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The Agricultural Gazette

of Canada

EDITOR: J. B. SPENCER, B.S.A.

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THE SCHOOL FAIR

BY W. J. BLACK, B.S.A., COMMISSIONER, THE AGRICULTURAL INSTRUCTION ACT

THE School Fair, although less than five years old in Canada, has shown a record of advancement seldom equalled by any new movement in education. During the year just closed eight hundred and seventy two fairs were held in the nine provinces of the Dominion. The vegetable products exhibited were from eighty-five thousand gardens planted and managed by boys and girls, mostly of school age, and one hundred and twenty thousand adults showed their interest in the efforts of the young people by attending the exhibitions.

The introduction of agriculture as a subject of study in elementary and high schools in Canada, marked a forward step in the evolution toward more practical and effective training for citizenship; the school fair represents an important stage in the progress of that evolution. The value of a movement so wide-spread, and so direct in its influence upon the training for service of those enjoying its benefits, no one can estimate. Perhaps no class of work carried on, as this is, under the provisions of THE AGRICULTURAL INSTRUCTION ACT will bear a richer harvest. If it be true, as generally agreed, that all human effort whether economic, social, political or educational is intended primarily and ultimately to aid in the preservation of life, it follows that teaching in any subject in order to be most directly effective must concern itself with conditions of living.

The school fair as the logical accompaniment of the school or home garden is educational in terms of life. It provides a fine demonstration showing what youthful intelligence and energy can accomplish when in combination with the great forces of nature. Teachers and departmental officials who are seeking to make more effective such agencies are deserving of commendation and the fullest possible measure of support. There is nothing truer than that Canada's future, in the next generation, depends largely upon the ideals and aspirations developing now in the hearts and minds of the boys and girls. The school fair if wisely directed and utilized within its proper sphere is sure to have a great influence for good in that development.

NOTE.—An account of how schools fairs were conducted in each of the provinces of Canada last year appears in Part III of this number.—EDITOR.

PART I

Dominion Department of Agriculture

INFORMATION SUPPLIED BY OFFICIALS OF THE VARIOUS BRANCHES REPRESENTED

INDEXING AND FILING PUBLICATIONS

THE EXPERIMENTAL FARMS

THE DIVISION OF CHEMISTRY

BY FRANK T. SHUTT, M.A., D.SC., DOMINION CHEMIST

IN devising our system of filing none of the standard methods were used; our arrangements were made to suit our facilities and the publications in which this Division is particularly interested.

The bulletins are divided into four groups:—

1. General.
2. Those of the Bureau of Chemistry, Department of Agriculture, U.S.A.
3. Publications of the Bureaux of Plant Industry, Animal Industry and Soils.
4. Bulletins of the Inland Revenue Department.

The first two groups are filed in bulletin drawers which are divided to form two divisions. These divisions are all marked with a number e.g., 1, 2, 3, 4, 5, 6. These sub-divisions are again separated into A, B, C, D, each of these groups containing 50 bulletins. Thus a bulletin marked 2B10 would be the 10th publication in section B of the second half of the first drawer.

These bulletins are subject indexed, and, in each case where many publications are received from the same source, as the different State Agricultural Colleges, they are also numerically indexed.

In the case of the Bureau of Chemistry, we have the Library of Congress cards for this Bureau's publications. Where we have the bulletin corresponding to the card the place in the file is indicated on the corner such as 6A12.

The remaining two groups are filed in cases, fifty publications going to one case with subject and numerical indices.

THE DIVISION OF FORAGE PLANTS

BY M. O. MALTE, DOMINION AGROSTOLOGIST

AGRICULTURAL bulletins are being filed as they arrive, regardless of content, and each bulletin is given a number. A subject index is kept of the bulletins, and in addition an author's index is kept. Through the latter index, it is possible to keep track of the work published by specialists, and thus to follow, rather closely, the advancement of special investigations, and especially of those of a strictly technical nature requiring years to finish.

THE POULTRY DIVISION

BY F. C. ELFORD, DOMINION POULTRY HUSBANDMAN

IN the Poultry Division we have two systems of filing publications one with reference to bulletins and the other to catalogues. Bulletins are numbered consecutively as they arrive and are filed under three heads, author, subject and address. The catalogues are filed under subject only.

In our indexing, therefore, we use three cards for bulletins and one for catalogues. As a sample I shall take as a bulletin, Bulletin No. 87 of the Experimental Farms, "The Principles of Poultry House Construction." This bulletin bears the file number 500. For this we have three index cards, the first for the author, which reads as follows:—

F. C. Elford
The Principles of Poultry House Construction with General and Detailed Plans..... 500

The second, for the subject, reads as follows:—

The Principles of Poultry House Construction with General and Detailed Plans..... 500

and the third card, for the address:—

Ottawa, Department of Agriculture
The Principles of Poultry House Construction with General and Detailed Plans..... 500

Our catalogues are also numbered consecutively by subjects. For example, a catalogue on "Incubators and Brooders" would have a card bearing the title "Incubators and Brooders," with the name of the manufacturer, the address and the catalogue number.

The index cards are kept in drawers while the publications are filed in cabinets, and, as already stated, numbered consecutively.

THE DAIRY AND COLD STORAGE BRANCH

BY J. A. RUDDICK, COMMISSIONER

THE system of filing and indexing publications in this Branch is a very simple one. For a number of years we have followed the practice of card indexing bulletins and pamphlets as they come in, numbering them consecutively as they arrive and placing them in that order in a vertical filing cabinet of specified dimensions. The index cards are filed under subjects and titles. In order to look up a publication, we go direct to the sub-division, then to the title of the bulletin desired, which shows the office number of the publication wanted. This system works out fairly satisfactory. We are beginning to follow the plan of binding in volumes bulletins from all sources. These are classified according to the different divisions of the subject.

Books and reports are card indexed and numbered. A card index is made of articles in the dairy papers.

THE ENTOMOLOGICAL BRANCH

BY C. GORDON HEWITT, D.SC., F.R.S.C., DOMINION ENTOMOLOGIST

THE Entomological Branch maintains a library of books and publications devoted either entirely or partially to entomology and to some extent to economic zoology. The general and specific treatises, are arranged and grouped on the shelves of the library accord-

ing to subjects, for example; Lepidoptera, Diptera, Medical Entomology, etc. The periodicals, including entomological, Zoological, agricultural and general scientific journals and reports are arranged according to countries; this method is found to be very convenient. Bulletins of Agricultural Experiment Stations and similar publications are filed in cloth-covered pamphlet cases (open at the back) under the names of the states or countries by which they are issued. A large part of these are indexed on a card catalogue under subjects, and we have the entomological portion of the index to experiment station literature published by the United States Department of Agriculture. In the case of publications of Agricultural Experiment Stations only those dealing with insect pests, insecticides, spraying and kindred subjects are filed. When we receive bulletins on non-entomological subjects these are transferred to the Branch of the Department to whom they will be of most interest and value. The books are indexed under subject on cards furnished by the Commissioner of the International Institute of Agriculture to whom duplicates are sent. Miscellaneous scientific pamphlets and memoirs are filed in pamphlet cases, and are placed with the books treating of the subjects to which the pamphlets relate; for example, the cases containing the pamphlets on Lepidoptera or Medical Entomology are placed with the books relating to those subjects. When it is possible, pamphlets on the same subject are grouped either under the name of a single author or in another convenient manner, and are bound in one volume for convenience of handling and to preserve them; for example: Memoirs on Orthoptera by Scudder; Miscellaneous Entomological Papers of Leconte.

As the library forms a very essentia part of the equipment of the Entomological Branch much time and thought have been devoted to its creation and upkeep.

THE FRUIT BRANCH

BY H. H. SINCLAIR, LIBRARIAN

THE Card Index System is the style of filing and indexing publications adopted by the Fruit Branch of the Department of Agriculture.

Bulletins and pamphlets are numbered consecutively, irrespective of subject or serial number, and arranged in the filing cabinet in their numerical order.

In a separate tray, under subject, alphabetically arranged, are the index cards.

The subject matter of each bulletin and the number notated on the cover are placed on a card bearing the subject, title and the name of the state, province or county where published, together with the date of issue, and also the number of the serial issued by that state or county.

These cards representing the various states, counties, etc., are also arranged alphabetically.

Subjects are divided and redivided as occasion arises. For instance, take the subject "Apples." There will be a general leading card as "Apples," following alphabetically subheads of, say, "Disease," 'Insects," "Orchards" etc., and under these, alphabetically placed also, are the cards with the name and bulletin No. from the various states, etc., on that subject.

As regards annual reports, bound books on special subjects, volumes that will run in as series by the year, a sectional book case is used.

They are labelled with the numerals designating that particular book,

and, to have them uniform, a system has been adopted whereby the numbers 1 to 800 have been reserved for all such volumes.

Bulletins in leaflet and other forms run in consecutive series from 801 *ad infinitum*.

THE LIVE STOCK BRANCH

BY H. S. ARKELL, M.A., B.S.A., LIVE STOCK COMMISSIONER

AFTER considerable wading through the slough, a scheme for filing information was decided upon. The following is a brief description of the method used in the office. Subject cards are kept in alphabetical order and upon these cards is written the name of the bulletin, together with a reference number. Newspaper cuttings are kept on file, and they are included in the same card drawer as the bulletins, so that all printed information on any given subject can be discovered by simply looking up the subject card. The important subjects have a special card drawer in which sub-divisions of subjects is made as required. Cards of different colour are used to indicate the subdivision. For example, a special drawer is used for sheep, in it a red card denotes "Feeding," and the next red card is "Feeds"; sub-divisions between these two are signified by yellow cards as "Experimental," "Ewes," "Fattening," "Forests," "Lambs," "Rams," and "Range." Subject cards are 3″ x 5″. Bulletins are kept in numbered folders in drawers 8″ x 12″. Newspaper clippings are also placed in numbered folders in drawers 10″ x 14″. To save space, these bulletins are placed in one folder, whilst five or six, depending upon size, clippings occupy another folder. The bulletin cards are placed before the clipping cards in the sub-division. This is a sample bulletin card:—

Sheep
  Feeding
    Lambs
Sheep Feeding Experiments.
Report Expt. Sta. Lethbridge, Alta.
  Clipping No. 95 A

This is a newspaper clipping card:

Sheep
  Feeding
    Lambs
Raising Lambs in the Corn Belt.
  Clipping No. 483 A

THE INTERNATIONAL INSTITUTE BRANCH

BY MISS A. L. SHAW, B.A., LIBRARIAN

THE publications in the library of the Commissioner of the International Agricultural Institute, West Block, Ottawa, are classified by the Decimal System, using for agriculture the expansion of the Institut International de Bibliographie translated into English and used by the Board of Agriculture and Fisheries, London, England. This is the classification adopted by the Library of the International Agricultural Institute, Rome, Italy, and applied in the Bulletin Bibliographique Hebdomadaire, a weekly record of their accessions.

By this system all books and pamphlets on the same subject are placed together on the shelves. For example, we have sections for bibliography, statistics, agricultural credit, co-operation, laws, chemistry, botany, series of agricultural bulletins, reports of agricultural departments, proceedings of agricultural societies, soils, live stock, etc. Books and

pamphlets are placed beside each other on shelves, keeping the latter in pamphlet boxes and individual binders.

A DEPOSITORY CATALOGUE

We have a depository catalogue for agriculture received currently from the Library of Congress which includes secondary entries. This gives us a complete list of all the U.S. Federal documents on agriculture, all books on agriculture having American copyright, all other modern agricultural publications in English and foreign languages, purchased or received, by the Library of Congress and the Library of the U. S. Dept. of Agriculture, constituting altogether a practically complete bibliography of agriculture for the 20th Century. The Experiment Station card catalogue covers the publications of the Agricultural Experiment Stations. All that is necessary in dealing with the publications of the U.S. Dept. of Agriculture and those of the Experimental Stations is to file them by series and the corresponding catalogue cards when received. The only series of Canadian agricultural bulletins for which cards may be obtained from the Library of Congress are the bulletins of the Live Stock Branch, Ottawa, and those of the British Columbia Dept. of Agriculture. The following will illustrate both the cards and the system adopted:—

Canada. *Dept. of Agriculture.*
...Grain screenings, by John R. Dymond... with Results of feeding experiments, by E. S. Archibald ...and F. C. Elford...Ottawa, 1915.

44 p. 45cm.
At head of title: Dominion of Canada. Department of agriculture.

1. [Grain screenings]. I. Archibald, E. S. II. Dymond John R. III. Elford, F. C.

Agr 15-1355

Library, U.S. Dept. of Agriculture 59C167

Spencer, James Burns,
...The Maple Sugar Industry in Canada.... Ottawa, Government Printing Bureau, 1913.

64 p. incl. 2 front. (1 col.) illus. 25½cm. (Canada. Dept. of Agriculture. Bulletin no. 2B)

1. Maple sirup. 2. Maple sugar.

Agr 14-253

Library, U.S. Dept. of Agriculture 7C16B no. 2B

The others are catalogued by ourselves under author, subject and series. The entire catalogue now numbers 165,000 cards, and is the only one of its kind in Canada. Without it, we could not make use of the 35,000 publications in the library.

In regard to pamphlet material of minor importance the publication is simply put in a pamphlet box, and

no entry is made in the catalogue other than a subject card referring to the pamphlet box of uncatalogued material, e.g., canning and preserving, miscellaneous pamphlets, etc.

Entries are made in the catalogue for all publications purchased by the Department of Agriculture for any Branch.

ANNUAL REPORTS, ETC.

Annual reports are checked and kept up-to-date by a card index referring to them by the month in which each new issue should be received, e.g., under "Annual—January" would come cards referring to such reports as are likely to be received during January. If they do not come to hand at that time, it is easy to follow them up with a card of request. Each time a post card is sent out a Graffco Vise Signal is put on the "Annual" card in order to check it the following month without necessitating going over the entire index. The same system is used for following up periodicals. We take practically all indexed in *The Agricultural Index*, some important ones from England and France, and try to obtain all Agricultural publications issued by various Governments.

Series of bulletins appearing irregularly are entered under country, province, state, etc., in a loose-leaved book by number only and are checked currently by means of the lists of new publications published in THE AGRICULTURAL GAZETTE, *The Canada Gazette*, the Monthly List of State Publications, etc.

THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF APICULTURE

PRACTICAL MEANS FOR INCREASING HONEY PRODUCTION

BY F. W. L. SLADEN, DOMINION APIARIST

WE owe it to ourselves and to the nation to prepare to produce as much honey as we can in 1918 and 1919.

The principal factor will be the weather, but we can do our part.

We can produce extracted honey in place of comb honey. During the past two years the price of extracted honey has risen to a greater extent than the price of comb honey, and extracted honey production is now decidedly more profitable for most bee-keepers. Two comb-honey supers fastened together will make a deep super for extracted honey.

Bee-keepers who are also farmers may give preference to alsike over red clover in a mixture with timothy sown for hay, and to alsike and white clover for pasture. When the alsike and timothy are ready for cutting, red clover has passed its best, and late cutting will not lessen the value of alsike hay as much as that of red clover. The growing of alsike for seed and the pasturing of white clover will lengthen the clover honey flow.

The growing of more buckwheat in parts of the St. Lawrence Valley above the city of Quebec and in the south-western part of the province, would be of service.

Caution should be exercised in sowing sweet clover. It does not produce so much honey in Canada as in some regions of the United States, and its honey is liable to overpower the delicate flavour of the pure clover honey which is produced in many parts of the province of Quebec.

The indifferent season of 1917 has shown that some parts of the St. Lawrence Valley are over-stocked

with bees. In an over-stocked district much feeding is needed in June if the weather is unfavourable, and this will be very costly this year. The remedy is to move the apiary to one of the many clover locations where insufficient bees are now kept. Last year I visited the farming country around Lake St. John, and found it very good for clover production; a large yield per colony of excellent white clover honey was also being produced at Chicoutimi. The fear that the winter in that country is too long and cold for bees is groundless. With good winter stores consisting almost exclusively of clover honey the bees winter well even out-of-doors.

The more enterprising bee-keepers may try a location in which fireweed (*Epilobium angustifolium*), the chief honey plant of the north, abounds. This plant begins to yield honey about a week later than clover, and the honey flow lasts for six or seven weeks, whereas the honey flow from clover lasts only three or four weeks. I saw, this year, a vast tract of fireweed between Lake Edward and Kiskisink Stations on the Quebec and the St. John Railway, the result of forest fires that took place several years ago, but it was getting choked w th other plants. It appears that those who depend on fireweed for honey production will have to move to a new location every few years, or will have to burn over the fireweed lands periodically. Fireweed is usually scarce the first year after a fire, but, spreading by its creeping roots, it becomes abundant the second year in moist rich ground, and usually continues plentiful for several years. A light fire does not kill the roots, but promotes their growth. We are starting an experiment of burning a plot of fireweed periodically near Chelsea, Que., in order to see whether a good stand of the plant can be maintained by this means.

If our colonies are very strong in early spring, it will sometimes pay to divide them not less than seven weeks before the honey flow, provided one has a fertile queen ready to introduce to the queenless half. For the present let us take care to protect the bees wintered outside with plenty of packing material around the hives, and place the hives in cases, preferably holding two or four hives each. Above all, protect the hives from winds in winter and early spring by means of windbreaks and fences or evergreens. If any colonies are likely to use up their stores before they can be examined, one may lay a cake of candy or a frame of honey-in-the-comb over the frames in early spring. To keep wax moths from damaging empty combs, which are the extracted-honey producer's most valuable possession, they should be kept in an out-house exposed to zero weather, and carefully protected from mice.

EFFORTS TO INCREASE HOG PRODUCTION

BY J. H. GRISDALE, B.AGR., DIRECTOR

THE Experimental Farms system is making every effort to encourage an increased production of hogs. At the Ottawa Farm we have now 60 brood sows, and have over 1000 brood sows on all the Farms and Stations. At the Lacombe Station, where swine breeding is being gone into very extensively, we have now on hand 700 hogs, and have already marketed several carloads of finished hogs as well.

At the Experimental Stations at Cap Rouge, Ste. Anne and Lennoxville, in addition to our own work with swine, we are arranging to winter 100 sows altogether for the Quebec Department, in order to aid them in their effort to stimulate swine breeding in the province of Quebec.

THE ENTOMOLOGICAL BRANCH

THE BLACK CHERRY APHIS

BY WILLIAM A. ROSS, DOMINION ENTOMOLOGICAL LABORATORY, VINELAND STATION, ONT.

THE experiments, on which the following paper is based, were carried on during the past season at the Dominion Entomological Laboratory, Vineland Station, Ontario.

HISTORY

The black cherry aphis has long been known in Europe and North America as a pest of cherry trees. On this side of the Atlantic the species was first recorded in 1851 by Dr. Asa Fitch (Cat. Homopt. N.Y. 65, 1851). What is probably the first reference to the aphis in Canadian literature is contained in Dr. Fletcher's Report of the Entomologist, 1885. Mention is merely made of the occurrence of aphids on young cherry trees at Victoria, V.I.—no name or description is given. In the Entomologist's report for 1897, Dr. Fletcher gives the following interesting observations made by the Hon. Martin Burrell, at that time living near St. Catharines, Ontario.

"The principal damage has been done by the cherry aphis, *Myzus cerasi* Fab., whose attacks on the sweet cherry of this Peninsula (Niagara) were simply disastrous. I do not think I should be overshooting the mark if I said that half of the crop was ruined. I saw many cases where not only the foliage was covered, but even the fruit, and especially the stalks, with lice."

FIG. I.—CHERRY TREE ATTACKED BY *MYZUS CERASI*. NOTE WITHERED TIPS OF TWIGS. (Original)

HABITS AND DEPREDATIONS

The cherry aphis is primarily a pest of the sweet cherry. It occurs on, but, so far as I am aware, is never destructive to, the sour cherry.

The aphis feeds on the buds and tender foliage, and it may even attack the blossoms and fruit, especially the stems. Infested leaves become tightly curled and when badly attacked, turn brown and die. One observer speaks of aphis infested leaves "looking as though they had been scorched by fire." The fruit may also be seriously damaged. During the summer of 1915, there was an outbreak of cherry aphis in the Niagara District, and in a Vineland orchard the fruit was so badly injured that most of it

was left on the trees. The cherries were small, ripened irregularly and many of them were covered with honey-dew and black honey-dew fungus.

LIFE HISTORY

The Egg.—The minute, oval-shaped eggs (.68 mm. x .32 mm.) are deposited around the buds and on the rough bark of twigs and branches in the fall. They commence to hatch early in spring when the buds are swelling. In a cherry orchard (situated on the lake shore) which we had under observation during the past season, the period of hatching extended from the 17th to the 24th of April. All the eggs hatched at least nineteen days before the buds burst.

FIG. II.—CONDITION OF INFESTED FOLIAGE, SHORTLY AFTER FRUIT IS SET. (Original)

The Stem Mother.—The newly hatched, dark green stem mothers migrate to and settle on the buds where they feed on the green tissue. Later on, they attack the tender leaves and blossom buds. They reach maturity in four or five weeks and commence within a day or two to give birth to living young. Each individual may produce about 150 young.

Summer Forms on Cherry.—The progeny of the stem mothers develop into wingless forms. This generation is then followed by brood after brood of wingless and winged aphids. The winged lice leave the cherry and migrate to an alternate host plant. The apterous forms on the other hand remain on cherry and may be found on this tree from spring till late autumn. During the early part of the season they are very common, but as the summer wears along they diminish in numbers. This decrease is due to the production of migrants, to the effective work of the predacious enemies, and also to the drying up of the affected foliage.

Migration of the Species.—The winged or alate aphids, already referred to, develop during a period extending from mid-June to the middle or latter part of August. As nothing was previously known concerning the fate of these forms, this matter was carefully investigated during the past season, and the discovery was made that the aphids migrate to Wild Pepper-grass, *Lepidium apetalum**, where they establish colonies of wingless lice.

*Our migratory experiments suggest that other crucifers, e.g., Common Mustard, Wormseed Mustard and Shepherd's Purse, may serve as secondary host plants.

Autumn Forms.—In early autumn, migrant aphids are produced on Wild Peppergrass and return to the cherry where they deposit the egg-laying females. At the same time, the colonies on cherry trees give rise to large numbers of winged forms, which also give birth to egg-laying females. In other words, the sexupara—the mother of the sexual female—is produced on both the secondary and primary hosts.

FIG. III.—BLACK CHERRY APHIS, *M. CERASI*; WINGLESS FORMS; MUCH ENLARGED. (Original)

Early in October, winged males appear on the secondary host plant and fly back to the cherry where they mate with the oviparous females.

No males are produced on the cherry. This means that in spite of the pronounced tendency of the black cherry aphis to live a monophagous life on cherry, the completion of its life cycle is still dependent on the existence of a secondary host.

Control.—The cherry aphis is most vulnerable early in spring just before the buds break. At this time, all the eggs have hatched and the young stem mothers, feeding on the buds, are absolutely without protection. Thorough spraying at this stage with a good aphidicide, such as "Black Leaf 40," will destroy practically all the lice.

In orchard practice, the most economical method of applying this remedy is to delay the so-called dormant spray until just before the buds break and then combine "Black Leaf 40" with the lime sulphur wash.

The application of "Black Leaf 40" combined with lime sulphur or Bordeaux mixture and arsenate of lead at the time of the second regular spray, i.e., soon after the fruit is set, is sometimes recommended, but it is very questionable if this treat-

FIG. IV.—*M. CERASI* ON WILD PEPPERGRASS. (Original)

ment is at all effective, because at this stage many of the aphids are well protected by curled leaves. (See Fig. 2.)

FIG. V.—STAGE OF GROWTH AT WHICH SPRAY SHOULD BE APPLIED FOR CONTROL OF *M. CERASI*

THE DOMINION ENTOMOLOGIST HONOURED IN ENGLAND

DR. C. GORDON HEWITT, F. R.S.C., Dominion Entomologist and Consulting Zoologist, of the Department of Agriculture, Ottawa, has been awarded the Gold Medal of the Royal Society for the Protection of Birds, and at the same time was elected an Honorary Fellow of the Society "in recognition of eminent services to the cause of bird protection" in England and Canada. There are but eleven other honorary fellows of the Society in different parts of the world.

THE LIVE STOCK BRANCH

A FEED DIVISION ESTABLISHED—THE METHOD OF WORKING

IN accordance with resolutions passed by the hog production conventions and representatives from the Eastern and Western Provinces respectively, a feed division, under the title of the Bureau of Feed Purchase and Distribution, has been established within the Live Stock Branch of the Dominion Department of Agriculture, and Mr. R. J. Allen, B.S.A., an expert on the subject has been placed in charge. As has been previously stated, an arrangement has been entered into between the Live Stock Branch and the Food Controller towards assisting farmers in securing feed for their stock. The price of bran and shorts has been definitely set by the Food Controller, and the embargo against export has been made practically absolute until the requirements of Canadian feeders are satisfactorily filled. Millers in applying for permit to export feed are required to state price and submit sample to the Food Controller by whom the application is referred to Mr. Allan, after which the sale will be subject to that official's refusal at the price named. If Mr. Allan is prepared to accept the feed at the price, he takes it over and arranges for its disposal in accordance with an agreement with the Provincial Departments of Agriculture, who have consented to constitute themselves the medium through which orders within their own territory shall be received. The Provincial Departments also guarantee the solvency of the consignee.

In addition to the quality of the mill feeds that is sold through this channel, screenings from the elevators, now to be known as standard stock food, of which the Federal Live Stock Branch through contract negotiated by the Hon. Mr. Crerar has purchased the whole output, will be offered to farmers in the same manner. It is probable that a considerable amount of the feed will also be imported, purchased and sold by the Branch.

During the week ending December 8th the Ontario Department of Agriculture placed upwards of thirty cars of feed all from one mill. The transaction was carried out through the Co-operative Branch in communication with the offices of the District Representatives. The latter were advised at the beginning of the week that feed would likely be available and commenced at once to record orders. They were consequently ready to take advantage of the situation as soon as the feed was offered for sale.

As a result of the policy that has been adopted, *The Canadian Food Bulletin* of December 14th was able to state that no less than 140 carloads of bran and shorts which would otherwise have been exported to the United States were made available for Canadian farmers in a single week. As *The Bulletin* suggests the refusal of a license to export, if it can be proved that the feed can be sold for the same price in Canada as in the United States, will be an important factor in providing supplies for farmers who have responded to the call for an increased production of hogs.

THE SEED BRANCH

SCIENCE AND SEED TESTING

BY J. R. DYMOND, B.A., SEED ANALYST

THE object of seed testing is to determine before hand, as nearly as possible, the productivity of a given lot of seed. Thorough scientific research that will enable us to state with certainty the value in crop production of the various qualities of seed is essential before we can realise the maximum returns.

In crop production there are some factors,—climatic conditions for instance, which are unforeseeable and beyond man's control; there are others, such as the fertility and mechanical condition of the soil, which are only partially within our power to change; but in the seed used, we have a very important factor which is almost, or entirely, within the grower's control.

The preparation and seeding of a field of grain represents a considerable investment in money and labour. This investment is converted into a total loss if non-vital or otherwise unsuitable seed is used.

Some of the qualities of seed which influence the value of the crop are its vitality, variety, origin, purity and freedom from disease.

VITALITY

Vitality may be defined as the ability of a lot of seed to produce strong vigourous plants. This is usually the result of a combination of qualities such as (a) percentage of vital seeds, (b) energy of germination, (c) amount of food material stored in the seed. The percentage of vital seeds may be determined by placing a known number of seeds under conditions most favourable to their germination. That the information thus gained does not go far enough is shown by the fact that some seeds that germinate produce seedlings too weak to survive under natural conditions, while others grow into strong plants even under unfavourable conditions. Both sorts are vital, but the latter possess more vital energy or energy of germination. The accurate measurement of this quality of seeds has not yet been successfully or seriously studied. Some work on this subject has lately been undertaken in our laboratory. These two qual ties, percentage vitality and energy of germination, are the result of the interaction of many varied causes—(1) the age of the seed, (2) atmospheric conditions of temperature and moisture under which seeds are stored, (3) moisture content of stored seeds, (4) maturity, (5) mechanical injury or disease.

The amount of food material stored in the seed by the mother plant, and available to the little seedling while it is developing roots and leaves in preparation for its own support, is often a deciding factor in determining the vigour of the plant.

The extent of the contribution of each of these factors, and perhaps others, to the vigour of a seedling under given conditions, are subjects which will require research of the most thorough and painstaking kind.

VARIETY

Variety is recognized as one of the most important factors in crop production. The use of the Marquis variety of wheat, instead of the varieties previously grown by the grain growers of Western Canada, has

increased our wealth by millions of dollars. For every crop there is a variety which is better suited than any other for a particular set of conditions. Hand in hand with scientific work to originate improved varieties, there should be carried on researches to devise means of distinguishing the seeds of nearly related sorts so that one might assure himself before sowing the seed that the crop was going to be of the variety he desired to grow. Our normal supply of winter rape has been practically cut off since the war started, and much of the seed imported lately has been of varieties not suited for forage production. A method of distinguishing these varieties would be of considerable monetary value to the country, as would also means of distinguishing the seed of variegated alfalfa from that of the common variety. Many similar cases will readily occur to one familiar with the importance of variety in crop production.

ORIGIN

The origin, or place of growth, of seed is an important consideration often more or less closely connected with the question of variety. One of the objections to using seed grown under conditions widely different from those under which the seed is to be sown, is that the varieties are commonly not those best suited for the districts into which the seed is brought. Even when the varieties grown in the two localities are indistinguishable from the botanical point of view, it is usually best to use seed produced under conditions not too dissimilar to those under which the crop is to be grown. Therefore Dakota, Montana and Minnesota alfalfa seeds are better for Canadian conditions than Oklahoma or Kansas seeds, and red clover seed grown in northern Ontario produces plants capable of withstanding our severe winters better than seed grown much farther south.

In most kinds of crops the place of growth of the seed has a far-reaching influence on the nature of the crop, and so it is certain that some day the study of the origin of seed will be a science in itself. Then the accurate determination of this important factor will be in strong contrast to our present haphazard methods.

PURITY

Purity, or the freedom of a lot of seed from weed seeds, other crop seeds, and inert matter, is at present the only quality of seed capable of exact determination. There is, however, still much need for scientific investigation in bulking, sampling and testing in connection with the enforcement of seed control laws.

SEED-BORNE DISEASES

Seed-borne diseases account for enormous losses in our annual yields. Smut is one of the few such diseases that has thus far received any considerable attention, but it is likely that in the future the control of seed-borne diseases will contribute very largely to increased crop production.

WEED CONTROL

Weed control is another important method of increasing the output and value of our crops. The weed seeds which occur as impurities in the grain and grass and clover seeds produced in Canada, besides increasing considerably the cost of production and handling, depreciate the value of the crop by millions of dollars. A large proportion of the weeds responsible for these losses are annual plants propagated entirely by seeds. The investigation of the seeding habits of these weeds and of the behaviour of their seeds in different kinds of soil under various climatic conditions and cropping systems, is of immense importance in itself. It is in connection with the investigation of these matters that the largest amount of scientific study of the behaviour of seeds has up to the present been

undertaken. This is pioneer work in a field from which results of immense value will come. Among the problems which have been or are now being studied are the causes of delayed germination, and the factors influencing longevity of seeds. The seeds of many of our commonly cultivated plants will grow almost, if not quite as well as soon as they ripen, as they will after being stored through the winter, but in the case of a large number of plants the seeds cannot be induced to grow under natural conditions until some time after ripening. In the case of wild oats, seeds which ripen and fall to the ground during the summer do not germinate as do the seeds of ordinary cultivated oats. It is in this delay in their germination that the weed character of the wild oats consists. W. M. Atwood,* working in the Botanical Laboratories, University of Chicago, investigated the cause of this delay in germination and attributes it to a restriction of the oxygen supply due to the seed coat. When the seed coats were pricked or broken the seeds germinated quite readily, even when freshly ripened.

IMPERMEABLE OR HARD SEEDS

Many species of plants, especially in the Leguminosæ family, produce "impermeable" or "hard" seeds. Such seeds do not absorb water, and germinate as ordinary viable seeds do when placed under temperature and moisture conditions favourable to germination. This impermeability is due to something in the seed coat which excludes water, for when the seed coat is scratched the seed readily absorbs water and germinates. Germination of impermeable seeds is brought about naturally by freezing and thawing, scratching of the seed coat by contact with the soil, and by various other means which render the seed permeable to water. Hard-seededness or impermeability is a device of the plant for guarding the vitality of the seed, for dry seeds retain their vitality much longer than seeds containing much moisture. Harrington‡ states that "impermeable seeds frequently retain their vitality for many years, sometimes for at least as many as 80 years."

In a recent article on the loss of vitality of seeds Crocker and Groves,† suggest that loss of vitality in seeds approaching air-dry condition is due to the slow denaturing, or coagulation, of certain protoplasmic proteins of the embryo. Their work "shows possibilities of throwing light on the nature of the process of loss of viability in seeds and of leading to a quantitative statement of the significance of various storage conditions (especially moisture content and temperature) upon the longevity of seeds."

* Bot. Gaz. 57 (1914) No. 5, 386-414.
‡ Jour. of Agric. Research, U.S. Dept. of Agric. 4 (1916) No. 4, 761-796
† Proc. Nat. Acad. Sci. Vol. 1 p. 152—March 1915.

THE DAIRY AND COLD STORAGE BRANCH

THE APPLICATION OF REFRIGERATION TO FOOD

MR. J. A. Ruddick, Dairy and Cold Storage Commissioner for Canada, has been authorized by the Honourable, the Minister of Agriculture, to act on a Commission on the Application of Refrigeration to Food. This is an United States organization, whose chief object is to study the whole question of refrigeration as applied to food and to co-operate with the Food Administration. Mr. Ruddick's departmental duties, which include a large amount of work for the Imperial war office, will not permit of his giving much time to the work of the commission, the scope of which is confined to the United States.

THE HEALTH OF ANIMALS BRANCH

SHEEP SCAB, ITS HISTORY AND CAUSE

BY A. E. MOORE, D.V.S., CHIEF TRAVELLING INSPECTOR

SHEEP scab, or as it is more properly called "Scabies in sheep," is an extremely contagious disease. It is caused by a small animal parasite, which lives on the skin of the animal and is known as a "mite," technically called *"Psorophtes Communis."* These mites are about (1–50) one-fiftieth of an inch long. They reproduce by laying eggs and multiply very rapidly; millions may be produced from a single pair in only a few days.

The disease has been known for ages, and has caused great losses in the sheep industry of nearly every country. When allowed to spread, sheep scab causes losses, first, in the production of wool, which is generally decreased and of poor quality. Second, shrinkage in mutton and lamb production, owing to the initiation of the disease causing an unthrifty condition of the animal and loss of weight. Third, death, sometimes in large numbers if treatment is not applied.

Although this disease is an extremely disastrous one and highly contagious it can easily be cured if the proper treatment is applied.

SYMPTOMS

When the mite first becomes attached to the sheep it begins to feed by sucking the blood or lymph from the skin. It is generally supposed that its saliva is poisonous; at any rate the bite produces redness and great irritation of the skin. As this goes on an oozing of the lymph takes place and finally as the mites become numerous this lymph with other foreign matter of the skin collects and produces scabs or crusts. When this stage is reached the wool begins to fall out, especially in patches on the shoulders, sides and back. The first symptom noticed is that of itching. The animal becomes restless, rubs against objects, scratches with its hind feet, and pulls tufts of wool from the sides and back with its mouth. If the skin is scratched by the hand the sheep makes a peculiar champing motion with its lips and jaws, evincing extreme satisfaction.

As the disease advances large areas of wool fall out; the scabs become thick, often crack and bleed, and many of the animals may die.

In the early stages it is sometimes difficult to positively diagnose sheep scab, as lice, ticks and other conditions of the skin often produce intense itching and sometimes loss of wool. An examination under the microscope of scrapings from the skin in these cases, however, will fail to reveal the mites or their eggs.

As the mites of sheep scab live on the surface of the skin, a close examination of scrapings containing scabs and tufts of wool will usually reveal the insects or their eggs.

TREATMENT

As sheep scab is purely an affection of the skin, the only treatment consists of an external application which will kill the mite.

There are numerous dips used, but the most effective and the one adopted by this Department as the official dip consists of lime and sulphur and is made as follows:—

To make 100 gallons of dip, weigh carefully

10 pounds of unslaked lime and

24 pounds of flowers of sulphur. The lime is first slaked in enough water to make a paste; the sulphur is then added to this and thoroughly mixed to the consistency of mortar. Place this lime and sulphur mixture into 30 gallons of boiling water and boil for three hours, adding water as it boils away to keep the proportion the same. Keep stirring this mixture while it is boiling until the sulphur is all dissolved. After it has boiled for three hours allow the mixture to settle. Then carefully pour off the dark chocolate coloured fluid. Measure it and add enough warm water to make 100 gallons. Do not use the sediment as it is injurious to the sheep. If a large amount of dip is needed the same proportions of lime and sulphur are used, but in larger quantities.

There are many different kinds of vats for dipping sheep, from large cement swimming tanks which are used by the ranchers to portable tanks large enough to submerge one or two sheep at a time, and used by small sheep growers.

Detailed plans for vats or tanks will be supplied by the Veterinary Director General.

DIPPING

Dipping consists in completely immersing the sheep in the dip, either by swimming them through vats or holding them in smaller tanks.

In dipping sheep the following directions should be strictly followed:—

1st. The sheep should be clipped.

2nd. The dip must be kept warm, from 100° F. to 105° F.

3rd. The sheep must remain in the dip, completely covered, except the head, for at least two minutes (by the watch).

Care should be taken in handling the animals and the dip should not be allowed to enter the nostrils. When it is time to take the sheep out, place the hand over the nostrils and quickly plunge the head under. Then remove the anima and place on a draining board which should be so arranged that the drippings will flow back into the tank.

As the first dipping only kills the live mites, this treatment should be repeated in from ten to fourteen days. During this interval the eggs which are on the animal have hatched, but the new mites are not mature enough to lay eggs and the second dipping will kill them, and the sheep will be completely cured. In a few very bad cases where the crusts are very thick a third dipping is sometimes advisable. All contact sheep, whether they show any symtoms or not, should be twice dipped.

CLEANSING AND DISINFECTION

Although the mite of sheep scab is unable to propagate except on the skin of sheep, it will live for some time on fences or with objects with which diseased sheep have come in contact. All pens and yards that have been occupied by scabby sheep are therefore infected, as tags of wool, straw or litter may harbour the mites and eggs.

Immediately after the first dipping the manure from all infected pens should be removed and ploughed under, and all pieces of wool and litter collected and burned. Every place occupied by diseased sheep and where they have rubbed should be thoroughly cleansed and disinfected and then whitewashed. The dip that is left over from the first dipping may be used to some extent for disinfecting the premises, but should not on any account be kept over to be used for the second dipping, as it soon spoils.

After the second dipping the pens should again be disinfected, and it is always advisable, if at all posible, to at once remove the sheep to new quarters which have never been occupied by sheep. All the infected pens and yards should be fully exposed to the sunlight, as the sun is one of the best destroyers of the mite.

THE CONTROL OF SHEEP SCAB IN CANADA

The disease has never existed to any alarming extent in Canada, but in the years 1907 and 1908 sheep scab was quite prevalent in Western Ontario. Inspectors of this Branch were constantly finding the disease, which nearly always traced to shipments from the Toronto Stock Yards. We located the origin of these shipments, and, after a great deal of investigating, finally found the centres of infection.

The diseased sheep, and all those in contact, were quarantined and twice dipped in lime and sulphur, and the premises thoroughly cleansed and disinfected. This work was done under the personal supervision of the inspector.

A general inspection of all the sheep in the infected counties was made, which resulted in our finding some scattered cases.

Two years later quite an extensive outbreak was discovered in the Province of Quebec. This was dealt with as above, and I am pleased to say that our work has proved entirely satisfactory. From that date to this, not one case of sheep scab has been found in any of the Eastern Provinces.

As sheep scab is one of the diseases dealt with by this Department, owners of sheep who suspect the disease should at once notify the Government and an inspector will be sent to investigate. If the disease proves to be scab, the inspector will give all assistance possible to secure its eradication.

THE FRUIT BRANCH

PLAN TO CONSERVE CARS

A far-reaching plan designed by the railroads, the Transportation Division of the Fruit Branch and the food administration to conserve railway equipment and foodstuffs, has been in effect for some time.

Railroads entering Montreal and Toronto and a few other central distributing centres report regularly to Mr. G. E. McIntosh, Traffic Officer for the Fruit and Vegetable Committee, and in charge of fruit transportation, Department of Agriculture, every car of fruit, vegetable and other perishable foodstuffs which has been delayed 72 hours and over, either awaiting unloading or reconsignment or other disposition. In all cases reported by the railroads of undue detention of cars loaded, an effort is made to fix the responsibility and then take such steps as may be necessary to remedy conditions and prevent a recurrence by the offenders.

The chief results which it is believed the new plan will accomplish are: the prompt unloading of cars containing perishable foodstuffs; the prevention of waste or loss of foodstuffs through deterioration because of undue detention in cars; the prevention of similar loss at shipping points because of lack of transportation facilities, owing to the undue detention elsewhere of loaded cars of perishable foodstuffs, and an increase in the amount of railway cars available for moving foodstuffs and other commodities necessary for the public welfare. During the short time this plan has been made effective, absolute proof has been given that many cars are held by small dealers for storage purposes, while producers have been unable to move perishable products because of a car shortage.

PART II

Provincial Departments of Agriculture

THE INDEXING AND FILING OF PUBLICATIONS

NOVA SCOTIA

THE COLLEGE OF AGRICULTURE

BY MISS MARGARET M. CALDWELL, LIBRARIAN

IN the filing of agricultural publications we use the Dewey Decimal System, the same as we use for library books. The publications are filed under subject rather than source. As far as the arrangement under the different subjects is concerned, we file alphabetically under the different provinces or countries and do not take the name of the author into consideration.

ONTARIO

THE AGRICULTURAL COLLEGE

BY MISS JACQUETTA GARDINER, LIBRARIAN, MASSEY LIBRARY

THE subject of classification and indexing is one that no doubt has troubled the mind of man since the beginning of time,—and of woman. And some of us have had wonderful schemes in our minds, truly brilliant ideas which worked out as well as those of the old woman who determined to classify her pies. Some she marked "T.M." ('Tis Mince) and the others "T.M." (T'aint Mince), and believed that she had solved the problem forever.

However, there are several things which go to simplify one's task in the filing and indexing of agricultural publicat ons. One is the manner in which these are issued; whether they come in uniform sizes and can be bound or kept in folders, or are found in all sizes and forms. Another is whether or not the pamphlets are issued in any kind of order; some having numbers and some without; each division of a Department starting a new series of numbers, and then later on discontinuing their publication, etc. The U.S.D.A. publications are very satisfactory.

In Massey Library the following plan is followed:—

U.S. AGRICULTURAL PUBLICATIONS ARRANGEMENT

Current Numbers.—The current numbers of the various U.S. Experiment Stations and the U.S. Department of Agriculture Bulletins and circulars are entered in a loose-leaf book kept for that purpose, each Station or Division having its own

place in the book, and the bulletins and circulars of that particular Station being kept on separate pages.

Sometimes these come irregularly, and in order to have the pages of our book neat and uniform in appearance, spaces are left to be filled in when the tardy ones appear. For our own convenience, the date when the pamphlet arrives is added to the end of the line. A sample page from our Bulletin Entry Book would read thus:

CALIFORNIA BULLETINS

275. Cultivation of belladonna in California.....Dec. 1916
276. .....
277. Sudan grass.....Mar. '17
278. Grain sorghums.....Apr. '17
279. Irrigation of rice in California.....May '17
280. .....
281. Control of the gopher.....Je. '17

Then these current numbers are arranged with previous numbers in our Lang Document File, a vertical filing case containing 90 drawers, and having the name of each Experiment Station or Division of the U.S.D.A. indicated on the drawers. The bulletins and circulars of each Station are kept in the same file, their numbers running consecutively.

When all the numbers are complete and enough have come to make a volume uniform with the previous ones, they are bound, numbers still in consecutive order. Each volume has the name of the Experiment Station or whatever it is, stamped on the back, and the number of bulletins contained therein, thus:

CALIFORNIA
Bulletins
1-75

These bound volumes are then placed on the shelves, the States being arranged alphabetically.

As each volume is placed on the shelves, its number is added to a card in our general library card index, rather than make a new card for each volume. The latest date or number is added in pencil, then the next year one erases the previous number and adds the new one, thus:—

630.5 Connecticut, Storrs.–Agric. Exper. Station
C75s Bulletins. 1888-1912 nos. 1-74
il. Storrs, 1888-1912

630.5 U.S.–Entomology, Bureau of.
U5eat Bulletins. 1895-'97 Technical ser. 1-7
il. Wash. Gov't print, 1895-'97

NOTE.—Sometimes two series may be added to a card, as above: especially if they are in the same Vol. They are better bound separately.

These cards in our general catalogue are merely to indicate what numbers we have. For the Bulletin Index, we received the printed catalogue cards from the Library of Congress and the U.S. Dept. of Agriculture at Washington. *The Library of Congress Cards* are filed in their own cabinets; subjects, authors and titles all together arranged alphabetically exactly as in a dictionary. When a certain publication is asked for, looked up in the index under the subject or author, it is a

very simple matter on finding the number indicated on the card to locate the bulletin either among the bound volumes on the shelves, or among the current numbers in the vertical file. Here is a most satisfactory catalogue card for U.S. Dept. of Agriculture publications:—

Cattle tick.

Graybill, Harry W.

...Methods of exterminating Texas-fever tick. By H. W. Graybill... Washington, Govt. print. off., 1912.

42 p. illus. (incl. map, plans) 23cm. (U.S. Dept. of agriculture. Farmers' bulletin 498)

Revision of Farmers' bulletin 378.

1. Texas fever. 2. Cattle tick.

Agr. 12-1199

Library, U.S. Dept. of Agriculture 1Ag84F no. 498

The cards for the Experiment Station publications are arranged under the scheme supplied by the U.S. Office of Experiment Stations, Washington, D.C., as follows:—

3.1

Soil Survey of Winnebago County, Illinois.—C. G. Hopkins

Illinois Soil Report No. 12, Jan., 1916, pp. 76, pls. 2, figs. 7 (E. S. R., vol. 35, p. 421).

A detailed soil survey, with soil map, is reported of Winnebago County, which is located in northern Illinois in the Iowan and pre-Iowan glaciations and is covered with a deposit of drift, loess, and alluvial material.

It s more difficult to locate what one wants in this file.

The *Reports of the various U.S. Experiment Stations*, State Departments of Agriculture, etc., are arranged on the shelves in separate groups in alphabetical order, each group having the years running consecutively. These are catalogued in our general catalogue thus:—

630.5 U.S.–Experiment Stations, Office of.
U5er Experiment station record. 1889-'16.
v.1-35 Wash. Govt. print.
630.5 U5es ———— Index to v.1-25.

630.5 U.S.–Agriculture, Dep't. of.
U5r Reports. 1897'13. nos. 57-98
il. Wash. 1897'13

630.5 U.S.–Agriculture, Dep't. of.
U5y Yearbook. 1862'16 il. Wash. 1862'17

On the backs of all our cards we indicate what subject headings we have used, so that in case of destroying the cards at any time, we know how many to look for. The subject headings for all cards are typed in red; the rest of the card being a copy of the main author card.

CANADA, DEPARTMENT OF AGRICULTURE PUBLICATIONS

Inland Revenue Bulletins are first entered in a loose-leaf book, as in fact, are all our bulletins, which, however, has been mentioned before. Then they are filed in consecutive order in the vertical file until the numbers are complete, and sufficient have come to make a bound volume. Each volume is stamped on the back with the name and number of bulletins included, as was the case with the U.S. ones.

The card in our general catalogue is as follows:—

660.6 Canada.–Inland Revenue Dept. Laboratory of.
C2li Bulletins. 1887-'17 nos. 1-361
Ottawa, 887–

Of course, this does not give any idea of the contents, but merely indicates the numbers we have on the she ves. These have no index, neither have we been able to make one for our own use, and so much valuable material is not as available as it should be.

The current *O.A.C. Bulletins* are filed in the same way, numbers running consecutively, until the bound copies come from the Department of Agriculture at Toronto. The card in the general catalogue for the whole series is as follows:—

630.4 Ontario Agricultural College.
O59 Bulletins. 1886'17
nos. 3-17, 19-29, 31-34, 36-251
il. Tor. 1886-1917

As each one comes to hand, an author card is made, thus:

Graham, W. R.
Farm poultry; with the results of some experiments in poultry houses and fattening chickens. il. 64p. (O.A.C. bulletin No. 189. Tor. 1911).

Also one or more subject cards, subject being in red type. These are then filed alphabetically in a separate O.A.C. card index.

The *Central Experimental Farm Bulletins* are arranged like the Inland Revenue publications, being bound when enough have come to bind in volumes uniform with the previous ones. These too, lack a good index. The card for the general catalogue is as follows:—

630.4 Canada.–Central Experimental Farm.
C21c Bulletins. 1887-1911 nos. 1-68
il. Ottawa, 1887–1911

The other Ottawa publications are filed in our vertical file under their various *subjects*, each group alphabet cally by title, thus:—

LIVE STOCK:
Anthrax
Bacon pigs
Beef raising
Ewe and lamb...etc.

Filing under subjects has its disadvantages, in that sometimes a bulletin could be placed equally correctly in two places, for instance, "Substitutes for corn in rations for feeding swine." One person might file the bulletin in the division with "Swine," while another, looking at it from a different standpoint, might place it under "Feeds and feeding." Of course, if it were numbered, and subject cards made under both the above headings, with the number of the bulletin indicated, it would be easier to find.

Filing under title is very unsatisfactory also, as very few people remember the exact title, and sometimes do not remember the Division publishing it, and, although the article can be found eventually, much time is lost in the search.

If all these publications were numbered consecutively, regardless of the Division publishing them, and an accurate ndex could be prepared for each twenty-five or fifty numbers, —(the number it would take to make a fair-sized volume)—as is the case with the U.S. Dept. of Agriculture bulletins, it would mean a great deal to those who cannot get a chance to index each pamphlet as it is issued. Of course, the "List of Publications" issued by the Publications Branch of

the Department of Agriculture at Ottawa, with the bulletins arranged under headings, is useful, but it could not be called an index.

The bound bulletins and reports of the Dairy and Cold Storage Commissioner are placed on the shelves with our Dairy books, and treated as such. The cards n the catalogue are as follows:—

638.05 Canada.–Dairy and Cold Storage commission.
C21b Bulletins. 1905-'17 nos. 1-50
Ottawa, 1905-'17
Circulars 1–21

The reports of the various Provincial Departments of Agriculture, the Central Experimental Farm, etc., are each in a group, dates running consecutively. Cards for the latter thus:—

630.4 Canada.–Agriculture, Dep't of.
C21e Expermental fairms reports. 1887'-17
v. 1–29 il.
Ottawa, Dawson, 1888–1916

On the reverse side of all these cards, the subject headings used are given.

The *Herd Books* are with our other books on live stock, carded in catalogue as follows:—

636.21 Canada. Holstein-Friesian Association.
C21h Holstein-Friesian herd book; containing a record of all Holstein-Friesian cattle approved and admitted for registry . . under the by-laws and resolutions. 1892-'16 v. 1–20
St. George, Ont. 1892-'17

Our Agricultural periodicals are arranged on the shelves in alphabetical order in each class. That is to say, all the general agricultural magazines are in one group, all the dairy numbers in another, heredity in another, etc., each periodical having its numbers in consecutive order. The numbers are bound as each volume is completed, and a card made for our general catalogue, thus:

630.2 Agricultural Gazette of Canada.
A27c 1914–'15 v. 1–2
Ottawa, Govt. print.
(Canada, Dep't of Agric.)

For each book in the library, or series of bound articles, there is a shelf-list card made out, filed in a separate shelf-list cabinet. This is merely a record of the volumes on hand, so the cards are not filed alphabetically, but under the "call number" in the upper left-hand corner of each card. When taking inventory, these numbers correspond with the volumes as they appear on the shelves. Cards as follows:—

630.2 Agricultural Gazette of Canada.
A27c 25017, v. 1.
26173, v. 2.

The Agricultural Index, published five times a year by a New York firm, is a boon to all those who have occasion to refer to articles appearing in the agricultural periodicals. All the best magazines are included, as well as the U.S.D.A. and some Canadian publications. It was started in 1916, and is prepared by a staff of experts who have made available for instant

reference a great wealth of previously unmined information on agricultural topics.

The foregoing notes, do not, of course, cover the entire field of agricultural publications, but will give an idea of the general principle followed in the Ontario Agricultural College Library.

In conclusion we would like to add our plea to one heard at a conference of the Agricultural College Librarians at the American Library Association in Kentucky this summer,—a plea which came in the form of a question,—"When are the Canadian people going to index their publications so they will be of more use to us."

MANITOBA

THE DEPARTMENT OF AGRICULTURE

BY T. J. HARRISON, B.S.A., PROFESSOR OF FIELD HUSBANDRY

IN the Field Husbandry Department of the Manitoba Agricultural College a small library of bulletins, circulars, newspaper articles etc., dealing with subjects of Agronomy is operated for the benefit of the staff. The stenographer has charge of the library. It is her duty to secure bulletins, etc., and clip the newspaper articles. These are filed in folders or binders according to subject.

The folders or binders are placed on the book shelves in a large bookcase. The case is divided into six main sections—Improvement and Management of Cereal Crops; Improvement and Management of Forage Crops; Soils and their Management; Farm Management and Markets, etc.; Departmental Reports, and Journals of Scientific Associations, and Miscellaneous.

The Cereal section, for example, has one shelf for each of the more important cereal crops. These are then subdivided. Wheat, for instance, is divided into varieties, seed, seeding, cultivation, harvesting, stacking, storing, and general. All articles and bulletins dealing with seed are found in one folder, which has an index in the front enumerating the material in the folder and stating in what folders further information on this subject may be obtained. For example, information on harrowing of growing wheat crop is desired the folder is taken down. In the folder is found all the articles dealing with this subject, and in addition the index will show that a bulletin in the general folder on "Wheat Growing" on a certain page also contains information on this subject.

For a small library like this the subject method of filing is preferable to the source, because in Departmental work it is the information on one subject and not from one particular source that is desired.

THE AGRICULTURAL COLLEGE

BY MARY G. WOOD, LIBRARIAN

I AM only able to make reply in regard to the methods used in the Library. We have a separate card index for official agricultural publications. They are entered under subject headings. They are arranged in sections which correspond to the various departments of the College; that is to say, there are separate drawers for Animal Husbandry, Entomology, Soils, Engineering, etc., etc.

The subject headings in the various sections are in alphabetical order, and they have all been recently revised and the cards rearranged in accordance with the headings used in *The Agricultural Index;* so that we

might have standardized headings throughout, and know that one topic would always be found under the same heading in both *The Agricultural Index* and in our own card catalogue. This also assists in making out the cards, when doubt arises as to the headings which are to be used.

This arrangement of the card index in departments is very convenient for the use of departments, but it does, of course, result in some confusion and overlapping, as, for nstance, in the case of Soils and Chemistry; and it is debatable whether it would not be better to entirely rearrange the catalogue in dictionary order like *The Agricultural Index*.

Our files (pigeon holes) are divided into two main sections—Canada and the United States. These are subdivided into the various official departments, alphabetically, e.g.:—

Canada—
Conservation
Dairy and Cold Storage Branch
Entomological Branch
&c. &c.

with subdivisions, e.g.:—

Experimental Farms—Bulletins.
" " Circulars.
" " Reports.

The United States publications are arranged in the same way.

This arrangement applies to Dominion Government and United States Government publications only. Those from the various provinces and states are filed according to source and number; this is to say, bulletins and circulars from, say Illinois or California, are filed under the names of those states.

The binding-up of the official publications corresponds to the arrangement in filing.

Up to 1916 a card was made out for every publication received; now that we have *The Agricultural Index* we make cards for only those publications which will not eventually be included in this *Index*. Although this has resulted in great conservation of time, cards and catalogue space, it is not entirely satisfactory, as the items are frequently not included in the *Index* until several months late. We, therefore, intend to revert to indexing those publications especially and probably all the Canadian, which are likely to be needed and called for soon, in order that they may not be lost sight of meanwhile—pending their inclusion in *The Agricultural Index*.

SASKATCHEWAN

THE DEPARTMENT OF AGRICULTURE

BY F. H. AULD, DEPUTY MINISTER

AGRICULTURAL publications filed in this Department are grouped according to origin and not according to subject, except that to a limited extent for my own use I am keeping publications topically.

We have two types of filing cabinets. The original equipment consists of a number of sectional cases similar to those used in law offices for filing legal documents, with the exception that each drawer is sufficiently large to file the ordinary bulletin vertically. Later purchases of equipment consist of steel cases, and these are more convenient for the reason that the vertical drawers remain in position when partly open and bulletins thus filed are more convenient for reference.

Our library of bulletins could be made more useful and more readily accessible by a suitable system of filing.

ALBERTA

THE COLLEGE OF AGRICULTURE

BY A. A. DOWELL, B.S., PROFESSOR OF ANIMAL HUSBANDRY

WHILE teaching at the Iowa Agricultural College, Ames, Iowa, it became necessary to have all the material on certain subjects available for ready reference. Many times a bulletin or agricultural journal containing valuable information could be found only after loss of considerable time in searching through the mass of literature. To overcome this difficulty, I worked out a system of filing the desired publications. The scheme outlined below is original with me and no doubt can be improved upon. However, it has given excellent satisfaction in my office, and is now being used by other men in like professions, as well as by a few farmers with equal success.

The index cards used are 3″ by 5″, and may be either plain or ruled. All cards are kept in a small card index cabinet. If one wished to avoid this expense, a small drawer could be made at home to answer the purpose. All information is filed by subject instead of source.

The accompanying index card, numbered I, shows how the subjects are arranged. All the subjects under "S" are listed on one card or more if needed, for instance, a farmer is interested in swine, sheep, silos, soils, soiling crops, Shorthorn cattle, seed laws and strawberries. These are listed as shown on card "S", each with a separate subject number. Later he may get some information on smut in grain. This is added to the list as subject number 9. Any number of subjects can be added as desired. Twenty-six cards, one for each letter of the alphabet, are placed in order at the front of the card index drawer to show just what subjects have been filed. It is a simple matter to run through this list to see if one has any information on any particular subject.

I

"S"

I 1. Swine.
I 2. Sheep.
II 3. Silo-construction—silage.
II 4. Soils—soil areas.
II 5. Soiling Crops.
I 6. Shorthorn Cattle.
II 7. Seed Laws.
II 8. Strawberries.
II 9. Smut in Grain.

For instance, we wish to gather material on the subject of "Bacon Hogs and the British Market." By turning to the card "S," swine is found to be the first subject. Then turn back through the index cards and the desired pamphlet is found as I. S. 1.16. The Roman numeral I. indicates which drawer of the bulletin cabinet contains the pamphlet; "S" indicates where it is to be found alphabetically; the small figure 1 shows the number of the subject, and point 16 (.16) gives the number of the bulletin. As new bulletins appear they are added and numbered from this on, as point 17 (.17), point 18 (.18), and so on indefinitely.

The index card, numbered II., shows that the subject of "The Bacon Hog and the British Market" was published in pamphlet No 21, in 1916, by John Bright and H. S. Arkell, under the direction of the Minister of Agriculture at Ottawa. In other words, the card shows the publication, date, author, and station or Department publishing.

II

I S 1.16
The Bacon Hog and the British Market.
"Production and Thrift."
Pamphet No. 21.
1916 By John Bright.
H. S. Arkell.
Department of Agriculture
Ottawa.

Material from agricultural journals is filed in the same way. For example, the accompanying card, I. S. 1.27, numbered III., shows that the subjects of Permanent Hog Pastures, Buckwheat Screenings for Hogs, Finishing Hogs at Present Prices, have been discussed in the October 20th, 1917, issue of *The Nor'-West Farmer*. These publications may be put back on the shelf in order of publication for such references.

III
I S 1.27
Permanent Hog Pastures.
Buckwheat Screenings for Hogs.
Finishing Hogs at Present Prices.
The Nor'-West Farmer
Oct. 20, 1917.

Bulletin filing cabinets can be purchased through furniture stores, or substitutes can be made at home. Each drawer or shelf is numbered with a Roman numeral. Index card enclosed (numbered II.) shows that the subject of swine is filed in cabinet drawer No. I. The subject of "smut in grain" as shown on card S (numbered I.) is found in cabinet drawer No. II.

The name of the person filing the information or the Department concerned can be written on the upper right hand corner of the bulletin. The number in the upper left hand corner indicates its place in the cabinet. If the bulletin on "The Bacon Hog and the British Market" is taken out for reference, it is a simple matter to return to the cabinet and place it in cabinet drawer I., under "S", subject number I., and between bulletins .15 and .17.

If new bulletins are later received by the same author on a similar subject, the old bulletin and corresponding index card, may be destroyed and the new bulletin and index card substituted.

BRITISH COLUMBIA

THE DEPARTMENT OF AGRICULTURE

BY A. B. TWEDDLE, STATISTICIAN

DESCRIBING the system for filing the incoming publications in this Department,—this is based on the Decimal Classification and Relative Index by Melvil Dewey, A.M., Director, New York State Library, but somewhat simplified. The Dewey classification is to be found in all the leading libraries in the United States and Europe.

BOOKS

All books are kept on separate shelves and in ordinary numerical order, i.e., there may be two books each on Fruits, Poultry and Butter, in which case they would stand number 634_1, 634_2, 636.5_1, 636.5_2, and 637_1. This method of numbering was found to be more readily understood by the members of the Department and answers a library of this size, containing, as it does, about 1000 books. For a more extensive library, and where an efficient librarian is in attendance, it is believed C. A. Cutler's system of numbers would be more satisfactory and which is universally used. The reference catalogue of these books consists of a card index. Separate "Author" and "Subject" cards are typed and arranged together in alphabetical order. The "Author" cards are typed in black and the "Subject" cards in red. The number given the book on the shelf is shown on the upper left-hand corner of the card.

BULLETINS, CIRCULARS ETC.

Bulletins, circulars, etc., are, as far as possible, kept in strong telescope cases which, as they stand,

are 10½" high x 4¾" wide and 7¾" deep (inside measurement). These are grouped on the shelves according to countries. Since the United States publications comprise the largest number, these are sub-divided—"Federal" and "States"—the latter being arranged in alphabetical order on the shelves. Another group is "British Empire," and all countries included therein are also arranged in alphabetical order. The balance come in the "Foreign" group in similar order.

The cases in each group are each given a number as called for by the Dewey classification. For instance, number 632 will be found in this classification to refer to "Pests, hindrances, blights, and insects"; and 635 refers to "Kitchen garden." It may be that all bulletins included under 632 may require twenty cases; therefore, these would be numbered $\frac{632}{\text{B-1 to 20}}$ ("B" Bulletin). One case, on the other hand, may not only include all the bulletins on a particular subject, but circulars, reprints, etc., as well. If so, these would again be arranged alphabetically, such as Bulletins "B," Circular "C," and so on, and in the same manner for all coming under 635, which number would follow in its proper numerical order on the shelf.

As to whether it is better to file a publication under its source or subject, I may say that, in the case of books, this library files under "author," for while there are some which might appear to be published by a particular Department yet the author may be a popular authority.

In the case of bulletins, circulars, reports, reprints, etc., the Department, Branch or Office publishing these is shown on the index card, for while several bulletins may be written by one author, the author of the same series may later change while the Department or Branch is not so apt to.

CATALOGUES

The catalogue (card index) consists of two parts—one for books and the other for all other publications.

A particular subject may be more readily referred to by the use of tab cards showing the most popular subjects, such as heredity, plants, potatoes, tree planting, etc.

In compiling the catalogue, the American Library Association "List of Subject Headings" was found very useful in this library. This list is published by the American Library Association Publishing Board, Chicago, Ill., and contains a very complete list of those headings most commonly known and used in libraries. It further prevents much duplication of "Subjects," which is difficult to avoid without some such guide.

In dealing with new publications, which may arrive in too large numbers to permit of immediate filing, some temporary arrangement should be provided. This may be done by grouping according to country. For instance, all U.S. Federal publications should be put in one group, so subdivided as to have all bulletins of the Bureau of Industry together and in numerical order, and so on with other divisions of the Department of Agriculture.

All publications of the various States should be arranged in the same manner. This is important, since it is the more recent publications which are generally referred to most frequently.

If possible, it is far more satisfactory to employ the services of a library graduate in organizing a library of any extent, for while the catalogue otherwise compiled may answer the purpose, yet the time consumed will prove more expensive. This has been the experience in this Department.

In laying out space for publications properly catalogued, it is well to make ample provision for expansion, for it will be found in checking over old lists that there are not only many missing numbers in a series, but that your library has not been on the mailing list of many publishers on which it should have been.

SHORT AGRICULTURAL COURSES

NOVA SCOTIA

THE usual short courses covering all phases of agricultural instruction will be held at the College of Agriculture, Truro, from January 2nd to 11th. In addition to this a series of short courses will be held at other centres of the province.

QUEBEC

THE programme of short courses arranged for the northern division of Quebec covers a period from January 8th to March 28th, takes in 11 different places, and extends over four days at each place. The subjects that will be taken up include every branch of farming, private and professional bee-keeping and poultry keeping, home and market gardening, various lines of household science, farm hygiene and the control of injurious insects and plant diseases. The courses for the southern section of the province cover the month of January, starting on the seventh, a week being allowed to each of four centres. The lectures and subjects will be very much the same as in the northern section, but will be treated by a different staff of instructors, all of whom will be from the Provincial Department of Agriculture or the School of Agriculture at Ste Anne de la Pocatière. Special demonstrations will be given at each course, and lantern slides will be shown in the evening of subjects taken up during the day. Lectures will be given twice every day, morning and afternoon. The courses are arranged largely out of funds derived under THE AGRICULTURAL INSTRUCTION ACT.

MACDONALD COLLEGE

A FOUR months course in dress making will commence on January 8th. Women from towns will be required to pay a fee of $25.00 for the course. Farmers' wives and daughters may obtain the course free. A course in household science will be held from January 22nd to the 25th. This is restricted to farmers' wives or daughters. Preference will be given to members of Homemakers' Clubs. Short courses for men will include horticulture, February 5th to 8th. animal and cereal husbandry, February 12th to 15th; poultry, February 19th to 22nd.

THE regular short course in household science will be given from January 3rd to March 22nd. This will include cooking, needle work and general housekeeping. The students also have the choice of home gardening or poultry as an optional course. The course will be conducted under the direction of Miss Anita E. Hill, Director of Household Science.

ONTARIO AGRICULTURAL COLLEGE

SHORT courses of instruction will be given at the Ontario Agricultural College during the winter months. The following is a list of the courses to be held with the date of each.—

SUBJECT	DATE
Stock and Seed Judging	Jan. 8th to 19th
Poultry Raising	Jan. 8th to Feb. 2nd
Horticulture	Jan. 21st to Mar. 2nd
The Dairy Courses:—	
The Factory Dairy Course	Jan. 2nd to Mar. 22nd
The Farm Dairy Course	Jan. 21st to Feb. 16th
Cow Testing	Mar. 25th to Apr. 3rd
Ice Cream Making	Mar. 25th to Mar. 30th
Soft Cheese Making	Mar. 25th to Mar. 30th
Bee-keeping	Jan. 8th to Jan. 26th
Drainage and Drainage Surveying	Jan. 8th to Jan. 19th
Farm Power, including farm tractors, gasoline engines, motors, etc.	Jan. 21st to Feb. 2nd
Business and Marketing	Jan. 8th to 19th

APPOINTMENTS AND RESIGNATIONS

DURING the past year many changes were made in the personnel of the staffs of the Provincial Departments of Agricultural and of the Agricultural Colleges. Although some of these have already been published, in order that the readers of THE GAZETTE may have a complete record, the lists as supplied by heads of the respective institutions are herewith given:—

PRINCE EDWARD ISLAND

DEPARTMENT OF AGRICULTURE

Resignations

W. R. Reek, B.S.A., Director of Agricultural Instruction.
W. J. Reid, District Representative, Prince County.
J. L. Tennant, B.S.A., Instructor in Soils.
Miss Alberta MacFarlane, Supervisor of Women's Institutes.

Appointments

W. J. Reid, Director of Agricultural Instruction.
J. L. Tennant, B.S.A., District Representative for Prince County.

Died

M. Coughlan, B.S.A., District Representative for King's County, died in April.

NOVA SCOTIA

Resignations

C. B. Gooderham, B.S.A., Provincial Apiculturist and Assistant Botanist.

NEW BRUNSWICK

DEPARTMENT OF AGRICULTURE

Resignations

J. B. Daggett, Secretary for Agriculture.
N. W. Eveleigh, Dairy Superintendent.
Seth Jones, Poultry Superintendent.
J. E. DeGrace, Superintendent, Agricultural Societies.
H. B. Durost, Instructor in Soil Fertility and Beekeeping.
J. W. Mitchell, Live Stock and Dairy Commissioner.

Appointments

W. R. Reek, Secretary for Agriculture.
M. A. MacLeod, Superintendent, Agricultural Societies.
L. T. Floyd, Instructor in Beekeeping.
Thomas Hetherington, Live Stock Instructor.
Ben Gallant, Assistant Dairy Superintendent.
J. Hayes King, District Representative, Moncton.
Jas. Brenner, Jr., District Representative, Chatham.
A. C. Taylor, District Representative, Woodstock.
John Woods, Instructor in Drainage.
A. C. McCulloch, B.S.A., Poultry Superintendent.

Died

C. W. McDougall, Dairy Superintendent, died as result of automobile accident.

QUEBEC

MACDONALD COLLEGE

Resignations

Miss Katherine A. Fisher, Head of School of Household Science.

Appointments

Miss Anita E. Hill, Head of School of Household Science.
Miss Edla M. Lindholm, Instructor in Household Science.

ONTARIO

DEPARTMENT OF AGRICULTURE

Resignations

W. R. Reek, Assistant Commissioner of Agriculture.
W. J. Bell, Live Stock Specialist.
R. S. Duncan, District Representative, Durham County, Port Hope.
R. H. Clemens, Manager, Demonstration Farm, Monteith.
L. H. Hanlon, District Representative, Kenora District, Kenora.
J. Laughland, District Representative Simcoe County, Collingwood.
A. S. Smith, District Representative, Algoma District, Sault Ste. Marie.
W. G. Nixon, District Representative, Timiskaming District, New Liskeard.
C. Graham, District Representative, Timiskaming District, New Liskeard.
J. N. Allen, District Representative, Wentworth County, Hamilton.
H. B. Roy, District Representative, Sudbury District, Hamilton.

Appointments

Dr. G. C. Creelman, Commissioner of Agriculture.
W. R. Reek, Assistant Commissioner of Agriculture.
Justus Miller, Assistant Commissioner of Agriculture.
W. J. Bell, Principal, Kemptville Agricultural School.
Malcolm J. McQueen, Live Stock Specialist.
R. S. Duncan, District Representative Supervisor, Toronto.
R. H. Clemens, District Representative, Wellington County, Arthur.
L. H. Hanlon, Manager, Demonstration Farm, Monteith.
E. E. Reilley, District Representative, Kenora District, Kenora.
F. A. Wiggins, District Representative, Simcoe County, Collingwood.
J. W. Wadsworth, District Representative, Algoma District, Sault Ste. Marie.
C. Graham, District Representative, Timiskaming District, New Liskeard.
J. M. McIntosh, District Representative, Timiskaming District, New Liskeard.
W. G. Marritt, District Representative, Wentworth County, Hamilton.
G. H. Dickson, Pomologist, Horticultural Experiment Station, Vineland Station.
F. S. Reeves, Expert in Plant Breeding, Horticultural Experiment Station, Vineland Station.

ONTARIO AGRICULTURAL COLLEGE

Resignations

H. S. Fry, B.S.A., Demonstrator in Horticulture.
J. R. Spry, B.S.A., Lecturer in Physics.
Morley Pettit, Lecturer in Apiculture.
Geo. E. Day, Professor of Animal Husbandry.

Appointments

R. C. Moffatt, M.A., Lecturer in Physics.
W. H. Sproule, Demonstrator in Dairying.
Miss H. Theodora Job, Instructor in Normal Methods.
Miss E. J. Rogers, Demonstrator in Laundry and Household Administration.
Miss Rona W. Fraser, Supervisor of House Practice.

Died

The staff of Macdonald Institute suffered the loss in August by the death of Miss Grace Greenwood, Instructor in Normal Methods.

MANITOBA

DEPARTMENT OF AGRICULTURE

Resignation

N. E. Smith, Manager, Killarney Demonstration Farm.

Appointments

W. W. Fraser, Live Stock Commissioner.
L. A. Gibson, Dairy Commissioner.
S. A. Cox, Provincial Veterinarian.
J. A. Macdonald, Dairy & Produce Grader.
D. E. McKenzie, Inspector of Creameries.
H. E. Walker, Manager, Killarney Demonstration Farm.

AGRICULTURAL COLLEGE

Resignations

Professor F. S. Jacobs, Professor of Animal Husbandry.

Appointments

G. W. Wood, Professor of Animal Husbandry.
R. W. Brown, B.S.A., Professor of Dairying.

SASKATCHEWAN

DEPARTMENT OF AGRICULTURE

Resignations

W. A. Wilson, Dairy Commissioner.

Appointments

F. M. Logan, Dairy Commissioner.
M. P. Tullis, Acting Weeds and Seed Commissioner.

COLLEGE OF AGRICULTURE

Appointments

L. E. Kirk, B.A., B.S.A., Instructor in Field Husbandry.
Arthur Henry, B.S.A., Instructor in Field Husbandry.
Geo. Green, B.S.A., Instructor in Field Husbandry.
Hugh Ross, Instructor in Animal Husbandry.

Casualties

Lt. H. N. Thompson, Weeds and Seed Commissioner.
Lt. N. R. Pawley, Asst. Weeds and Seed Commissioner.
Capt. J. C. Smith, Live Stock Commissioner.

COLLEGE OF AGRICULTURE

Resignations

Evan A. Hardy, Assistant Professor in Agricultural Engineering.

ALBERTA

DEPARTMENT OF AGRICULTURE

Resignation

J. Clements, Asst. Superintendent, Fairs and Institutes.

Appointments

M. E. Meyers, Superintendent of Demonstration Farms.
J. H. Hare, Poultry Marketing Commissioner.

BRITISH COLUMBIA

DEPARTMENT OF AGRICULTURE

Resignations

J. H. McCulloch, District Agriculturist, Kamloops; in charge of Dry Farm Experimental Stations.
R. M. Winslow, Provincial Horticulturist.
S. H. Hopkins, Assistant Live Stock Commissioner and Brand Recorder.
J. H. McCulloch, District Agriculturist, Kamloops.
R. M. Winslow, Provincial Horticulturist and Secretary British Columbia Fruit Growers' Association.
W. E. McTaggart, Prairie Fruit Markets Commissioner.
H. E. Walker, District Agriculturist, Prince George.
J. R. McLennan, Editor, *Agricultural Journal.*

Appointments

Geo. C. Hay, District Agriculturist, Kamloops, in charge of Experimental Dry Farms at 105 Mile and Quilchena.
M. S. Middleton, Acting Provincial Horticulturist, at Victoria in succession to R. M. Winslow, resigned.
W. T. Hunter, B.S.A., District Field Inspector at Penticton.
H. H. Evans, District Field Inspector at Vernon under P. E. French, Assistant Horticulturist.

EGG LAYING COMPETITIONS

ALBERTA

BY A. W. FOLEY, POULTRY SUPERINTENDENT

AN egg-laying competition covering eleven months was concluded at the Government Poultry Farm, Edmonton, on October 14th, 1917. This was the third competition held under the supervision of the Alberta Department of Agriculture, by arrangement with the Alberta Poultry Association.

The competition included 22 pens that began with 6 birds each, hatched in 1916, and embraced Barred and White Rocks, White Wyandottes, Buff Orpington, White and Brown Leghorn, Rhode Island Red and White Cornish. At the conclusion of the test pen 9 had been reduced to five birds, pen 16 to three and pen 7 to two. Four of the pens were from British Columbia, and the remainder from Alberta.

THE EGGS LAID

The following table shows the total eggs laid during the competition, and the relative standing of the different pens:—

Pen	Breed	Total Eggs
12	Barred Rocks	826
19	White Wyandottes	820
13	White Wyandottes	802
18	White Wyandottes	758
11	Buff Orpington	672
3	White Leghorns	616
2	Brown Leghorns	604
22	Barred Rocks	603
15	White Wyandottes	588
6	Buff Orpingtons	565
4	Rhode Island Reds	561
14	Buff Orpingtons	501
21	White Wyandottes	499
17	White Wyandottes	497
9	Barred Rocks	463
5	White Rocks	449
20	White Wyandottes	410
1	White Leghorns	388
16	Rhode Island Reds	373
8	White Cornish	342
10	White Wyandottes	337
7	White Wyandottes	248

INDIVIDUAL RECORDS OF WINNING PENS

The number of eggs laid in eleven months by individual hens in the four prize winning pens are shown as follows:—

Pen 12—	80	142	164	146	118	180
" 19—	157	104	167	133	118	141
" 13—	122	118	128	165	114	155
" 18—	142	86	140	157	141	84

INDIVIDUAL RECORDS AND RECEIPT

The following table gives the individual records and receipts for the five hens laying the largest and the five laying the smallest number of eggs during the eleven month period:—

Highest

Hen	72	in Pen	12	180	$6.42
"	121	"	22	171	6.63
"	86	"	15	169	6.48
	105	"	19	167	6.38
"	76	"	13	165	6.35
Total					$32.26

Lowest

Hen	55	in Pen	10	2	$ .08
"	60	"	10	2	.06
"	27	"	5	30	.86
"	48	"	8	32	1.01
"	102	"	17	33	1.03
Total					$3.04

The highest individual records and receipts for the winter months, November 15th, 1916, to April 14th, 1917, were:—

Hen	*Pen*	*Eggs*	*Receipts*
121	22	79	$3.55
76	13	69	3.03
105	19	67	3.07
63	11	67	3.00

The highest pen records and receipts for the winter months, November 15th, 1916, to April 14th, 1917, were:—

Pen	*Eggs*	*Receipts*
13	336	$14.53
19	314	13.65
18	300	12.97

The total number of eggs laid was 11,922, which sold at an average price of 43.39 cents per dozen, amounting to a total of $430.31.

FEED CONSUMED AND COST

	Lb.	*Cost*	*Per Cwt.*
Mash	3,563	$67.20	$1.84 to $2.00
Wheat	783	18.80	1.85 " 2.90
Oats	1,602	28.15	1.40 " 1.90
Barley	488	8.91	1.75 " 2.00
Corn	304	7.53	2.25 " 3.00
Beef Scrap	1,077	45.47	4.00 " 5.50
Green Bone	153	6.12	4.00
Buttermilk	2,400	3.90	.12½
Grit	59	.88	1.50
Oyster Shell	226	3.39	1.50
Totals	10,655	$189.45	

RECEIPTS AND EXPENDITURES

Total receipts	$430.31
Total cost	189.45
Profit on eggs sold over cost of feed	$240.86
Average receipts per hen	$ 3.16
Average cost per hen	$ 1.37
Average profit per hen	$ 1.79
Average receipts per dozen	43.39c
Average cost per dozen	19.06c
Average profit per dozen	24.33c

CARE AND MANAGEMENT

HOUSING

The birds were housed in a building constructed of one thickness of drop-siding on outside studding, lath on the inside of studding and space stuffed with straw. Cotton windows were used entirely with drop curtain in front of roosts. The birds were housed three pens (18 birds) to a section, size 12ft. x 12ft.

RATIONS AND FEEDING

Dry Mash Rations:	Lb.
Bran	25
Shorts	25
Oat Chop	25
Alfalfa meal	12½
Bone	5
Charcoal	1
Barley chop	12½

This mixture was constantly before the birds in self-feeding hoppers. Beef scrap, oyster shell and grit were also kept before the birds in hoppers.

WET MASH

A wet mash consisting of the dry mash ration to which boiling water and 15lb. of beef scrap were added and shorts to partially dry the mash. This was fed three times a week in the evening.

GRAIN RATION

A light feed of whole oats was given each morning in the litter. During the winter a light feed of wheat, oats and barley and occasionally a little corn was given at noon to insure exercise. Whole wheat was fed in the evening when no mash was given.

GREEN FOOD

Throughout the winter months alfalfa and sprouted oats were given as green feed. During the summer months sufficient green feed was produced in the runs.

WEATHER CONDITIONS

The weather throughout the competition may be called unusual in many respects. The severe weather of January had a serious effect on the records.

HEALTH OF THE BIRDS

The mortality of the birds was much greater than in the previous competitions. Many of the birds entered did not appear to have the constitution and vitality necessary for heavy egg production.

Two birds died from the bursting of blood vessels, two of ovarian trouble, one of ulcerated intestines, and seven of a peculiar disease the exact nature of which could not be determined.

The competition was in charge of Mr. J. Shackleton, manager of the poultry plant.

BRITISH COLUMBIA

BY J. R. TERRY, CHIEF POULTRY INSTRUCTOR

THE sixth international egg-laying contest was held under the auspices of the Department of Agriculture at the Exhibition Grounds, Victoria, B.C., from October 6th, 1916, to October 4th, 1917, extending over 12 months.

SUMMARY OF RESULTS

Duration of contest (months)	12
No. of pens	40
" birds	240
" eggs laid	38,360
Value of eggs laid	$1,310.63c
Average monthly revenue	$1,310.63c
Average monthly revenue	$109.21c
Cost of feeding	$611.05
Average monthly feed cost	$ 50.92
Profit over cost of feeding	$ 699.58
Average price of eggs per dozen	41c
Highest price received per dozen (Oct. 9)	.60c
Lowest price received per dozen (Mar. 12)	.30c
Average cost to produce dozen eggs	.19.1c
Average number of eggs paid per pen	959
Average number of eggs laid per bird	159.8
Average cost of food per pen (6 birds)	$15.27
Average cost of food per bird	$ 2.54
Profit over cost of feed per pen	$ 18.48
Profit over cost of feed per bird	$ 2.91
Eggs laid by winning pen, class one, (light weight)	1,193
Average per bird winning pen, class one	198.8
Eggs laid by winning pen, class two (heavy weight)	1,188
Average per bird winning pen, class two	198

In class one White Leghorns were first, second, and third in the awards. In class two White Wyandottes were first and second and Rhode Island Whites third.

As to the debated question of whether or not the introduction of school garden and nature work interfered with the progress of pupils in other studies, I can say most decidedly from my own experience that it does not. On the contrary by correlating it with the other studies, the interest awakened, the information gained, the better school attendance all tend directly to better scholarship.—A New Brunswick Teacher.

NOVA SCOTIA

POULTRY WORK UNDER THE AGRICULTURAL INSTRUCTION ACT

BY J. W. MITCHELL, B.A., ASSISTANT COMMISSIONER, THE AGRICULTURAL INSTRUCTION ACT FOR THE MARITIME PROVINCES

FROM the grant to Nova Scotia, under THE AGRICULTURAL INSTRUCTION ACT, there is an allotment of $1,500.00 for poultry work for the current year. This is used, mainly, for the following purposes:—

1. Expenses of the poultry expert, Mr. J. P. Landry, in connection with field work.
2. Erection of demonstration poultry houses.
3. Egg club or circles work.

Already, about thirty meetings have been held in different parts of the province, at which various phases of the poultry work have been taken up, such as the care, feeding and management of poultry, the home production of suitable poultry foods, the production, care and marketing of eggs, and the building of poultry houses. Lantern slides are frequently used in the lecture work.

WORK OF THE PROVINCIAL DEPARTMENT

It has been the practice of the provincial Department of Agriculture to erect a few demonstration poultry houses each year at carefully selected central points, the farmers chosen to secure these being those who take an interest in poultry and are sufficiently public spirited to do a little missionary work. The cost of erecting such a house—one suitable for the average farmer—ranges from $100.00 to $150.00. Already about thirty demonstration houses have been built in the province—six of them during 1917. On arecent visit to Bridgetown, in the Annapolis Valley, I was informed by the owner of one of these houses, put up this year, that six farmers in that locality have, as a result, built poultry houses modelled after his, and that several others purpose doing the same thing in the near future. Mr. Landry informed me that similar results have been secured at other points.

EGG CLUBS OR CIRCLES FORMED

Egg clubs or circles for the collecting and marketing of eggs, have been formed at three different points in the province—Pugwash Jct., Bridgetown, and Margaree Forks (C.B.). The Department of Agriculture has not been pressing the formation of these circles, but rather has been giving the farmers the necessary information, and then leaving it to them to move in the matter themselves, and directing them along right lines where they decide to organize. It is in outlying districts, where eggs cannot be marketed advantageously during the early months of the season, that egg circles serve the most useful purpose.

MARKETING THE EGGS

The eggs are not marketed at the time they are collected, but are put in a water-glass solution, in a cement tank in a cellar or basement, and are marketed largely during November and December. Most of the eggs stored at the points mentioned were collected during the months of April to July inclusive.

The quantities collected at the different stations during the past season were, approximately, as follows:—

POINTS	EGGS COLLECTED, Dozen
Pugwash Jct.....	7,000
Bridgetown.....	5,000
Margaree Forks.....	3,000

The Department defrays the expense of putting in the first tank. The members of the circle are instructed to supply unfertilized eggs only, to gather them daily and to keep them in a suitable place until collected. The eggs are collected weekly, a suitable man being engaged to do the work of collecting, candling, sorting, caring for and shipping them. The cost of this phase of the work is approximately 5c per dozen. Mr. Landry, co-operating with the directors, undertakes the general supervision and direction of the work and the marketing of the eggs. He estimates that the eggs will, this year, sell at an average price of close to 45c per dozen, delivered, and will net the farmers about 10c per dozen more than they would have received under the conditions that existed before the circles were formed.

At Margaree Forks, where there is a creamery operated under the Dairy Branch of the Department, the eggs are collected by the cream collectors, and are cared for and shipped by the creamery manager.

ADVANTAGES OF THE EGG CIRCLE

The advantages of the egg circles work in the province may be summed up as follows:—

1. It is educational, and educational in a practical way.
2. It serves as a stimulus to the members to do better work, as regards both quality and quantity of product. The increase in the price secured demonstrates the advantages to be derived from the production of eggs of high quality, the proper care of them until marketed, and the marketing of them under right conditions.
3. It develops a spirit of co-operation—co-operation amongst the farmers themselves and between them and the Department of Agriculture, not only in this but in other phases of their work.

One thing that militates against the development of the poultry industry in the province is the fact that much of the food for poultry has to be imported. This will, no doubt, remedy itself, in part at least, as time goes by.

NEW BRUNSWICK

HOW THE SHEEP CAMPAIGN WAS HANDLED

BY W. R. REEK, SECRETARY FOR AGRICULTURE

IN New Brunswick, as in most of the other provinces, sheep have been decreasing in numbers for many years. On investigation it was found that most of those who had gone out of the sheep business claimed that it was on account of the havoc caused by dogs. There was a law on the statutes regarding dogs and sheep, but this was often unworkable, as it took fewer people to repeal than it did to put it in force. Hon. J. F. Tweeddale, Minister of Agriculture for New Brunswick, saw this, and he succeeded in getting parts of it repealed, so that the law could be put in action by a petition to be signed by a small number of taxpayers. With this accomplished, it was felt that the great obstacle to successful sheep raising had been overcome, but Hon. J. F. Tweeddale did not stop here; he instructed the Department of Agriculture to give the farmers all the assistance they could, to enable the farmers who had no sheep to establish flocks, and those who had to improve theirs by bringing in new blood.

STEPS TO INCREASE BREEDING

In consideration of the high prices paid for mutton and wool, the fact

that these prices were likely to remain so for many years, and the big crop of hay throughout the province, with, consequently, its relative low price, the Live Stock Division of the Department of Agriculture placed these facts before the farmers and advised those who did not keep sheep that the present was the best time to start.

Many of the farmers found upon looking around for available stock as a foundation of a flock that it was impossible for them to obtain the same at a reasonable figure, as nearly all the local breeders who had ewes or ewe lambs wanted them to increase or replenish their own flocks, which had in most cases been allowed to decrease in both quantity and quality.

Notice of these conditions came to the attention of the Live Stock Division of the Department of Agriculture, and they at once made plans to enable the farmers to obtain good stock at a reasonable price.

SEARCH FOR EWES

They communicated with most of the large sheep breeders and butchers in New Brunswick, and also with the District Representatives of the counties of Nova Scotia where sheep raising is carried on quite extensively, requesting prices on breeding ewes and ewe lambs. The answer they received, in most cases, was that mature breeding ewes were not to be had and that ewe lambs, ranging from 75 to 95 pounds in weight, when available, were priced at from $9.50 to $10.50 f.o.b. their respective shipping points. To this price was added the freight and a few incidental charges for care, feeding and in some cases crating, and it was figured that the ewe lambs would range from $10.50 to $11.50, according to size and quality. The Department also received prices from most of the breeders in the Maritime Provinces and Quebec on pure-breds, both male and female, which were quoted at $20 to $25 for lambs and $25 to $40 for older sheep. The Department in turn, through the medium of the newspapers, quoted these prices to the farmers, along with an offer to secure sheep and distribute them at cost. It was also made imperative that each order was to be accompanied with a cash deposit of 50% of the approximate amount of the order, and that the remainder was to be paid on the arrival of the sheep at the central point of distribution, Fredericton.

THE EFFORT EFFECTIVE

The farmers readily took advantage of this offer, and orders for a large number of sheep were received. As many sheep as possible, both grades and pure-breds, were secured in the province. In this way breeders were aided in disposing of their surplus and freight rates were reduced. The supply, however, rapidly diminished, and it became necessary to import from Nova Scotia, Quebec and Prince Edward Island.

In orders of one or two sheep, these were shipped direct from the breeder to the buyer, but in the majority of cases they were shipped in carload lots to a central point where they were watered, fed, and given a few days rest before being consigned to their various destinations.

Great care was exercised throughout to get only well-matured, healthy stock, which had the characteristics of the breed they represented, and in the case of grades, they were mostly of Shropshire and Oxford breeding.

During the months of October and November, nearly 1200 sheep were handled by the foregoing methods and, although the number was not great, considering the possibilities New Brunswick has for sheep raising, it started nearly 100 flocks, and acted as a stimulus to that branch of live stock which has been sadly neglected.

QUEBEC

DEMONSTRATION POULTRY HOUSES

MACDONALD COLLEGE

BY A. G. TAYLOR, B.S.A., ASSISTANT POULTRY DEPARTMENT

DURING the fall of 1913 the Poultry Department of Macdonald College, undertook out of funds derived under THE AGRICULTURAL INSTRUCTION ACT, to demonstrate to the farmers in various sections of the province what they considered to be some of the best types of poultry house for the farm. The object in view was to show the farmers in each locality what one of their neighbours could do when conditions were favourable for successful poultry keeping. In each locality chosen a poultry house was constructed according to instructions. These houses were built in such a way as to accommodate the entire flock in one pen, thus keeping down cost of construction and reducing labour to a minimum. Special attention was given to light and ventilation, as these features are of paramount importance.

DEMONSTRATION HOUSE AT YARM AND COWANSVILLE, QUE.

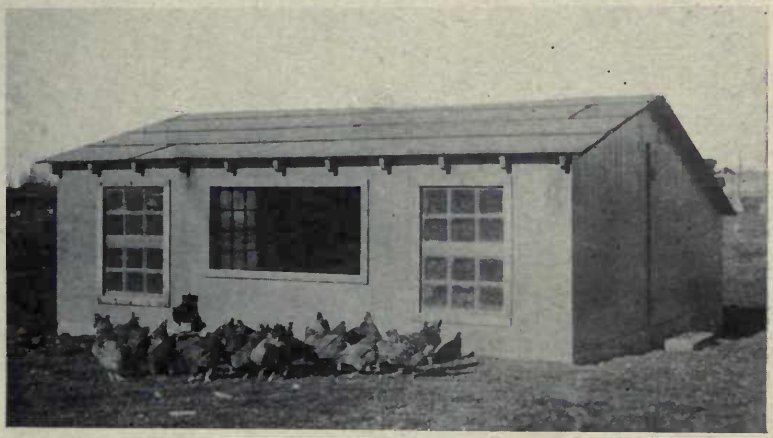
The farmers chosen to carry on this work were: Mr. Bert Hodgins, (Yarm), in the county of Pontiac; Mr. Edgar B. Standish (Rougemont), in the county of Rouville; Mr. W. R. Beach (Cowanville), in the county of Missisquoi; Mr. E. N. Chaddock (Cookshire), in the county of Compton. These men were chosen by the college because of their keen interest in agricultural advancement. Each location is suitable for poultry work and, in addition, the poultry house could be constructed near the public road. The houses in Compton and Rouville counties are of the Macdonald type, while those in Missisquoi and Pontiac counties are of the Tolman type.

The cost of these houses varied slightly, due largely to the price of building materials locally. Owing to the fact that most of the construction work was done by the farmer himself no account is given for labour. Had the time employed in the construction work been in the farmer's busy time an account could have been given, but as he used spare time no account was kept. The actual cost of the material purchased is as follows: Pontiac house, $72.88; Rouville house $128.55; Missisquoi house, $110.98; Compton house, $109.55. The house in Rouville county is 18 by 20 feet,

and the remaining three houses are 20 by 20 feet. The larger houses accommodate 100 hens each, while the smaller structure provides ample room for about 75 birds.

In the fall of 1913 each farmer was supplied with Barred Plymouth Rock pullets at $1.50 each. Male birds for breeding purposes were supplied annually by the Poultry Department. Each farmer kept an account of all business transacted for three years, and filled in a monthly statement, which was forwarded to the College at the end of each month. The number of eggs laid was recorded on the report sheet, and the grain used was also recorded regularly. Labour was charged up at 15c per hour, and the flock was given credit for all the eggs laid, whether sold or used on the farmer's table. Poultry sold was also put on the credit side of the report. Eggs used for hatching were charged up at 10c each and 25c was allowed for each chicken hatched. Losses, whether chicks or hens, were charged up at their actual value.

The following is a report of the results thus obtained:—



DEMONSTRATION HOUSE AT COOKSHIRE AND ROUGEMONT, QUE

Pontiac house (100) hens:—		
Stock on hand, Oct. 15, '16, when test was concluded	$371.80	
Stock on hand Oct. 15, '13, when test was commenced	150.00	
Profit from increase in stock		$221.80
Loss for year 1913-14	$ 80.61	
Profit for year 1914-15	74.72	
" " 1915-16	84.66	
Profit		$ 78.77
Value of labour, 1913-14	$ 46.03	
" " 1914-15	58.81	
" " 1915-16	50.39	
		$155.23
Total profit not counting labour		$455.80
Rouville house (75 hens):—		
Stock on hand Oct. 15, '16, when test was concluded	$139.30	
Stock on hand Oct. 15, '13, when test was commenced	112.50	
Profit from increase in stock		$ 26.80

Profit for year 1913-14	$42.83	
" " 1914-15	50.89	
" " 1915-16	118.07	
		$211.79
Value of labour, 1913-14	$ 38.63	
" " 1914-15	36.00	
" " 1915-16	37.80	
		$112.43
Total profit not counting labour		$351.02

Missisquoi house (100 hens):—

Stock on hand Oct. 15, '16, when test was concluded	$135.00	
Stock on hand Oct. 15, '13, when test was commenced	150.00	
Loss from decrease in stock		$ 15.00
Profit for year 1913-14	$ 10.43	
" " 1914-15	53.67	
" " 1915-16	18.43	
		$ 82.53
Value of labour, 1913-14	$ 49.55	
" " 1914-15	54.00	
" " 1915-16	57.00	
		$160.55
Total profit not counting labour		$228.08

Cookshire house (100 hens):—

Stock on hand Oct. 15, '16, when test was concluded	$ 52.50	
Stock on hand Oct. 15, '13, when test was commenced	150.00	
Loss from decrease in stock		$ 97.50
Profit for year 1913-14	$ 24.51	
" " 1914-15	79.89	
Loss for year 1915-16	28.60	
		$ 75.80
Value of labour, 1913-14	$ 55.65	
" " 1914-15	54.95	
" " 1915-16	47.40	
		$158.00
Total profit not counting labour		$136.30

These houses have given universal satisfaction; they are easily operated and although cheap serve the purpose well. They admit of an abundance of fresh air and are comparatively dry. Egg production has been exceptionally good, and has increased each year. One farmer has succeeded in obtaining as high as 43 per cent egg yield during the winter months. The increase in the number of poultry raised has also been very marked, one farmer raising 300 chickens during the summer of 1916. The quality of the flocks has also improved considerably, and these farmers are now possessors of flocks of Barred Plymouth Rock fowls that are not only a credit to themselves but are an asset to the poultry industry. These flocks are looked upon by their respective communities as foundation stock in utility poultry breeding.

The influence these demonstration houses have had on poultry house construction is very favourable indeed. A number of new poultry houses have been built along the same lines, and the increased demand for information on poultry houses is, to say the least, a good omen.

ONTARIO

THE AGRICULTURAL SCHOOL, KEMPTVILLE—SHORT COURSES AND SEED FAIR

MR. W. J. BELL, Principal of the Agricultural School at Kemptville, announces that his school will begin its career as a teaching institution in the month of January. For four days, from January 22nd to 25th, a general short course will be given embracing all branches of agriculture suitable for Eastern Ontario. Federal and provincial officials will have charge of the classes.

INTER-COUNTY JUDGING COMPETITION

On account of the withdrawal of the Eastern Ontario winter fair, two of the usual features of that exhibition will be held at Kemptville. Within the period of the short courses the Inter-County Judging Competition for counties east of Northumberland will take place. This will involve teams of three junior farmers from each county trained by the respective District Representatives. The competition for Western Canada was held at the Ontario Winter Fair at Guelph, when the team from York County was successful. After the eastern competition has been held, the winning teams from the east and the west will be brought together at the Toronto Stock Yards for a final test.

EASTERN ONTARIO SEED FAIR

The annual fair held by the Eastern Ontario Seed Growers' Association will take place at Kemptville during the four days of the short course, when the usual sale of seed will be carried out. In connection with the show there will be available to visitors a directory of farmers in eastern Ontario who have seed grain for sale, and with it samples what may be purchased.

MANITOBA

INCREASED PRODUCTION OF LIVE STOCK

AT a conference representing the Agricultural Societies, the Grain Growers' Associations, the Live Stock and Dairymen's Associations, the Home Economics Society and the Boys' and Girls' Clubs, a resolution was passed pledging the members to do their utmost to present the existing situation to the whole people, and to secure united action in increased live stock production and food production generally. Resolutions were also passed recommending the registration and organization of all labour resources; commending the action of the Dominion Government in establishing a Feeds Branch; commending the banks for their policy in helping members of boys' and girls' clubs to buy feeding stock; requesting that municipal and town and village councils make it feasible for residents of towns and villages to raise and feed pigs or other live stock; calling upon municipal councils, grain growers, agricultural societies, banks, railways and all other available agencies to

work in the interests of increased hog production; pledging the delegates to the conference to present the needs to their own districts and to assist in organization; asking the ministers of all churches to preach a sermon on food production, and approving the appointment of Mr. H. S. Arkell as Live Stock Commissioner for Canada and Mr. J. D. McGregor as Food Controller for the Western Provinces.

SASKATCHEWAN

AGRICULTURAL CONVENTION AND SEED FAIR

AGRICULTURALLY speaking, Saskatchewan is going to be very busy during January. From the 8th to the 11th, the agricultural societies meet in convention at Saskatoon. During the same period the annual seed fair will be held. The Dairymen's annual convention will be held on Jan. 9th and 10th. From January 14th to 26th, there are to be short courses in agriculture at the Agricultural College. At the Seed Fair, prizes are offered in fifty-six classes. Any farmer in Saskatchewan is eligible as an exhibitor. All exhibits must have been grown in the province during 1917. Classes 1 to 37 are open to any exhibitor. Classes 38 to 54 are open only to members of the Canadian Seed Growers' Association. Each exhibit in the seed classes 1 to 37 must be as follows: Wheat, 75 lb.; oats, 50 lb.; barley, 60 lb.; flax, 70 lb.; peas, 75 lb.; potatoes, 60 lb.; grass seed, 10 lb.; clover or alfalfa seed, 5 lb.; corn 10 ears. Besides the money prizes, which run from $20 down, a number of special prizes will be offered such as the "Farm Crops" trophy, the Millers' Cup and the Mooney Challenge Shield. Special competitions for boys and girls between the ages of 12 and 18 years will be held. The exhibits must consist of a sheaf of wheat and oats sufficient to make a compact sheaf 6 inches in diameter, the plants to have been selected by hand from the standing crop, and to show the full length of the straw. In addition to this sheaf, a gallon of fresh grain from the same field or plot is called for. By way of encouragement to the growers of registered seed in Saskatchewan transportation charges over $2 will be remitted on all Seed Grain Associations' exhibits that have been shipped by freight prepaid at least two weeks prior to date on which the fair opens. S. E. Greenway, Director of Extension work College of Agriculture, Saskatoon, is the Secretary.

PROGRESS OF THE CO-OPERATIVE MOVEMENT

BY W. E. H. STOKES, EDITOR "PUBLIC SERVICE MONTHLY"

IT is a significant fact that the very first recommendation of the Agricultural Credits Commission was to the effect that co-operative legislation should be passed, and that such information and guidance should be given by the provincial Government as would facilitate the formation on a sound basis of local co-operative societies for purchasing and selling farm products and supplies. The adoption of this recommendation gave the initial stimulus to the whole movement, and, in consequence of it, the Co-operative Organization branch was added to the Department of Agriculture, and The Co-operative Asso-

ciations Act passed at the session of 1913.

THE BEGINNING

Prior to this time there had been a growing feeling of unrest amongst the farmers, and a rapidly increasing desire to escape from the exactions of the middlemen. The members of the Saskatchewan Grain Growers' Association in various localities had demonstrated what could be done by co-operation. These enterprises were always merely local, and were never carried on by the central office of that organization. But these associations had no legal standing, and consequently each member was individually liable for any debts contracted. There were two objections to registering under the Companies Act. If this were done the control would rest with the largest shareholder, and the profits would be divided on the same basis. Secondly, the minimum incorporation fee was $40, and the whole paid up capital of more than one of the associations amounted to very little more, although they had a turnover of thousands of dollars. When the Act referred to was passed these disabilities were dealt with. The control of one association is absolutely democratic, being based on the principle of "one man, one vote," regardless of the number of shares held, while the profits depend on the amount of patronage extended. Thus the man with only one share doing the greater part of his business through his association receives more than the man with fifty shares who deals elsewhere. The associations were registered for a fee of $4.50, and for this sum obtain proper legal standing, while the liability of each member is limited.

PUSHING THE MOVEMENT ALONG

When the Co-operative Organizations Branch was established informative literature was issued and addresses delivered at farmers' conventions and elsewhere, in order to place the matter squarely before the people. The advantages that might accrue were not unduly urged or thrust upon the farmers, but whenever, and wherever, a community of farmers showed a desire to take advantage of the legislation provided, advice and practical assistance were tendered. Bylaws were suggested, different lines of work were indicated, showing the degree of success which might be anticipated, men were sent to assist in the first co-operative shipment of live stock, the difficult matter of co-operative accounting was provided for by supplying forms which the experience of other countries had shown to be simplest and best. In short, every precaution was taken to see that the association was started right.

AN EXAMPLE

Of the two lines of co-operative work, purchasing and selling, it is in selling that the farmer has saved most money by the adoption of co-operation. The records of one of the associations show that coal was bought at $1.85 per ton less than the prevailing local price; cordwood was procured at 60 cents per cord less; lumber at a reduction of $7.00 per thousand; shingles at $1.00 per thousand less. A long list of other commodities might be quoted showing where great savings have been made.

THE CO-OPERATIVE ACT AMENDED

An important amendment to the Act was made in 1916. Formerly all transactions of the associations had to be in cash only. This was done to prevent them from falling into the hands of a creditor who might be antagonistic, and who might, by pressing for a payment at an inopportune time, seriously embarrass a struggling association or even put it out of business altogether. Therefore, the law was amended to permit associations to purchase on credit

from other associations having similar objects. Since this amendment the central office of the S.G.G.A. has acted as purchasing agent for the associations, and there is co-operation not only amongst individual members but amongst the associations themselves.

In only one aspect is Saskatchewan reported to be lagging behind as regards co-operation, and that is in co-operative production. There is one co-operative farm where owners and employees work on shares, while there are only two cases of community breeding, one in horses and the other in cattle breeding. It is thought this is because of the scattered nature of the settlement of the province and the pioneer conditions which still prevail over a large section.

PROGRESSIVE STATISTICS

The following comparative figures will show the gratifying progress which has been made:—

	1915	1916	1917
Associations reporting	102	173	309
Number of shareholders	2,850	5,537	9,444
Paid up Capital	$13,494.20	$39,421.49	$92,940.27
Assets	$37,337.53	$105,322.37	$295,012.40
Liabilities including paid up capital	$29,717.33	$82,956.57	$232,938.81
Associations handling supplies	70	138	308
Value of supplies handled	$239,320.42	$805,456.88	$1,984,545.85
Associations marketing live stock	9	10	23
Value of live stock marketed	$42,034.22	$150,512.76	$32,171.25
Other farm produce marketed	.....	8,923.03	15,115.80
Total turn over	281,354.64	964,892.67	2,122,832.90

In the interval from May 1st, 1917, to the present time the number of associations registered has risen to 367.

THE CO-OPERATIVE MARKETING OF LIVE STOCK

WITH a view to encouraging co-operative live stock marketing, the Co-operative Organization Branch of the Saskatchewan Department of Agriculture announces that after January 1st that Branch will send on application a representative to asist the manager of any co-operative association in the receiving, forwarding and marketing of the first co-operative shipment of live stock. The Branch is also prepared to furnish free a set of live stock marketing receipt and account forms sufficient to record one years' marketing transactions.

ALBERTA

THE COW BILL

BY J. MCCAIG, EDITOR OF PUBLICATIONS

THE so-called Cow Bill enacted in the last legislature of the Province of Alberta under the special direction of Hon. Duncan Marshall, appears to be what was needed. Since May 10th, 172 loans have been guaranteed by the Treasury Department and totalling $384,750. The applications are distributed pretty well over the province,

but are distinctly few in the grain-growing sections of the south and numerous in the newer districts where mixed farming is the system followed. Peace River, St. Paul de Metis and Coronation seem to be the centres where associations are thickest, and these are all undergoing rapid settlement at present.

The effect of the bill will be to give to many enterprises, which otherwise would be poor for a long time, a permanency and stability that will be the making and saving of many struggling homesteaders and their families. The Act is simple in its scope and simple in operation, and appears to have been conceived with a close sense of country needs.

BRITISH COLUMBIA

EXHIBITS OF PLANT DISEASES AND INSECT PESTS

BY J. W. EASTHAM, PLANT PATHOLOGIST

EXHIBITS of plant diseases and insect pests which were shown at one or two of the fairs last year, were this year displayed at a considerably larger number of centres. These were Duncan and Victoria on Vancouver Island; Coquitlam and Langley on the Lower Mainland; Kelowna, Grand Forks, Nelson and Summerland in the Interior. The exhibits consisted principally of Riker mounts, these affording the most convenient means of shipping and arranging such an exhibit. Each mount included specimens of attacked plants or parts of plants prepared to show the symptoms by which the infestation can be recognized and distinguished from those resembling it. In the case of superficial diseases of fruits and tubers, the scraping out of the soft tissue from beneath the skin and replacing it with plaster of Paris has made very satisfactory mounts. They retain their colour and natural appearance well. They also bear handling, and can be placed in a Riker mount with the other material illustrating a particular disease, thus avoiding the division of related specimens, and the risk of transit with preparations mounted in liquid preservatives.

The life history of the fungus or insect pest was shown as fully as space permitted in a type-written legend, further reference being made to the publications of the Department.

The exhibit was made, as far as possible, to meet the needs of the locality. Diseases or pests of general distribution, like Potato Scab and Woolly Aphis, formed part of each exhibit, while those, like Fire Blight and Anthracno, confined to certain of apple sections, were only shown where they would be of interest. At the same time an effort was made to give prominence to those which are at present only found in certain areas of the province, but which are quite likely to spread to other points or to be introduced from outside sources, e.g., Codlin Moth and Powdery Scab of Potatoes, in order that growers should be able to recognize them at once should they appear, and take proper steps for their suppression.

In most cases Mr. Ruhmann or myself remained in charge of the exhibit during the hours of the fair to give further information. At most centres much interest was shown, and the number of inquiries large.

PART III
Rural Science

RURAL SCHOOL FAIRS

PRINCE EDWARD ISLAND

BY W. J. REID, B.S.A., DIRECTOR OF AGRICULTURAL INSTRUCTION

THE school fair movement is practically a new venture in this province, as this is only its second season. The school fair as an important factor in connection with the successful teaching of rural science has been recognized by the inspectors, teachers and pupils, and of the ratepayers who have been made by a few of the inspectors to introduce the movement, and four fairs were held. Although the plans had not been laid very long before hand, the teachers and pupils entered into the scheme whole heartedly and the success attained was sufficient to stimulate all who had taken part to greater effort for 1917. The

PARTIAL VIEW OF BICYCLE PARADE, CHARLOTTETOWN, P.E.I.

privileged to attend any of the fairs held in the province during the past season.

THE EXTENT OF THE MOVEMENT

In the fall of 1916 an attempt was enthusiasm spread to other inspectors and teachers, and we find last year fourteen school fairs for the province held in the following centres: Tyne Valley, Central Bedeque, Kinkora, Crapaud, Charlottetown, Hills-

boro, Mount Stewart, New Perth, Montague, Sturgeon, Murray Harbour, Heatherdale, Uigg and Eldon.

ORGANIZATION

The chief aim of the school fair, namely, "To produce better educated boys and girls," has been kept in view, and as much of the executive work as possible has been placed in their hands.

Early in the spring of 1917 a circular on School Fairs was issued by the Rural Science Department of the Prince of Wales College and sent to the inspectors and teachers. The circular contained among other things suggestions for organization and a specimen prize list with the following note as a preface.—

The following prize list is quite a comprehensive one and is intended to serve as a suggestive medium rather than as one to be directly followed. At the first or subsequent meeting of your Central Fair committee a definite prize list following the suggestions here given should be made out to be used for your school fair. The making out of a suitable prize list will in itself give considerable training to the committee.

With these suggestions the general scheme for the province was placed on a somewhat uniform basis. The value of the training in executive work is a great factor in the educational advantages in connection with school fairs. Most of the pupils have received their first training in executive work, and it was marvellous to see the system with which the work was carried out. That the pupils recognize the benefits themselves is proven by the fact that they continually strive to improve upon what has gone before.

ASSISTANCE LENT TO FAIR CENTRES

The School Fair circular contained the following offer of assistance to all fair centres:—

The Department of Agriculture and Education will give assistance (whenever requested) on the day of the fair to assist with the judging. Printed prize ribbons for the sports and entry forms and prize tickets for the exhibits will be supplied free to any school fair board making application to the Rural Science Department, Prince of Wales College, upon condition that they forward to this Department a report of their fair in the fall.

It would be advisable that fair boards notify the Rural Science Department of the date chosen for their fair at their earliest convenience to prevent conflicting dates, so that judges may be supplied with least difficulty.

SCHOOL FAIR EXECUTIVES (TEACHER AND THREE PUPILS FROM EACH SCHOOL), TYNE VALLEY, P.E.I.

This was taken advantage of by all the fair centres, and a line of correspondence was then set up between the secretary of the fair and the rural science Department. The following assisted with the judging: The members of the Provincial Department of Agriculture; Mr. Clark, Superintendent of the Experimental Farm; Mr. Shaw, Superintendent of Education; Miss Dutcher, Instructor in Domestic Science, Prince of Wales College; Mr. Barlow, Instructor in Manual Training and Drawing, Prince of Wales College; the Inspectors; and in some cases local people lent assistance.

each school. At Central Bedeque the pupils from the different schools marched in procession lined up in front of the hall, where each school sang its respective patriotic song, and all joined in "The Maple Leaf Forever." At Crapaud a special feature was inter-school basketball, which proved very exciting. At Charlottetown the pupils had a bicycle parade in which at least 100 prettily decorated bicycles filed past the judges. At New Perth the boys, to make the fair more realistic, introduced the old time "wheel of fortune," by means of which the unsuspecting public were separated from their

PRIZE CALVES EXHIBITED IN BANKERS' COMPETITION AT KINKERA, P.E.I.

At centres where successful fairs were held last year prizes were awarded for calves and pigs by the Bankers' Association. This we hope will play a greater part in our scheme for 1918.

SPECIAL FEATURES

Each fair committee showed sufficient initiative to introduce special features as a part of their programme. Tyne Valley had a school competition for the best decorated wagon used to convey the pupils to the fair. This proved very exciting, and brought out the loyal supporters for "nickels."

The following is part of a report sent in by one of the boy secretaries:—

REPORT OF SCHOOL FAIR

The schools which were included in the fair held at the Macdonald Consolidated School were as follows: Alexandra, Cross Roads, Bunbury, Mt. Herbert and Hazelbrook.

The names of the officers in charge of the fair, were: Mildred Ballem, Cross Roads; president; Mildred Mutch, Mt. Herbert, Vice-president; George McKinnon, Alexandra, secretary; William Monaghan, Mt. Herbert, treasurer.

There were four prizes given to each section in the respective classes. The

amount of each was, 1st prize, 45c.; 2nd prize, 35c.; 3rd prize, 25c. and 4th prize, 15c.

The prizes for class 10, Sec. 1, which was best, Halter-broken colts, were double of those of the sections included in the other classes.

Funds for prizes were raised by canvassing the rate-payers of the school districts included in the fair, and the serving of refreshments on the day of the fair.

(Signed) GEORGE L. MACKINNON,
Secretary.

EDUCATIONAL VALUE

In speaking of the value of the school fair, two inspectors write as follows:—

The school fair stimulates a strong community spirit among old and young, and broadens the usefulness of the schools, especially in agricultural work. It brings together parents, teachers and pupils, and in that matter alone serves an important purpose. It is to the school children what the provincial and county exhibitions are to the adults; its creates among the pupils a friendly competition, encourages them to study agriculture and to take an interest in "home projects." In carrying out a school fair the boys and girls receive a training in organization, management and in the fundamental value of co-operation, which must inevitably have a far-reaching result in equipping them for action and useful citizenship.

(Signed) D. S. FRASER.

The activity and interest taken by the teachers in the schools which have participated thus far deserve more than ordinary recognition, for while the management is nominally in the hands of the pupils the stimulation and discretion of their efforts have their base in the teachers' underlying devotedness to its success.

As to the value of holding school fairs, I am not sceptical. In addition to their importance in an agricultural sense, their organization affords opportunities for business training and a recognition of the principles which go to make square dealing with each other.

(Signed) J. F. DOYLE.

NOVA SCOTIA

L. A. DEWOLFE, DIRECTOR OF RURAL SCIENCE SCHOOLS

THE school fairs showed a marked improvement last year. Not only did the number increase, but the quality of the exhibits was away beyond that of previous years. I attribute this improvement largely to awakened interest on the part of the parents.

The parents pay little attention to the child's first efforts. When a small amount of the prize-money arrives, however, the parents realize what is doing, and take a hand in the matter themselves. The small successes of 1916, therefore, brought the parents' assistance in the selection of exhibits in 1917. Reasoning thus, I anticipate still greater improvement th's year.

Last year 55 schools sent rural science exhibits to the Provincial Exhibition; 60 to the County Exhibition; and 70 exhibited locally. Deducting those who exhibited at more than one place, 160 different schools exhibited their produce last year. That is about 6% of the schools in the province. This is small, but it is a start.

PRIZE FUNDS

The prize money contributors were as follows:—

Provincial Exhibition Commission, Halifax	$150
Various County Exhibition Commissions	100
Local contributions for local exhibitions	700
Government grants (to counties and locally)	220
Total	$1,170

Notable among the local exhibitions were three towns which made their first attempt last year. They raised their money by door receipts, sale of candy, and by private subscriptions. They were:—

Westville	$84
Glace Bay	75
Stellarton	70

The best district exhibitions were at Tatamagouche, Lawrencetown and Bridgetown.

In several cases no prize-money was paid. Instead, the receipts were given to the Red Cross; and the chi'dren were awarded cards or ribbons.

As usual the Women's Institutes and Women's Council gave assistance. The officials of the county and provincial exhibitions co-operated in every way possible.

THE FUTURE

From our future rural science prize lists for county and provincial exhibitions we are eliminating pressed plants and general collections of insects, minerals, etc. We are retaining weeds, fodder plants, economic insects, etc. In other words, we are admitting only those things which have a bearing on the material prosperity of our people.

Pure nature work, which, in itself, is not economic, we are exhibiting with writing, drawing and kindred school subjects. We admit their value, but we are separating the productive and economic exhibits from the purely so-called educational ones. The former, we call rural science, the latter is classed as general education.

NEW BRUNSWICK

BY R. P. STEEVES, B.A., DIRECTOR, ELEMENTARY AGRICULTURAL EDUCATION

OUR school fair work the past year registered a distinct advance on the success achieved last year. The large numbers that attended, and the readiness with which school officers and citizens helped to finance the movement bespeak the interest taken in this phase of rural improvement.

All the fairs were held in districts where a garden at school has been established and successfully used as a feature of school work.

The earnestness and enthusiasm with which teachers have supported and encouraged fair work shows that they consider it of great advantage in their teaching.

Products grown on central and home plots, as well as those from the school garden may be exhibited. The only restriction is that exhibits must positively represent the work of the exhibitor, and be connected with school instruction. In accordance with this idea each pupil, before receiving his exhibit number, is required to sign a declaration to this effect, and the teacher also certifies to the correctness of the pupil's affirmation. We seek to give to the teacher and the school a claim to the benefit resulting.

The Elementary Agricultural Education Division of the Department of Agriculture, with the co-operation of the Education Department, organized and conducted all the fairs. The Education Department by regulation permits teachers actually taking part in the fair work of their schools to take one half or the whole of a day from regular school work for this purpose.

EXHIBITORS AND EXHIBITS

Fourteen fairs participated in by 23 school districts were held. Over 1000 school children had exhibits. It is estimated that more than 3000 visitors attended. Most of the children had exhibits in two or three classes.

The classes of exhibits were as follows:—

1. Products of school garden and home plots.
2. Manual Training and Household Science work.
3. Collection of mounted plants, of mounted insects, of seeds.

4. Educational work including compositions, maps, drawings, charts, etc., having local or provincial reference.
5. Other home project work, chiefly poultry.

A feature of many of the fairs was the large number of exhibits of the same kind. At one fair, for example, thirty-five pupils exhibited beets. Competition was keen, and competent judges often had great difficulty in placing prizes.

Only small money prizes were awarded, our wish being to encourage the pupils to exert themselves for the honour and distinction and for education, rather than for pecuniary advantage.

The exhibits of canned and preserved vegetables and fruits was much larger than in the previous year.

We had 87 gardens at school and 1502 home gardens conducted by children in the public schools. In addition there were several central plots, aggregating in area four acres. These also were cultivated by pupils in the public schools.

QUEBEC

MACDONALD COLLEGE

BY J. H. MCOUAT, ASSISTANT DEMONSTRATOR IN RURAL SCHOOLS

IN the month of September, twenty-one school fairs, in which Macdonald College co-operated, were carried through. These fairs were the result of a year's careful planning and foresight on the part of all those who took part and the fact that, in spite of the very backward season which obtained in the Eastern Townships and in Quebec generally, the fairs were a series of successes reflects credits where it belongs—on the children.

In 1916, 13 school fairs were held conjointly by Macdonald College and three provincial demonstrators. In 1917 that number was increased to 21, and, with scarcely an exception, each fair was larger. This shows that the movement is at least as popular as it has been and, in districts where four consecutive fairs have been held, it is a point worth noting. There were practically no new plans adopted for the season just passed over, those of the previous year being followed. The only change was where a somewhat loose, individual method of organization as regards determining the amount of materials needed and the distribution of these materials among the children was dropped and a definite and centralized method was followed. A strong feeling of co-operation has sprung up among the demonstrators, and this is perhaps the key to the success of the fairs as a whole. With co-operation, foresight, insight and determination, the development and the success of any number of fairs is guaranteed.

THINGS THAT ARE NECESSARY

A very important point in beginning a school fair is to win the interest of the children. One of the best things that one can do is to prove to them that he is interested and absolutely so. The children do more than half of their work during the summer, because they feel that some one is really in earnest about this matter, and that, therefore, they must do their part. It is hardly possible to visit the schools too often, to encourage the children in that way. The plan followed by the College and the provincial demonstrators is, where possible, to visit the schools in November or December and then pay the prizes won at the fair in September and encourage the children to continue their efforts, and to do even better than they have done. At this visit, too, the choice of seeds and other materials that are being distributed is outlined. The form to be filled in is then left with

the teacher, to be sent to the one in charge within a week. This gives the children an occasion to talk matters over with their parents. Even that arouses a greater interest.

When these lists have been gathered and the total amounts of material determined, the figures are given over to each department at the College, and individual packages or small sacks are labelled and filled.

A 10-YEAR OLD BOYS' DAY OF TRIUMPH

In the spring another visit is paid to each school, and every pupil, unless he is absent, in which case his material is left with the teacher, receives his material, together with a sheet of directions, *direct from* one whom he feels is interested that he should take good care of his chickens or his crop.

SUMMER DUTIES

Early in July, it is the aim that every child shall receive a copy of the prize list which outlines for him everything he needs to know about his particular fair. From it he knows the prizes he is working for, and how he must prepare his exhibit.

During the latter half of July or during August every child should be visited. By that time he is beginning to realize better just why he is doing certain things, and he will likely have some difficulties that he would wish to have cleared up. Besides, and this is very important, every child likes to have the results of his hard work admired, and a word of praise from one whom he knows must know is ample payment for many, many hours of hard work. Certainly, a visit to the child's home during the summer-time is, not just to be recommended; it is absolutely necessary.

THE "BIG DAY"

On the day of the fair the building where the exhibits are displayed should, if at all possible, be quietly and tastefully decorated. The person who visits the children at their homes should be present, for, although all others may be strangers, the children feel that in him they have a friend. It is very desirable that plenty of opportunity be given to the people to talk to those in charge, because there are countless problems upon which they would like to have light. One feature for the children which should always be carried through is that a well-arranged programme of sports should be sent forward with a swing. A day's whole-hearted fun is what should be aimed at, for the children have done their work during the summer and now they are reaping their reward. To a large extent the success of next year's whole movement may depend on the quality of the happiness drawn from this year's "Big Day." All, large and small, are sure to have an interest in the exhibits, and this interest will only be made more keen by one or two hours of healthy sport.

It might be thought that it would be wise to pay the prizes the day of the fair and, while from one standpoint it would, yet by withholding the money for a month or a little more, the children's interest is extended over the whole year.

THE OBJECTS SOUGHT

The purpose of the school fair movement is not to create in the minds of the children a commercial spirit. If good seed is distributed solely that the country may in time be filled with it, and if no ideals are spread among the pupils, the good seed would not for very long be good. The two forms of seed are dependent one on the other. Since the war, however, our attention has been forcibly directed towards the greater production of foodstuffs, and because of our larger interest in obtaining food the quieter motive has been shadowed. Nevertheless, although we speak and write concerning this line of work almost wholly of the splendid results per pound, or per bushel, the other influence is at work, and the more it is the better are the results from a crop or material standpoint.

RESULTS

Because of the bad weather which prevailed in almost every district where school fairs were held, it would be very difficult to estimate even an average yield from the materials distributed. In some instances, scarcely the seed was obtained at harvesting, while in others an excellent yield was obtained. It would be true to say that, speaking for all the districts, the yield for all crops ranged from fair to good. To enable those who might wish to estimate a yield to do so, the amounts of the materials distributed are herewith submitted:—

Material to each pupil:	Total Quantity
Eggs—1 setting	658
Barley—1 lb	190
Ensilage corn—½ lb	115
Gra n corn—½ lb	255
Oats—1 lb	285
Swedes—1 oz	340
Flowers—3 pkgs	1,025
Potatoes—8 lb	1,125
Sweet corn—1 pkg	560
Tomatoes—1 pkg	340

These figures totalled represent the number of children who received material last spring. There were 4,893. Whatever amount of crop was raised by them represents a clear increase over the amount that would have been raised had no seeds and eggs been distributed, for almost all the work done on the plots was done in the child's spare time, or by children who would have otherwise been idle. Even though this amount of material were suited only for consumption, it would be by no means to be despised, but the chickens raised and the seed harvested are of such a superior quality that every farmer is proud to keep them separate

A SCHOOL FAIR EXHIBIT OF VEGETABLES

and make them the starting point of better stock or seed for his whole farm.

THE PARENTS PROFIT

Already several farmers have multiplied the little one pound sack of grain, or ten pound sack of potatoes, which his boy or girl received two or three years previously into several large sacks. One case in particular can be recalled where the small plot of oats had been increased to practically an acre, and that acre of oats was the best that had been seen among upwards of two hundred and fifty of our better farmers' crops. The crowning feature of this accomplishment was that the grain had been cared for *altogether* by the boy—a little lad only 10 years old when he got his little parcel of oats at the school two years previously. It is by multiplying instances such as this one and by encouraging the parents, who are really hungry for material assistance that they may be able to assist and educate their families further than they were assisted or educated, that the most real good will be done. If we can but inculcate into the minds of boys and girls of eight, nine, ten, twelve or fourteen years of age ideas concerning the growing of major crops which give excellent results, they will forget neither them nor us. What those in charge must do is to see that what they do is done fairly. If they do that the children will never fail them, and increased production will come and come in a much greater measure than if it alone is sought.

SEWING, CANNING AND COOKING

One phase of the school fairs which deserves space by itself and the highest praise is that phase introduced by the School of Household Science of Macdonald College. The cooking and sewing exhibits at last year's fairs were splendid, and they served to balance the exhibits as a whole, interest the ladies, and cause many of the older girls to decide to take part the following year. All the work in this division was also done according to recipe and pattern, which increases its value. If no other line had been followed beyond explaining the canning process sufficient good would have been done by the ladies in charge. Hundreds of homes will be using canned fruit and vegetables this winter and next that were formerly strangers to such foods. This will mean a big saving of other foods, which is an inverted but important method of increasing production. The ladies deserve a great deal of credit,—more than will go to them because of their quiet ways of work.

THIS YEAR

For this year practically no new plans will be adopted. Better organization, a perfecting of the methods at present in use, and more co-operation are the three lines along which the work will be carried. Our aim will be to reach more children, and this can best be done by doing our work along familiar lines. Were new phases to be adopted, less could be accomplished. Therefore, while we feel and know that there are many places where we could enlarge and improve our methods and our results, yet we feel that, to do the most good to the greatest number, we shall be acting wisely by adhering to our old policy.

FRENCH SPEAKING COUNTIES

BY JEAN CHARLES MAGNAN, DIRECTOR OF SCHOOL GARDENS DURING THE YEAR 1917

OVER 80 rural school fairs were held during the year 1917 in the French Speaking counties of the province of Quebec.

Agricultural school fairs were organized last spring in 24 counties of the province, with the help of District Representatives and School Inspectors. A distribution of material and seed necessary for sowing

school and home gardens was carried this spring by the Horticultural Division. These consisted in a collection of seeds of vegetables, corn, swedes, potatoes, cereals, etc.

Grants were distributed to the school boards on this basis: A school board giving $10, $15 or $20, received a grant of twice the amount. The average grant per county to school boards organizing agricultural school fairs was $80.

Products were exhibited at these fairs by nearly 115,000 school children. Children and parents were both greatly interested. It is no exaggeration to say that these fairs are a very important factor in agricultural progress.

ONTARIO

BY R. S. DUNCAN, B.S.A., DISTRICT REPRESENTATIVE SUPERVISOR

GREAT Oaks from Little Acorns grow." The rural school fair idea originated in Waterloo county, in the year 1909, when the District Representative distributed seeds for a small home-garden plot to the pupils of three schools in North Dumfries township. That fall, the first school fair in Ontario, if not in the Dominion, was held at the River Road school, near Galt, and augured well for the success and spread of the movement through the rural districts. This was a "Red Letter Day" long to be remembered by the writer, who was present and assisted in the management of the fair.

The first fair was successful from every standpoint—the interest of the pupils was aroused and their thought stimulated; the teachers were heartily in favour of the development of the scheme; the trustees gave their undivided support and the parents voiced their sentiments in favour of the idea in no uncertain tones, and became enthusiastic concerning the new atmosphere which had been created in the district.

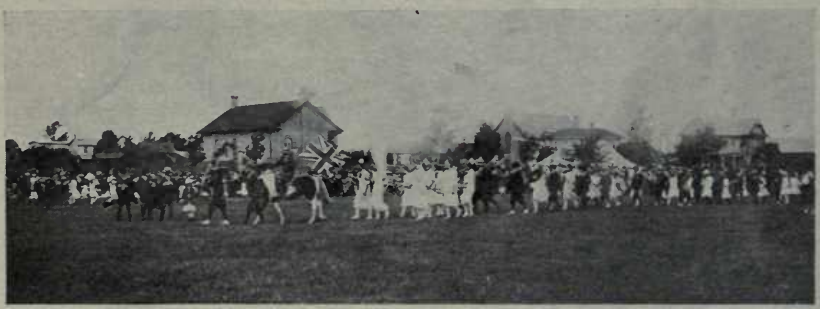
JUDGING COLTS, CENTREVILLE, ONT., SCHOOL FAIR

The movement has grown year by year, until in 1917 there are no less than 302 school fairs held in the province. One can gather some idea of the magnitude of the movement from the purchase and distribution

of the following seeds and eggs to the pupils during the spring of 1917:—

Barley:—
O.A.C. 21, 64 bus.
Oats:—
O.A.C. 72,
O.A.C. 3,
Orloff,
Abundance,
Industrial,
Banner, 138 bus.
Wheat:—
Marquis,
Common Emmer, 23 bus.
Sweet Corn:—
Golden Bantam, 26 bus. shelled

Mangels:—
Yellow Leviathan,
Bruce's Giant
Our Ideal,
Yellow Intermediate, 5,850 packages
Mammoth Long Red, 5,850 packages
Beets:—
Detroit Dark Red, 6,430 packages
Carrots:—
Chantenay, 6,865 packages
Parsnips:—
Hollow Crown, 2,840 packages
Asters:—
Giant Comet, 9,110 packages
Sweet Peas,
Giant Spencer, 4,180 packages



JUDGES AND WINNERS PARADE, VERSCHOYLE, ONT., SCHOOL FAIR

Field Corn:—
Golden Glow,
Salzer's,
Bailey,
White Cap,
Wisconsin No. 7,
Longfellow,
Comptons, 43½ bus. on the cob
Field Peas:—
Arthur, 580 lb.
Potatoes:—
Davies Warrior,
Early Eureka,
Green Mountain,
Empire State,
Delaware,
Irish Cobbler,
Carmen,
Doolley's,
White Star,
Canadian Beauty, 1.211 bus.
Turnips:—
Purple Top Swede,
Carters Invicta,
Gartons Keepwell,
Good Luck,
Gartons Model,
Hartley Rouge Top,
Kangaroo Swede, 3,695 packages

Phlox:—
Drummond, 1,395 packages
Eggs:—
White Wyandottes
Rhode Island Reds,
Barred Rocks, 9,284 dozen

The grains were distributed in 1 lb. packages, potatoes in 5 lb. bags, corn in packages of 160 kernels, and other seeds were put up in small sealed packages, sufficient to plant a plot 7 ft. x 10 ft. for vegetables and 10 ft. x 18 ft. for roots.

Mention was made in the August number of the GAZETTE, concerning the distribution of eggs in connection with this movememt, hence there is no necessity for repitition here.

The following table gives a summarized and comparative statement of the number of fairs, number of children competing, and the number of entries made, with attendance, during the past three years:—

	1915	1916	1917
Number of fairs held	234	275	302
" schools included	2,291	2,620	2,825
" children taking part	48,386	60,262	68,862
Attendance of children at fairs	72,860	83,029	86,121
" adults at fairs	84,406	95,217	82,077
Total attendance	157,266	178,246	168,198
Number of Entries	116,236	113,263	106,570
" home plots	51,243	55,947	59,329

WHITE WYANDOTTES AT ODESSA, ONT., SCHOOL FAIR

In view of the unprecedented conditions which prevailed in regard to the labour problem, it was decided to discontinue an inspection of the school fair plots, with the exception of those in newly organized rural school fair districts. A special appeal was made to the teacher and the trustees to arrange for some local assistance in the inspection and judging of the plots in their school section. In many instances, the clergy visited the plots, in some cases either the teachers or trustees made the rounds and forwarded reports to the District Representative's office, who awarded prizes for the best cared for plots in the section.

IMPROVEMENT APPARENT

The majority of the representatives reported that the interest of the pupils did not wane on account of the plots not being judged by some one officially representing the Department, but on the other hand the very fact of getting the local people to undertake this work, stimulated greater interest among the parents in school fair work

In spite of unfavourable conditions in many districts, the fairs were an improvement over last year, not so much in the number, as in the quality of the exhibits. Pupils are taking greater pains in

the preparation of their exhibits for the fair, and where size and quantity seemed to be the rule a few years ago, we now note a marked change, and quality is the outstanding feature.

Practically every organization connected with the rural communities stood behind the school fair and rendered valuable assistance, not only financially, but in the conduction of the various special features. Let me give a few concrete examples. The Board of Agriculture donated silver cups or shields to the boy or girl securing the highest number of points at the school fairs in the county, or to the schools whose teams won the live stock judging competitions; the women's institutes assisted in conducting refreshment booths in aid of the Red Cross, and undertook in some cases to supply judges for the girls' work in baking and sewing; the Junior Farmers' Improvement Association had complete charge of some of the live stock competitions conducted at the fair; the trustee boards and the township councils were generous in their assistance from a financial standpoint, in making grants to enable the Rural School Fair Associations to pay their prizes.

THE RURAL SCHOOL FAIR ASSOCIATION

Special mention, of course should be made of the Rural School Fair Association itself, which is composed of representatives from each school in the district, who were elected by ballot by their own school. The accredited delegates from each school would meet, form a rural school Fair Association, and elect officers. The School Fair officers would meet perhaps twice during the season to discuss matters pertaining to the welfare of the fair. Special duties were assigned each officer and director and their assistance was of untold value. The splendid business training these boys and girls would receive would no doubt stand them in good stead in future years.

The usual custom in years past has been for the District Representative to distribute the seeds and eggs to the schools in the spring, by motor or livery, which would afford an opportunity to give a little talk to the pupils on agriculture. During the past season, two or three Representatives undertook to distribute seeds and eggs by parcel post or express. This method of distribution worked out splendidly in spite of the fact that we were somewhat dubious about shipping eggs for hatching by parcel post. The eggs arrived in good condition, only an occasional one was broken, and the hatch was quite equal to those distributed in former years. These pasteboard boxes cost approximately one cent each, and the postage for the empty box is 5c, and for the box containing one dozen eggs 14 cents.

SPECIAL FEATURES

The special features worthy of more than a passing note are the live stock judging competitions for teams of three boys from each school, who are asked to judge two classes of live stock, generally beef or diary cattle and heavy horses, the public speaking contests in which from two to ten boys and girls compete; the boys and girls driving contest, which includes hitching and unhitching; the school fair parades; physical drill under the Strathcona Trust; weed and apple naming contests; and the exhibition of calves and colts led by the boys who spent considerable time training their pet animals.

Special mention should be made of the "Children's Tag Day" at the school fair, when patriotic Buttons were sold by three girls from each school. The response in most districts was generous. Last year $5,518.14 was collected from the sale of these buttons, and, after deducting expenses, a "motor carryall" costing

$2,000.00 was purchased and donated to the Military Hospitals Commission, to be used specially to convey wounded soldiers from the hospitals to the Vocational Training Classes at the University. The inscription on the plate of the carryall bears these words: "The children of the rural school fairs in Ontario, Canada, organized by the Ontario Department of Agriculture, donated this car from proceeds secured from the sale of patriotic buttons at the rural school fairs. held in the province, 1916." The balance of the proceeds was handed to the Soldiers' Aid Commission, to be used to relieve special cases of distress of returned men.

NORTHERN SASKATCHEWAN

BY FRED W. BATES, B.A., M.SC., DIRECTOR OF SCHOOL AGRICULTURE

WHATEVER the future may hold in store, the school fair is the best present-day means of arousing interest in the work of the school. It tends to break down that greatest of all hindrances to educational advancement—public indifference. It has undergone a severe testing, and has proven to be a most potent factor in bringing the school and the home into closer relationship and more sympathetic co-operation.

THE VEGETABLE EXHIBIT AT GRIFFIN, SASK., SCHOOL FAIR

RAPID DEVELOPMENT

In Northern Saskatchewan the movement continues to develop at a rapid rate. In 1916 there were 33 fairs, of which 6 failed to reorganize, but 25 new points took up the work, making a total of 52 for the year just ended. A few of these were local competitions among the pupils of a single school, but the great majority of these fairs drew support from 10 to 15 schools. As reports are still incomplete, it is not possible to give exact statistics, but it is estimated that over 400 schools took part with some 7000 children, making 15,000 exhibits.

HEARTY ENDORSEMENT OF TEACHERS AND TRUSTEES

The outstanding feature of the work in 1917 was the hearty and

widespread endorsation of the movement by teachers and trustees in convention. For several years school fairs have been held at isolated points, but within range of the observation of the teachers. Before 1916 only one of the school inspectoral districts in Northern Saskatchewan had a school fair organization. In 1916 a second inspectorate took steps toward complete organization, so that every pupil in every school might have opportunity to compete at a convenient centre. The past season a great advance in this line was made. Eleven of the remaining fourteen inspectorates, in convention assembled, endorsed unanimously the school fair movement, and adopted plans for complete organization for 1918. Only three remain unorganized, one of which plans to take the step early in the spring. Already many of the local centres in connection with the larger plans have organized, and are carrying on active preparation for this year's work.

THE RURAL EDUCATIONAL ASSOCIATION

The co-operation of the whole community is necessary to continued success in school fair work, but the active interest and sympathetic attention of the teacher are absolutely essential if the true educational value of the work is to be conserved. The Rural Educational Association, consisting of teachers, trustees and others interested in boys' and girls' work, continues to be the most popular form of local organization. In these associations everyone interested in the school and its work unites in the common enterprise.

OTHER AGENCIES JOIN IN

Of the other agencies at work, the agricultural societies have given the greatest assistance, sometimes in organizing the school fair, again by support and financial backing, making the work of the fair committee less difficult, and very frequently by enlarging their own prize lists so as to include school work. The grain growers, homemakers' and women's grain growers' clubs have all rendered valiant service.

COLTS AT SHAUNAVON, SASK., SCHOOL FAIR

THE WHOLE WORK OF THE SCHOOL DISPLAYED

In Saskatchewan the school fair is regarded as an exhibition of the whole work of the school. Its pro-

gramme has steadily developed toward that end. Of course much of the school work cannot be placed on exhibit, but every year sees some modification which broadens its scope. The most noticeable development during the past season has been the emphasis laid on music, public speaking and sports. The lack of traditions of play and song in our western communities has drawn attention to the need of greater attention to these activities. The school fairs have given special prominence to contests in rote singing, original story telling, sports and games, resulting in a greatly aroused public interest. Handwork, household science, agriculture and gardening will always hold a large place, and especially in the early stages of the work these may dominate the programme. However, the whole tendency is to develop a programme that will give the public a true idea of the whole range of the activities of the school.

The school fair movement continues to develop. It is more popular than ever. Few centres drop out after once attempting the work. There were 33 fairs in 1916, 52 in 1917, and, if present plans carry, there will be 100 at least in 1918. The school fair is meeting a need at present, and until some better device or project is developed to meet that need, it will remain with us and continue to grow in extent and popularity.

SOUTHERN SASKATCHEWAN

BY A. W. COCKS, B.Sc., DIRECTOR OF SCHOOL AGRICULTURE

THE discussion of educational matters during the past two or three years in the Province of Saskatchewan has created considerable public interest in this important question, but the one agency which has done most during this period to direct the attention of the public to educational affairs, and more particularly to local conditions, is the school fair. The splendid support, financial and otherwise, given by the people of the province the past year to school fairs has been most encouraging. In Southern Saskatchewan at least 90 fairs were held during the fall.

On an average ten school districts would co-operate for the purpose of the fair, which would be held at some convenient centre, usually a small village or town. It is estimated that the average attendance was about 200 children and 200 adults, and the average number of exhibits 500. For the whole province this would mean that approximately 35,000 children and 35,000 adults took part in school fairs in the province during the fall of 1917.

DEVELOPMENT OF THE MOVEMENT

The growth of the movement appears to take place in three fairly well-defined steps. First a single fair is organized by an inspector or a teacher or teachers' association or a homemakers' club, or some other interested individual or organization. This fair may be for the pupils of one school district or a number of school districts may join together and send their exhibits to some central point. Occasionally this first fair is held at the time and place of the teachers' convention for the inspectorate. The next step is the organization of a large territory, such as an inspectorate, a number of local fairs being organized at different points throughout the inspectorate, and a central fair at which the winners from the local fairs will compete being conducted by the teachers' association in connection with the fall convention. This plan has worked very successfully in the inspectorates of Yorkton, Balcarres, Kindersley and a few others. The next step and one which

the Department wishes to encourage is the formation at each of these local centres of a Rural Education Association. This association will be responsible for the school fair work of a municipality or other suitable unit of territory. In addition this association will make itself responsible for many other kinds of educational work, such as boys' and girls' club work and contests of various kinds; the organization of literary societies, debates, entertainments, short courses in agriculture, household science, home nursing, poultry keeping, etc. There are over 50 of these associations in the province at the present time, and with few exceptions all of them have held successful school exhibitions this fall.

INVALUABLE

From all parts the Directors have received reports which indicate the greatest interest and enthusiasm on the part of pupils, teachers, parents and ratepayers generally. Farmers have been known to stop their harvest work and hitch their horses to waggons and democrats in order to drive the children and their exhibits to the local fair. One such man was heard to say, "This half day has cost me $80, but its worth it." In another case the teacher and pupils of a rural school were taken by the owners of automobiles a distance of 72 miles to the school fair. These children, who started from home at 5 a.m., were so full of enthusiasm and energy that they were able to win prizes in the singing, spelling and athletic contests after their long drive.

THE PRIZES

The committees in charge of arrangements had little difficulty in enlisting financial aid. Usually each school board contributed five or ten dollars and the municipal council often gives a small grant. The business men of the towns and villages are quite generous with special prizes. One merchant offered a pony worth $125.00 as the first prize in a spelling contest.

THE JUDGING

The judging was done by farmers, business men, teachers and representatives from the Department. This judging was not always an easy matter, and the ability of the farmers, their wives and other judges was often severely tested, but it is safe to say that no judge at the Provincial Exhibition at Regina ever gave more serious consideration to his decisions, and that no decisions were ever awaited with more eagerness and received with more general approval than those made by the judges at the school fairs.

BEST DAY OF THE YEAR

And what does the school fair mean to the children? Without doubt it is the best day of the year. It is their day. For weeks and months they have been preparing their exhibits from the garden, from the classroom and the great outdoors. They have been practising spelling, reading, singing, reciting, writing and physical exercises, and at last everything is ready for the fair. With happy faces, shining eyes and busy tongues they are driven in decorated waggons, buggies, democrats and autos to the chosen centre. While the judging of exhibits is in progress, the athletic contests are the centre of attraction, and this seems to introduce the pupils from one school district to those of another, and for the rest of the day there are no strangers. When the prize ribbons have all been attached, pupils, parent and friends commence a tour of inspection.

PRIDE OF THE MOTHERS

What a scene! One little fellow discovers he has a prize for his collection of weeds. His eyes sparkle with excitement and he exclaims,

"Oh, look! Where's mother?" He must show mother, and then, with justifiable pride, mother's eyes brighten too, and together they continue the search for more delightful surprises. The sewing and cooking naturally attract mother's eye, and she comments on the good work accomplished. "They only started this last spring, you know, after they knew there was to be a fair," she informs an interested neighbour, "I wish we had done some of this work when I was at school."

Next comes a splendid selection of insects. One of the teachers explains that the boy who made it was hardly interested in nature study at all a year ago, but the thought of the fair had spurred him on to work for his school, and now he was a nature enthusiast. The art work reveals much latent artistic talent, while the compositions indicate the power of clear expression aud lucid thought seldom credited to our prairie pupils.

THE FARMER OF THE FUTURE

The vegetables shown at one of the school fairs would have done credit to the province at the International Soil Products Exposition, and are evidence of careful cultivation and good selection on the part of the young gardeners, the future farmers of Saskatchewan.

The hand-work often is also a revelation to many of what skilful fingers can accomplish. Then there are usually classes for live stock of various kinds, and the children are very anxious to have a prize ribbon attached to their pets, whether they be pigs, dogs, chickens, colts, calves or white mice.

ALL IS GOOD

As the darkness begins to fall the crowd gathers in some hall or one of the rooms of the school for the concert. The children provide the programme with perhaps the exception of one or two addresses, while parents watch with natural interest and pride the contests of singing, elocution, spelling, etc. One gentleman, who came to Canada years ago from Austria, and who now possesses a good Canadian home and a prosperous farm, but whose knowledge of English was still very meagre, was asked his opinion of it all. "Fine," he said, "Good work, good schools, good teachers. My boy speak English good now; good country—good everything." No further comment is necessary.

At such conventions many of the exhibits are frequently sold by auction and the proceeds given by the committee to the Red Cross Society, the Belgian Relief, or some other patriotic organization.

A COMMUNITY BUILDER

The grain growers' organizations, agricultural societies and homemakers' clubs have supported this movement, and in some instances have been entirely responsible for the fair. The Tantallon fair, which was held for the first time in the fall of 1915, is an example of a fair held under the auspices of an agricultural society. This year the entries at this fair numbered over 1,000. In referring to the fair at Tantallon a Grain Grower writes, "But there is another feature which should not be lost sight of, and that is the effect of the school fair as a community builder, especially as it affects our foreign population. In this particular district are people of various nationalities, many of the children of which never mixed with those of other races. The school fair, however, brought to them an opportunity which was almost unique of acquiring in the most pleasant way a knowledge and understanding of races other than their own. This cannot fail to have an influence on the parents and must contribute much to the making of the Canadian nation of the future." These remarks are equally applicable to the majority of the other fairs.

A PERMANENT AND VALUABLE FEATURE

One splendid feature of the school fair movement is that it is chiefly dependent for its success and support upon local enthusiasm and initiative. While anxious to foster the growth of the movement, the Department of Education exercises little or no parental control over it, but through its officials renders as much assistance as possible. The inspectors of schools and other officers of the Department assist in the organization and act as judges, but no financial aid by way of grants is given by the Department. Being practically independent of Governmental control and financial support the school fair will remain a permanent and valuable feature of our educational system, so long as it is able to attract and retain the interest and support of the local community.

ALBERTA

BY JAS. McCAIG, EDITOR OF PUBLICATIONS

THE work in connection with the school fairs in the Province of Alberta has followed much the same lines as in previous years, but it has expanded considerably both with respect to the number of fairs held and with respect to the work carried on. During 1916 the number of schools organized for school fair work was only eighty-five; during 1917 one hundred and fifty-seven schools were included, an increase of over 80%. In addition to there being a larger number of schools there was also a decided improvement in interest on the part of the public, and the attendance was very large, in some cases reaching up to about two thousand people, and in the majority of cases running from four to eight hundred. The quality of interest, likewise, was much greater than in the case of the ordinary mixed district fair. The limitation in the classifications and the fact that the work was done by children both led to a concentration of attention on the kind of work that is being done.

NOTICEABLE IMPROVEMENT

The standard classes of competitions among the pupils of each school included potatoes, carrots, beets, parsnips, turnips, mangolds, peas, bouquets of cut flowers and chickens. This work was practically the same as last year, but there was an improvement shown in such matters as grading of potatoes, and in the smoothness and quality of all classes of garden products. The household science work included sewing and embroidery and darning; the making of tea biscuits and cakes; the canning of vegetables and fruits, and the preparation of school lunches. In grains, prizes were offered for sheaves of wheat, oats and barley, and also for hand-picked grain of wheat, oats and barley. The live stock classes were represented by pail-fed dairy heifers; pail-fed beef heifers and steers, and halter-broken and groomed foals. In addition to this, in all the fairs there were numerous miscellaneous classes, differing in different districts according to the tastes of donors and directors of the fairs. They included such matters as collections of weeds, collections of insects, collections of sewing, pure-bred calves, mixed stock exhibits by school pupils.

THE BANKS HELP

At the Olds fair there was a fine exhibit of hogs, which was provided for by the co-operation of the district agent with the manager of the Bank

of Commerce. The pig-growing contest is really a miniature farm enterprise, which includes financing, feeding, breeding and selling. Each boy or girl wishing to enter the competition borrows sufficient money from the bank to buy two pigs. He feeds the pigs during the summer and sells one of them to retire the note, which bears 6%. The bank also gives prizes amounting to 6% at the fall fair. The other pig is kept for breeding purposes, and the success or failure of this work will have to be told the following year. All the animals shown gave evidence of good care and attention and while the original pair only cost thirty-two dollars, some of the single pigs sold as high as forty-five dollars on the day of the fair.

THE LIVE STOCK

The exhibits in live stock on the whole this year were not especially strong, principally owing to the same press of work that limited the exhibits at the regular fall fairs. The importance of this side of the work is being realized to a greater and greater extent by the district agents and, in future, more attention will be given to the care of calves, colts and pigs, as it is felt that this class of attention and work on the farm is really what develops the best class of industry and skill in farm enterprise. The Department is satisfied with the work that has been done in school fairs to date.

In addition to the school fairs held directly under the supervision of the district agents there were a number of small fairs held in the province under purely local patronage, and many of these possessed an interest quite equal to those held under official direction.

BRITISH COLUMBIA

BY J. C. READEY, B.S.A., DISTRICT SUPERVISOR OF AGRICULTURAL INSTRUCTION, CHILLIWACK, B.C.

A UNIVERSAL restlessness, a vague but real craving in the soul of man, a general dissatisfaction with the condition of things, has characterized the world during the past few years. It may be that the emphasis had been shifted from the things that endure to those things that have to do with external appearances. Whatever the reason for the restlessnes has been, not many departments of human relationship and activity have escaped the lash of at least a considerable portion of public sentiment.

THE UPWARD TREND

Nor has our systems of education escaped. Even the man on the street has that vague feeling that something is not right with the finished product of our schools. While the load is light a machine with a flaw may stand, but when the strain comes the flaw gives way and the service suffers. For the first half-century at least the world has moved on comparatively care-free and without a test. As a consequence of the ever-increasing carelessness, and with a gradual lowering of ideals characteristic of human weakness under prosperity the inevitable came, and we began to feel the want of that which is enduring. Culture is desirable, but it does not supply all the needs of the human race. Men must be served in vital ways, food and clothing, and a thousand other ministrations must be provided under our too complex civilization. Culture and the ideal of service must be combined in our educational systems, and we are beginning to realize, and how slowly we came to it, that the highest culture a human being can possess

is the desire and ability to serve. And so we understand now that the enduring part of an education, that for which the heart of humanity really craves, is qualification for service to others.

CORRELATION A NECESSITY

Since the ministration to the needs of human society requires the exercise of the muscular system as well as the mental faculties, it would seem clear at once that any system of education which does not correlate these two is at fault. To know "why" is an aid to intelligent action, but it does not supply the skill to act. There is nothing degrading, and there need be nothing mercenary, about the study of geometry when its problems are worked out in the construction of an article of utility or on a farm drainage survey. The "purity" of chemistry need not suffer nor the student of chemistry feel lowered in his cultural standing if the laws of that science are studied in connection with bread-making or soil-cultivation. But what a difference it does make when the boy or girl comes to the place where their contribution to human welfare begins if a trained and cultured mind, a mind appreciating and in harmony with its environment, finds a ready and skilful response from a trained and cultured hand.

THE PART AGRICULTURE PLAYS

Agriculture as a school subject lends itself well to this two-fold education. Science and art, mental and muscular development, potential pleasure and service are so well combined in the study of this subject and the cost of the necessary equipment so light that agriculture has been almost universally chosen to meet the universal demand for something to complete the training for service, and British Columbia, along with the other provinces of Canada, has given it a place in her list of elementary and secondary school subjects.

THE PART OF THE SCHOOLS

In 1915, the work was opened up in the public schools of Chilliwack city and rural district and in the Chilliwack High School. It became apparent very shortly that the greatest problems came from the public schools. People did not recognize in the subject the answer to their demand for a better education. Teachers were untrained, though usually friendly in their attitude. A supervisor was put in charge, whose duty it was to give instruction in agriculture in the high school and to advise and assist the teachers in the public schools.

The support of public sentiment was necessary. A parent's interest in the attainments of his or her progeny seemed to be the vulnerable point and, consequently, the point of attack. An exhibition of produce grown by the pupils seemed to be the weapon. Accordingly, a small exhibit was made at the annual Chilliwack exhibition in September 1915, and following that a larger and better one was made the following year.

TAKES THE PLACE OF THE REGULAR EXHIBITION

Early in the present year the Directors of the Exhibition Association decided not to hold the annual fair. About the same time a call for patriotic production was issued by the Director of Elementary Agricultural Education for the province. The response to the call by the teachers and the boys and the girls was instant and unanimous, so that the summer of 1917 saw almost all of the space available for school gardens planted to carrots, potatoes, onions, and beans for the local evaporating plant. But since there was no occasion upon which an exhibit from the gardens could be made, the exhibition having been

cancelled, the local supervisor with the concurrence of the two school boards, prepared to hold the first school fair in Chilliwack.

THE PRIZES

The regular prize-list was continued and a large special prize-list was added. The regular prize-list offered prizes for the best exhibits selected by the pupils from their own school gardens. These were competed for by the one-room schools, two-room schools and schools with three or more rooms, respectively. The special list offered prizes for bird-houses, chicken feed-hoppers, corn, oats, eggs, garden plants, painting, composition, and biscuits, as well as competitions in grading potatoes and judging mangels. The special prizes totalled one hundred and fifty dollars, and consisted of cash and goods donated by the citizens of the city and district. The fair was held in the fine, new drill hall, and it was most gratifying to those interested that at times this building was almost filled to its standing capacity. There were three hundred and forty-three entries. In the biscuit class alone sixty dozen were shown—no easy task for a judge. The potato-grading and mangel-judging competitions excited very great interest.

Prof. P. A. Boving of the University of British Columbia judged the agricultural products. Local men and women officiated in the other departments. Besides acting as judge, Prof. Boving donated a handsome silver cup to the winner in the mangel-judging competition.

PRODUCE OF THE SCHOOL GARDENS

A unique feature of the fair was the exhibit of all the produce grown in the school gardens. This produce was sacked and piled in one large stack at the end of the hall. The stack comprised seven tons of potatoes, eleven and one half tons of carrots, and two tons of onions, a total of twenty and a half tons. The sale of this produce brought three hundred and sixty dollars, and was the product of slightly over one and one-half acres. The proceeds go to the fund opened by the Department of Education for contributions by the school children of the province for patriotic purposes.

This particular school fair has fulfilled its mission. Prejudices have been weakened, and in some cases completely broken down. The slogan of the fair, "We do as well as we think," appealed to all because it was unmistakably demonstrated. The skill shown in the preparation of most of the exhibits was beyond expectation, so that the educational attainments of a large number of boys and girls resulting from their efforts will be a factor in their usefulness throughout life.

During the war I will carry out every suggestion made by Food Controller Hanna, whom I have known intimately for twenty years. Mr. Hanna is a man of extraordinary ability and broad experience. He is handling the worst job that could be invented, and he is handling it better than 99 per cent of the men in Canada could handle it.—*Honourable Duncan Marshall, Minister of Agriculture for Alberta.*

WOMEN'S INSTITUTES AND THE RURAL SCHOOL

PRINCE EDWARD ISLAND

BY HAZEL L. STERNS, SUPERVISOR OF WOMEN'S INSTITUTES

IT is one of the aims of the Women's Institutes of Prince Edward Island to bring into closer relation the home and the school. To accomplish this, parents must be brought into sympathy and co-operation with the school, and how better can this be done than by bringing the mothers face to face with the unsanitary conditions surrounding the children, and in that way make them realize more fully the necessity for improvement.

Since the organization of the Women's Institutes in Prince Edward Island, there has been a marked improvement in many of the rural schools of the province. The Institutes are organized to include one, two or three school districts, and at present 55 schools receive the benefits of the Women's Institutes.

This improvement may be largely attributed to the fact that many of the Institutes hold their regular monthly meetings in the schools and the need of bettering conditions there has been brought more closely to the attention of the Institute members.

SANITARINESS AND COMFORT

To abolish the open water pail and common drinking cup for a covered drinking fountain and individual cups has been the first work of nearly all the Institutes. The worn soft wood floors of many of the schools have been replaced by the more sanitary hardwood floors. The school-rooms have been painted inside and out, new desks, blackboards, blinds and maps have been supplied where needed, and some districts have had the school grounds fenced.

The Institutes have endeavoured to encourage good reading among the children, and in several districts splendid school libraries have been started through their influence.

In addition to these general improvements the different Institutes have taken up various phases of this work. One progressive Institute took the entire responsibility of putting the primary department of their school in first class condition, with the result that their work was an incentive for the district to bring about improvements in the other departments of the school.

In some districts a committee of Institute members are appointed to visit the schools regularly. One Institute supplies the children with bulbs and flower seeds in order to encourage home projects, while other Institutes encourage the children by giving prizes to the school.

DEVELOPMENT OF TASTE

The Institutes have aimed to develop the æsthethic side of the pupils' natures by having window plants in the school-rooms, suitable pictures on the walls, and in many ways making the rooms more attractive, so that not only will the children have the pleasure of working in more comfortable surroundings, but they will as a consequence do more efficient work.

When the Institute meetings are held in the afternoon, the children are occasionally invited to remain and to assist in the program. At one of these meetings held recently, the program consisted of an exhibition

in physical drill by the children under the direction of the teacher.

With the urgent call for patriotic work, there has necessarily been a decrease during the past months in the amounts of money voted for school improvements, but the interest in the schools is being kept up.

We look forward to the time when the Institutes will be free to carry on this work to a greater extent, and the members, working with a will and a spirit of co-operation, shall increase the efficiency of the public schools of the province.

NOVA SCOTIA

BY JENNIE A. FRASER, SUPERINTENDENT OF WOMEN'S INSTITUTES

THE Women's Institutes of Nova Scotia have been taking an active interest in the improvement of rural schools ever since the first organization in 1913. Co-operation with the teachers has been aimed at and successfully carried out. The sanitary conditions have been greatly improved and the surroundings beautified in many districts. The covered water container and the individual cup have been introduced, libraries have been encouraged, globes and maps donated, school fairs instituted, classes to teach the girls sewing formed and conducted by the members of the Institute, and what is perhaps the most important the cleanliness of the interior of the schools has been faithfully looked after and insisted upon.

QUEBEC

MACDONALD COLLEGE

BY MRS. CAMPBELL-MACFARLANE, DEMONSTRATOR FOR HOMEMAKERS' CLUBS

BESIDES the school lunch demonstrations described by Miss Jeanette Babb, in THE AGRICULTURAL GAZETTE, November No. page 978, the Homemakers' Clubs have arranged to have demonstrations for the school children on the making of bread and cake and the canning of fruits and vegetables, in order to help them with their school fair work. The result has been a gratifying improvement in the quality of the exhibits. The displays of canned goods, hitherto unseen at school fairs, were highly creditable to the children and evinced their interest in doing their best towards saving food in war time.

Nearly all of the clubs are taking special interest in the welfare of the schools, and many improvements have been brought about directly or indirectly by the influence of the individual club in its own district, i.e. improvement of sanitary conditions; improvement of play grounds; beautifying of the walls by means of good pictures; contributions for prizes at school fairs, etc.

This year the clubs propose to hold at least two meetings which shall be devoted to the subject of the education of the children to the end that they may become good citizens of the state. Teachers and the other authorities on education will be asked to address these meetings.

ONTARIO

BY GEO. A. PUTNAM, B.S.A., SUPERINTENDENT OF INSTITUTES

WHEN the Women's Institutes of Ontario began to consider lines of activity for community betterment, their attention was naturally directed to the public schools. The Institutes, as is well known, have touched many local interests, but in no field of interest have their activities been of greater benefit to the youth of the land than their work in connection with the schools.

They started by appointing committees to visit the schools and co-operate with the teachers and trustees for planting out trees and flowers, vines and shrubbery, the two latter partly for the purpose of screening out-buildings. The interior of many schools have been cleaned and freshly painted, new blinds put up, educative pictures hung upon the walls, etc. The water supply has been examined, and much improvement has resulted in this respect. Drinking tanks have been installed, and in a few cases drinking cups introduced. Sanitary wash-basins, soap and towels have also been provided, while much improvement has been made in the sanitary conditions of the schools.

The funds for this work have been raised in many cases by concerts, socials, etc., held under the auspices of the Institute, while a number of school boards have assisted in financing the work.

INTEREST IN SCHOOL FAIRS

The Women's Institutes have been an important factor in making the school fairs such a decided success in Ontario, and much encouragement has been given to the school children in some districts where they have no school fairs by the distribution of seeds and bulbs for home gardens, and the holding of special school exhibits in the fall. School gardens have also been encouraged by the Institutes.

The girls in the public schools have been encouraged in sewing by the women of the Institutes giving the necessary instruction and donating prizes for the work done. Prizes have also been given by the members of the Institute for baking done by the girls, and in a few instances the boys have been included in this latter competition. New seating accommodation, graded to suit the children of all sizes, has been secured for a number of schools.

HEALTH AND RECREATION

The health of the children has always been kept in view. Medical inspection has been made possible in a few centres through the co-operation of the school boards, the local Women's Institutes and the Department of Agriculture. A somewhat detailed report on this feature will be found in the Women's Institute report of 1916. Tooth brush drill has been a feature in a few schools, and a clean-mouth league has been formed to encourage the children in the care of teeth. Special cupboards have been installed for the children's lunches.

In a few of the larger towns, special encouragement and direction has been given to the children in helpful entertainment and recreation. School concerts have been encouraged, and in some localities a literary society has been formed through the efforts of the Institute.

In a few centres a regular school field day has been organized and managed by the Institute. Prizes have been donated as a recognition of progress and ability in essay writing.

The Institute has been instrumental in organizing a parents and teachers association, including men and women, in order that the best interests of the school may be always kept to the fore.

MANITOBA

BY S. T. NEWTON, SUPERINTENDENT, EXTENSION SERVICE

DURING the past year the public school has not received as much attention from the Home Economic Societies as usual, owing to the fact that the attention of the women of the province has been concentrated on the various Win-the-War plans. However, the children have not been entirely forgotten, and at the present moment a great deal of attention is being given to Boys' and Girls' Club work. Almost every club in the province has a member of the Home Economics Society as one of its directors, and their energy has not been confined to the strictly Home Economics contests. They have encouraged chicken raising, gardening, pig and calf raising as well, and have rendered splendid assistance in raising funds for the school fairs.

In the matter of canning and preserving they first encouraged the children to plant the garden seeds, the products of which would be suitable for canning, and then arranged for canning demonstrations, and as a consequence a large amount of perishable food has been successfully canned for winter use by the school children.

The Home Economics Societies have co-operated with the health department in assisting the school nurses, and have consistently advocated medical inspection in the schools. In a considerable number of cases they have lent their assistance in beautifying the school premises both inside and out.

An increasing number of H.E.S. members are serving on school boards, and through them have succeeded in effecting many changes which are a direct benefit to the school children.

Wherever cookery and sewing demonstration lecturers have been spending a week in connection with the various societies, they have made it a point to get as many of the girls interested as possible, and the success of the cookery and needlework exhibits at the school fairs is due to their co-operation with the public and high school teachers.

BRITISH COLUMBIA

BY WILLIAM J. BONAVIA, SECRETARY, DEPARTMENT OF AGRICULTURE

IN certain districts of the province, Women's Institutes have been instrumental in getting vastly improved conditions in rural schools with regard to equipment and surroundings, such as school gardens. On Vancouver Island, in particular, certain institutes have taken up this matter very keenly, and competitions have been organized which will no doubt have a far-reaching effect on the young students with regard to interesting them in agricultural and horticultural matters.

The first work that the Women's Institutes of British Columbia have attempted amongst the schools of the province was the starting of school gardens.

On Vancouver Island several of the institutes supplied the schools with seeds and interested ladies visited the schools at regular periods to assist the children in their work, but unfortunately the school trustees in some places did not have sympathy with this movement and it was dropped in these places.

In 1913 the Department of Agriculture distributed assorted packages with 12 pkts. of flower and vegetable seeds in each to schools applying through the Women's Institutes. The experiment was successful, and many schools made creditable showing at the flower shows and fall fairs. The following year this work was taken over by the Department of Education. In many districts the improved schools surroundings are due to this first interest taken by the institutes.

Arbour day has been observed at a few schools through the interest of the institutes, and some provide school sports that afternoon.

School committees have been appointed at each of the four institute district conferences to plan and suggest ways whereby the teachers, trustees and institutes might work together to improve school conditions, but unfortunately before anything definite had been attempted the urgent call for patriotic work came before the women and their plans have been "laid on the table" for the present; still we are glad to state that a number of energetic school committees are working locally.

EDUCATIONAL, SANITARY AND MEDICAL IMPROVEMENT

Sewing classes have been started in a number of the schools; improved sanitary conditions in a good many; sanitary cups and towels instituted; better lighting and ventilation (for these are especially noted); and on Vancouver Island some institutes were instrumental in procuring a proper supply of drinking water.

The Central Park W.I. was the means of having hot lunches at two schools, soup, bread and cocoa being served for 5c. Other W.I.'s have arranged for hot cocoa to be served at noon.

For some years the institutes have asked for medical and dental school clinics, the majority of the rural scholars not being within easy reach of medical help, and the cost of minor operations to correct defects of ears, throat and teeth being almost prohibitive when the cost of reaching a medical or dental centre had to be met.

Last year the institute conferences added to their requisition the request that the Provincial Board of Health arrange for medical and dental practitioners to visit the various districts, so that the children might be treated at convenient centres.

The Provincial Board of Health, realizing the interest taken by the institutes, has asked for their co-operation in improving sanitary conditions amongst the schools.

Quite a number of the Government travelling school libraries have been Procured by the institutes and placed in the schools; the matter of forming parent-teacher associations was discussed at the fall conferences, also the question of the school penny banks.

It is hoped that some rural schools may have the benefit of this penny bank saving plan, our children are learning the grace of "giving" in their patriotic plans, and they also need to learn the grace of "saving."

PRINCE EDWARD ISLAND

HOME PROJECT WORK IN THE SCHOOLS

BY J. E. McLARTY, CHIEF, RURAL SCIENCE DEPARTMENT, PRINCE OF WALES COLLEGE

IN the spring of 1917 an appeal was issued to the school teachers of Prince Edward Island to enlist the energies of their pupils toward assisting in any way possible the great national movement for "increased production." A circular issued by the Rural Science Department of Prince of Wales College gave the following suggestions as work worthy of being conducted:—

SUGGESTIONS FOR RURAL SCIENCE PATRIOTIC WORK

The necessity for increasing the food supply of Canada is apparent to everybody. In the next few months the producing powers of our country will be strained to the limit to help provide the necessary food products to feed the great armies of the allied nations. Here is a great opportunity for every school teacher to do real good patriotic work by encouraging and stimulating the Home Project Scheme together with intensive cultivation of your School Garden, if you have one at your school. Think of the amount which can be added to the food supply of P.E. Island, if every one of the 18,000 pupils enrolled in our schools can be induced to expend some of their energy along this line.

It would be well, during the war, as they are doing in other places, for every teacher in P.E. Island to endeavour to have a great part of the school garden given over to growing vegetables, rather than flowers. In addition to this, if each pupil in the schools could be induced to conduct some Home Project with the purpose of increased production great results could be accomplished. These projects may take the form of

1. Growing potatoes, turnips, sugar beets, oats, wheat, and other vegetables and grains.

2. Improving the poultry flock by careful feeding and watering, and increasing the quantity and quality of eggs produced by keeping houses and nests clean, gathering the eggs regularly and keeping them in a cool, dry, clean place until they are marketed, which should be done as regularly and frequently as possible.

3. Feeding calves or pigs.

4. Assuming some of responsibility in connection with some of the "chores" about the home.

5. Hiring with one of your neighbors for Saturdays and holidays.

6. Assisting where necessary at patriotic functions.

Make a supreme effort to have the pupils of your school among the ones who are doing a part to increase the food supply of the country.

Arrangements were made with a firm of local seed merchants to supply the schools with vegetable and flower seed at a special rate, also with Mr. Clark, Superintendent of the Experimental Farm, by which a limited supply of potatoes, oats, barley and flax was made available at special prices to school children. Through Mr. Kerr, Dominion Poultry Representative, settings of eggs from pure-bred "Bred-to-Lay" Barred Rocks were supplied by some of the leading poultrymen of the province for poultry improvement work.

The schools took willingly to the work, as is evidenced by the following returns taken from the midsummer reports by the teachers:—

SUMMARY OF REPORTS RECEIVED ON HOME PROJECT WORK

	No. of Pupils
Beans	202
Vegetables	1,235
Flowers	225
Live Stock	106
Poultry	200
Grain	4
Strawberries	8
Sewing	78
Chores	113

The ultimate success of the work cannot be fully ascertained until the teachers report for the second half

year, but judging from the casual reports received, and the exhibits made at school fairs, many good results have been accomplished. The reports received include 93 schools where gardens were conducted at the schools, and 175 schools where home projects only were carried out.

This year we hope to carry on the work somewhat along the same line, but introducing new ideas wherever possible to do so.

NOVA SCOTIA

PIONEER WORKERS IN RURAL SCIENCE

IN the training of teachers in the province of Nova Scotia special attention is given to their preparation for school gardening and instruction in nature study. In the normal school training all the teachers get the rudiments of these subjects. In the spring months the best of the students are selected and placed in a class by themselves for special garden training. They take charge of the planting of the Truro school garden and of the greenhouse and hotbed work. When the summer school is in session the students care for this same garden, and in the fall the crops are gathered and the flower seeds are saved by the new class that has just arrived for the regular normal winter term. Thus the one garden supplies some of the training of the three groups of students. From the general group that harvested the fall crops a special group is chosen to plant the garden the following spring. It is from this special group that teachers are secured to carry on much of the pioneer work throughout the country.

QUEBEC

INSTRUCTION IN POULTRY RAISING

MACDONALD COLLEGE is carrying on an important extension service in connection with poultry raising. The Poultry Department of the College, working through the rural schools, encourages the children to take an active interest in the work on the farms, and at the same time gives them an opportunity for doing practical work in poultry production.

The method employed is the distribution of hatching eggs to the school children and the holding of rural school fairs, where the chickens raised from the eggs supplied are exhibited. Eggs from a good strain of a pure breed of fowls are supplied free of cost to the most deserving pupils, each pupil receiving twelve eggs, on the simple condition that each applicant agrees to do the best possible with the chicks hatched and to show them at a rural school fair held in the district.

At each fair a prize list is arranged which stimulates keen competition and provides as large a number of prizes as is consistent with the object in view.

This work was started in 1913 when 100 settings of eggs were distributed; in 1914 there were 425 settings distributed; in 1915 there were 610 settings distributed; in 1916 there were 541 settings distri-

buted; in 1917 there were 658 settings distributed. There were three rural school fairs held in 1913, nine in 1914, fourteen in 1915, thirteen in 1916 and twenty-one in 1917. Each succeeding year has been an increase in the number of chicks raised per pupil and an improvement in the quality of the stock.

This work is having a decided influence in improving poultry-raising conditions in Quebec.

ONTARIO

LANTERN SLIDES FOR AGRICULTURAL CLASSES

BY J. B. DANDENO, INSPECTOR OF ELEMENTARY AGRICULTURAL CLASSES

THE agricultural extension service of the International Harvester Company provides slides for educational purposes free to schools which can profit by them. The secondary schools of Ontario, which are conducting classes in agriculture, and the seven normal schools have been arranged in three circuits with an average of ten schools in each circuit. For each of the three circuits there are eight sets of slides, that is to say, eight topics each illustrated by about 50 or 60 slides excellently arranged both for illustration and transportation. The circuit is arranged so that each set moves from school to school in regular order, remaining at one school for one week. The operation of the circuit closed on Dec. 15th, 1917, and opens up again on January 15th, 1918, each school holding whatever set may be on hand on December 15th until the circuit opens on January 15th.

The subjects covered by the slides are Corn, Dairying, the Housefly, Live Stock, Poultry, Soil Fertility, Home Economics, Canning. The slides for each subject are so arranged as to be useful for lecture purposes or for illustration to classes in schools. Most of the teachers of agriculture make use of the slides for public meetings in the locality and some as part of a programme for the school literary society.

A few of the schools where agricultural classes are conducted have not as yet lanterns, consequently these schools are not on the list.

The following schools form the circuits for 1917-18:—

School	*Post Office*	*Teacher*
High School	Whitby	G. S. Johnson
High School	Port Hope	G. G. Copeland
Collegiate Institute	Cobourg	R. D. Davidson
Collegiate Institute	Picton	H. H. Graham
High School	Oakville	W. B. Wyndham
Normal School	Hamilton	G. A. McMillan
Normal School	London	John Dearness
High School	Niagara Falls South	W. A. Porter
High School	Essex	Norman Davies
High School	Leamington	G. A. Campbell
Collegiate Institute	London	J. F. Calvert
Collegiate Institute	Woodstock	Miss M. I. Shook
Normal School	Stratford	J. W. Emery
Collegiate Institute	Clinton	J. W. Treleaven
High School	Arthur	A. R. McRitchie
Continuation School	Drayton	G. A. Clark
High School	Kincardine	F. V. Elliott
Collegiate Institute	Brockville	F. P. Smith
Collegiate Institute	Smith's Falls	G. W. Bunton
High School	Winchester	F. J. Barlow
Normal School	Ottawa	G. A. Miller

School	*Post Office*	*Teacher*
Normal School	North Bay	H. E. Ricker
Continuation School	New Liskeard	Miss I. E. Dobbie
Collegiate Institute	Fort William	A. J. Madill
High School	Athens	J. E. Burchell
High School	Williamstown	J. A. Cooke
Normal School	Peterboro	E. E. Ingall
Collegiate Institute	Renfrew	W. D. Hay

No charts have so far been made use of, but we are planning to introduce this feature later on.

SASKATCHEWAN

MUNICIPAL AGRICULTURAL SCHOOL

BY A. KENNEDY, M.A., INSPECTOR OF SCHOOLS

I AM grateful for expressions of appreciation that have reached me in which the South Weyburn school has been spoken of as being very nearly a perfect illustration of what a rural school should be. I have endeavoured to make it so, and since the day on which the Board accepted my recommendation, I have had the fullest co-operation of every man, woman and child in the district, so that it would have been my fault had progress not been made. Progress is still being made and the end is not yet. Only a few weeks ago Miss Eunice Bennett, the teacher in charge, undertook the noon-day lunch at an initial outlay of $19. In the course of our conversation she jokingly remarked that she could saw a board straighter than I could. "Well," I said, "we shall see." At my request the Board purchased the saw and the board,—also incidentally, a hammer, a plane and one or two other tools. Miss Bennett is now proceeding to saw the board, and with the assistance of the children is installing the cupboards, shelves, etc., for the kitchen, using one of the cloak rooms for this purpose. They have taken a contract away from a carpenter, and are undertaking the installing of shelves in the library room. When that is completed they intend to build a library table, and the Board has already at my request, provided for a number of magazines, journasl, etc., for this table. I trust the Department of Education as well as the Department of Agriculture, the Department of Municipal Affairs, and the College of Agriculture, will manifest interest by putting this school

A. KENNEDY, M.A.
Inspector of Schools, Weyburn, Sask.

on the mailing list so that bulletins and other literature will go on this library table for the use of the children, and the community. I will go further and ask that one of the

Government libraries be established in this school.

EXAMPLES

To indicate the striking typical efficiency of this school and its possibilities for the future, permit me to note the following incident. A few days ago, I was called from my Normal School Class to the telephone. "Mr. Kennedy, will you tell me on what dates the School Garden exhibition was held in 1915? I am Wilfred Spafford of South Weyburn school, and am writing a letter to *The Grain Growers' Guide.*" It is impossible to convey in this letter the tone and spirit in which this request was made. As I walked back to my class I realized the deep significance of this telephone conversation and the possibilities of a real, living education for our boys and girls. I am quite confident that Wilfred accomplished more in the twenty minutes required to write that letter than is accomplished in the usual manner in twenty days; that his interest in the subject matter and his pride in writing a good letter gave him more of English composition, more of neat, businesslike writing, more of correct spelling and punctuation, more of efficiency, than would have been secured in the too generally accepted way.

On Sept. 17, 1909, I visited Hale S. D. 2044 and found there four children; my recollection is that not one of the four children spoke English at home. My attention was attracted to the "baby" pupil, a boy about six years old, and I was pleased to note some excellent work on his part. I was further attracted to him at the recess-period when the little fellow shyly asked Mr. A. M. Warner, the teacher in charge, if I would visit the garden. I shall not soon forget that little boy's beaming face as he looked up at me from beside his little plot and pointed with interest and pride to his tomato plants. That boy gave me the inspiration and showed me the possibilities of school garden work.

On February 29, 1916, Wilfred Spafford gave me an inspiration and opened to me a door into a larger future. The ring in his voice over the telephone wire will remain with me alongside the picture of that little six-year-old boy, whose name, unfortunately, I have forgotten. I trust that I may be able to transmit to the boys and girls of Canada the realization of the glory of this inspiration.

"A LITTLE CHILD SHALL LEAD THEM"

For some years I have followed with interest the development of rural high schools in various parts of the world. For the past year I have wearied people, I fear, with the question:—"What is a rural high school for this province?" On Feb. 29, 1916, Mr. C. M. Hamilton, a former teacher, now president of the Provincial Municipalities Association, turned the question on me. South Weyburn had furnished the answer: —a municipal agricultural school. I beg to point out that the change of name is significant. To put it concretely, South Weyburn is step No. 1; the provincial university, with its trinity—arts, agriculture and education—is step no. 3. One has but to solve the problem, the equation, to find step no. 2. The answer, I say, is the municipal agricultural school.

No. 1 has a site of approximately two acres, No. 3 has a site of approximately 1333 acres. The geometric mean is approximately 160 acres, a quarter section. No. 2 then is to have a site of 160 acres.

No. 1 has arranged for the warm noon-day lunch, and when later in the season the garden plots have advanced, the children will have fresh radishes to eat with their noonday meal, and a bouquet of flowers, or a flowering plant for their table. No. 3 has the university residence and dining hall; solve the equation and secure the answer as to the living side of No. 2.

No. 1 began with the saw and the board; No. 3 has the several laboratories. Solve the equation to find the manner in which No. 2 will develop.

These points are but typical, but they solve the problems of financing and of tax-rate.

MUST BE BORN AGAIN

I said that the change of name was significant. South Weyburn did not merely modify its school plant; it was "born again". It will not be sufficient to modify existing high schools; a new municipal agricultural school must be born. Existing high schools will still have ample opportunity and work to do. The function of the municipal agricultural school is peculiarly a new need in our national life.

Some people smile, saying, "How can the school garden teach agriculture"? The school garden has begun to answer the question, and will answer the question, in so far as it requires an answer. South Weyburn has been an educational school garden to me; has it not answered the question in a larger sense in solving the equation for the municipal agricultural school?

The full solution of this tremendously serious, infinitely potent problem will be materially assisted by the work of the community centre clubs in the several school districts, by the harmonious operation of the rural education associations of the municipalities, and by the co-operation of the provincial trustee's associations and kindred associations, with the Saskatchewan Educational Association and the various Departments of the government of this province. It IS worth while that the educational energies of this province be exerted in the solution of the problem.

THE SCHOOL LUNCH

ANSWERS received from a questionnaire sent to all of the rural and village schools in Saskatchewan indicate that about 12 per cent serve a hot dish to the pupils at noon.

The teachers in the schools where the hot noon lunch was served stated its advantages as follows: The school attendance is improved. The children are trained to be more efficient, self-reliant and economical. It makes for a well-conducted school room during the noon hour. Conditions are more homelike and sociable. It is a means whereby children may be taught table manners. They are more considerate and patient. It makes them tidy. They are more interested in the school and do better work. Their health is better. No food is wasted, for the children eat all of their cold lunch.

In one Regina school, a cup of cocoa is served each day to the school pupils who cannot go home for dinner. Cocoa is prepared at recess by girls of grade 8 who serve it from large pitchers. Two cents per cup is paid by pupils who are able To others, it is supplied free.

SUGGESTIONS FOR AGRICULTURAL TEACHERS

IN a bulletin issued by the States Relation Service of the United States Department of Agriculture entitled, "Increasing Production on the Farm," suggestions are made for teachers in secondary schools under the heading "Administrative Problems." The bulletin says:

WELL-TRAINED TEACHERS NEEDED

The amount and nature of the service which schools may render now in increased food production will be limited chiefly by the capacity and training of the teacher of agriculture. Never before was there such need for men who have the ability to make their instruction practical. The kind of work suggested means that the teacher must not only know scientific agriculture, but that he must also know how to practice farming, and what is even more important he must know boys and girls have the ability to bring out the best that is in them.

TEACHERS TO BE EMPLOYED THROUGHOUT THE YEAR

Most of the practical work in production comes in the summer. It is during the summer months when the boys and girls need most help. If the work of the teacher of agriculture is to count very much in increased production, he must be employed throughout the year with the understanding that the summer is to be his busy time, when his work will count for most in the actual training of farmers. Teachers who are impressed with the spirit of patriotic service at this time will be more willing than ever to put in overtime and put forth every effort to serve their country.

MORE AND BETTER SUPERVISION

It is not only necessary to give more direction and supervision to the boys and girls in their productive home work, but it is also necessary to make a greater effort to coordinate and direct the work of the teachers themselves. If state funds are given to the teaching of agriculture and the direction of the project work, provision should be made for the proper supervision of this work not only to be sure that the funds are spent as intended but also as a means of establishing high standards and aiding the weaker teachers in reaching them. As such supervision should mean more than inspection, the work should be given to men who have a wide vision, a patriotic desire to help the country in this crisis, and the ability to inspire others to service.

MORE ATTENTION TO TEACHER-TRAINING

It will be evident to those who are in charge of agricultural education that there is a dearth of men qualified to do this work. The present needs should emphasize the fact that we should not neglect the training of teachers of agriculture. There are such possibilities for aiding the nation through instruction and practice in productive agriculture that a special appeal should be made to college students to avail themselves of all opportunity to prepare themselves as teachers and community leaders in this work.

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications and Notes

VACANT LOT GARDENING

A PRIZE-WINNING POEM

IN furtherance of the vacant lot gardening campaign of the Ottawa Horticultural Society, Mr. W. T. Macoun, the Dominion Horticulturist, inaugurated a competition for the best poem on a vegetable garden. Out of the several praiseworthy efforts sent in first prize was awarded for the following to Miss Henrietta Wood of Ottawa:—

MY GARDEN—1917

A DREAM

Rain-softened and sun-warmed, it stretches fair,
Prepared to yield a wealth of all good things.
In neat, well-ordered rows the seedlings pierce
The rich brown mould, and seek the sunlight.
Swift fly the days, and soon with eager hands
I cull the radish, ruddy tinted globe
Of pungent crispness; and green-gold lettuce;
And that scented darling of the garden,
The spring onion.
The happy days glide on.
Behold my Vacant Lot, vacant no more.
Here grow my cabbages, dew-pearled at dawn.
There stands my corn, beplumed like knight of old.
Look on my cauliflowers, white as snow;
Potatoes, soon to yield a khaki host
To rout the hordes of hunger; and carrots,
Beets and parsnips, and many more fair growths
Depicted in the catalogues. All these
Adorn my garden.

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Hark, the alarm sounds! The vision fades.
'Tis morn; 'tis March. Deep lies the snow upon
The unbroken sod, hiding the couch-grass,
Snake-like roots and many a weedy foe.
A thousand million tiny enemies,—
Worm, weevil, beetle, bug,—in ambush lie.
To win my harvest I must surely bear
A thousand aches in my poor stooping back,
And cramps in bending limbs, and sun-skinned nose,
And countless freckles on my now fair arms.
O say, thou preacher of domestic thrift,
Dost think that I can conquer?

A NATIONAL FLOWER FOR CANADA

AT the annual meeting of the Ontario Horticultural Association held in Toronto on November 22nd, 1917, a resolution was adopted that it was proposed should form the basis of action to obtain for Canada a national flower. The subject was brought up by Mr. F. E. Buck, President of the Ottawa Horticultural Society, in the form of a report of the action that had been taken by the Ottawa Society during the past year. Mr. Buck presented two aspects of the question which the Ottawa committee considers deserve special consideration. The first is that this question of a national flower is one which interests, besides horticultural societies, other bodies of individuals, such as botanical departments of universities, educationalists and students of colleges and schools. It is, therefore, felt that, to a large extent, such would be more easily approached through this central committee and with that point in mind the committee has already written to the Minister of Agriculture to obtain Governmental support for the question, and to obtain permission to use THE AGRICULTURAL GAZETTE as one means of getting into touch with educational institutions, etc.

The other aspect which it is desirable to emphasize is that the initial work should be undertaken by the horticultural societies, because such societies are naturally trustees of the nation's sentiments in such a matter. They should, therefore, take immediate steps to see that the burial grounds in Flanders of Canadians who have fought and died that we might retain the right to possess national sentiments and ideals, are made spots where native flowers shall blossom and remind those who visit those burial grounds of the glories and beauties

of the country for which the dead gave up their lives, and that, amongst the burial places of those honoured dead, those of our sons shall be suitably clothed and perfumed with simple but enduring tributes from the homeland.

The report as presented gave the principal reasons why a national flower is desirable and suggested a plan for its selection:—

REASONS FOR A NATIONAL FLOWER

1. Nearly all other countries have national flowers.
2. A national flower signifies *national* personality and sentiment.
3. As a national emblem it becomes like a nation's flag, the golden cord binding together historic events and national incidents.
4. It has a definite value similar to the value of a state seal.
5. The selection of such a flower will encourage an increased interest in Canada's wonderful flora.
6. A national flower on the graves of fallen Canadians in Flanders will be as a perpetual banner over our noble dead.

PLAN OF SELECTION

For the purpose of obtaining the national mind as to which flower should be selected for this purpose the following plan is suggested:—

A. The presentation of the claims of certain flowers to as many individuals as possible.

1. Through horticultural societies, educational institutions, etc.
2. Through the medium of the Press.

B. By means of local committees named or appointed by horticultural societies and educational authorities.

C. The will of the people expressed in a majority vote to form the basis of definite action.

1. Through a central committee at Ottawa.
2. Which in turn will hand over its work to a Minister of the Crown to deal with the matter through legislative enactment.

The report named the following six flowers and gave the characteristics of each with respect to nativity, attractiveness, ease of cultivation, propagation and season of bloom:—Columbine, Perennial Aster, Trillium, Iris (Flag), Delphinium, Pæony.

OFFICIAL PRICES OF BRAN, SHORTS AND MILK

Acting with the authority given by Order-in- Council of November 15th, 1917, the Food Controller has fixed the prices at which bran and shorts shall be sold. He has also fixed the amount in excess of cost at which milk may be sold. Following are the orders that have been issued:

BRAN AND SHORTS

That the maximum price at which millers shall sell bran and shorts after the 17th day of December, 1917, shall be:

$24.50 per ton of 2,000 lbs. for bran.
$29.50 per ton of 2,000 lbs. for shorts.

These prices shall be for bran and shorts in bulk, freight paid at Fort William and Port Arthur. To these prices may be added the cost of bags and freight from Fort William and Port Arthur to the point of destination, east of Fort William and Port Arthur. At points west of Fort William and Port Arthur, the maximum price of bran and shorts in bulk shall be, the price at Fort William and Port Arthur, less the difference between the freight charges to such points and the freight charges for delivery at Fort William and Port Arthur.

MILK

1. That from and after the first day of January A.D. 1918, and until further notice, milk distributors shall not charge more for milk sold by them than the actual cost of the milk delivered at their premises and, in addition to such cost, on milk sold in the province of

	Per Quart
British Columbia	5.25 cents
Alberta	5.25 "
Saskatchewan	5.25 "
Manitoba	5.25 "
Ontario	5. "
Quebec	5. "
Nova Scotia	5. "
New Brunswick	5. "
P.E. Island	5. "

2. That no retail dealer shall charge a higher price for milk than the price the milk distributors charge the consumers in the locality in which such retail dealer is carrying on business.

3. That as the cost of distribution is increased owing to an increase in the price of labour or otherwise, any distributor affected thereby may submit evidence of such increase to the Food Controller and ask that the maximum amount herein prescribed for distributors in the province in which such distributor is selling milk may be increased.

ASSOCIATIONS AND SOCIETIES

BROWN SWISS ASSOCIATION

The annual meeting of the Canadian Brown Swiss Association will be held at Sherbrooke, Quebec, on January 2nd. The secretary is Ralph H. Libby, Stanstead, Quebec.

NOVA SCOTIA DAIRYMEN'S ASSOCIATION

The Fifth Annual Convention of the Dairymen's Association of Nova Scotia, will be held at the Agricultural College, Truro, on January 10th and 11th. The creamery butter exhibit will be held at the same time and place. The secretary of the association is W. A. MacKay, Truro.

MANITOBA HORTICULTURAL AND FORESTRY ASSOCIATION

The annual convention of the Manitoba Horticultural and Forestry Association will be held at Winipeg on February 21st and 22nd, 1918. The secretary is Professor F. W. Broderick, Manitoba Agricultural College.

WESTERN ONTARIO DAIRYMEN'S ASSOCIATION

The annual convention and dairy exhibition of the Western Ontario Dairymen's Association will take place at Stratford, Ont., on January 16th and 17th. Frank Herns, London, Ont., secretary.

ALBERTA DAIRY CONVENTION

The Alberta Provincial Dairy Convention will be held at Calgary on February 20th and 21st; secretary, C. Marker, Dairy Commissioner, Calgary.

BRITISH COLUMBIA DAIRYMEN'S ASSOCIATION

The annual convention of the British Columbia Dairymen's Association will be held at Chilliwack on February 6th and 7th. The third annual creamery butter exhibit will be held in conjunction with the convention. Mr. T. A. F. Wiancko, Department of Agriculture, Victoria, is the acting secretary of the association.

BREEDERS' ASSOCIATIONS' ANNUAL MEETINGS

The annual meetings for 1918 of the National Records Live Stock Breeders' Associations of Canada and of the Ontario Provincial Associations will be held in Toronto as follows:—

	Secretaries
Monday, February 4th	
Canadian Thoroughbred Horse Society	T. J. Macabe, Toronto.
Canadian Swine Breeders' Association	R. W. Wade, Toronto.
Canadian Pony Society	G. de W. Green, Toronto.
Tuesday, February 5th	
Ontario Swine Breeders' Association	R. W. Wade, Toronto
Dominion Shorthorn Breeders' Association	G. E. Day, Guelph, Ont.
Canadian Jersey Cattle Club	Bartley H. Bull, Brampton.
Ontario Berkshire Club	R. W. Wade, Toronto.
Ontario Yorkshire Club	R. W. Wade, Toronto.
Canadian Sheep Breeders' Association	R. W. Wade, Toronto.
Canadian Trotting Association	W. A. McCullough, Toronto.
Canadian Standard Bred Horse Society	John W. Brant, Ottawa.
Wednesday, February 6th	
Ontario Sheep Breeders' Association	R. W. Wade, Toronto.
Canadian Hackney Horse Society	H. M. Robinson, Toronto.
Canadian Kennel Club	J. A. Dowling, Toronto.

Thursday, February 7th

Canadian Shire Horse Association	G. de W. Green, Toronto.
Canadian Ayrshire Breeders' Association	W. F. Stephen, Huntingdon, Que.
Clydesdale Horse Association of Canada	J. W. Wheaton, Toronto.
Canadian Hereford Association	H. D. Smith, Ancaster, Ont.
Ontario Horse Breeders' Association	R. W. Wade, Toronto.

Friday, February 8th

Dominion Cattle Breeders' Association	R. W. Wade, Toronto.
Eastern Canada Live Stock Union	R. W. Wade, Toronto.

WOMEN'S INSTITUTE COMPETITIONS IN BRITISH COLUMBIA, 1917

Women's Institute Competitions for the year 1918 in British Columbia have been arranged as follows:—

(1) Prizes for Institutes having the best average attendance at meetings held during the year, based on membership as sent in to The Department of Agriculture. The prizes to consist of books to form the nucleus of an Institute library as follows: First, $15; Second, $10.

(2) Prizes for Institutes having the best programme for the year 1918, consisting of books to the value of $15 and $10.

(3) Prizes of $10, $7.50, $5 and $3 for essays by Institute members on the following subjects:—

(*a*) My War Garden and the Disposal of its Products.

(*b*) Conserving Food and Maintaining the Health and Happiness of the Household.

(*c*) Domestic Science and Household Economics as Essential Studies for our Girls.

(*d*) Our Returned Soldier and What We Can do to Assist Him.

(*e*) Necessity of Keeping Household Accounts.

(*f*) The Place of the Institute in the Community.

(*g*) Some of Our Problems When Peace Comes.

(*h*) The Meaning of Democracy.

(4) Competitions for junior members. Prizes of $5 and $2.50 for the best papers by the junior members on the following subjects:—

(*a*) Wild Flowers of our Neighbourhood.

(*b*) My Patriotic Work.

In the case of junior members a first and second prize will be given for each of these subjects provided there are a sufficient number of entries.

Essays must be from 1,500 to 2,000 words in length. Programmes will be judged from the point of view of merit as regards arrangement and subjects for discussion during the year, due allowance being given for the style in which the programme is prepared and the printing.

PURE-BRED SHEEP SALES IN QUEBEC

BY A. A. MACMILLAN, IN CHARGE SHEEP DEPARTMENT, MACDONALD COLLEGE

In the past two years the pure-bred requirements of the local Wool Growers' and Sheep Breeders' Associations in Quebec had been partially met by the holding of four pure-bred sales in 1915 and two in 1916. These sales were very successful, but it was felt that there was room for a larger number, and, accordingly, last year a more extensive programme was planned with the object of affording better opportunities for individual selections within the province as well as to provide better facilities for outside purchasers.

The pure-bred sheep auction sales car was decided upon as the most convenient, cheapest and most expedient means of transportation for stock consigned to the sales, and in consequence thereof, arrangements were made with the Canadian Pacific Railway to run a palace horse car from Waltham to Megantic, making twelve stops inclusive, at each of which an auction sale was held. The above route leads directly through or borders all of the ten associations already organized, so that each stop on the four hundred and sixty mile circuit was within the territory of one or other of the associations.

The palace horse car with slight reconstruction and some additional equipment proved to be entirely satisfactory. It provided ample accommodation for eighty to one hundred head of sheep, allowing sufficient space for feeding and watering during transit. The pens were so arranged that intending purchasers could see and handle the stock previous to the hour of sale.

The car was placed at Lennoxville, where some eighty head of the Shropshire, Oxford, Leicester, Cheviot, Hampshire and Southdown breeds were consigned for sale. The car was then moved to Waltham, where the first sale was held at Chapeau. Succeeding sales were held at Campbell's Bay, Shawville, Low, Lachute, Cowansville, Magog, Lennoxville, Cookshire, Scotstown and Megantic. At each stop animals of desirable conformation, quality and breeding were consigned for sale, and if not sold were carried forward to the following sales. In this way a full quota of animals, both male and female, was maintained in the car at all times.

Aside from the advantage of individual selection which the sales afforded to intending purchasers, they have had the effect of giving a general impetus to pure-bred breeding by stimulating interest in pure-bred stock among farmers in the various communities. The small and uninitiated breeders were also profited, not only by securing a larger number of sales, but as well by their actual associations with other breeders. The exchange and sale of older rams which was affected in a large number of cases has proven one of the greatest benefits of the sales, as many excellent sires which would otherwise have gone to the block are now doing good service at the head of another flock. The avenue of sale for the older rams at breeding value, thus eliminating the usual loss which previously occurred when they were sold for the block after one to two years of service, has tended to make the farmer more liberal, particularly when purchasing a good individual.

The sales were on a cash basis and entirely self-sustaining. No capital was provided except in certain cases where associations wished to bring in special stock. Each contributor consigned his flock subject to a reserve bid, and a fee of seven per cent of all sales was deducted to cover expenses incidental to sale.

As was anticipated a number of outside purchasers took advantage of the sales to make their selections. A representative of the New Brunswick Government purchased seventy-three head. Thirty head went to the Prince Edward Island Government, thirty head were sold to parties in Alberta and several went to Ontario, the balance being sold to farmers and farmers' clubs in Quebec. A much larger number of pure-bred ewes could have been sold had they been available. In all two hundred and thirty-five head were sold.

Below is a statement of the numbers, average selling price and total value of sales for each breed:

	Average price	Total value
SHROPSHIRES:—		
56 rams.	$28.24....	$1,581.50
36 ewes.	33.15....	1,193.50
OXFORDS:—		
42 rams.	$28.06....	1,178.50
20 ewes.	27.27....	545.50
LEICESTERS:—		
12 rams.	$24.71....	296.50
CHEVIOTS:—		
35 rams.	$26.01....	910.50
3 ewes.	34.16....	102.50
HAMPSHIRES:—		
10 rams.	$33.62....	336.20
1 ewe.	26.50....	26.50
SOUTHDOWNS:—		
4 rams.	$23.75....	95.00
DORSETHORNS:—		
6 ewes.	$20.00....	$120.00
235, total number sold.		$6,386.20
Average selling price, $27.17		

AN AYRSHIRE BREEDERS' CLUB

The Ayrshire breeders of Brome, Missisquoi and Shefford met at Foster, Que., on November 30th and formed the District of Bedford Ayrshire Breeders' Club, with the following officers: President W. F. Kay, M.P., Philipsburg; vice-president, Jas. Davidson, Waterloo, Que.; secretary, W. M. Wallace, Warden, Que.

THE POMOLOGICAL AND FRUIT GROWING SOCIETY OF QUEBEC

The following gentlemen were elected officers of the Pomological and Fruit Growing Society of Quebec at the annual meeting held in Macdonald College, Dec. 6th, 1917, and the only resolution of note passed was to memorialize the Provincial Department to carry on a more aggressive campaign for the purpose of advertising the local fruits: Hon. President R. A. Rosseau, Acton Vale; Hon. Vice-President, Prof. W. Lochhead, Macdonald College; President, Z. Abel Raymond, Plessisville; Vice-President, Chas. E. Slack, Abbotsford; Secretary-Treasurer, Peter Reid, Chateauguay Basin; Directors, G. B. Edwards, Covery Hill, J. R. Marshall, Abbotsford, G. P. Hitchcock, Massawippi, T. A. Raymond, Plessisville, Abbe Levasseur, Ste. Anne de la Pocatiere, A. D. Verreault, Village Des Aulnaies, J. M. Talbot, Quebec City, Rev. Father Leopold, La Trappe, Robt. Brodie, Montreal.

ANNUAL CONVENTIONS OF ONTARIO WOMEN'S INSTITUTES

BY GEO. A. PUTNAM, B.S.A., SUPERINTENDENT

That the women of rural Ontario are awake to the vital problems of the day is quite evident after witnessing the large and enthusiastic audiences that attended the Annual Women's Institute Conventions held at Ottawa for Eastern Ontario; London for Western Ontario; and Toronto for Central and Northern Ontario during the month of November.

Red Cross Work demanded considerable attention, but when we say that the average amount of cash given, alone, for the 900 branches was about $250.00, in addition to the numberless bales of clothing sent for Relief purposes, and individual boxes to the boys overseas, it is sufficient proof that patriotic work is well organized.

An interesting feature of the conventions was the reading of reports by delegates from the various branches and districts represented, and to note that while patriotic work took a foremost place in these reports, still the regular lines of institute work were carried on as well. Papers were prepared, business methods were adhered to—the members always bearing in mind that it is well to hand down to the younger generation a legacy worth while re business management. The co-operation of the girls was secured chiefly through the holding of demonstration lecture courses in food value and cooking, sewing and home nursing; and also by making the regular programme attractive to them.

Last year many of the branches took advantage of the free vegetable seeds sent out by the Department, and after supplying their tables throughout the summer with fresh vegetables, they had a surplus for canning in the fall. Many applied to the Department for a demonstration in canning. The libraries, also, are receiving attention. The women know that more interest should be taken in reading by old and young if they are to keep in touch with present day conditions, and as a result they are endeavouring to make their libraries a little more up-to-date.

To-day the country woman knows that she is standing behind her boy in the trenches when she is assisting in any way to increase production or to conserve food. After hearing addresses from Premier Hearst, Hon. Mr. Hanna, Dr. Creelman, and Mrs. Muldrew, speakers who have all the available information, and after hearing that no grain or no food of any kind was to be used in the distillation of liquor, she was ready to support the Food Controller in anything that he thought advisable for the best interests of the country. The women of the Institute will continue to assist as best they can in a greater production and to practise economy in their homes, so that they may give largely to patriotic calls and do their part in Food Conservation.

But, further than this, the women see right around them problems which cannot wait until after the war. The child is the nation's greatest asset, and as such should not be handicapped. That the child is handicapped is evident, as the report of the medical school inspection carried on in one of the best counties of Ontario would indicate.

Out of 20 schools visited, the lighting was good in only 2. The seating was good in 4. In the remaining 16 the child had to fit the seat rather than the seat fit the child. Only 2 were properly ventilated. Upon examining the children, 15% were found to be suffering from malnutrition, 38% had defective vision, 28% had nose and throat trouble, 75% had defective teeth, 5% had poor hearing. A record like this proves that something must be done at once.

Then again, after listening to addresses from Dr. Hill, of London, and Dr. Fitzgerald, of Toronto, on "Communicable Diseases," the ladies saw at once that they had another problem right in their own midst which demanded immediate attention, and they must co-operate with the city people in trying to control the vilest of all diseases.

That the Women's Institutes are anxious that something shall be done at once regarding these problems is evident from the resolutions which were adopted at the Toronto convention. These resolutions approved the work of the Food Controller and pledged him support; advocated education as a precaution against the spread of communicable diseases and further legislation relative thereto; requested additional grants of funds to enable the Institutes to further prosecute their work relating to medical school inspection; appealed to the Government for prohibition of the use of cane sugar in the manufacture of candy and the sale of ice cream; pledging the efforts of the Institute towards securing the use of fair grounds as recreation centres; favoured the extension of women's labour; deplored the high cost of living, and urged that official action be taken in order that children may not be unfed, underfed, or illfed.

ONTARIO SHEEP AND SWINE DIRECTORS ELECTED BY MAIL

Mr. R. W. Wade, Secretary of the Canadian Sheep Breeders' Association and of the Canadian Swine Breeders' Association, in accordance with section 6 of the constitution of these organizations has received and counted the ballots for the election of directors for these associations outside of the province of Ontario as follows:—

CANADIAN SHEEP BREEDERS' ASSOCIATION

DISRTICT, NAME AND ADDRESS OF DIRECTORS, 191 8

Maritime Provinces	W. B. Bishop, 85 St. Germain St. St. John, N.B.
Quebec	V. Sylvestre, Clairvaux de Bagot, Que.
	A. Denis, St. Norbert Station, Que.
	Jas. Bryson, Brysonville, Que.
Manitoba	A. J. MacKay, Macdonald, Man.
Saskatchewan	F. T. Skinner, Indian Head, Sask.
Alberta	H. J. A. Evans, Lacombe, Alta.
British Columbia	S.F. Tolmie, M.P., Victoria, B.C.

CANADIAN SWINE BREEDERS' ASSOCIATION

DISTRICT, NAME AND ADDRESS OF DIRECTOR, 1918

Maritime Provinces	J. F. Roach, Sussex, N.B.
Quebec	Alfred Gingras, St. Cesaire, Que.
	F. Byrne, Charlesbourg, Que.
Manitoba	W. H. English, Harding, Man.
Saskatchewan	S. V. Tomicko, Lipton, Sask.
Alberta	G. H. Hutton, Lacombe, Alta.
British Columbia	S. F. Tolmie, M.P., Victoria, B.C.

THE ONTARIO WINTER FAIR

The 34th Annual Provincial Winter Fair was held at Guelph from November 30th to December 6th, 1917, and attracted more entries and a greater attendance than ever before. The quality of the entries was also pronounced the best yet. There were altogether 8,123 entries, or upwards of 950 more than in 1916. The increase was in horses, sheep and poultry. Cattle, both beef and diary, showed a slight decrease, as also did swine and seeds. Some noteworthy improvements as regards the shipping of stock and other details were observable. All the prize money was promptly paid before the exhibitors left the ground, and arrangements were made with the local banks to keep open until 6 p.m., and to re-open again later on, so that exhibitors might cash their cheques.

The judging competitions proved exceptionally interesting. In the Inter-County event for teams of three young men not over 25 years of age, chosen by the District Repesentatives, the trio from York County were the winners, as the team from the same county were in 1916. There were 19 teams competed. Two classes of each of the following animals were judged: heavy horses, beef cattle, dairy cattle, sheep and swine. In this competition York county won the Duff trophy, which was the highest prize competed for, with a score of 2,524, Oxford being second with 2,203, Victoria third with 2,143, Middlesex fourth with 2,127, Essex fifth with 2,079, and Waterloo sixth with 2,062. A silver medal was presented to each member of the winning team.

The Inter-year or open competition, for which students from the Ontario Agricultural College and farmers' sons not more than twenty-five years of age are eligible to compete for the trophy presented by Professor G. E. Day, also provided a keen and interesting contest. In the Inter-county competition, six money prizes are given ranging from $10 to $5 for each of the classes of animals judged. In the students' and farmers' sons competition, five prizes are given for each of the classes, ranging from $10 to $6.

Another attractive feature was the moving picture show by the Ontario Government under the superintendency of Mr. S. C. Johnston, the chief of the new division that has come recently into existence. The Dominion Government exhibit and the exhibit of the National Soil Fertility League also attracted much attention.

TWO YEARS' ENTRIES

A tabular statement of the entries for 1917 and 1916 follows:—

CLASS	NUMBERS 1917	1916
Horses	336	301
Beef cattle	177	335
Dairy cattle	105	
Sheep	555	336
Sheep carcasses	80	79
Swine	230	257
Swine carcasses	63	38
Wool fleeces	21	27
Seeds	252	370
Poultry	6,112	5,231
Dressed poultry	166	167
Eggs	26	25
Totals	8,123	7,166

THE DAIRY TEST

The dairy breeds, Holsteins, Ayrshires and Jerseys, were well represented in the dairy tests. There were few Shorthorns and Grades. The champion in the three-day test was a Holstein, pure-bred, but not registered, owned by E. Grier, Woodstock, who also owned the winner in the grade classes in 1916. The score of the cow, which was entered under the name of "Lilly," was 304.425 points, and she gave 219.1 pounds of milk, testing 4.3% of fat. The score was 13.420 points below that of the previous year's winner, Sunbeam of Edgeley, a Jersey owned by Jas. Bagg & Son. Following is the record of the first prize winners in each class and compared with the records made in 1916:—

Age, Months	Name	Owner	RESULTS IN 1917			RESULTS IN 1916		
			Lb. Milk	Per Cent Fat	Total Points	Lb. Milk	Per Cent Fat	Total Points
		HOLSTEINS						
48 and over	Polo Mercena DeKo	H. C. Hanmer, Norwich	218.1	3.5	253.814	201.1	4.7	303.91
36 and under 48	Duchess of Norfolk	A. E. Hulet, Norwich	195.7	3.55	228.041	181.1	4.0	240.7
24 and under 36	Pontiac Abberkerk Beets	Hiram Dyment, Dundas	172.7	3.6	205.127	144.5	4.0	185.9
		AYRSHIRES						
48 and over	Lady Jane	A. S. Turner & Son, Ryckman's Corners	250.6	3.45	282.725	170.3	4.7	247.1
36 and under 48	Brookside Lady	J. McKee & Son, Norwich	147.1	4.55	210.077	185.1	3.5	210.7
24 and under 36	Scottie Victoria 2nd	J. McKee & Son, Norwich	130.2	4.25	175.122	112.3	4.4	155.7
		JERSEYS						
48 and over	Mabel of Edgeley	Jas Bagg & Son, Edgeley	158.4	4.8	239.261	195.3	5.4	317.84
36 and under 48	Queen Greta	Jas. Bagg & Son, Edgeley	115.9	5.5	197.622	87.3	4.6	135.85
24 and under 36	Edgeley Queen 2nd	Alfred Bagg, Edgeley	108.0	4.7	162.057	95.9	5.6	161.3
		SHORTHORNS						
48 and over	Royal Mysies Girl	John Brown, Galt	177.9	3.5	206.992	158.6	3.4	176.9
24 and under 36	Butterfly Beauty	S. W. Jackson, Woodstock	87.5	3.8	108.587	102.8	4.6	147.2
		GRADE						
48 and over	Lilly	E. Grier, Woodstock	219.1	4.3	304.425	211.3	3.8	253.02

THE ONTARIO BEE-KEEPERS' ASSOCIATION

The Thirty-Eighth Annual Convention of the Ontario Beekeepers' Association was held in Toronto on December 11th to 13th. The Convention was well attended and great interest was shown in all the addresses. The Association having been successful in providing queens for the members, it was decided at this Convention to undertake the business co-operatively and to undertake the distribution of bees in pound packages. The Convention strongly urged that the Ontario Department of Agriculture change the act in reference to foul brood so as to eliminate the word "knowingly" from the clause prohibiting the sale or distribution of any kind of bee supplies that are diseased without the permission of the Department. The election of officers was as follows: President, James Armstrong, Selkirk; 1st Vice-President, W. W. Webster, Little Britain; 2nd Vice-President, A. McTavish, Carleton Place; Secretary-Treasurer, P. W. Hodgetts, Toronto.

PEEL COUNTY MILK PRODUCERS' ASSOCIATION

BY J. W. STARK, DISTRICT REPRESENTATIVE, PEEL COUNTY

The Peel County Milk and Cream Producers' Association was organized on February 24th, 1917. For a long time I had felt that the dairy interests in a county like Peel which supplied a large portion of the dairy products that went to the city of Toronto should receive more attention. There were a number of things in connection with the dairy trade that needed looking into, and it seemed that the best way to bring this about would be to form an organization. The meeting was really one of the regular winter meetings of the Board of Agriculture, and we advertised that it would be of special interest to dairymen, and said that we hoped to form a Producer's Association that day. In addition to the regular Board of Agriculture speakers we had Professor H. H. Dean from the O.A.C. give an address, and Mr. Coleman, of the Dominion Dairy Branch, spoke on Cow Testing. About 200 farmers were present, and it was decided to organize under the name of the Peel County Milk and Cream Producers' Association.

The objects of the Association are to improve the dairy herds in the county by cow-testing, and the introduction of pure-bred sires; to do co-operative buying of feeds and supplies; and to secure fairer prices for dairy products. A small cow-testing association was organized and the bottles are brought to the Department of Agriculture office, where monthly tests are made by the Dominion Tester. Another matter to receive the attention of the executive was the question of price. Other lines of work are also receiving attention.

AN INTER-PROVINCIAL BUTTER COMPETITION

At the annual convention of the Manitoba Dairy Association, to be held in Winnipeg on January 31st and February 1st, an Inter-Provincial Butter Competition will be held. Each of the three provinces of Alberta, Saskatchewan and Manitoba, will bring together on that occasion exhibits of butter that won prizes at each of the provincial competitions held at earlier dates. The provincial competitions include five samples of 14 pounds each made respectively in June, July, August, September and October. The butter will be judged by men engaged in the butter trade in Vancouver and Montreal. It is expected that a standardization of butter, made in these three provinces to suit both these important markets, will be reached. Mr. W. Weir, Winnipeg, is secretary of the Association.

SASKATCHEWAN CATTLE, SHEEP AND SWINE SALES

BY P. M. BREDT, SECRETARY, SASKATCHEWAN LIVE STOCK ASSOCIATIONS

The sales of cattle, sheep and swine held in connection with the winter fair at Regina were very successful, and practically all contributors expressed themselves as being well satisfied with the prices realized.

In pure-bred sheep, 109 head were sold at an average of a little under $50.00 per head, and 69 swine were sold at an average of $28.53. This latter would have been considerably higher if it had not been for the fact that a number of young stock, four months old, was contributed to the sale, and this brought comparatively low prices. The average of boars and sows, seven to eight months old, was over $40.00 per head.

Approximately 300 head of grade sheep found ready buyers and the average, including lambs, was $14.80. The top price for grade ewes was $28.00 per head for a bunch of six contributed by the University.

A record price was made for Western Canada in pure-bred sheep, when an imported Shropshire shearling was sold to Mr. E. S. Clinch, M.L.A. for Shellbrook, for $325.00. Besides the highest priced ram about fifteen brought $100.00 and over. Four pure-bred Shropshire ewes, contributed by Mr. Skinner, were sold at $77.50 and $75.00 per head respectively, the highest prices ever realized for pure-bred ewes at Saskatchewan sales.

Berkshires were in most demand in hogs, and the highest priced boar sold for $65.00, while the top price for sows was $58.00.

In the cattle sale about 100 head changed hands, the number being made up of 72 pure-bred Angus and Shorthorns, and 27 grades, the grades being mostly one or two year old heifers.

The highest price at the sale was paid for a three-year-old Shorthorn heifer, contributed by W. G. Wilkinson of Tuxford, and sold to W. C. Honey, of Binscarth, Manitoba, for $910.00.

The following are particulars of the number sold and the average prices realized:

	Average price
66 Shorthorns	$203.18
6 Angus	220.00
27 Grade heifers	75.18
109 Pure-bred sheep	49.57
288 Grade sheep	14.80
96 Pure-bred swine	28.53

ALBERTA SHORTHORN BREEDERS' ASSOCIATION

A provincial Shorthorn Breeders' Association has been formed in the province of Alberta. The following officers have been elected: Honorary president, Hon. Duncan Marshall, Olds; honorary vice-president, A. E. Myers, Demonstration Farm Branch, Department of Agriculture; president, Senator Talbot, Lacombe; first vice-president, James Sharpe, Lacombe; second vice-president, Herbert Wright, Blackie; secretary-treasurer, Charles Beeching, Nanton.

NEW PUBLICATIONS

THE DOMINION DEPARTMENT OF AGRICULTURE

SEED BRANCH

Pamphlet No. 1 entitled "Cleaning Seed" discusses the purposes of cleaning the seeds of grain, grasses and other farm crops and describes the method by the use of the modern fanning mill. The pamphlet is illustrated with screens and riddles.

THE ENTOMOLOGICAL BRANCH

The Entomological Branch is distributing a series of leaflets regarding the protection of crops. The object, of course, is to caution farmers, gardeners and vacant land cultivators against the approach and inroads of insect pests.

Enquiries or further call for assistance addressed to the Dominion Entomologist, Department of Agriculture, will receive attention.

PROVINCIAL DEPARTMENTS OF AGRICULTURE

QUEBEC

Sheep Raising for Profit in Quebec, by A. A. MacMillan, B.S.A., in charge of sheep husbandry, Macdonald College; Bulletin No. 50. In the 58 pages of which this bulletin consists Mr. MacMillan has gone very fully into his subject, dealing (with diagrams and illustrations) with the characteristics of the different breeds, buildings and equipment, flock establishment and improvement, seasonable management, feeds and rations, diseases and marketing.

MACDONALD COLLEGE

Macdonald College has arranged to send out a weekly press bulletin containing articles written by members of the college teaching staff and dealing with agriculture, household science and rural schools. Bulletin No. 1 contains articles by Professor Barton of the Department of Animal Husbandry; Miss Anita E. Hill, Head of the School of Household Science, and Professor Sinclair Laird, Dean of the College for Teachers.

ONTARIO

Keep an Extra Sow and her Litter. Circular No. 6 of the Provincial Department of Agriculture gives plain counsel and instruction for raising pigs of a special value to small breeders.

MANITOBA

The Department of Agriculture of Manitoba has issued a leaflet regarding the pledge cards which are being sent from the Food Controller's office. The leaflet is an appeal for thrift in every branch of the household.

The Extension Service of the Manitoba Department of Agriculture has circulated an eight-page leaflet dealing with the "Conservation of Food" and other matters of like importance.

Bulletin No. 25 of the Manitoba Agricultural College gives the rules for organization and conducting Debating Clubs and subjects suggested for discussion

SASKATCHEWAN

Gardening in Saskatchewan, by W. W. Thomson, B.S.A., Director Co-operative Organization, Bulletin No. 55. Mr. Thomson in this bulletin tells of the importance of the garden, of its methods of cultivation, of how to raise vegetables and fruits and of how to control insect pests.

MISCELLANEOUS

Dominion Shorthorn Herd Book.—The thirty-third volume, recently published by the Dominion Shorthorn Breeders' Association from the offices of the Canadian National Live Stock Records, Ottawa' contains, besides minutes of the last annual meeting, lists of officers, the usual recording features, and a frontispiece of the late John Bright, Live Stock Commissioner for Canada, the registered pedigrees of bulls from No. 105,035 to 109,865, and of cows from 116,715 to 124, 360.

New or Noteworthy North American Fungi. Reprinted from "Mycologia," New York, Volume 9, Number 6, November 1917, by John Dearness, Vice-Principal, Normal School, London, Ontario. Besides observations on some plants of Professor Dearness' own collection, the article contains notes on interesting specimens collected in British Columbia by Dr. Macoun and in the Artics by Mr. F. Johansen of the Canadian Arctic Expedition. Some of the specimens contributed by Mr. Bartholomew are from the West Indies and the Middle States.

NOTES

The New Brunswick Provincial Dairy School at Sussex has been destroyed by fire.

Interned aliens in Nova Scotia have been employed in ditching in the fields and macadamizing the barn yard at the Experimental Farm at Nappan.

A Holstein Breeders' Association has been formed in the county of Durham, Ontario. Mr. A. A. Gibson of Newcastle, has been appointed Secretary.

Mr. F. M. Clement, Professor of Horticulture, University of British Columbia, has been appointed secretary of the Fruit Growers' Association of British Columbia, succeeding Mr. R. M. Winslow.

The short courses in horticulture held by the University of British Columbia were attended principally by returned soldiers. The classes consisted of about twenty per cent of fruit growers from various parts of the province and eighty per cent of returned men.

The Department of Agriculture of British Columbia has decided to send the monthly *Agricultural Journal* published by that Department free from the beginning of the present year to all members of Farmers' Institutes that have a membership fee of $1.00.

The prize winners in the Boys' and Girls' Competitions held throughout the various parts of the province of Manitoba were brought together to spend a week in the city of Winnipeg and the Agricultural College. A remarkable feature in connection with the provincial prize winners is that twenty of them are girls and only six boys, in spite of the fact that the contest was based for the most part on agricultural competitions.

To meet the shortage of cheesemakers in the province of Ontario the Dairy School at the Ontario Agricultural College will admit to their regular course for cheese makers for the first time this year, men who have not had factory experience. The course opens on January 2nd and will continue into March.

Dr. Alonzo B. Melvin, Chief of the Bureau of Animal I dustry of the United States Department of Agriculture, died on December 7th after a long illness. Dr. Melvin occupied the position of the Chief of the Bureau of Animal Industry for twelve years.

The eighth annual exhibition of seed grain held by the Province of Quebec will be held at Quebec city on the 30th and 31st of January. This will be conducted under the joint auspices of the Provincial and Dominion Departments of Agriculture. At 11 o'clock on the second day an auction sale of the seed grain exhibited will be held.

Farmers' Weeks will be held as usual at Macdonald College in February. One week will be devoted to Cereal Husbandry and Animal Husbandry, another week to Poultry, and the third week to Horticulture. For the first time, a week will be devoted to farm women of the province of Quebec, in which courses will be given in Household Science.

The ladies of the Saskatchewan Department of Agriculture have organized themselves into a circle to help forward the work of the British Empire Agricultural Relief of the Allies Fund. They had a table at the Saskatchewan winter fair, recently held, from which they appealed to exhibitors and visitors for contributions. The responses were generous.

INDEX TO PERIODICAL LITERATURE

The Canadian Poultry Review, 184 Adelaide St. West, Toronto, November, 1917.

Poultry Breeding and Its Problems, by M. A. Jull, B.S.A., Poultry Manager and Lecturer, Macdonald College, Que., page 438.

Canadian Farm, Toronto, Ont., December 5, 1917.

Mushrooms by W. W. Jackson, Botanist, Manitoba Agricultural College, Winnipeg, page 6.

The Canadian Horticulturist and Beekeeper, Toronto, December, 1917.

Apiary Inspection and Demonstration Report for 1917. Morely Pettit, Provincial Apiarist, page 314.

Plant Breeding at the Central Experimental Farm, by A. J. Logsdail, B.S. A., Assistant in Plant Breeding, page 309.

The Canadian Countryman, Toronto, Ont., December 22, 1917.

A National Policy for Grain and Live Stock, by Herbert C. Hoover, United States Food Administrator, page 1568.

Farm and Ranch Review, Calgary, Alta., December 5, 1917.

Post-War Agriculture, by J. B. Reynolds, B.A., President, Manitoba Agricultural College, page 1066.

Hope and the Opportunity, by T. A. Benson, Edmonton, Dominion Poultry Representative for Alberta, page 1070.

Nov. 20.—Increased Production of Hogs for 1918, by G. H. Hutton, Vice-president Canadian Swine Breeders' Association, page 1036.

Dec. 5.—Tractor Ratings, by Professor J. MacGregor Smith of the College of Agriculture, University of Saskatchewan, Saskatoon, page 1069.

Farm and Dairy and Rural Home, Peterboro, Ont., November 28, 1917.

Poultry Pointers by F. C. Elford, Dominon Poultry Husbandman, page 1284.

Farmers' Advocate and Home Journal, Winnipeg, Man., November 28, 1917.

Dec. 12.—Feeding High Priced Grains to Hogs, by M. J. Tinline, Superintendent of Dominion Experimental Station, Scott, Sask., page 1755.

Dec. 26.—How about the Hog, by W. J. Elliott, Superintendent, School of Agriculture, Olds, Alta., page 1854.

The Grain Growers' Guide, Winnipeg, Man. November 28, 1917.

Acre of Pasture Worth $50, by J. H. Hutton, Vice-president, Canadian Swine Breeders' Association, page 1952.

School Fairs in Saskatchewan, by A. W. Cocks, B.Sc., page 1927.

Dec. 12.—Better Farming Club, by L. H. Newman, Secretary, Canadian Seed Growers' Association, page 14.

The Maritime Farmer, Sussex, N.B., December 4, 1917.

Finishing Lambs for the Block, by E. S. Archibald, Dominion Animal Husbandman, page 134.

The Farm Flock, by George Robertson, Poultry Division, Experimental Farms page 147.

Nor'-West Farmer, Winnipeg, Man., November 20, 1917.

Breeding the Dairy Shorthorn in Alberta, by H. A. Craig, Deputy Minister of Agriculture, page 1219. Sheep Raising Conditions and Prospects, by J. McCaig, Alberta Department of Agriculture, page 1217.

Dec. 5.—The Nations Call for Meat by Dean Rutherford, Saskatoon, Sask., page 1286.

Some Famous Families of the Scotch Shorthorn. A Study in Pedigree for Young Breeders, by Hon. Duncan Marshall, page 1292.

Dec. 20.—Cost of Producting Pork, W. C. McKillican, Superintendent Brandon Experimental Farms, page 1448.

O. A. C. Review, Guelph, Ont., November, 1917.

The Export Dairy Trade, by H. H. Dean, Professor of Dairying, page 71.

The Saturday Press and Prairie Farm, Saskatoon, Sask., November 24, 1917.

How to Kill and Dry-pluck Poultry, by R. K. Baker, B.A., Professor of Poultry Husbandry, College of Agriculture, page 3.

PART V

The International Institute of Agriculture

T. K. Doherty, LL.B., Commissioner

FOREIGN AGRICULTURAL INTELLIGENCE

The Institute is an international clearing house of agricultural information, trade and statistics, a State institution made up of fifty-five adhering countries.

The Canadian Commissioner furnishes the Institute the information needed concerning Canada, and in this connection solicits the active co-operation of all the readers of this section. It is particularly desired that duplicate copies of articles to be published in current periodicals or reports summarizing results of original research and investigations of universal interest, be sent to the Canadian office for communication to the Institute, to be available for publication in one or other of its three original monthly bulletins. Similarly, duplicate copies of all agricultural reports and writings, whether official or not, are requested for the Rome and Ottawa libraries.

The Canadian Commissioner makes available to Canadians information published by the Institute, for which purpose this section of THE AGRICULTURAL GAZETTE is published monthly. It contains articles and summaries from the original Institute publications. Owing to lack of space many articles are merely indicated, but may be secured upon application to the Commissioner.

Similarly, the Canadian office cheerfully collaborates with anyone desiring to investigate details of foreign agricultural methods and processes, legislation, organization or administration. The Institute library at Ottawa, which has been made as nearly as possible a reproduction of the great International Agricultural Library at the headquarters of the Institute, Rome, now contains about 35,000 books, reports and pamphlets, and a reference catalogue of some 165,000 cards, which includes a complete set of the cards of the U. S. library of Congress referring to agriculture. There are also some 350 periodicals, a great many of which are indexed by the H. W. Wilson Agricultural Index and are consequently easily available for the investigation of current questions. Anyone who may be unable to visit the library in person may write to the Commissioner, who will, if desired, have appropriate bibliographies and memoranda prepared on any given subject.

All communications in regard to this section should be addressed to T. K. Doherty, International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

The original Institute Bulletins may be obtained direct from the General Secretary of the International Institute of Agriculture, Rome, Italy. The subscription rates postpaid are as follows:

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SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

617—**Observations on Certain Flies Infecting Meat and Causing Human Myiasis**—DEXLER, GUSTAV, in *Zeitschrift fur Fleisch-und Milchhygiene*, Berlin, Nov. 1 and 15, and Dec. 1, 1916.

The writer has visited two of the biggest meat markets in Vienna and has carried out observations on the live adults, eggs, larvae, pupæ, etc., of flies which visit meat.

The following are the conclusions derived from these observations:

1) Flies prefer, both for egg-laying and feeding, fresh meat at a temperature of at least 17°C. Chilled or frozen meat is avoided by them.

2) The eggs are laid for preference in those portions of the meat which are fairly damp, warm and not directly exposed to sunlight: abdominal cavity, lower part of back, muscle folds, etc.

3) The species most frequently occurring on meat are: *Lucilia sericata* Meig.—*Calliphora erythrocephala* Meig.—*Sarcophaga haemorrhoidalis* Meig.—*S. nurus* Rond.—*S. falculata* Pandellé.—*Phormyia groenlandica* Zett.—*Muscina stabulans* Fall.—*Fannia canicularis* and *F. scalaris* L. The following rarely occur on meat: *Ophyra leucostoma* Wiedem. and *Drosophila funebris* Fabr.; they feed on it but never oviposit. The same thing holds for *Musca domestica*—*Calliphora vomitoria, Sarcophaga carnaria Musca meridiana* and *Stomoxys calcitrans.*

4) The presence of the larvae of these flies affords no evidence as to whether the meat is putrid or not.

5) The dimensions of the larvae can only be determined with precision after they have been killed; the size is practically of no use for determining the length of infection.

6) If the infected meat is exposed to a temperature of 10°C. (50°F.) the process of hatching is arrested and the eggs gradually die off.

7) The larvae die if exposed to direct sunlight or if the medium in which they occur becomes dry.

8) A temperature of below 7°C. (44.6 F.) arrests the development of the larvae but does not kill them. The optimum growth temperature is between 20° and 40° C. (68° and 104° F.) The larva pupates on the 5th or 6th day after hatching, both at the above temperatures or at a temperature of 15° to 17° C. (59° to 62.6° F.)

9) Meat containing larvae can be dangerous to man if eaten raw.

10) No effective method is yet known for protecting meat from becoming infested with flies. At present, the best way is to keep the meat in a cool, dark place. The larvae are not killed either by washing the meat with vinegar or a solution of potassium permanganate, or even by immersing the meat in these two liquids.

618—**The Station for Forestry Research in Denmark.**— *Det Forstlige Forsogsvaesen i Danemark*, Vol. IV., Part 4, pp. 461-463. Copengahen, 1915.

The management of the Station is in the hands of a Chief in conjunction with a Commission of five. The Commission meets once yearly at least. It settles the plan of work for the coming session and draws up the budget. It reports upon the work of the preceding session. It has the power to entrust the direction or execution of a piece of work to a person other than the Station Chief, although in cases where the nature of the work demands continuity it shall be the Station Chief who has preference. The Commission may consult technical men and invite them, if necessary, to attend their sittings, in cases where they are deemed specially competent to deal with some special question.

Up to the present, the Station has published 4 volumes (1905-1915) of reports. Beginning with the 4th volume the reports, printed in Danish, are accompanied by summaries in English, French and German, The following is a list of subjects dealt with up to the present.

Growth and yield of forest trees; Trials of foreign species; Researches on forest soils and particularly the forms of humus and soil biology; Mechanical and chemical analysis combined with trials on the application of artificial fertilizers to spruce, Scots pine, fir and oak in heath soils; The action of storms on forest trees; Races and forms of forest trees; Control of diseases of forest trees; Management, thinning and repopulating of beech; Manufacture and employment of wood for joinery and fuel; Easy and economic methods of mensuration of timber.

CROPS AND CULTIVATION

619—A Review of Investigations in Soil Protozoa and Soil Sterilization.—KOPELOFF, N., and COLEMANN, D. A., in *Soil Science*, Vol. III, No. 3, pp. 197-269. New Brunswick, N.J., March, 1917 (1).

As there has been no adequate historical review of the literature dealing with soil sterilization and soil protozoology, with the exception of certain introductory briefs published in connection with investigations along one definite line or another, the writers considered it advisable to present a survey of the subject to date, not only as an introduction to the investigations to follow, but likewise as being of inherent value to the investigator pursuing specialized work along these and allied lines, and those whose interests may lead them into the field of soil fertility. The practice of sterilizing soils by heat, as well as antiseptics, has been the basis of no small amount of experimentation before the publication of Russell and Hutchinson's work. However, in view of the importance of the latter, it seemed to the writers desirable arbitrarily to divide the investigations into sterilization into two parts, the first treating of those prior to Russell and Hutchinson, and the second of those following. Again for the purpose of a more coherent résumé, soil sterilization may be considered under the two headings of sterilization by heat, and antiseptics, each of which may be further subdivided into three parts, namely: (*a*) the effect on the physical and chemical condition of the soil; (*b*) the effect on plant growth; (*c*) the effect on the biological activities.

(1) See also the Agricultural Gazette for November, 1917.

From the review of the bulk of the literature dealing with soil protozoa and soil sterilization, it may be seen that, despite the work already done, comparatively little is known concerning the phenomena involved. Tracing the practice of soil sterilization by heat and disinfectants it is seen that beyond recognizing the fact that crops are increased by such treatment, and that the chemical composition of the soil undergoes an alteration, together with a profound influence on the biological activities, data of a definite and penetrating character are wanting. Among the varied theories advanced to explain the phenomena of soil sterilization briefly summarized in this paper the following demand serious consideration:

1. In Koch's theory of direct stimulation it is maintained that increased crop production is a result of the physiological effect of the sterilizing agency in stimulating plant growth directly. While several investigators have confirmed Koch's conclusions, they are nevertheless not widely accepted at the present day.

2. Hiltner and Stormer's theory of "indirect" stimulation emphasizes the bacterial factor. These investigators maintain that there is a bacterial equilibrium in the soil which is altered by the introduction of sterilizing agencies. After the decimation of a vast number of bacteria has occurred, a marked development in numbers ensues, which is responsible for the additional available plant-food causing an increased crop yield. This theory has received the confirmation of many eminent investigators, and is still in vogue, although it hardly completely explains the phenomena observed.

3. Liebscher's view is that soil sterilization may be regarded in the same light as a nitrogenous fertilizer. This is not worked out in very great detail, but finds corroboration in most subsequent investigations.

4. Russell and Hutchinson's conclusions have been considered at some length and have been so frequently referred to that it suffices to say at this point that they contend that sterilization eliminates a biological factor (protozoa) which is one of the limiting factors in soil fertility. This view, although having a profound influence upon all research in this field, has not been accepted by the majority of investigators working along the same lines.

5. Pickering attaches the utmost significance to an alteration in the chemical composition of the soil and proves that this change is largely responsible for increased plant growth.

6. Schreiner and his associates also emphasize the chemical aspect of the problem, and contend that biochemical factors induce a change in the organic matter of the soil, releasing certain beneficial and harmful compounds which change the fertility of the soil.

7. Greig-Smith and others adhere to the bacterio-toxin hypothesis which considers that toxins and nutrients of the soil are alone concerned with the changes that occur when soils undergo sterilization. In his latest paper Greig-Smith contends that the traces of antiseptic remaining in the soil are responsible for increase in bacterial numbers and activities.

It remains unquestionable that considerably more investigation must be carried out before any one of the above theories is accepted in an unqualified manner. Considering the province of soil protozoology in its entirety, it immediately becomes apparent that this science is in its infancy and is urgently in need of suitable methods for making accurate investigation possible. As media, 1 per cent hay infusion, 3 per cent blood meal solution and soil extracts

have proved to be most generally accepted. In staining, picric acid (Kleinenberg) and iron haemotoxylin (Delafield's) are most highly recommended. The "Blutkorperzahlapparat" and the loop methods are employed for counting. A consideration of the inter-relation of protozoa and bacteria in normal soil remains practically a virgin field, although what little evidence there is obtainable points to the probability that the protozoa limit bacterial activity under conditions especially favorable to protozoan development. Thus, the scope of unsolved problems is considerably broader than the investigations already carried to completion. How to sterilize the soil without altering its chemical composition is an important though baffling problem.

On the bacteriological side much can and needs to be done in determining the differences in the physiological efficiencies of the various groups of organisms in the soil and how they are affected by sterilization. Further, it is imperative to know what role the fungi play in soil fertility, and how they may be taken into consideration when it is desired to have bacteria or protozoa constitute the limiting factor. In addition to an improvement and discovery of methods in soil protozoology it is essential to know more of the life-habits of these organisms, especially as regards the effect upon them of environmental conditions such as (*a*) the physical and chemical conditions in the soil, together with the effect of (*b*) air; (*c*) light; (*d*) heat; (*e*) moisture, reaction, gases, etc., as well as the mutual association with other biological factors. Finally, a matter demanding immediate study is the actual observation of pure cultures of protozoa acting singly and collectively upon pure cultures of bacteria, thus furnishing some definite basis for the investigation of soil protozoa as a factor in soil fertility.

With the solution of these problems will come a more profound understanding of the science of protozoology, a science which bids fair to take its place with soil bacteriology as furnishing a portion of the foundation essential for soil fertility investigations.

A list of 337 references to literature bearing on the subject is given in appendix.

620—**The Relation of Protozoa to Certain Groups of Soil Bacteria.**—HILLS, T. L. (Laboratory of Agricultural Bacteriology, University of Wisconsin) in *Journal of Bacteriology*, Vol. 1, No. 4, pp. 423-433. Baltimore, 1916.

The writer has studied the effect of protozoa on certain biological processes of the soil: ammonification, nitrification, and free nitrogen fixation. For this study silt loam soil cultures were used; the moisture content was maintained at as near one-half saturation as possible.

In the soil cultures the presence of protozoa under the conditions of the experiments did not have any noticeable effect, detrimental or otherwise, on the processes of ammonification, nitrification and free nitrogen fixation. In the case of the liquid cultures employed in the study of free nitrogen fixation the conditions were at an optimum for the development of the protozoa and under these circumstances they limited bacterial activity as evidenced by the harmful effect on the fixation of free nitrogen. Under these conditions the protozoa were undoubtedly active in destroying the *Azotobacter* cells. But in the soil cultures conditions were evidently not favourable for the activity of the protozoa as these organisms did not appear to exert any harmful influence on the three soil processes studied.

A bibliography of 6 references is appended.

621—**New Irrigation-District Code for Oregon, U. S. A.**—CUPPER, PERCY A., in *Engineering News-Record*, Vol. 78, No. 5, p. 254. New York, May 3, 1917.

The Oregon legislature has just enacted a complete irrigation-district code and repealed all laws on this subject hitherto existing in the statute books. A brief summary of the code is given in the Institute Bulletin.

622—**Summary of Researches by Messrs. Muntz and Lainé on the Control of Irrigation according to the Physical Properties of Soils.**—HITIER, H., in *Bulletin de la Société d'Encouragement pour l'Industrie Nationale*, 116th year, 1st half year, Vol. 127, No. 2, pp. 386-398. Paris, March-April, 1917. (5pp. in Institute Bulletin).

623—**A Modified Method of Green-Manuring.**—HUTCHINSON, C. M. (Imperial Agricultural Bacteriologist) in *Bulletin No. 63, Agricultural Research Institute, Pusa*, 12 pp. Calcutta 1916. (2 pp. in Institute Bulletin).

It has been noticed that the complete decomposition of a green crop depends upon the incidence of rainfall following its burial. This fact has suggested the avoidance of negative results from green-manuring by carrying out the initial stages of decomposition under artificial conditions. The method practiced is described in the Institute Bulletin, and its advantages summarized.

624—**The Trade in Nitrogenous Materials.**—I. BERTRAND, A. (Inspector Fiscal de la Propaganda Salitrera), 5 pp. in Institute Bulletin).

Summaries of six articles published in different Bulletins of the *Asociacion Salitrera de Propaganda* are discussed in the Institute Bulletin with illustrative charts.

625—**The Effect of Weeds upon Cereal Crops.**—BRENCHLEY, WINIFRED E. *Rothamsted Experimental Station*) in *The New Phytologist*, Vol. XVI, Nos. 3 and 4, pp. 54-76. London, March and April, 1917.

The practical results of the competition of weeds and crops are well known, but the exact cause of this competition is less obvious. It is common knowledge that the weeds utilize food and water from the soil and, above ground, tend to rob the crop of much of the sunlight essential to full development. Apart from this, however, it has often been questioned whether the weeds may not excrete from their roots some poisonous substance which actually inhibits the growth of the crops, but the whole matter is very undecided.

The present paper gives the results of pot and water-culture experiments carried out at Rothamsted over a period of 4 years with crops and weeds grown in association. The following combinations were tested, the conditions being varied as far as possible to imitate natural conditions except that the pots were protected from birds.

The pots with wheat or weed alone received twice as much seed as was sown in the mixed pots; i.e. two parts of wheat or weed when alone and one part wheat + one part weed when mixed.

I.—POT EXPERIMENTS.—*Papaver Rhoeas*, + *Papaver Rhoeas*, *Papaver Rhoeas* + Wheat, Wheat + Wheat, Wheat + *Alopecurus agrestis*, *Alopecurus agrestis* + *Alopecurus agrestis*, *Brassica alba* + *Brassica alba*, *Brassica alba* +Wheat, Wheat + *Spergula arvensis*, *Spergula arvensis* + *Spergula arvensis*.

II.—WATER-CULTURE EXPERIMENTS.—Wheat + *Spergula arvensis*, Wheat + *Alopecurus agrestis*.

The conditions and results of the various experiments are set out in detail, the total dry weights of the resulting crops of cereal and weed being given in each case. The conclusions are as follows:

There is no evidence, and indeed no indication, that any direct toxic action comes into play.

It is evident that the mere competition of plant with plant, irrespective of species, has much to do with development and that the time and duration of competitive check are the chief factors involved. Purely vegetative competition is more potent than is generally realized. In the experiment all the crop plants were at least 4 or 5 inches apart, and the effects of overcrowding were most obvious. In a field where weeds are at all prevalent, the plants are still more closely placed, and the struggle must be still keener. Even when the weeds are suppressed by cultivating and hoeing, the roots remain in the soil to a large extent, and those of the perennials at least continue functioning in a normal way, though to a less degree; nevertheless, such suppression of weeds is all to the advantage of the crop, owing to the removal of the aerial competition.

The vital factor in competition is the mere presence of other plants, be they what they may, and, up to a certain limit, two plants cannot make such good individual growth in a given restricted area as can one plant.

In those cases where the same soil was allowed to serve for experiments in successive years a comparison of the dry weights, pot for pot, did not show any evidence that the crop obtained from any individual pot in the first year in any way affected that obtained in the year following. This is a further proof of the absence of toxic effects from the roots. If toxins had been present a pot which carried a relatively small crop in 1915 might have been expected to carry a relatively large one in 1916 and vice-versa, as the large crop would have left a larger supply of toxin in the soil. As no such correlation was proved it seems evident that no toxin capable of remaining unchanged from one season to the other was present in the soils.

630—**Reduplication Series in Sweet Peas.**—PUNNET, R. C., in the *Journal of Genetics*, Vol. VI, No. 3, pp. 185-193. III tables. Cambridge, April, 1917. (2 pp. in Institute Bulletin).

631—**Studies in the Inheritance of Doubleness in Flowers, II. Meconopsis, Althaea and Dianthus.**—SAUNDERS, EDITH R., in the *Journal of Genetics*, Vol. VI, No. 3, pp. 165-184. Cambridge, April, 1917.

632—**Dry Farmed and Irrigated Wheat.**—JONES, J. S., and COLVER, C. W., in *University of Idaho Agricultural Experiment Station* (Departments of Chemistry and Home Economics), *Bulletin* No. 88, 20 pp., 3 tables. Moscow, (Idaho), 1916.

This report on dry-farmed and irrigated wheat covers the completed portion of a general investigation which was commenced in 1907 and which has for its ultimate object the study of the factors which determine the protein content of normally matured wheat.

Gluten is the most important constituent of wheat flour because it makes possible the baking of light bread. The gluten content of flour depends upon the protein content of the wheat from which it was ground and, although flours may vary rather widely in the percentage content of gluten without varying to the same extent in baking value, a reasonable percentage of gluten is absolutely necessary to insure satisfactory results under normal conditions of baking.

There is a widespread feeling among investigators, grain buyers and millers, that the maintenance of quality in wheat de-

pends primarily upon the maintenance of a high protein content and that the improvement of northwestern grown wheat is intimately connected in some way with a substantial increase of that constituent in the commonly grown varieties. At any rate, those wheats which establish the standards of excellence in milling centres are relatively high in protein and produce flours of relatively high gluten content. Finally, experience teaches that no matter what other objects the wheat breeder may attain, they are for practical purposes almost valueless if, in their attainment, protein content is materially sacrificed.

In the Pacific North West, wheat is cultivated under very variable conditions. Whether or not quality could be correlated in any marked degree with such differences appears to be ascertainable only by the systematic collection of samples through a term of years, and the performance of the necessary analytical work and baking tests. The first report was made in 1911. This one is supplementary to a certain extent, but deals specifically with wheat grown in south Idaho under two radically different systems of farming—dry-farming and irrigation. The samples reported upon were grown and secured for analytical, milling and baking tests in 1912, 1913 and 1914.

Examination of the data secured (table I omitted here) suggests that possibly some varieties of wheat respond more quickly to changes of environment than do others. This seems to be particularly true of Turkey Red and Marquis. Nevertheless, the protein of the average dry-farmed sample was only one per cent. greater and the protein of its flour only seven-tenths per cent. greater than that of the average irrigated sample—differences too small to be strongly affected in the gluten percentage either wet or dry. There were no significant differences between the average dry-farmed and irrigated sample in weight per bushel, in weight per 1000 grains, or in percentage of moisture, ash and fatty matter.

Results of baking tests (table II omitted here) in many ways do not support the commonly held views regarding the relative values for bread making purposes of dry farmed and irrigated wheat. They suggest the possibility of making greater progress toward the raising of flour standards in this state by a systematic insistence on the part of housewives for brands of flour that have been ground from the better varieties of wheat rather than by discrimination in favour of either the dry-farmed or the irrigated product.

Wheat Production in Canada.—NEWMAN, L. H., Secretary of the Canadian Seed Growers' Association, in *International Review of the Science and Practice of Agriculture*, Year VIII, No. 7, pp. 961 967. Rome, July, 1917. (7 pp. in Institute Bulletin).

633—Study on the Digestibility of the Grain Sorghums.—LANGWORTHY, C. F., and HOLMES, A. D., in *United States Department of Agriculture Bulletin* No. 470, pp. 33. Washington, December 22, 1916. (2 pp. in Institute Bulletin).

636—Cultivation of Beans in Germany; Trials to Determine the Best Number of Plants per Pole.—UNSELT, in *Moeller's Deutsche Gaertner Zeitung*, part 7, pp. 51-52. Erfurt, 1917.

The poles with 2 and 3 plants gave equal and maximum results.

637—Fruit Varieties for Maine.—BROWN, BLISS S., in *University of Maine, Agricultural Extension Service, Extension Bulletin* No. 111, pp. 19. Orono, January, 1917.

639—Experimental Work in Italy on the Plum (Prunus domestica L. var. —oeconomica) and on the Composition of the Oil extracted from the Kernels.—FERUGLIO, D., and BERNARDIS, G. B., in *Bolletino dell' Associazione Agraria Friulana*, 61st Year, Series VII, Vol. 31, pp. 56-75. Udine, December 31, 1916. (3 pp. in Institute Bulletin).

The concluding paragraphs of this article in the Institute Bulletin are as follows:

In districts where the plum is largely grown, the kernels might well be used for the extraction of the oil, the residue being employed as a feeding cake.

Numerous analyses made by the writers have shown that this oil is composed chiefly of the glycerides of oleic acid, those of linoleic acid and palmitic acid figuring in only a small proportion. Analysis has also shown the presence of a very feeble quantity of an unidentified phytosterin (vegetable cholesterin).

The oil shows a certain number of constants which only differ slightly from those of olive oil, consequently on mixing it with this latter in a certain proportion its presence is not easily detected. Owing to its properties and organoleptic qualities, it can be put to various uses and may attain quite favorable prices on the market.

641—Cultivation of the Vine by the Desbois Method.—GRANDCLÉMENT in *La Vie agricole et rurale*, Year 7, No. 18, pp. 315-317. Paris, May 5, 1917. (2 pp. in Institute Bulletin).

LIVE STOCK AND BREEDING

644—**Anaphylaxis in Cattle and Sheep, Produced by the Larvae of Hypoderma bovis, H. lineata and Oestrus Ovis.**—HADWEN, SEYMOUR and BRUCE, E. A., in *Journal of American Veterinary Medical Association*, Vol. LI, New Series, Vol. 4, No. 1, pp. 15-44, 15 plates. Ithaca, N.Y. April, 1917.

Anaphylaxis has been described by Muir and Ritchie (1910) as development under certain circumstances in an animal of hypersensitiveness to foreign albuminous materials which in themselves are not essentially toxic. The common feature is that repeated injections of certain substances in sub-toxic or non-toxic doses—a suitable interval of time elapsing between the injections—may be followed by markedly toxic or even fatal symptoms. The writers have obtained such reactions in cattle, sheep and small animals by injecting them with extracts of the larval forms of *Hypoderma lineata, H. bovis* and *Oestrus ovis* from their own bodies. They have also observed natural cases of anaphylaxis where, owing to injury, the larvae have been ruptured subcutaneously *in loco*. As extracts of *Hypoderma* larvæ contain little or no toxic material the reaction is regarded as being due to the development of hypersensitiveness in the host to the protein material of its parasite.

Anaphylaxis may be either "acute" or "chronic". The symptoms in the first case were immediate, the first noticeable sign being an extremely tired look, succeeded almost immediately by salivation, tears and defaecation, then by signs of asphyxia and death. In the "chronic" form the symptoms were a little less rapid and not so severe, in addition there were œdemas, especially of the eyelids and anus, and marked irritation of the skin.

Small animals were sensitized with warble extracts and showed signs of anaphylaxis following the second injection.

Eye and other local reactions were obtained with extracts applied to the mucous membranes. In cattle the reaction was specific for extracts of *Hypoderma*, and in a horse for *Gastrophilus*.

It would appear probable that similar reactions will be obtained in other animals with their own parasites.

645—**A Study of Hemorragic Septicaemia, Observations in Sheep and in Mouflon-Sheep Hybrids.**—MORI, NELLO (*Director of the Naples Experimental Station for Infectious Diseases of Livestock*) in *Annali delle Stazione Sperimentale per le malattie infettive del bestiame*, Vol. III, part II, 33 pp. Naples, Year 1916. (3 pp. in Institute Bulletin).

646—**An Intradermal Test for Bacterium pullorum Infection in Fowls.**—WARD, ARCHIBALD R., and GALLAGHER, A., in *U. S. Dept. of Agriculture*, Bulletin No. 517, 15 pp. Washington, February 16, 1917. (2 pp. in Institute Bulletin).

647—**Relation between the External Body Measurements, the Live Weight and the Net Weight on the One Hand, and the Weight of the Heart and the Lungs on the Other Hand, in Cattle of the Schwytz and Parmesan Breeds; Investigations carried out in Italy.**—BRENTANA, DOMENICO, in *Il Moderno Zooiatro*, Series V., Year VI, No. 3, pp. 61-79. Bologna, March 5, 1917. (2 pp. in Institute Bulletin).

The modern works on the relation between the body measurements, live weight, etc., on the one hand and the weight of the heart and the lungs on the other, in domestic animals and in man, are summarily reviewed. The author then describes his own experiments at the public abattoir of Parma on 84 cattle, giving, in 4 tables, the results of his measurements and calculations. The minimum, maximum and average figures obtained are summarized in an appended table. In the Institute article the author's conclusions are summarized.

648—**The Mineral Metabolism of the Milch Cow.**—FORBES, B., BEAGLE F. M. FRITZ, C. M., MORGAN, L. E., and RHUE, S. N., in *Ohio Agricultural Experiment Station Bulletin* No. 295, pp. 323-348. Wooster, Ohio, April, 1916. (4 pp. in Institute Bulletin).

649—**By-Products from the Manufacture of Tin Plate.**—*The Board of Agriculture Ohio*, Vol. VII, No. 4, pp. 65-66. Columbus, Ohio, Nov., 1917.

650—**A Contribution to the Bacteriology of Silage.**—SHERMAN, J. M., (Bacteriological Laboratories of the Pennsylvania State College and Agricultural Experiment Station). *Journal of Bacteriology*, Vol. I, No. 4, pp. 445-451. Baltimore, 1916.

651—**Effects of Feeding Cottonseed Products on the Composition and Properties of Butter.**—ECKLES, C. M., and PALMER, L. S., in *University of Missouri College of Agriculture, Agricultural Experiment Station Research Bulletin No.* 27, pp. 1-44. Columbia, Missouri, December, 1916.

652—**Pig Feeding Experiments on the Model Farm of Dikopshof, Germany.**—RICHARDSEN, A., in *Landwirtschaftliche Jahrbucher*, Vol. 49, Pt. 3-4. Berlin, 1916. (3 pp. in Institute Bulletin).

653—**Temperature Experiments in Incubation.**—PHILIPS, A. G., in *Purdue Agricultural Experiment Station Bulletin* No. 195, Vol. XIX, December 1916.

The details of the observations are given in a set of 21 tables. The conclusions drawn are as follows:

1. A temperature of 101-102-103 degrees the first, second and third weeks respectively, using a standing thermometer on a level with the top of the eggs but not touching them, will prove very satisfactory in the artificial hatching of hens' eggs.

2. A temperature slightly above or below 101-102-103 degrees will not influence the hatch one way or another.

3. A temperature of 103-104-105 F., degrees is too high and will injure the hatch greatly.

A temperature of 102-103-104 degrees is a little high for successful incubation.

5. There seems to be little difference in number of chicks hatched between machines run at 100-101-102 degrees and machines run at 101-102-103 degrees. This means that at such low temperatures a variation of one degree or more will have little influence.

6. Operators of incubators should endeavour to hold down temperatures below common practice, rather than allow them to rise above it.

7. Brown and white eggs need the same temperature.

8. Brown eggs are no warmer or cooler than white eggs.

9. Brown eggs have a tendency to produce poorer fertility, more dead germs, more chicks dead in shell and fewer chicks than white eggs. No reason from the standpoint of incubation can be given for this peculiarity.

10. Under ordinary conditions, it is reasonable to expect white eggs to be 90 to 92 per cent. fertile and hatch 75 per cent. of the fertile eggs. Brown eggs will run 2 per cent less in fertility and 12 per cent. to 15 per cent. less in hatchable fertile eggs.

11. Touching thermometers average slightly higher temperatures than standing thermometers. Such differences have no influence on the hatch.

12. As the chicks develop in the eggs, they give off heat tending to equalize the temperature in all parts of the machine. This is demonstrated by the hanging thermometer. This thermometer runs at a uniform temperature for the three weeks but the temperature at the level with the eggs starts about 2.5 degrees lower and rises until it comes within one degree of the hanging thermometer temperature on the twenty-first day.

13. A temperature with a standing thermometer of 100.5 degrees the first week. 101.5 degrees the second and 102.5 degrees the third week compares well in temperature and hatching results with a hanging thermometer temperature of 103 degrees for three weeks.

654—**Spore-Forming Bacteria of the Apiary.**—MCCRAY, ARTHUR H., *Apicultural Assistant, Bureau of Entomology, United States Dept. of Agriculture*) in *Journal of Agricultural Research*, Vol. VIII, No. 11, pp. 399-420, figs. 6, Plates II. Washington, D.C., March, 12, 1917.

FARM ENGINEERING

656—**The Encouragement of Mechanical Cultivation in Italy and France.**—I. *Bollettino die Ministeri per l'Agricoltura, per l'Industria, il Commercio ed il Lavaro*, Year 16, Vol. I, Parts 7 and 8, pp. 300-302. Rome, April 1 and 16, 1917.—II. *Feuille d'Informations du Ministère de l'Agriculture*, Year 22, No. 19, pp. 6-7. Paris, May 8, 1917.

ITALY: By decree of February 18, 1917, the Minister for Agriculture has issued the following order:

Subsidies to be granted to agricultural societies and syndicates for the purchase of tractors for immediate use on the land may amount to 30 % of the cost price of the machines, including ploughs and accessories.

Those organizations that buy at least 5 tractors for general use within the limits of a province, may receive a supplementary premium of 10 % of the cost price.

Subsidies to private agriculturists for the purchase of tractors for immediate use, may amount to not more than 20 % of the sale price, including ploughs and accessories.

Requests for subsidies should be directed to the provincial Commissions, and should include, besides technical details of the tractors and the price, the undertaking to buy the tractor within a limited time. The provincial Commissions will transmit the requests, together with the reasons for their approval, to the Ministry for Agriculture.

II.—FRANCE.—The Ministry for Agriculture has published the subsidies granted, in 1916, to the various syndicates, societies, communes and departments which are interested in mechanical cultivation, so as to enable them to purchase agricultural tractors and motors. The subsidies, ranging from $425 to $15,958, make a total of $41,360. The three national Schools of

Agriculture have received, for the same purpose, subsidies amounting to $4,000.

657—**The Donalies Patent Mechanism for Attaching One or More Implements to a Balance Plough.**—*Deutsche Landwirtschalftliche Presse*, Year 44, No. 27, p. 246, 5 fig. Berlin, April 4, 1917. (2 pp. in Institute Bulletin.)

659—**New Stump Burner for Logged-Off Lands.**—LE ROY W. ALLISON, in *Engineering Record*, Vol. 75, No. 13, pp. 495-496, 1 fig. New York, March 31, 1917.

The Hubbard stump burner consists of an adjustable steel hood of two principal sections to form a base and top, designed to be placed over the stump.

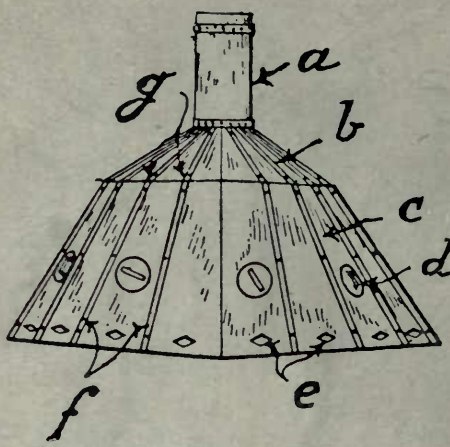
By means of draught tubes, placed around and near the base of the burner, the need for any blower or other artificial draught device is eliminated.

The lower section panels are made from steel sheets and are 11 in. wide at the top, 19 in. at the base and about 48 in. high. On one edge of each panel a ½ in. lip is bent at an angle slightly in excess of 90°, while the other edge is made in the form of an inverted U, ¼ in. wide and ½ in. deep. Bolt holes are punched near the bottom, middle, and top of its joint for the field connections. A 2-in. hole is provided in the centre of each of the lower panels near the base for the insertion of the draught tubes made of ½ in. iron pipe. A damper, pivoted on a single rivet, covers the hole when the draft tube is not used. Every alternate panel has also an 8 in. hole for observation purposes.

The upper section is composed of sheet steel panels, similar in shape and design to the lower panels. A 1½ in. overlap is provided to allow for joining the upper and lower sections by means of V-shaped tie bolts.

The smokestack, of sheet metal, is adjustable, and is supported by a metal band at the base and top of the cylinder. The size of the smokestack varies according to the number of panels used to make up the burner. A 12 in. stack has been found in practice the best size to use with a sixteen-panel hood.

In erection the lower panels are bolted together in groups of 2 or 3, to facilitate handling and moving. The different groups are then placed round the stump



a = Smokestack.
b = Upper panels of No. 22 steel.
c = Lower panels of No. 18 steel.
d = Observation holes.
e = Draught tube holes with damper.
f = Lips and u-shaped edges of panels.
g = V-shape tie bolts for fastening upper to lower panels.

and the remaining connections made with heavy cotter pins. The roof section is bolted together and the stack is attached before being fastened to the bottom panels. Before operating, dirt, etc., is cleared away sufficiently to allow kindling of a good fire. The fire is started through the observation openings and the draught pipes are inserted so as to give the best draught. The draught increases as the temperature rises under the hood, being augmented by feeding logs to the fire as needed after kindling.

This burner will consume stumps of from 3 to 5 ft. in diameter in 24 hours, while 6 to 7 ft. stumps require 30 or 40 hours.

660—**The "Jahn" Curved Knife for Root-Pulping Machines.**—*Deutsche Landwirtschaftliche Presse*, Year 44, No. 28, 254-255, 3 figs. Berlin, April 7, 1917. (2 pp. in Institute Bulletin).

661—**The Schilde "Universal Drier".**—PAROW, in *Zeitschrift fur Spiritusindustrie*, Year 40, No. 2, p. 13, 9 fig. Berlin, January 11, 1917. (4 pp. in Institute Bulletin).

RURAL ECONOMICS

665—**Financial Statement of the Delaware Experiment Station Peach Orchard**—MCCUE, C. A., in *Delaware College Agricultural Experiment Station, Bulletin* No. 113, pp. 1-21. Newark, Delaware, June, 1916. (3 pp. in Institute Bulletin).

AGRICULTURAL INDUSTRIES

669—**Simple Method for Estimating the Degree of Bolting of Wheat Flour.**—PERRACINI, in *Le Stazioni Sperimentali Agrarie Italiane*, Vol. L, Pts. 1-4-5, pp. 250-252. Modena, 1917.

674—**On the Interpretation of the Results of Analysis of Tomato Preserve.**—GUARNIERI, P., in *Le Stazioni Sperimentali Agrarie Italiane*, Vol. L, Pts. 3-4-5, pp. 245-249. Modena, 1917. (2 pp. in Institute Bulletin).

676—**Pepsin in Cheesemaking.**—STEPHENSON, C., in the *Journal of Agriculture, New Zealand Department of Agriculture, Industries and Commerce*, Vol. XIV, No. 1, pp. 32-33. Wellington, January 20, 1917.

The present shortage of rennet is a serious menace to the New Zealand cheese industry. Experiments in the use of pepsin as a total or partial substitute for rennet were, therefore, made by the Dairy Division. The results obtained were entirely satisfactory.

In order to make a thorough comparison between the action of the pepsin and that of the rennet, the same class of milk was used in each experiment.

As soon as the milk reached the factory it was divided equally and poured into 3 vats. The milk in vat No. 1 was coagulated with pepsin, that in vat No. 2 with a mixture of pepsin and rennet, and that in vat No. 3 with rennet only. The pepsin was used at the rate of 2½ drams per 1000 lbs. milk, and the rennet at the rate of 3½ oz. per 1000 lbs. milk.

The curd in vats 2 and 3 was ready for cutting in 30 minutes, while that in vat 1, in which pepsin only was used, required 10 minutes longer before it was firm enough for cutting. No difference in the development of acidity was observed between the curds of any of the vats. The weight of cheese from each vat was practically the same.

The whey in vat No. 1, coagulated with pepsin, had a rather lower fat content than that of vats No. 2 and 3. This may be attributed to the slowness of the coagulation. This experiment, as well as later tests, shows that the action of pepsin when used alone is somewhat slow, even if it is added in larger quantities.

For this reason a mixture of pepsin and rennet is strongly recommended. Before being added to the rennet, the pepsin should be dissolved in 20 times its own weight of water; the mixture should then be diluted with about half a bucketful of cold water before being stirred into the milk. If warm water is used its temperature should not be above 100° to 105° F., as the pepsin will, in this case, quickly lose its strength. Pepsin solution kept for any length of time becomes so weak as to be practically useless, and should always be prepared afresh 15 to 20 minutes before use.

The present price of pepsin is $4.40 to $4.60 per pound, and that of rennet $14.60 to $15.80 per gallon. As 1 lb. of pepsin is practically equal to 1 gallon of rennet, its use presents distinct economic advantages.

The cheeses made with pepsin were of good quality, and no difference could be observed between them and those coagulated with rennet.

677—**Preservation of Timber.**—*The Colonial Journal*, Vol. 10, No. 4, pp. 306-308. London, April, 1917.

The sap which exists in the cells and vessels is the chief cause of the decay of timber, especially that which is put in the ground.

A brief survey of the processes used to preserve timbers is given. Special attention should be called to a new method, called "Powellising". By this method the green timber is placed in a bath containing a substance with a boiling point well above that of water, for example molasses. This is heated till the molasses is hot enough to boil off the moisture in the green timber. The bath is then allowed to cool. If white arsenic be added, then the molasses absorbed impregnates the wood with this preservative when cooling.

PLANT DISEASES

678—**Decree regarding the Organization of the Phytopathological Service in Italy.**—*Gazzetta ufficiale del Regno d'Italia*, Year 1917, No. 144, p. 2852. Rome, June 19, 1917. (2 pp. in Institute Bulletin).

679—**Decree by the Minister of Agriculture, in Italy, Regulating the Importation of Living Plants, Portions of Plants, Seeds and other Plant Products.**—*Gazzetta ufficiale del Regno d'Italia*, Year 1917, No. 111, p. 2379. Rome, May 11, 1917.

682—**Practical Means of Control of the**

"Oidium" of the Oak.—DANIEL, LUCIEN, in *Comptes rendus hebdomadaires des séances de l'Académie des sciences*, Vol. 164, No. 25 (June 18, 1917), pp. 957-959. Paris, 1917.

684—Fusarium tracheiphilum Parasitic on Soy-Bean (Soja max) in North Carolina. —CROMWELL, RICHARD O., in *Journal of Agricultural Research*, Vol. VIII, No. 11, pp. 421-440, Fig. 1, Pl. 95. Washington, D.C., March 12, 1917.

690—Invasions of Locusts in Uruguay, in 1915 and 1916.—REPUBLICA ORIENTAL DEL URUGUAY, MINISTERIO DE INDUSTRIAS. DEFENSA AGRICOLA. *Memoria de los trabajos realizados contra la langosta. Invasion del* 1915-1916. 1 vol. in-16, 444 pp., 36 maps, 28 figs. Montevideo, 1916.

AGRICULTURAL ECONOMICS

AGRICULTURE AND THE WAR IN GREAT BRITAIN

The existing provisions as to the cultivation of lands are based on an amendment, passed on 13 March, 1917, of Regulation 2 M of the Defence of the Realm Regulations. This amendment gives certain powers as regards England and Wales to the Board of Agriculture and Fisheries, and as regards Scotland to the Board of Agriculture for Scotland, which bodies exercise their powers "after such consultation with the Food Controller as may be arranged" and where they "are of opinion that, with a view to maintaining the food supply of the country, it is expedient."

They may "enter on and take possession of any land which in their opinion is not being so cultivated as to increase, as far as practicable, the food supply of the country, and, after entry thereon, do all things necessary or desirable for the cultivation of the land or for adapting it for cultivation; and for such purposes enter on and take possession of any buildings on the land or convenient for such purposes". They may "take possession of any machinery, implements of husbandry or plant . . . ., or any farm produce, stock or animals . . . required for the cultivation of land or the increase of the food supply of the country". They may "by notice served on the occupier of any land require him to cultivate the land in accordance with such requirements as the Board may think necessary or desirable . . . ., and by notice served on the tenant of any land, which or part of which in the opinion of the Board is not being so cultivated as to increase as far as practicable the food supply of the country, determine his tenancy of the land . . .; and after entry on any land arrange for its cultivation by any other person whether by contract of tenancy or otherwise. An occupier of land may, with a view to maintaining the food supply of the country, submit to the Board a scheme for the cultivation of the land in a manner not consistent with the contract of tenancy of the land, and the Board, if satisfied that the adoption of the scheme is necessary or desirable for the maintenance of the food supply, may direct that the land shall be cultivated in accordance with the scheme, subject to any modifications which the Board may think fit to make therein". "If the Board at any time withdraw from possession of any land of which possession has been taken under this regulation, they may recover from the person then entitled to resume occupation of the land such amount as represents the value to him of all acts of cultivation or adaptation for cultivation executed by the Board". "The Board may with respect to any land . . . . authorise any person or any body constituted by the Board to exercise on behalf of the Board any powers of the Board under this regulation and prescribe the procedure of any such body."

As regards England and Wales this regulation was completed by an order of the Board of Agriculture and Fisheries which defined the powers of the War Agricultural Executive Committees. At present in England and Wales the machinery for the intensification of agricultural production consists in each county of a War Agricultural Committee, the directing body, on which depends a War Agricultural Executive Committee, which leaves certain duties to sub-committees.

These sub-committees consist of from four to seven members experienced in agriculture who are expected to meet weekly or at least fortnightly. They report to the County Committee any land which is not producing its full quota of food and suggest the necessary action. They also report on the labour shortage and assist farmers to obtain seed and manures and the use of horses and implements. In short the business of the sub-committee is to help the farmers in every possible way.

On the advice given in a circular letter issued by the Director General of the Food Production Department further sub-committees were formed in each county, in particular a Labour Sub-Committee, a

Machinery Sub-Committee and a Supplies Sub-Committee.

The application of the Cultivation of Lands Order is the most important duty of the County Executive Committees. In the first place they send recommendations to the farmers who generally agree to carry out the suggestions. If a farmer is unable to fulfil requirements of the Executive it becomes necessary to supplement his efforts or to replace him. When all else fails it becomes necessary to use compulsory powers. Reports show that the Executive committees are doing their work thoroughly. Advice and persuasion are being used in numberless cases and where these fail most committees have no hesitation in applying their more drastic powers (Summarized from the *International Review of Agricultural Economics*, August, 1917, pp. 79-84).

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the August number of the International Review of Agricultural Economics. Persons interested in any of the articles in this list may obtain the original bulletin on application to the Institute Branch, so long as the supply for distribution is not exhausted.

AGRICULTURAL STATISTICS

THE WHEAT SITUATION, PRESENT AND PROSPECTIVE

BY T. K. Doherty, LL.B.

The situation as described in THE AGRICULTURAL GAZETTE of September last (pp. 839-842) (1) has very materially changed as the result of further information since received. Hence the following presentation of data which refers only to the countries which are open to the world's commerce. In dealing with production the countries are grouped for the purpose of facilitating analysis. First the consumptive requirements are considered, then the supplies in exporting countries together with actual and prospective shipments.

GROUP 1.—SOUTH MEDITERRANEAN AND THE CAPE

COUNTRIES	1917	1916	Five Years' Average, 1909-13
	Bush.	Bush.	Bush.
Cyprus and Malta	2,400,000	2,400,000	2,400,000
Egypt (a)	29,835,000	36,543,000	34,814,000
Tunis (a)	6,963,000	11,023,000	6,230,000
The Cape	2,400,000	2,400,000	2,400,000
Totals	41,598,000	52,366,000	45,844,000

(a) Official figures.

(1) That article was republished practically in full as U.S. Food Administration Bulletin, No. 351.

Tunis and the Cape will probably be self-sustaining. Malta will remain an importer, and Egypt, with a decrease of five millions from average production will probably need to import an equal amount. Egypt's average pre-war requirements, including its own production, were 42,623,000 bushels. Average import was 7,716,000. Estimating in this group also for the wheat requirements of Mesopotamia and Jerusalem with the occupying armies, probably at least 10 million bushels will be reached.

GROUP II.—NEUTRAL COUNTRIES OPEN TO THE WORLD'S COMMERCE

COUNTRIES	1917	1916	Five Years' Average 1909-13
	Bushels	Bushels	Bushels
Denmark	4,500,000(b)	6,026,000	5,344,000
Netherlands	3,453,000(a)	4,710,000	4,896,000
Norway	241,000(a)	305,000	306,000
Spain	141,000,000(a)	152,330,000	130,447,000
Sweden	7,497,000(a)	8,979,000	7,769,000
Switzerland	4,556,000(a)	4,053,000	3,314,000
Totals	161,247,000	176,403,000	152,076,000

(a) Official figures.
(b) Estimated.

An analysis of this group shows (1) that the 1917 production exceeds the pre-war average by slightly over 9 million bushels; (2) that the production of 1916 was 24 million bushels in excess of that average, 22 of it belonging to Spain alone; (3) that the pre-war import requirements of the group were 62 millions; (4) that the actual imports in 1916 were 69,812,000 bushels. The minimum import supplies which they may be expected to try to secure are estimated in millions of bushels as follows: (pre-war average import indicated in parenthesis); Holland, 15 (22.0); Scandinavia, 13 (16.9); Switzerland, 15 (16.9); Spain 5 (6.25); furnishing a total requirement for the group of 48 million bushels. This probably must be cut by 10 millions

GROUP III.—IMPORTING ALLIED COUNTRIES OPEN TO THE WORLD'S COMMERCE

COUNTRIES	1917	1916	Five Years' Average, (1909–13)
	Bushels	Bushels	Bushels
France (a)	144,150,000	204,910,000	317,639,000
Greece	4,000,000	8,000,000	4,320,000
Great Britain (a)	59,717,000	56,948,000	58,043,000
Ireland (a)	4,347,000	2,827,000	1,597,000
Italy (a)	140,000,000	176,531,000	183,336,000
Portugal	7,440,000	8,000,000	7,440,000
Belgium	9,000,000	11,917,000	14,896,000
Totals	368,654,000	469,133,000	587,271,000

(a) Official figures.

The analysis of this group shows (1) that the 1917 production is smaller by 218,617,000 bushels than the pre-war average, the deficit being almost wholly accounted for by France's 173 million and Italy's 43 million decrease; (2) that the decrease from 1916 is about 100 millions; (3) that the average pre-war total supplies of this group, including their own production, were 961,459,000; (4) that with their 1917 production of only 368,654,000 their corresponding import requirements now would be 592,805,000 which they cannot hope to secure. This is more than was ever exported to the whole of Europe in any one year.

France's pre-war average consumption of wheat was 361 million bushels. Deducting from this total its domestic production in 1917, we find that her normal needs for the current year would be 217 millions. In estimating a prospective import during the current year of 180 millions, allowance is made for an economy of 37 millions over the pre-war period.

Italy's pre-war consumption was 236 million bushels. With a production of 140 millions in 1917 her normal import need would be 97 millions. Reducing this by 17 millions absolute needs are estimated at 80 million bushels. These results for the ally group are tabulated as follows:

	Pre-war Consumption	Normal Import Need 1917-18	Estimated Minimum Needs 1917-18
France	361,364,000	217,214,000	180,000,000
Italy	236,614,000	96,614,000	80,000,000
Great Britain	275,693,000	211,629,000	180,000,000
Greece	.....	.....	20,000,000
Portugal	.....	.....	3,000,000
Belgium	64,000,000	55,000,000	24,000,000
Group I.—Malta, Egypt, Mesopotamia, Jerusalem	.....	.....	10,000,000
Groups I and III.—Total Allied Requirements			497,000,000
Group II.—Five European Neutrals			48,000,000
Outside of Europe, including 15 millions to Brazil			50,000,000
World's requirements, 1917-18			595,000,000

EXPORT SITUATION

GROUP IV.—EXPORTING COUNTRIES OPEN TO THE WORLD'S COMMERCE

COUNTRIES	1917	1916	Five Years' Average, 1909-13
	Bushels	Bushels	Bushels
United States	650,828,000	636,308,000	686,694,000
Canada	231,730,000	262,781,000	197,118,000
Total North America	882,558,000	899,089,000	883,812,000
Argentina	210,000,000(*a*)	70,225,000	147,071,000
India	379,307,000	318,005,000	360,550,000
Australia	115,000,000(*b*)	152,090,000	90,499,000
Total three countries	704,307,000	540,320,000	598,120,000
New Zealand	7,000,000	5,000,000	7,070,000
Uruguay	6,500,000	5,390,000	6,519,000
Chili	14,000,000	12,000,000	14,000,000
Algeria	28,980,000	29,152,000	34,998,000
Total four countries(*c*)	56,480,000	51,542,000	62,587,000
Grand totals(*d*)	1,643,345,000	1,490,951,000	1,544,519,000

(*a*) Estimated on the basis of a yield of 12 bushels per acre. This compares with an average yield of 11 bushels during the best single year of the pre-war five year average. There was serious frost damage reported in the first half of November, so merchantable quantities will be reduced.

(*b*) Broomhall December 4th, 1917.

(*c*) With present shipping facilities the prospective exports of these four countries are negligible. Algeria on the five year average exported four million bushels, but its production in 1917 has dropped nearly six millions below the average.

(*d*) The production in 1917 is 99 million bushels larger than the five year average, and 153 larger than the production of 1916; but 140 out of the 153 is accounted for by Argentina's extraordinary crop.

The preceding table affords a basis upon which to estimate what stores of wheat are available in the producing countries from which to supply the food requirements. Reliable information can only come from actual exports as they become available. The deductions made from the preceding data are here presented tentatively. This is done in the following table which shows the total production of the chief exporting countries for the year 1917, the actual exports for the year 1916-17 and the probable exports for 1917-18.

The estimates for the coming year are based upon only such quantities as shipping facilities will probably allow:

COUNTRIES	Carry-over, August 1st, 1917	Crop 1917	Exports 1916-17	Prospective Exports, 1917-18
United States	22,000,000	650,828,000	201,032,000	140,000,000
Canada	26,000,000	231,730,000	174,600,000	185,000,000
Argentina (December 1917 crop)	.....	210,000,000	55,376,000	100,000,000
Australia (December 1917 crop)	156,000,000	115,000,000	70,632,000	85,000,000
India (April 1917 crop)	.....	379,000,000	52,504,000	65,000,000
Totals	204,000,000	1,586,558,000	554,144,000	575,000,000

There is a good deal of optimism in the foregoing forecast of shipments. So that the difficulties in practice may be realized readers must be informed that Mr. Broomhall, reporting these shipments week by week for the first seventeen weeks of this season to December 1st shows them to be about 92 million bushels for North America and Argentina. The shipments of India and Australia for the full past year formed 22 per cent of the whole. Adding the quota of India and Australia on the same basis we would get a total of about 120 million bushels shipped in the seventeen weeks, compared with 160 for the same period last year. However, shipments of considerable importance will begin from Buenos Aires in January and probably attain their usual maximum in February. The British Government, it has been said, has made special arrangements for handling the crop promptly.

Owing to shortage of shipping and comparative distances, it may not be safe to count on Australia and India doing much better than the past year.

During August, September, October and November, with an exceptionally large shipment in the latter month Canada shipped nearly 71 million bushels compared with 71 millions shipped last year. For the first three months, however, United States are over 30 million short of the shipments in the same months last year. Since our last report on the situation the U.S. official estimate of production has been reduced by nearly 10 millions. It will therefore be all the more difficult to realize the export of 140 millions credited to the United States.

Viewed from the North American standpoint the situation presents itself thus:

	United States	Canada
Crop of 1917	650,828,000	231,730,000
Carry-over Aug. 1st, 1917	22,000,000	26,000,000
Total supply	672,828,000	257,730,000
Prospective exports	140,000,000	185,000,000
Balance	532,828,000	72,730,000
Deduct for seed	85,000,000	28,000,000
Left for food and carry-over	447,828,000	44,730,000

In order to realize this result Canada would have to economize from 8 to 10 million bushels and have no carry-over on Sept. 1st; the United States, however, would have to cut down their rations by 42,000,000 bushels from their minimum consumption last year which was at the rate of 4¾ bushels per capita.

PRODUCTION OF BARLEY AND OATS IN THE NORTHERN HEMISPHERE

COUNTRIES	1917	1916	Five Years' Average, 1911-15
Barley:—	Bushels	Bushels	Bushels
Spain	76,747,000	86,864,000	74,119,000
France	39,557,000	38,268,000	42,758,000
England and Wales	46,163,000	43,174,000	46,924,000
Scotland	6,208,000	5,393,000	6,868,000
Ireland	7,872,000	6,537,000	7,264,000
Italy	7,422,000	10,109,000	9,611,000
Luxemburg	156,000	125,000	95,000
Norway	3,000,000	3,592,000	2,942,000
Netherlands	2,573,000	2,372,000	3,257,000
Sweden	12,263,000	14,621,000	14,492,000
Switzerland	712,000	620,000	490,000
Canada	51,684,000	42,770,000	47,806,000
United States	203,975,000	182,309,000	197,211,000
Japan	76,505,000	95,903,000	99,175,000
Algeria	32,289,000	35,970,000	39,050,000
Egypt	13,598,000	11,987,000	11,865,000
Tunis	8,267,000	4,914,000	7,000,000
Totals	588,991,000	585,528,000	610,927,000
Oats:—			
Spain	31,104,000	30,272,000	28,311,000
France	223,462,000	260,818,000	280,753,000
England and Wales	99,719,000	95,536,000	88,656,000
Scotland	46,617,000	41,547,000	42,313,000
Ireland	87,755,000	58,685,000	61,000,000
Italy	31,896,000	24,543,000	32,192,000
Luxemburg	1,897,000	2,560,000	2,938,000
Norway	11,112,000	14,809,000	11,023,000
Netherlands	17,500,000	18,841,000	19,552,000
Sweden	66,593,000	87,614,000	72,536,000
Switzerland	4,331,000	6,348,000	4,678,000
Canada	393,570,000	410,211,000	399,648,000
United States	1,587,235,000	1,252,837,000	1,230,499,000
Algeria	17,183,000	12,368,000	12,028,000
Tunis	3,761,000	1,362,000	2,847,000
Totals	2,623,735,000	2,318,351,000	2,288,974,000

The production of barley, although slightly more than last year, is nearly 22,000,000 bushels less than the five years' average. The total production of the importing allied countries, France, Great Britain and Ireland and Italy, is 107,000,000 bushels against 103,000,000 in 1916 and a five years' average of 113,000,000. The average imports of these countries during the five grain years coinciding with the production years 1911-15 amounted to 52,000,000 bushels. The exporting countries, Canada and the United States during the same period produced an average of 245,000,000 bushels of barley and exported an average of 24,000,000 bushels. In the grain year 1915-16, however, these countries exported 38,000,000 bushels, and the large crop of 256,000,000 bushels produced by the two countries this year seems to assure a sufficient supply of the cereal.

The world's total for oats is 305,000,000 bushels greater than that of last year, 335,000,000 greater than that of the five years' average. The total production of France, Great Britain and Ireland and Italy is 489,000,000 bushels against 481,000,000 in 1916 and a five years' average of 505,000,000. Thanks to the record crop in the United States the total

production of that country and Canada is 317,000,000 bushels higher than in 1916 and 350,000,000 higher than the five years' average. The average exports from these two countries during the grain years 1911-12 to 1915-16 amounted to 69,000,000 bushels. During the same period the average imports of the three allied importing countries amounted to 102,000,000 bushels.

PRODUCTION OF POTATOES AND SUGAR BEETS IN THE NORTHERN HEMISPHERE

COUNTRIES	1917	1916	Five Years' Average, 1911-15
Potatoes	Bushels	Bushels	Bushels
Great Britain	145,779,000	113,327,000	139,860,000
Italy	55,116,000	54,278,000	60,464,000
Luxemburg	5,925,000	2,971,000	6,544,000
Norway	27,733,000	29,189,000	23,700,000
Netherlands	89,859,000	88,490,000	97,989,000
Sweden	64,599,000	54,972,000	63,755,000
Switzerland	36,376,000	18,372,000	24,912,000
Canada	79,892,000	63,297,000	76,589,000
United States	442,336,000	286,953,000	362,910,000
Totals	947,615,000	711,849,000	856,723,000

Sugarbeets	Tons	Tons	Tons
Netherlands	1,826,000	1,892,000	2,106,000
Sweden	797,000	1,034,000	953,000
Switzerland	15,000	22,000	24,000
Canada	118,000	71,000	161,000
United States	7,621,000	6,228,000	5,839,000
Totals	10,377,000	9,247,000	9,083,000

YIELD PER ACRE OF CEREALS

COUNTRIES	WHEAT			BARLEY			OATS		
	1917	1916	Five Years' Average, 1911-15	1917	1916	Five Years' Average, 1911-15	1917	1916	Five Years Average, 1911-15
	Bus.	Bus.	Bus.	Bus.	Bus.	Bus.	Bus.	Bus.	Bus.
Spain	13.8	15.0	12.8	18.8	22.3	20.6	21.8	21.8	21.5
France	13.8	16.5	18.6	22.3	24.9	24.5	29.1	33.6	60.4
England and Wales	29.9	28.6	31.2	31.6	32.3	32.7	44.2	45.9	43.8
Scotland	39.4	35.8	40.6	39.0	31.8	37.9	44.9	42.0	44.4
Ireland	33.2	37.0	37.0	44.2	43.5	44.8	59.8	54.9	58.0
Italy	13.2	15.2	15.3	15.8	16.9	15.8	28.9	22.3	26.0
Luxemburg	17.9	15.9	22.0	22.3	24.9	27.7	34.1	37.0	38.6
Norway	17.7	23.2	23.9	30.8	36.6	33.1	36.2	49.9	41.5
Netherlands	28.3	35.1	39.0	50.0	39.6	49.1	47.2	54.9	56.4
Sweden	22.8	29.3	31.7	28.1	34.8	33.1	34.6	44.9	37.0
Switzerland	32.9	30.9	33.0	37.5	35.3	35.5	61.4	61.4	55.8
Canada	15.8	17.1	22.0	21.5	23.7	30.1	29.5	37.3	38.8
United States	13.9	12.1	15.5	24.3	23.6	26.4	36.8	30.1	29.9
India	15.5	10.4	11.7	.....	.....	.....	.....	.....	.....
Japan	22.5	21.7	20.5	27.9	31.2	30.8	.....	35.4	42.3
Algeria	8.9	8.9	10.1	11.3	11.9	12.3	25.2	23.1	23.4
Egypt	26.8	25.3	25.6	30.5	30.1	29.9	.....	.....	.....
Tunis	5.4	4.9	4.6	8.0	3.9	6.0	30.4	8.9	21.8
Averages	13.8	13.4	15.6	22.1	23.0	24.2	33.6	31.5	32.8

THE CROPS OF ENGLAND AND WALES

CROPS	AREA		PRODUCTION		YIELD PER ACRE		
	1917	1916	1917	1916	1917	1916	Average of 10 years, 1907-16
	Acres	Acres	Bushels	Bushels	Bushels	Bushels	Bushels
Wheat	1,918,000	1,912,000	57,317,000	54,683,000	29.88	28.60	31.49
Barley	1,460,000	1,332,000	46,163,000	43,174,000	30.36	31.11	32.44
Oats	2,259,000	2,084,000	99,719,000	95,536,000	38.49	39.95	40.03
Beans	203,000	229,000	3,490,000	6,899,000	17.16	30.18	29.40
Peas	103,000	85,000	2,215,000	2,081,000	21.51	24.40	25.08
			Tons(1)	Tons	Cwt.	Cwt.	Cwt.
Seeds hay	1,682,000	1,763,000	2,405,000	2,899,000	28.60	32.89	29.54
Meadow hay	4,794,000	4,826,000	5,150,000	5,939 000	21.48	24.61	23.18

(1) 2,440 lbs.

UNITED STATES FINAL CROP REPORT

The Department of Agriculture makes the following report of the principal crops of the United States for the past two years, compared with average of five years—1911-15.

	1917	1916	Five Years' Average
	Bushels	Bushels	Bushels
W. Wheat	418,070,000	480,553,000	542,615,000
S. Wheat	232,758,000	155,755,000	263,746,000
Corn	3,159,494,000	2,566,927,000	2,754,164,000
Oats	1,587,235,000	1,252,837,000	1,230,499,000
Rye	60,145,000	48,862,000	41,399,000
Barley	203,975,000	182,309,000	197,211,000
Flax Seed	8,473,000	14,296,000	18,618,000
Potatoes	442,336,000	286,953,000	362,910,000
	Tons	Tons	Tons
Hay	94,930,000	110,992,000	86,587,000

UNITED STATES WINTER WHEAT AND RYE REPORT

Winter wheat sown this fall for next year's harvest aggregated 42,170,000 acres and its condition on December 1st was 79.3 per cent of a normal. The acreage is 4 per cent more than the revised estimated area sown in the fall of 1916.

The area sown to rye is 6,119,000 acres, which is 36.6 per cent more than sown a year ago, and the condition of the crop on December 1st was 84.1 per cent of a normal.

The condition of winter wheat on December 1st compares with 85.7 per cent of a normal on that date last year, 87.7 in 1915, and 89.3 the ten-year average.

The December 1st rye condition compared with 88.8 per cent of a normal on December 1st last year, 91.5 in 1915, and 92.2 the ten-year average.

BROOMHALL'S FOREIGN CROP CABLE, DECEMBER 19, 1917

France.—Rainy weather hinders seeding. Early sowing was favourable on a reduced acreage. Acreage decrease estimated at 15 per cent. Native movement small and foreign arrivals increasing. Mills operating slowly. Purchases in Australia liberal and Argentine large. American clearances good.

Italy.—Wintry weather prevails and seeding has stopped, as snow and ice in the northern sections is against agriculture. Supplies scanty and foreign arrivals inadequate. Labour is scarce and economic conditions unfavourable, import needs large and floating quantity moderate.

Spain.—Weather normal and crop prospects favourable. Stocks liberal.

North Africa.—Weather favourable. Clearances continue of moderate proportions and grain is being cleared both to United Kingdom and Continent.

Russia.—Weather is unfavourable, being very cold, and crops are unfavourable. Agricultural outlook poor as a result of reduced seeding, scarcity of fertilizer and indisposition shown by planters. The government has taken over the entire stocks. Prices are high. Port stocks nothing.

Canada.—Receipts keep large and grading high. Arrivals at all United Kingdom ports show excellent quality. Wheat offers liberal. Flour good and oats light.

United Kingdom.—Weather generally unfavourable, being cold and wet. This is against seeding and movement. Native supplies good and foreign stocks large.

Scandinavian Peninsula.—Weather very cold with snow in parts and otherwise crops exposed. Supplies are scanty, but arrivals are increasing under Government supervision. Stocks will last until mid-January with strict economy. United States and Canada are shipping moderately to relieve the situation.

Balkan States.—Weather generally favourable and crops are favourable. Corn outlook good. Stocks of all grain and shipments overland continue.

Australia.—Heavy general rains are unfavourable for harvesting, which has commenced. Recent crop advises unfavourable. Much of the reserves show unfavourable quality.

India.—Seeding is finished and weather is favourable for growth and development of the crops. It is expected that a large yield will be confirmed. The Government is assisting with labour. Stocks of old are fair and movement light into export channels.

THE SUPPLY AND CONSUMPTION OF WHEAT IN BRAZIL

A report of a commission appointed by the Federal Government and including representatives thereof, dated 12th May, 1917, dealing with the requirements of wheat for consumption in Brazil, states that the annual imports of wheat (and flour reduced to wheat) were 23,332,000 bushels on the average for the three years 1912, 1913 and 1914, and that 90 per cent of these imports were from Argentina. The requirements of imported wheat for consumption in normal times are therefore estimated at 412,000 bushels per week. Apart from the stock in the state of Rio Grande do Sul, the entire quantity of imported wheat in Brazil on 12th May 1917 was estimated as equal to two months requirements, and it was expected that Argentina could furnish a further 2,572,000 bushels from the crop of 1916-17, which would be equivalent to nearly another six weeks' consumption. The production of wheat in 1917 in the state of Rio Grande do Sul is estimated as 4,777,000 bushels. The mills at the ports of this state report that they hold sufficient wheat to continue their grinding until 31st December, 1917, by availing themselves of the home-grown crop as well as of their own stocks of Argentine wheat. These data serve to indicate the difficulties regarding adequate supplies of wheat during the period to elapse before the 1917-18 crop of Argentina becomes available in January, 1918.

On the part of the Federal Government and those of the states in southern Brazil, measures have been adopted with the view of increasing the production, already showing so much advance in Rio Grande do Sul, with the inducements offered by the high prices. Such measures are intended to mitigate the absolute dependence of Brazil upon the crops of Argentina for supplies of wheat, and they include proposals for free distribution of seed and the establishment of experimental farms.

As regards measures for immediate relief of the crisis, it is recommended by the Report to increase the flour extraction from the wheat up to 80 per cent, and to provide for an admixture of 30 per cent of other products in bread making, but fixing of maximum prices is not considered advisable.

INTERNATIONAL INSTITUTE CROP CABLE

A cablegram received from the International Institute of Agriculture gives the following estimates:

Total production of Wheat in Denmark, Spain, France, Great Britain, Ireland, Italy, Luxemburg, Norway, Holland, Sweden, Switzerland, Canada, United States, India, Japan, Algeria, Egypt and Tunis is 1,864,124,000 bushels or 96.1 per cent of the production of the same countries in 1916, a decrease of 75,000,000, and 85.1 per cent of their average production during the five years, 1911-15, a decrease of 325,000,000.

Production of Rye in Denmark, Spain, France, Ireland, Italy, Luxemburg, Norway, Holland, Sweden, Switzerland, Canada and the United States is 160,306,000 bushels or 96.2 per cent of last year, a decrease of 7,000,000, and 91.7 per cent of the five years' average, a decrease of over 6,000,000.

Production of Barley in the same countries as for rye plus Great Britain, Japan, Algeria, Egypt and Tunis is 610,699,000 bushels or 100.1 per cent of last year and 95.9 per cent of the five years' average, a decrease of 27,000,000.

Production of Oats in the same countries as for barley minus Japan and Egypt is 2,570,939,000 bushels or 112.1 per cent of last year, an increase of 275,000,000, and 113.4 per cent of the five years' average, an increase of 300,000,000.

Production of Corn in Spain, Italy, Switzerland, Canada, United States and Japan is 3,283,818,000 bushels or 121.4 per cent of last year, an increase of 578,000,000, and 113 per cent of the five years' average, an increase of 377,000,000.

Production of Rice in Spain, Italy, United States, Japan and Egypt 10,659,320 tons or 80.3 per cent of last year and 83.7 per cent of the five years' average.

Production of Flaxseed in Italy, Holland, Canada, United States and India is 36,664,000 bushels or 86.6 per cent of last year and 67.6 per cent of the five years' average.

Production of Potatoes in England and Wales, Ireland, Italy, Luxemburg, Norway, Holland, Sweden, Switzerland, Canada, United States and Japan is 1,118,669,000 bushels or 136.4 per cent of last year, an increase of 298,000,000, and 114.8 per cent of the five years' average, an increase of 143,000,000.

Production of Sugarbeets in Holland, Sweden, Switzerland, Canada and the United States is 8,992,000 tons or 92.7 per cent of last year and 103.1 per cent of the five years' average.

Production of Tobacco in Switzerland, United States and Japan is 1,289,000,000 pounds, 105.5 per cent of last year and 118.7 per cent of the five years' average.

Production of Wine in Spain, Luxemburg and Algeria is 643,384,000 imperial gallons or 90.8 per cent of last year and 130.5 per cent of the five years' average.

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DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

The Agricultural Gazette

of Canada

EDITOR: J. B. SPENCER, B.S.A.

Issued by direction of

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Minister of Agriculture

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The Agricultural Gazette

OF CANADA

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THE HOG PRODUCTION CAMPAIGN

CO-OPERATION in the campaign for increased hog production has resulted in the facts of the situation being plainly and dispassionately placed before the live stock producers of Canada. Correspondence shows that the urgency of the need is realized, and that there is a serious, business-like desire and intention to meet the situation. A statement as to the conditions in Europe, and the special need for a supply of bacon and pork products, was placed before the Minister of Agriculture and the Live Stock Commissioner by the Food Controller, and, following this discussion, under instruction from the Minister of Agriculture, the Live Stock Commissioner called into conference representatives of the different provinces, including representatives of the provincial Departments of Agriculture. There the Live Stock Commissioner, together with the Food Controller, gave facts and figures showing the responsibility resting upon Canada in making up the necessary food supply as related to meats and fats. Discussion as to ways and means followed, resulting in assurance being given that the whole organization of the various provincial Departments of Agriculture would be utilized to the fullest extent in placing before the people of each province the information secured and brought out in the discussion at these conferences. The time was short, there was no time to lose, and none was lost. The representatives went to work immediately, and systematically, to carry the word direct to practically every farm. The assistance was secured of farmers' organizations, and associations connected with live stock. The support of agricultural and other newspapers was heartily given.

As the Live Stock Branch had become responsible for the work, and it was of a Dominion-wide character, arrangements were authorized that the Live Stock Branch share a portion of the provincial expenses, so that every effectiveness would be assured. A series of display advertisements was also prepared and published throughout Canada in the agricultural papers, and papers having special agricultural pages. These advertisements were afterwards sent out in the form of posters to the branches of all the banks in Canada.

Their support was solicited and recognition must be given to the hearty and unqualifiied response of these institutions. The co-operation of these various bodies gave an exceptionally wide publicity to the movement, and created a sympathetic and anxious desire on the part of those who are in a position to avail themselves of the opportunity to become a part of the larger co-operative organization upon which is dependent the increased supply of food.

It is recognized, however, that the activity of the Live Stock Branch cannot end with its endeavour to increase the exportable supply of pork through a greater production of hogs. At the conferences held, problems and difficulties which are recognized as such were brought out, and they are being given serious consideration. As an example of what is meant, attention is directed to the recent organizations of the Feed Division within the Live Stock Branch. In filling orders it is organized to operate through the provincial Departments of Agriculture. Every endeavour is being made to see that the supply of feed is adequate. Other questions will be dealt with similarly in a practical way, and with every confidence of success, with the assurance of the same assistance and co-operation as has been given in the campaign for increased production.

THE AGRICULTURAL INSTRUCTION ACT

TEACHING OF AGRICULTURE IN THE SCHOOLS OF THE MARITIME PROVINCES

BY J. W. MITCHELL, B.A., ASSISTANT COMMISSIONER FOR THE MARITIME PROVINCES

IN all three of the Maritime Provinces there is a lively appreciation on the part of those responsible for the direction of educational work, and a steadily growing realization by the rank and file of the people, of the importance of the teaching of rural science in the schools, with elementary agriculture as an important phase of the work. This is plainly in evidence in the amount set apart for the work, in each of the provinces, out of THE AGRICULTURAL INSTRUCTION ACT grant. The amounts are as follows:

Nova Scotia	$12,000.00
New Brunswick	11,500.00
Prince Edward Island	$10,500.00

In the foregoing are included the amounts set apart for exhibition and competition purposes.

NOVA SCOTIA

In Nova Scotia the Rural Science work, through arrangement with the Department of Agriculture, is conducted by the Department of Education, with Mr. L. A. DeWolfe, M.A., in charge. He both teaches in the Normal School and directs the work of the schools. During 1917, for the first time, two travelling rural science teachers were employed, and Mr. DeWolfe is so satisfied with the results that he is anxious to see the staff gradually increased until provision is made for a travelling teacher in each of the eighteen counties of the province.

In Nova Scotia home-garden work is stressed to a much greater extent than is school-garden work, that is, the Director pins his faith to it more strongly than to school-garden work. The following data are illustrative of the growth in the teaching of agriculture in the schools:

	1914	*1917*
Home gardens	700	4,176
School gardens	77	200
Schools exhibiting garden produce	71	160

About 200 schools are doing special work in elementary agriculture and exhibition work.

Mr. DeWolfe is strongly of the opinion that much more efficient work could, and would, be done were the school year to correspond to the calendar year, instead of extending from midsummer to midsummer, as is the practice at present. The point would seem to be well taken, as such a change would enable each teacher to complete work begun.

The Agricultural College co-operates with the Normal School in the training of teachers for the teaching of agriculture in the schools.

NEW BRUNSWICK

In New Brunswick the responsibility for the teaching of agriculture in the schools devolves upon the Department of Agriculture. The director in charge of the work, which includes nature study, is Mr. R. P. Steeves, M.A., who works in close co-operation with the Department of Education. He has, at present, one permanent assistant.

In addition to the work amongst the schools, considerable attention is given to the training of teachers in order to fit them for the teaching of nature study subjects and agriculture in the schools.

Teachers' short courses are held at Sussex and Woodstock each year, during the month of January; while rural science schools are conducted at the same points during the summer holidays, when teachers are free to attend and conditions are such as to permit of making the course a practical one. Two courses are given in the Rural Science schools, one for first year and one for second year students.

Bonuses are given to teachers in accordance with their qualifications —the time devoted to nature study work and the teaching of agriculture in the school during the year, and the efficiency of the work done. Also grants are given to schools where they qualify. There are between 1 500 and 1,600 schools in the province, about 100 of which qualified for grants during 1917.

Home-project work, in the form of soil and plant cultivation and close observation of results, is encouraged.

The following data, indicative of the development of the teachin of agriculture in the schools, will prove of interest:

	1914	*1917*
Home gardens	59	1,700
School gardens	19	100
School fairs	...	14

In this province greater importance is, placed, by the director, upon the value of school garden than upon that of home-garden work. Both pl ases of the work, however, are being steadily developed.

PRINCE EDWARD ISLAND

In this province, Mr. J. E. McLarty, B.S.A., fills the two-fold position of teacher of rural science in Prince of Wales College and director of this class of work in the schools. He is engaged by the Department of Agriculture, but works in close association with the Department of Education, in his field work, and under the Principal of the college in his college work.

There are 476 schools in the province, all of which teach rural science, as it is a compulsory subject upon which a paper is set for the entrance examination.

In connection with the classes at the Prince of Wales College, a potato-growing contest was held in 1917, in which 32 boys competed.

What is termed home-project work—home gardens and the rearing of poultry, calves, and pigs, etc.—has received considerable attention. There were 289 schools in 1915, and 356 in 1916, that carried on this class of work.

The following table, giving the number of school fairs held, is a fair criterion from which to judge of the growth of home-garden work and the teaching of elementary agriculture in the schools of the province:

Year	*School Fairs*
1915	0
1916	4
1917	14

Due, in part, to unfavourable conditions at the schools—lack of ground and lack of fencing—the drift has been decidedly in the direction of home-garden rather than school-garden work. It is quite possible, however, that this will not militate against the progress of the work.

Boys' and Girls' club work is being encouraged as much as possible.

There are eight school inspectors in the province, all of whom act as assistants to Mr. McLarty in promoting rural science work in the schools. The salaries of four of these are paid out of THE AGRICULTURAL INSTRUCTION ACT grant.

CONCLUSION

No attempt has been made, in the foregoing, to deal at all exhaustively with the work done in the different provinces. If I have succeeded in showing that there is a realization of the necessity of changing the curriculum in our rural schools so as to make it include rural science, with elementary agriculture as an important branch; if I have succeeded in indicating that it is a duty, in the framing of a school course, to so shape it as to enable the teacher to take full advantage of environment for the double purpose of education and the laying of a foundation for future life work, and if I have, further, succeeded in showing that an honest effort is being made to grapple with the work in such a way as to make it educational, in a practical way, I have accomplished all that I set out to accomplish.

In all three of the provinces small portions of the grants are used in ways that tend to stimulate an interest in the work, such as grants to teachers, grants to schools, and grants for prizes to competitors at the school fairs.

Greater attention is given, from year to year, to the training of teachers to better fit them for their new duties. This is done through such means as a modification of the normal school course and the holding of summer schools. One difficulty experienced is that many of the teachers so trained are lost to other provinces, particularly the new western provinces. No doubt this resolves itself, quite largely, into a question of the relative salaries paid.

The greater proportion of teachers of our public schools are country born, and in most cases have some practical knowledge of farming. It behooves every teacher, whether holding a Nature Study certificate or not, to prepare now for greater production next year. Your country calls for you to assist. You will inculcate greater unity between school and home if you encourage your pupils and assist them; and your school work will be correspondingly benefitted. You may assist in this work by encouraging your pupils to cultivate any available fertile ground.—*Rural Education Monthly, New Brunswick.*

PART I

Dominion Department of Agriculture

INFORMATION SUPPLIED BY OFFICIALS OF THE VARIOUS BRANCHES REPRESENTED

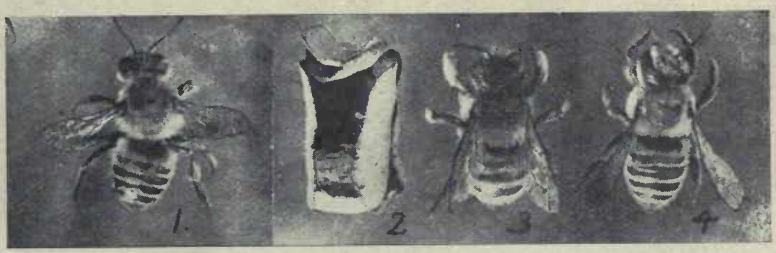
THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF APICULTURE

POLLINATION OF ALFALFA BY BEES OF THE GENUS MEGACHILE

BY F. W. L. SLADEN, DOMINION APIARIST

RECENT research work carried out in the Bee Division, has included a study of the species of bees that trip and, therefore, presumably, pollinate the flowers of alfalfa in the parts of Canada where this plant is, or can be, grown for seed.



1. Female Megashile perihirta CkII.
2. Nest of M. perihirta.
3. Male of M. Diligens, (latimanus CkII).
4. Female M. Diligens (latimanus CkII).

All magnified 1½ times.

On July 14th, 17th, and 31st, 1917, at Redcliff, Alta., and Lethbridge, Alta., a species of leaf-cutter bee, *Megachile latimanus* Ckll. was found to be visiting the fields of alfalfa in bloom in considerable numbers, tripping the flowers at an observed average rate of 17 flowers per minute. This species was more numerous in the alfalfa fields than five other species of *Megachile* together, all of which perform the same service. Several species of bumble-bees, fairly plentiful, worked more slowly and often failed to trip the flowers. Honey-bees, also plentiful, visited the flowers without tripping them.

Observations made at Summerland, B.C., and at Keremeos, B.C., on July 20th and 21st gave the same

results, except that *Megachile perihirta* Ckll. was the abundant species, *M. latimanus* Ckll. not having been met with in British Columbia.

The two species of *Megachile* mentioned belong to the sub-genus *Xanthosarus* Rob., which is represented in south-eastern Canada by a third species, *Megachile latimanus* Say. *M. perihirta* Ckll. was found nesting gregariously in a nearly new and bare gravel railway embankment at Cochrane, Ont., on August 9th, 1917. A nest of the same species was found in a nearly new gravel road leading to a dwelling house at Invermere, B.C., in July, 1914. There is, therefore, some hope that the species of *Xanthosarus* might be encouraged to breed in the vicinity of alfalfa fields by spreading gravel and making it firm by rolling.

THE DIVISION OF HORTICULTURE

APPLE BREEDING IN CANADA

BY W. T. MACOUN, DOMINION HORTICULTURIST

MOST of the varieties of apples in commerce in Canada today originated in other countries. At the same time, some of the best apples we grow are of Canadian origin; the McIntosh, which has a world-wide reputation, being one of these. The writer believes that within the next fifty years there will be a much larger proportion of varieties of apples of Canadian origin sold by nurserymen.

Much work has been done by a few men in Canada in originating varieties of apples by cross-breeding and hybridization. To the late Chas. Arnold, Paris, Ont., the late P. C. Dempsey, Trenton, Ont., and the late Francis Peabody Sharp, Upper Woodstock, N.B., is due great credit for work done at a time when few were interested in the scientific aspects of fruit growing.

At the Ontario Agricultural College, Guelph, Ont., and at the Horticultural Experimental Station, Vineland, Ont., work in cross-breeding apples has been in progress for some years and, no doubt, some good varieties will be produced at these institutions.

Most of the work in breeding or originating new varieties of apples in Canada has, however, been done at the Central Experimental Farm. Of the varieties originated since 1890, when the work was begun, 115 have been named because they gave promise of being useful in some part of Canada. The greater part of these were obtained by simply sowing the seed of good varieties which had proved hardy at Ottawa, but a few have been the result of hand pollination where both parents are known and every year new cross-bred varieties are fruiting.

In 1898, the writer, believing that in an orchard at the Central Experimental Farm, Ottawa, containing between 400 and 500 named varieties of apples, all sorts of combinations of characters would be taking place by natural pollination, and that the chances of obtaining some good seedlings by sowing seeds from some of these varieties would be very great, had seed saved of some of the best flavoured apples then fruiting in the orchard, as well as some other varieties desirable on account of other characteristics. There were included in these: the McIntosh, St. Lawrence, Fameuse, Wealthy, Shiawassee, Swayzie, Scott Winter, Salome, Lawyer, Gano, Northern Spy, Winter St. Lawrence and Bullock (American Golden Russet). During the past fourteen years, 1,211 of these seedling varieties have fruited, of which detailed descriptions have been made. Of that

number 378 are considered so promising that they are being propagated for further test, and 99 of the best have been named.

As there are very few winter apples hardy enough for the colder parts of Canada where the apple is grown successfully, and as there is room for better summer and autumn varieties all over Canada, these new varieties should prove of great value. As this kind of apple breeding had given such good results, seed was saved in 1908 of some more of the best hardy winter apples grown at Ottawa, including Milwaukee, Bethel, Winter Rose, Baxter, La Victoire, Stone and Forest.

The best and apparently the hardiest of 3,000 trees of varieties of Russian origin have been sent to the Prairie Provinces for trial.

CONCLUSIONS REACHED IN REGARD TO ORIGINATING NEW VARIETIES OF APPLES

(1) To produce a hardy apple where no apples have yet been found hardy: (*a*) Cross the apple with the wild Siberian Crab Apple (*Pyrus baccata*); (*b*) Sow seeds of apples which have ripened in a climate as nearly similar as possible.

(2) To produce a hardy long-keeping apple of good quality: Sow seeds of long keeping varieties of apples of good quality which have ripened fruit and proved hardy in a somewhat similar climate, and when possible have both parents long keeping varieties.

(3) To produce an apple having certain characteristics, as regards hardiness, vigour and productiveness of tree, and quality, size, and appearance of fruit. Sow seeds of varieties having most of the characteristics desired.

(4) If seedlings are to be grown on a large scale, more varieties having the characteristics desired will probably be obtained if trees of several named sorts blossoming at the same time be planted in close proximity in the orchard, and the seeds used from fruit borne of these trees. The trees thus planted should combine all the good points in the standard aimed at, for the variety to be originated.

(5) In cross-breeding apples where quality is an important factor, as it should be in most places, cross two varieties which are both good or very good in quality. It has been the experience at Ottawa that in crossing a variety of good quality with one of inferior quality the crosses will nearly always bear fruit with quality inferior to the one with good quality.

DR. SAUNDERS' HYBRIDS

The late Dr. Wm. Saunders, when Director of the Experimental Farms, did some good work in apple breeding for the Prairie Provinces of Canada, and before his death he published the results of his work in Bulletin 68 of the Experimental Farm Series entitled "Progress in the Breeding of Hardy Apples for the Canadian North-West."

After being propagated and thoroughly tested on the prairies, some of Dr. Saunders' hybrids have proved hardier than any other varieties of apples or crab apples tested, thus marking a stage of development in hardy apples for the Prairie Provinces. As none of the fruits resulting from this cross were large enough to compare favourably with less hardy varieties of apples and crab apples, the best of these first crosses were, in 1904, re-crossed with named varieties of apples, with the object of obtaining varieties bearing larger fruits, but which would retain sufficient hardiness to be grown in the open on the prairies. It is not known yet whether these will be sufficiently hardy or not, but this will soon be determined.

As it is important to obtain apples suitable for the Prairie Provinces of Canada as soon as possible, another method than that followed by the late Dr. Saunders is being practised

by the writer. Seed was sown in 1910 of some of the hardiest Russian apples, including Transparent, Charlamoff, Beautiful Arcade, Oldenburg, Tetofsky, Anis, Antonovka and Hibernal, and Moscow Pear Apple. More seedlings of these and other varieties have been grown since, and from these about 75,000 were sent as yearlings to the Dominion Experimental Farms in the Prairie Provinces, and planted close together in nursery rows. Some of those which have shown greatest hardiness have been removed to orchards for further test, others are left to fruit in the nursery row. It is planned to continue this work in the hope that from some of these hardy Russians, which stand so much cold in Russia, will be obtained some which will be useful in the cold districts of Canada, where early growth in the spring followed by frost seems as destructive as low temperatures of winter.

THE ENTOMOLOGICAL BRANCH

SOME RESULTS OF SCIENTIFIC RESEARCH ON INSECT PESTS IN CANADA

BY C. GORDON HEWITT, D.SC., DOMINION ENTOMOLOGIST AND CONSULTING ZOOLOGIST

THE increasing interest on the part of the general public that is being paid to the subject of scientific research in its application to industrial life in Canada should render a statement as to the results of such research as applied to agriculture in its varied forms of timely value at the present time when every effort is being made to promote greater production of foodstuffs by the adoption of more scientific methods in agriculture. It is well for the country that the fact that agriculture is our "basic industry" is becoming less an oratorical expression and more an established axiom. The financial security of the country depends upon the maintenance and advance of our agricultural prosperity, and the latter is absolutely dependent upon the application of the results of scientific agricultural research.

Increased crop production cannot be secured by the mere increase of the total area brought under cultivation. It demands the adoption of more scientific methods of farming and of handling the crops produced. And it is in this connection that the results of scientific research on insect pests find their practical application and value. Crop production cannot be completely successful without crop protection, that is, the protection of the crops from their numerous enemies that tend always to reduce the total amount produced.

The enormous toll exacted by the ravages of insect pests on our field crops in Canada is hardly comprehended except by those who are able to study the question closely over the whole country, and in these days of enormous expenditures, figures are less impressive; but when it is realized that on a conservative estimate based on actual statistics the annual loss caused by insect pests to our field crops in Canada represents, if the money value be expressed in wheat, sufficient wheat to feed the entire population of Canada for one year, the extent of this annual loss will be appreciated more vividly. One of the chief objects of our scientific research on insect pests is to seek means and to take steps to prevent as much of that loss as possible. But our scientific research on insect pests has even wider bearings on the protection of our national wealth. The public is impressed by

the devastating results of forest fires and the enormous losses they entail, but the losses that our forests suffer by the depredations of insect pests are less widely known and not generally appreciated, notwithstanding the fact that in certain sections of the country our forests have suffered greater losses on account of insect destruction than through the agency of fire. Forest fires are spectacular; as a rule, insect depredations are not. But insects work insidiously, and their damage is often widespread before it is realized.

The part which insects play in the destruction of human life is now only too well illustrated by the appalling death rate caused by malaria, by typhus, and by plague, all insect-borne diseases. In our own cities, towns and villages, typhoid fever, of which the ubiquitous housefly is one of the chief carriers, takes a toll of human life, especially among children, that we can ill afford to lose and that can be avoided by preventive measures. Likewise our live stock is harassed by and very great losses result from the attacks of insect pests. Our milk and leather supplies are reduced by the presence of warble flies; the working efficiency of our horses is affected by bots and horseflies, and black flies endanger the lives of both cattle and horses. While we have little malaria in Canada, mosquitoes nevertheless prevent agricultural work and the gathering of crops in some regions and the adequate exploration and settlement of others. All these insects are receiving our attention.

It is the object of this article to set forth as briefly as possible some of the more striking results of scientific research that have been brought about by the work of the officers of the Dominion Department of Agriculture. The fighting machine consists of a comparatively small band of trained scientific and enthusiastic workers stationed at laboratories which have been established at ten points in different regions of the Dominion from Nova Scotia to British Columbia and directed from headquarters at Ottawa.

Of the common insect pests attacking field and garden crops few are more widely spread and in the aggregate more injurious than cutworms. A careful study of the life-histories of the different species has enabled us to devise methods of prevention and control that may be adopted either in the small home garden or in the grain fields of the prairies. One example of the manner in which this work is prosecuted may be given. In 1915 the army cutworm appeared in destructive numbers for the first time in Canada in Alberta, where the outbreak covered an area of about 3000 square miles, and caused great apprehension among the grain growers. Our resident field officer immediately investigated the outbreak and discovered means of controlling the spread of the destructive caterpillar, with the result that by means of field demonstrations of the control measures and by press notices extensive damage was prevented.

Locusts or grasshoppers are widespread throughout Canada, and periodically very destructive to field crops. For a number of years a careful study has been made of their habits, with the result that practical control measures through the use of poisoned baits have been devised, and serious losses have been prevented by their application. A most striking instance of the value of these results was afforded three years ago in a region in Quebec, where the continued destruction of crops and grass land by locusts had led to the abandonment of many farms and general discouragement among the farmers. By co-operation among the farmers in the localities affected, over 33,000 acres were treated according to our recommendations with great success and a consequent re-establishment of agriculture in the infested region.

In all the fruit-growing regions of

Canada the orchards are affected, and fruit crops are reduced by the numerous insect pests. Their control, while it increases the cost of production, results in larger crops and higher grade fruit. The results of our investigations on insects affecting fruits have been conspicuously successful in Nova Scotia, where by the demonstration of the control methods based on investigations conducted for several years, the extension of spraying has been very marked with a consequent improvement in the quantity and quality of the fruit. In British Columbia a new fruit pest, the pear thrips, was discovered in 1915. On Vancouver Island certain orchards, which were well cared for in every way, produced little or no fruit; the cause of this failure was unknown until this minute pest was discovered. An investigation was immediately undertaken, and in 1916 the control measures adopted were so successful that in one of the infested orchards which only produced about 700 boxes of fruit in 1915, a crop of (approximately) 7,000 boxes was obtained in 1916.

An important aspect of insect control work which affects the natural resources of the country is the study of forest insects. The extensive areas of forest in Canada lend themselves to widespread depredations by insect pests. Thirty years ago the tamarack throughout eastern Canada from Manitoba to Nova Scotia was largely destroyed by the larch sawfly, which defoliated the trees for several years in succession. A few years ago an important insect parasite of this forest pest was discovered by the writer in England, and the parasite has now been imported and successfully established in Canada with a view to increasing the chances of controlling the pest in the future. During the last decade the spruce forests of eastern Canada have been attacked by the spruce budworm, the effects of which caused great alarm among the lumbermen. But a careful study of its parasites has disclosed the fact that the insect can be controlled by its natural enemies, and thus further apprehension has been removed. The worst enemies of our pine and spruce forest are certain small bark-beetles. In British Columbia these insects have destroyed hundreds of square miles of valuable merchantable timber. By an exhaustive investigation on the life-histories and habits of these beetles it has been possible to devise control methods, by the application of which the further spread of such extensive and serious damage can be prevented.

One of the greatest problems of insect control the world has ever seen was brought about by the accidental introduction into the New England States of two European pests, the gipsy and brown-tail moths, which defoliate orchard, shade and forest trees. They now cover an extensive area in those states, and the brown-tail moth has spread into Nova Scotia and New Brunswick. In the New England States forest and shade trees have been killed over large areas, real estate has depreciated in value on account of their presence, and millions of dollars have been expended in measures to control and prevent the spread of these pests. At the present time nearly a million dollars is being expended annually out of public funds on control measures. The most important of the methods now being carried out to secure control of the two insects is by the use of their insect enemies. From Europe and Asia large quantities of the parasites that keep these insects in check in their native countries have been imported. They have been reared in hundreds of thousands in the parasite laboratory of the United States Department of Agriculture in Massachusetts, and liberated through out the New England States. As the brown-tail moth is fairly-widely spread in New Brunswick and Nova Scotia, where we have been able to

keep it under control by continued effort each year, and as the gipsy moth is only about 50 miles from our borders, we commenced four years ago to collect these imported parasites in New England by the courteous permission of the United States Department of Agriculture, and each year considerable quantities have been reared and shipped to Canada. Up to date we have introduced over 100,000 of these insect parasites, and three species would appear to have been successfully established. Our object is to endeavour to establish them as enemies of certain of our native insects, so that as their chief hosts, the brown-tail and gipsy moths, tend to become more widespread, their natural enemies will be brought to exercise a beneficial control.

This branch of research work in the control of insect pests is now receiving greater attention in our laboratories every year, as it is realised that the control of pests by their natural enemies is destined to play a very important role in the future. Consequently, we are carrying on intensive studies of the agencies which control certain of our widespread pests, such as the tent caterpillars, the spruce budworm, oyster-shell scale, etc., with a view to making use of such controlling agencies wherever it may be found possible. In certain regions we find that some insect pests are prevented from being seriously injurious by the controlling agency of their natural enemies which are, however, absent in other regions where the pests are consequently injurious. To give one example, we have found that in certain sections of eastern Canada the oyster-shell scale is held in check by a species of mite, and we are now endeavouring to introduce this mite in other parts of Canada where it does no occur and where the scale is prolific and injurious. Other instances might be given if space permitted, but it is sufficient to point out that the prevention of insect outbreaks can only be brought about by a thorough understanding of their causes. It is for this reason that we are devoting increased attention to the underlying causes of such outbreaks, in the firm belief that a more complete knowledge of the reasons governing the increase of insect pests and their decrease by natural means will place in our hands the most powerful weapon that we can employ to secure their control. We hope thereby to be in a position to prevent to a greater extent than is now possible by the application of artificial means the losses that we annually experience from their injurious activities.

I am firmly convinced that the Agricultural Representative plan should be applied to the public schools. A travelling rural science teacher for a district including ten or twenty schools could work wonders. Possibly such travelling teachers will some day be engaged by our municipalities.—*L. A. DeWolfe, Director, Rural Science Schools, Truro, N.S.*

THE ALFALFA LOOPER, *Autographa californica* Speyer.

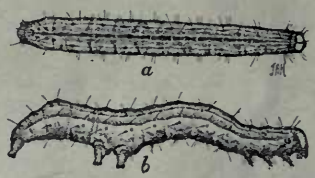
BY ARTHUR GIBSON, CHIEF ASSISTANT ENTOMOLOGIST

THE alfalfa looper is widespread in distribution in western North America. In Canada it occurs in the provinces of British Columbia, Yukon, Alberta and Manitoba. Although we have no actual records of its presence in Saskatchewan, it undoubtedly occurs, also, in that province. In the United States it has been recorded from the states of California, Nevada, Colorado, Oregon, Wyoming, Washington, Idaho, Utah and Montana. It has also been collected in Alaska. In the Journal of the New York Entomological Society, Vol. x., p. 65, Dr. Ottolengui recorded the species from New York state, from a single specimen labelled "Syracuse, New York, 7-10-95." In a recent letter however (Nov. 16, 1917) Dr. Ottolengui states: "This specimen was given to me long ago as registering an extreme eastern occurrence of this species. Whether it is authentic or not, I do not know."

The insect has been known in the United States as a pest of economic importance since 1895.[1] It was not, however, until 1914, that the caterpillars occurred in Canada in numbers sufficient to cause serious injury to crops.

HABITS AND DESCRIPTIONS OF THE INSECT

The Egg.—This has been described[2] as "hemispherical, rounded at the base, the apex with a rounded depression; finely creased vertically; colour pale yellow." We have no information on the length of this stage but it is doubtless similar to that of other closely related species which we have studied and, is, we presume, from about 5 to 7 days. Eggs of *Autographa contexta* Grt. laid at Ottawa on June 14 hatched on June 19, giving an incubation period of 5 days, and ova of *A. precationis* Gn. laid on July 1 produced larvæ on July 7, the egg stage in this instance being 7 days. *A. brassicae* Riley is known to have an incubation period of 6 or 7 days.



THE ALFALFA LOOPER

a, Larva, dorsal aspect; *b*, Same, lateral aspect. Slightly enlarged. (After Hyslop, U.S. Bureau Ent.)

The Larva, or Caterpillar.—The larva when it emerges from the egg is of a creamy white colour with long black hairs.[3] It soon becomes green in colour with pale longitudinal stripes. As it reaches maturity it assumes a darker shade of green. Specimens which we received from British Columbia were described as follows: Length 30 mm., body dark green, cylindrical in shape tapering towards the head; subdorsal line fine and wavy; two other lines in subdorsal space and a wide, whitish, stigmatal band. Tubercles white, setæ white. Spiracles pale, black-rimmed. Thoracic feet black, shiny. Head 2 mm. wide, green with a black patch on either side in some specimens, wholly black in others; hairs on face pale and slender.

As in other larvæ of this genus there are only three pairs of abdominal legs, namely on segments 9, 10 and 13. The larva, therefore, loops when walking, as do the geometrid larvæ.

The feeding habits of the larvæ, in 1914, were similar to other cater-

1 U. S. Bureau of Entomology, Bulletin 95, VII, 109.

2 Entomologica Americana, VI, 14.

3 U. S. Bureau Ent., Bulletin 95, VII, 110.

pillars which assume a marching habit, largely due to an insufficient supply of food in the areas in which they hatched. In the case of lettuce, whole plants were frequently destroyed, the leaves being entirely eaten, nothing remaining but the stalk and midribs. Alfalfa was stripped of foliage, as were also other plants. In the case of turnips and cabbage, at Kingcome Inlet, B.C., the injury was chiefly to the outer leaves. One correspondent, at Armstrong, B.C., stated that, "the caterpillars travelled and fed when the sun was shining hot, stopping as soon as the heat of the day was over, and on damp cloudy days."

Mr. Ruhmann[4] records that the larvæ, in 1914, commenced to pupate on June 12, their numbers decreasing from about that date. The length of the pupal stage is from about 10 days to two weeks.

The Moth.—With the wings expanded the moth measures from about one and one-half to nearly one and three-quarter inches. It is a beautiful species, the ground colour of the front wings being mostly grayish overlaid with pale and dark brown areas. The transverse lines are shown in the illustration. The gamma-like mark is of a creamy-yellow colour and conspicuous. The hind wings are brown, the outer third being dark brown and appearing as a wide band. All the wings have a metallic lustre.

THE ALFALFA LOOPER
1, Moth; 2, Cocoon in leaf; 3, Cocoon removed from leaf, showing pupa within. Natural size. (Original)

The Cocoon.—This is merely a thinly-woven web of whitish silk spun among leaves. In some of our specimens the larva had to some extent folded over a leaf which made a further shelter for the pupa.

The Pupa.—Length 18 mm.; width at widest part 6 mm.; blackish-brown in colour; the eyes and tongue-case prominent, the latter extending beyond the wing-cases, which are wrinkled. Spiracles reddish-brown. Cremaster roughened, short and blunt, the hooks firmly attached to the silk of the cocoon.

Observations have, as yet, failed to furnish information on the oviposition habits of the female moths. It is most likely, however, that the eggs are deposited on the foliage of plants as is the case with other species of the genus. The cabbage looper, *Autographa brassicae* Riley, is known to oviposit on the underside of leaves, the eggs being usually deposited

4 Proc. Ent. Soc. Brit. Col., July, 1915, 9.

singly, or three or four close together.[5]

The moths are active fliers and are attracted freely to lights at night. They have also been noticed flying in the day time. In Montana and Idaho[6] large numbers of the moths were observed, in 1914, around currant, apple and cherry blossoms.

NUMBER OF GENERATIONS

The seasonal history of the alfalfa looper is, as yet, not well known. No one has succeeded in studying the insect throughout the entire year. We have no definite knowledge as to how it passes the winter in western Canada. In the state of Washington it is known to hibernate as a pupa and probably also as a moth.[7] Referring to the occurrence of the moths in the province of Alberta, Dod says,[8] "I have records from May to September. I believe it hibernates here, and is almost certainly a migrant."

It is probable there are two distinct generations each year.

THE OUTBREAK OF 1914

In this year, injury by the insect was confined to the province of British Columbia, serious damage being effected to alfalfa and other crops chiefly in the Okanagan country. Brief references to this outbreak have appeared in the Report of the Dominion Entomologist for the year ending March 31st, 1915, in the Proceedings of the Entomological Society of British Columbia, No. 7, N.S., July, 1915, and in THE AGRICULTURAL GAZETTE OF CANADA, Volume 1, p. 818.

Crops Attacked.—At Westmoreland, B.C., one correspondent reported the complete destruction of a valuable crop of head lettuce. Near Armstrong, B.C., a large army of the caterpillars travelled through a ten acre field of wheat that was just heading out; they did not attack the wheat but the leaves of weeds were devoured and when they reached an orchard which was in clover and alfalfa they ravaged such crops and even climbed young apple trees and stripped them of their foliage. At Lytton, B.C., beans were attacked, one grower reporting that about 25 acres were badly damaged. In the neighborhood of Kingcome Inlet, B.C., the larvæ were present in countless numbers and attacked freely such field crops as clover, turnips, lettuce and other vegetables.

Mr. H. Ruhmann, of the British Columbia Department of Agriculture, reported that at Larkin, B.C., millions of the larvæ were present, but were confined to about 200 acres of alfalfa. Near Vernon, B.C., the insect was present in about 50 acres of orchard land in which clover and alfalfa were growing. At Kelowna, B.C., considerable injury took place in a large market garden, lettuce specially being destroyed.

In addition to the above mentioned crops, namely lettuce, clover, alfalfa, apple (both foliage and fruit), beans and turnips, other plants attacked by the caterpillars in British Columbia, in 1914, are the following: cabbage, peas (both garden ands weet peas), onions, potatoes (to a slight extent), rhododendron, laurel, holly and rose.[9]

Besides, the insect is recorded as having been found feeding, in the United States, on malva, barley, elder, dock, sweet clover, wild lettuce, flax, sugar-beets, corn, carrots, cucumbers, muskmelons, watermelons, squash, currants, gooseberries, raspberries, lamb's-quarters and sunflower.

In 1903, we reared at Ottawa, one adult moth which was found feeding on lupine, on Mt. Arrowsmith, Van-

5 New York Agricultural Experiment Station, Bulletin 144, p. 40.

6 Journal Economic Entomology, Volume 8, p. 287.

7 U. S. Bureau of Entomology, Bulletin 95, VII, 110.

8 Canadian Entomologist, July, 1905, 250.

9 The last four kinds are recorded by Treherne: Proc. B.C. Ent. Soc. No. 7, 1915, 37.

couver Island, B.C., the date of emergence being August 28.

NATURAL ENEMIES

In 1914, natural enemies of the alfalfa looper were present in British Columbia to a marked extent. From material received at Ottawa from Armstrong, B.C., Kingcome Inlet, B.C. and West Summerland, B.C., we reared the tachinid fly, *Plagia americana* Van der Wulp, the dates of emergence being June 22 to July 10. This fly had previously been known as a parasite of the alfalfa looper. At Larkin, B.C., another tachinid fly was present, namely *Exorista futilis* O.S.,[10] the species being determined from a specimen sent to us by Mr. Ruhmann. This species has not been previously recorded as a parasite of *Autographa californica*. In addition to these two dipterous parasites a third species, namely, a hymenopterous parasite, was also reared by Mr. Ruhmann, from material collected at Kelowna, B.C. This species proved to be *Microplitis alaskensis* Ashm., which was known to attack the alfalfa looper in the United States. Besides the above species, six other parasites—one tachinid fly, (*Phorocera saundersii* Will.) and five hymenopterous flies, (*Sargaritis websteri* Vier., *Rhogas autographae* Vier., *Microphlitis* sp., *Ameloctonus* sp., *Apanteles hyslopi* Vier.)—have been recorded as enemies of the pest under discussion.

In referring to the natural enemies of the alfalfa looper, Mr. Ruhmann states[11] that he collected 200 larvæ. Of these only eleven reached the pupal stage, the others being killed by a disease or by parasites. Of the eleven pupæ, seven produced tachinid flies, and the other four produced moths. From the 200 larvæ collected, therefore, only four moths were reared. This indicated a very heavy parasitism and from investigations made in the field, such natural checks were evidently widespread. Very few adult moths were captured or observed and the only reference to the second generation in British Columbia, in 1914, is a brief note by the late Mr. Tom Wilson, of the Entomological Branch, who stated, in his monthly manuscript report, under date of July 20, the following: "*Plusia californica* hatching out second brood."

In addition to the above natural enemies, birds were observed to feed readily upon the larvæ.

A bacterial disease was also present among the caterpillars in British Columbia in 1914, being noted particularly in the Vernon and Kelowna districts.

CONTROL

The alfalfa looper represents a type of destructive insect which is liable to increase, unknowingly to the farmer or market gardener, and suddenly appear in countless numbers among certain kinds of growing crops. For this reason it is extremely difficult to anticipate an outbreak and, as has been the case with certain other insects, farmers, in 1914, were unaware of the presence of the alfalfa looper until after important injury had been effected. Like the true army worm, *Cirphis unipuncta* Haw., the marching habits of which it is known to simulate, the alfalfa looper is, fortunately, quickly controlled by natural enemies. Since 1914, we have no records of the insect occurring in destructive numbers.

We had no opportunity to conduct any control experiments with insecticides, owing chiefly to the fact that the injury was largely effected before reports regarding the outbreak were received, and when infestations were investigated the caterpillars were approaching full growth and were being quickly reduced in numbers by natural enemies. At West Summerland, B.C., one correspondent re-

10 Determined by J. D. Tothill.

11 Proceedings B. C. Ent. Soc., No. 7 N.S., July, 1915.

ported that he had experimented with arsenate of lead, hellebore and nicotine-sulphate. Very little good resulted from applications of any of these insecticides. Paris green or arsenate of lead will, of course, destroy the caterpillars if used strong enough, but when a caterpillar is present in such enormous recurring numbers, spraying with an arsenical mixture is a rather hopeless task. A mechanical means of protection would possibly be found to be of advantage, such as the ploughing of furrows or the digging of trenches ahead of the line of march of the caterpillars. These means of protecting crops from the ravages of migrating hordes of caterpillars have been fully discussed in Bulletins Nos. 9 and 13 of the Dominion Entomological Branch.

THE HEALTH OF ANIMALS BRANCH

THE ABATTOIR AND DELICATESSEN

BY M. J. KELLAM, V.S., CALGARY, ALBERTA

AT first thought the reader may not grasp the idea of the close relationship existing between the abattoir and delicatessen, but a brief survey of the situation will no doubt be sufficient to establish in the mind of the reader the fact that the abattoir is a very important link in the chain that extends from the producer of food animals to the consumer.

THE RELATIONSHIP

One does not need an acquired taste to relish the high-grade delicatessen that is now being placed on the market by the large packing houses. The demand for such products as cooked ham, roast pork, jellied tongue, veal loaf, etc., has increased enormously during the last few years. No doubt the demand for this class of products depends largely on their agreeable taste and flavour, these qualities appealing to the increasing number of consumers as they become better known. The exacting demands of this ever-widening circle of consumers have acted as a stimulus to the firms engaged in this line of trade, and to-day the production of delicatessen has reached that state where it may well be classed as a fine art.

SANITARINESS A NECESSITY

Let us remember that the finished product can be no better than the raw material from which it comes, and that, from the time of slaughter to the time of it's preparation for the table, meat may undergo a variety of changes. It is a well-known fact that meat will readily absorb taints from an impure atmosphere, and that it soon becomes unfit for food if placed in unsanitary surroundings. We will then realize that care must be exercised, not only in the selection of the various cuts and portions that are to be prepared for this particular line of trade, but, also, in maintaining a high standard of sanitation in the rooms in which the meats are processed or handled. The vats, tables, and utensils used, as well as the hands and clothing of the employees engaged must be kept clean.

INFLUENCE OF SLAUGHTERING METHODS

All meats contain certain preserving qualities that depend on conditions that are in the meat itself, and also on outside influences. To the first belong especially the blood and juice contents of the meat, and the health or disease of the animal

before slaughter. If an animal is not well bled at the time of slaughter the keeping qualities of the meat are reduced; while in the case of certain diseases the keeping qualities of the meat are practically destroyed.

The influences of the outside conditions on the meat depend principally on the activity of the various organisms that produce putrefaction. They reach the meat from the air, or from soiling the meat either at the time of slaughter, or at some later period. Meat may become contaminated as a result of careless handling during the act of slaughter, consequently the sanitary condition of the abattoir, as well as the methods employed in slaughtering the animals and dressing the carcasses, are matters of vital importance. Of course, the proper course to pursue is to strive to avoid these sources of trouble. While it is important that slaughtering should be done in a clean place, the dressed carcass should be immediately removed from the abattoir to still cleaner surroundings, and should be promptly chilled.

THE ABATTOIR

But above all other points in sanitation stands the fact that in the abattoir, at the time of slaughter, is the only place where a satisfactory examination of the carcass can be made, for the detection of disease or other conditions that might render it entirely unfit for food. In order to afford protection to the health of the public, every animal should be inspected at the time of slaughter by a competent veterinarian, and the places at which animals are slaughtered and the meat prepared for food, should be maintained in good sanitary condition.

All animals should be slaughtered and dressed, and the carcasses chilled under conditions that will avoid contamination and produce the best results, as the meat of healthy animals, which in itself is suitable for food purposes, may become unfit for food as a result of improper preservation or other treatment. In the case of cured meats the cutting and curing must also be done under good sanitary conditions.

THE MEAT AND CANNED FOODS ACT

The Dominion Department of Agriculture takes a very important part in supervising the slaughter of animals, and the preparation of all products prepared in the large slaughter houses and packing plants in Canada. The Meat and Canned Foods Act, which has now been in operation for several years, is administered by the Department of Agriculture. The provisions of this Act apply to all establishments that are engaged in inter-provincial or export trade.

The principal object of meat inspection, as carried on under this Act, is to protect the consumer from diseased or otherwise unwholesome meat. This involves not only the inspection of the meat for the detection of disease or other unwholesome conditions, but also the requirement of sanitary conditions and equipment in the abattoirs and packing houses, and the enforcement of sanitary methods in the preparation, curing, and handling of the meat.

WORK OF THE INSPECTORS

To meet these requirements a large staff of inspectors is employed. Veterinary inspectors examine all animals before they are allowed to enter the abattoir; they also inspect all carcasses and parts of carcasses at the time of slaughter.

All carcasses, or parts thereof, found on inspection to be diseased, or otherwise unfit for food, are condemned and destroyed for food purposes. Those that are found to be healthy and fit for food are stamped with a design known as the "inspection legend," which consists of a crown, the words "Canada—Approved," and the establishment number. This design also appears on

pails, cans, and other receptacles containing meat or meat food products that have been inspected and passed. All meats and meat food products that bear this mark have undergone a careful and thorough inspection at the hands of the officers constituting the Canadian Meat Inspection Service.

SIGNIFICANCE OF THE "INSPECTION LEGEND"

The officers charged with the administration of the Meat and Canned Foods Act have made, and will continue to make, the "inspection legend" stand for something. When this stamp appears upon a product it indicates that the meat was derived from healthy animals, that the animals were killed, and the meat was prepared, under proper sanitary conditions, that no harmful preservative or dye was used in the preparation, and that the name of the product on the label is the true name. Convinced of the soundness of this it cannot be anything but prudence for people to insist that only inspected meats and food products be served on their tables.

THE FRUIT BRANCH

THE TRANSPORTATION OF FRUIT

BY G. E. McINTOSH, IN CHARGE OF FRUIT TRANSPORTATION

THERE are approximately 425,000 acres of fruits in Canada, representing a probable investment of $150,000,000, and providing homes and permanent employment for, say, 25,000 persons. The production from this acreage has increased tremendously in the past eight years, and to-day the fruit industry is one of the largest revenue-producing interests the railways of Canada have. The tonnage handled by the carriers increased from 562,716 tons in 1898 to 1,299,063 tons in 1916, and, when combined with the other products of agriculture, is responsible for one-sixth of the total freight receipts of Canadian railways.

INCREASE OF CONSUMPTION

There has always existed, more or less, a fear lest the increase in production might outrun the increase in consumption, or, to state it differently, that there might be more fruits produced than the people could consume at a price that would pay the producer. Marketing conditions of late years have, however, proven that this condition is not likely to materialize. The consumer is using more fruit than in former years, and in this period of high cost of living and the necessity of utilizing and conserving every line of foodstuffs, the public is using fruit more and more as an article of food rather than as a luxury. Producers, therefore, with proper transportation facilities, and careful marketing methods are almost sure to realize a fair return upon still greater development. The fruit industry of this country is now—to a greater extent than ever before—one of the important industries, and its development becomes a national duty.

IMPORTANCE OF CARE IN TRANSIT

While interest, perhaps, should centre around improved methods and greater production, it is dangerous to sacrifice the method of getting the fruit to the consumer in the best possible condition. No commodity is more likely to deteriorate in transit than the fruit crop, and many diseases that attack the growing fruit continue to develop in transit, thus demanding careful and prompt des-

patch, together with proper car accommodation.

The problem before the fruit growers of Canada is, first, to develop a product of quality, then, to create a larger consumer demand, and, finally, to perfect as nearly as possible, the system of efficient economical distribution. This can only be done by a close co-operation with the public carriers. The fruit industry and the railways and express companies of Canada are inter-dependent. Injury to one is injury to both.

MATTERS TO BE CONSIDERED

The successful transportation of fruit is a complex problem, depending as it does on the condition under which it is grown, the care in handling, conditions in transit, and the relation of these factors to the ripening of the fruit and to the development of decay. Losses occur in transporting fruit shipments that are not wholly due to the grower, the handler, or the transportation company, but may be due to causes for which each share the responsibility. The orchard product now requires better handling and better transportation facilities than in the early stages of its development. There has been a great improvement along these lines, but it must be greater in the years to come, as the industry increases and the distribution of the Canadian fruit crop is extended.

DUTIES OF THE TRANSPORT OFFICER

Fruit transportation is now to receive special attention through the Fruit Branch, and the writer, who, for seven years, was transportation officer for the Ontario Fruit Growers' Association, has been selected to take charge. The work as yet is only in the organization stage, but it is intended to make it a valuable addition to the present efficient work carried on through this Branch of the Department of Agriculture.

Briefly defined, the purpose will be to create more co-operation between carrier and producer. Producers and shippers are entitled to many considerations which they probably do not get, but which the railways in many cases would be perfectly willing to concede upon a proper presentation of facts.

To collect and disseminate such information as may be deemed helpful both to the shipper and the carrier through which undeveloped markets may be reached and distribution more properly regulated, to study and put into practice improved methods of distribution, will be the duty of the new officer.

It is difficult, if not impossible, for the average fruit-grower to become thoroughly familiar with classifications, railway or express tariffs and the many changes thereto. Therefore, it is proposed to issue bulletins from time to time acquainting shippers with existing privileges, or tariff changes, during the shipping period.

Finally, we intend to unite our efforts with growers, packers, shippers, carriers, and consumers in one great effort to get fruit and vegetables to the different markets in proper condition, avoiding all possible waste from deterioration in transit.

These and the many other problems arising in connection with fruit transportation will receive attention, and growers and shippers are requested to make known any grievances they may have in this regard.

Matters relating to transportation of fruit and vegetables coming before the Food Controller's Fruit and Vegetable Committee are also dealt with through this Branch, and given the same consideration as matters directly connected with the Fruit Branch.

ATTITUDE OF THE RAILWAY COMPANIES

The railway companies have had extraordinary conditions to meet during the war period, and regulations have at times been made

effective that were not in the interests of the shippers of perishable products, causing delay and congestion, particularly in British Columbia. On the whole, however, the service for the fall and winter movement has been better than was expected early in the season. The movement of the Nova Scotia apple crop to points in Quebec, Ontario, and west of the Great Lakes, made necessary because of the British embargo, was additional traffic requiring refrigerator equipment at a time when the demand for such was already taxing the united efforts of the carriers. The shippers and consignees, however, responded to appeals from this Branch and increased the average load to such an extent that, on a conservative estimate, there has been over 500 cars saved in a total movement of less than 2,000 carloads. British Columbia is now nearly cleaned up, and there are not more than 500 carloads yet to be moved from Nova Scotia.

POTATO SHIPMENTS ALSO RECEIVE ATTENTION

The Prince Edward Island potato surplus, which it is proposed to move throughout the winter months, is receiving special attention. The Canadian Government Railway has specially equipped nearly 100 cars on Prince Edward Island, and undertakes to have an adequate supply of standard cars at Port Borden to assure a continuous movement. The Fruit Branch is supplying reliable messengers to accompany these cars from shipping point to the larger distributing centres, Toronto and east thereof. Arrangements are now completed, and this traffic will be moving in the near future.

Several plans for improvement of transportation conditions in soft fruit producing districts of Nova Scotia, Ontario, and British Columbia are under consideration, together with other matters relating to the fruit industry in general, and definite announcement in reference thereto will be made at a later date.

LOWER FREIGHT RATES FOR MANURE

Production and consumption of such products as fruits, potatoes and vegetables, should be extended, not restricted, says the Food Controller. Therefore, their continued increased production and distribution are vital, in view of national and international necessities.

Since we must save for exportation, wheat, meat fats, and sugar, we should utilize more than before the bulkier, more perishable products, and to carry this into effect there must be a greater acreage devoted, especially to vegetables.

Fertilizer in some districts has been hard to get. Fruit and vegetable districts adjacent to Toronto were able to secure manure at a low freight rate, and were, therefore, not compelled to use great quantities of commercial fertilizer, the price of which has increased. Through the efforts of the Transportation Department of the Fruit Branch, Ottawa, Essex district is to share in this advantage, which means a reduction of 6 cents per 100 lb. in the freight rate. Manure from Toronto can now be laid down at Leamington, Kingsville, and other points, for $2.65 per ton, including the freight charges.

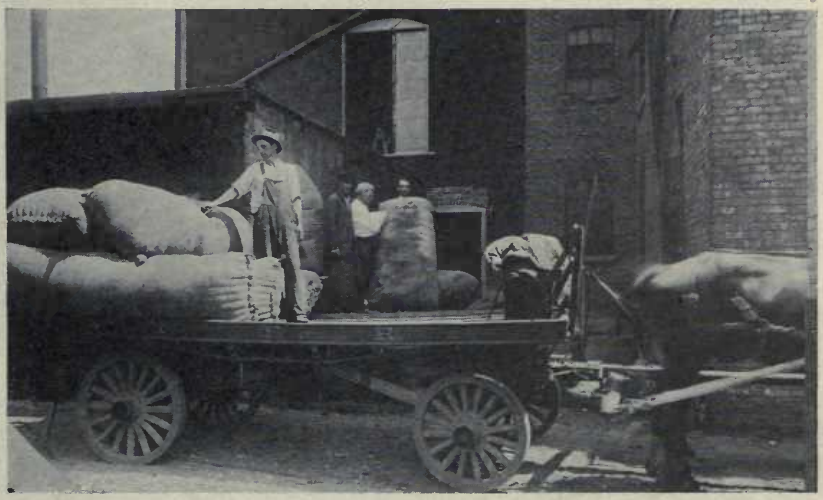
THE LIVE STOCK BRANCH

ASSISTANCE EXTENDED TO ASSOCIATIONS IN THE CO-OPERATIVE SALE OF WOOL

BY T. R. ARKELL, B.S.A., CHIEF, SHEEP AND GOAT DIVISION

THE selling of wool co-operatively on a graded basis has shown a most wholesome increase since its inception in 1914. In 1914, 206,129 pounds of wool were graded for societies organized in four provinces, namely, Quebec, Ontario, Manitoba, and Alberta. In 1915 the number of organizations formed for this purpose was increased to nineteen. Approximately 420,000 pounds were classified and offered for co-operative sale. In 1916 this amount had reached the total of 1,721,598 pounds, and every province was represented. This year the total graded was 2,097,909 pounds with a value of $1,321,682.67, as shown in the following statement.

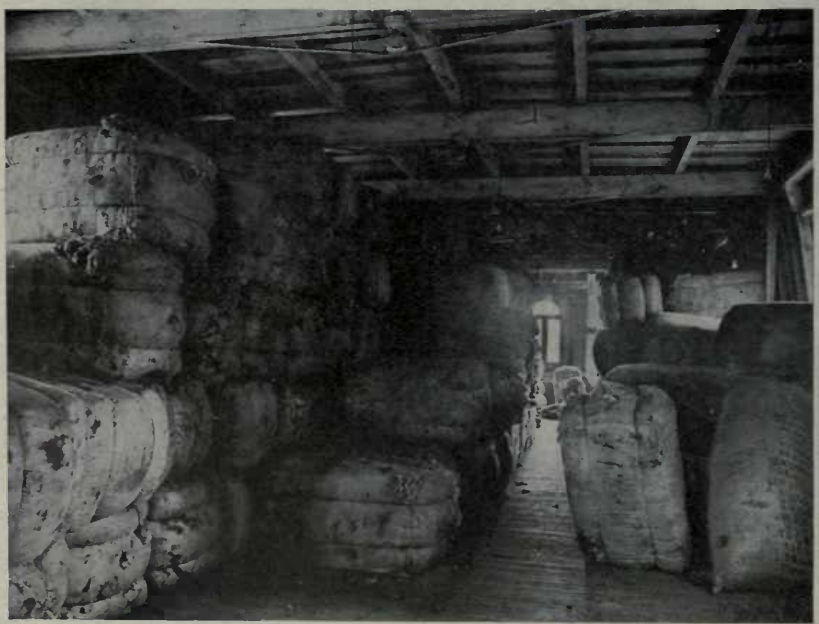
Previous to the shearing season a public warehouse for wool storage was established at Toronto, to which associations could ship in the event they had difficulty in disposing of their clips at point of collection. Southern Alberta and Southern Saskatchewan associations representing approximately 900,000 pounds of wool took advantage of these storage facilities, shipping their wool to Toronto and putting on sale their product at this point. The average price obtaining over Canada for wool sold co-operatively was in the neighbourhood of 63 cents.



UNLOADING WESTERN WOOL AT THE DOMINION GOVERNMENT WOOL WAREHOUSE, TORONTO

WOOL IN SACKS STORED AT THE DOMINION GOVERNMENT WOOL WAREHOUSE, TORONTO

A portion of the consignment from the Saskatchewan Southern Wool Growers' Association



WOOL IN BALES STORED AT THE DOMINION GOVERNMENT WOOL WAREHOUSE, TORONTO

A portion of the consignment of 650,000 lb from the Southern Alberta Wool Growers' Association

STATEMENT OF WOOL GRADED BY THE LIVE STOCK BRANCH AND OFFERED FOR CO-OPERATIVE SALE IN 1917

Name of Association.	Secy. or Manager.	Address.	Number of Members	Amt. of Wool Lb.
Prince Edward Island	L. J. Tennant	Summerside	315	24395½
Nova Scotia—				
Antigonish County	Dr. Hugh McPherson.	Antigonish	257	18893
Annapolis Valley	J. L. Pinee	Kentville	15	2232½
Guysboro County	A. B. McDonald	Guysboro	27	1462¾
Inverness County	John R. MacDonald.	Port Hood	36	2516
Pictou County	A. F. Fisher	New Glasgow	75	7384
Richmond County	Rev. R. L. McDonald.	St. Peters	28	1437¼
New Brunswick—				
Sussex & Westmoreland	M. A. McLeod	Sussex		4058½
Quebec—				
Argenteuil Wool Growers'	J. W. Gall	Lachute	106	14651
Beauharnois	R. E. Husk	Huntingdon	113	11743
Bedford	W. R. Beach	Cowansville	150	18402
Beauce				11025
Compton	H. A. Taylor	Cookshire	281	34514
Megantic	E. Bolduc	Leeds Village	49	8102
Pontiac	C. H. Hodge	Shawville	485	45887
Richmond	L. V. Parent	Richmond	172	34148
Sherbrooke	W. J. McDougall	Lennoxville	135	20235
Stanstead	E. E. Temple	Ayr's Cliff	125	19548
Ontario—				
Ottawa				3082½
Ontario Sheep Breeders'	R. W. Wade	Toronto		318212
Manitoulin	W. Hilliard	Kagawong		24321
Manitoba—				
Elkhorn Wool Growers'	H. J. Jones	Elkhorn	8	2252
Dept. of Agriculture	J. H. Evans	Winnipeg	459	167978
Saskatchewan—				
Southern Sask. Wool Growers'.	C. S. Herringer	Maple Creek	41	165443
Alberta—				
Alberta Sheep Breeders' (Calgary)	E. L. Richardson	Calgary	280	151497
Alberta Provincial Sheep Breeders' Assn. (Edmonton)	W. J. Stark	Edmonton	165	63490
Central Alberta Wool Growers'	A. J. Cameron	Lacombe	98	45540
Pincher District Wool Growers'	J. W. Harwood	Pincher Creek	45	61277
Southern Alta. Wool Growers' Assn.	F. Colpman	Lethbridge	61	714303
Vermilion Wool Growers'	Job Mace	Vermilion	32	37879
Walsh-Irving Wool Growers'.	Chas. Beattie	Walsh	2	52334
British Columbia—				
Interior of B. C. Wool Growers' Association	C. E. Lawrence	Kamloops	14	9666
Total				2,097,909

THE SEED BRANCH

SEED TESTING

BY E. D. EDDY, B.S.A., CHIEF SEED INSPECTOR

DURING the year ending August 31st last, 12,431 samples of seed were received at the Ottawa seed laboratory for test from farmers, seed merchants, and institutions. Nearly 70 per cent of these samples were sent by seed merchants and about 25 per cent by farmers. At the Calgary laboratory during the same period 13,547 samples were received. Of these 85 per cent were from farmers and largely represented lots of oats and wheat for germination test.

During the first four months of the present laboratory year, from September 1st to December 31st, the Ottawa laboratory has received 3,740 samples. Of these 192 were from farmers, 2,276 from seed merchants and 1,272 from institutions, including experimental farms. From this it will be seen that farmers are not taking full advantage of the laboratory to have their seed tested before offering for sale. Comparatively few samples are received from the Maritime Provinces. Of the number stated, 163 were from Quebec, 1,554 from Ontario, and 539 from the United States. Most of the samples were for only either purity or germination test, but 200 were for both. The purity test asked for numbered 2,063, and the germination 1,677. Of the samples of timothy, red clover, alsike, and alfalfa seed for grading, 389 were No. 1, 954 No. 2, 408 No. 3, and 290 rejected, or prohibited, from sale under the Seed Control Act. This shows a considerably larger proportion of samples coming within the higher grades than in some years.

As germination tests require from ten to twenty-eight days, it is impossible to give results promptly on samples received during a stated period. In the four months ending December 31st, 957 germination tests were reported. The results showed 571 samples to be up to, or above, the standard percentage of vitality for good seed, 324 between standard, and two-thirds of standard, and 62 below two-thirds of standard.

The word production now rivets our attention. It suggests thought with power, intelligence and organization. It represents not a spontaneous quantity only, in a ragged slipshod fashion, but, when coupled with conservation, it implies enterprise, expansion, development, co-operation, thrift, progress, prosperity. It suggests the occupations of more than 75 per cent of the people, the great problems of distribution, of transportation, of the accumulation of real wealth, of vast enterprises of world democracy, and it demands education of the most direct and substantial character.—*R. P. Steeves, Director, New Brunswick Elementary Agricultural Education, in Rural Education Monthly for January.*

PART II

Provincial Departments of Agriculture

INCREASED HOG PRODUCTION

NOVA SCOTIA

BY M. CUMMING, B.A., B.S.A., SECRETARY FOR AGRICULTURE

THE seriousness of the feed situation made it impossible for us to do as much in connection with the "Increased Pork Production Campaign" as we might otherwise have done. Provincial crop returns for the year indicate that our grain crop will not be much over a 75 per cent crop, which means that practically every extra hog kept will have to be fed on imported feeds, the high price of which is common knowledge.

Our policy consisted of:—

1. An article issued to the press of Nova Scotia early in November entitled "Hogs as Valuable as Shells."

2. An advertisement headed "Keep a Pig" which appeared in every local paper in the province of Nova Scotia, and along with that a reader entitled "Moderate Estimate of the Profits from Keeping a Brood Sow this Winter."

Also advantage was taken of the annual meetings of some 275 agricultural societies in the province to whom a letter signed by John M. Trueman was sent. This letter outlined the conditions and urged the saving of sows, and also contained a statement to the effect that the College at Truro would act as a medium of exchange and distribution.

How many sows were actually saved by this propaganda we have no notion, but Mr. Trueman has received to date 137 inquiries for sows, and was able to reply to practically all the parties inquiring and advise them where they could get sows offered for sale. It was anticipated, however, that the great majority would effect purchases and sales locally and, therefore, we did not expect to hear from them. The correspondence, however, received indicates that a very considerable conservation of the sows of the province occurred as the result of the campaign—just how many we cannot easily ascertain.

The Government only owns two institutions at which pigs can be kept; at one of these, the college at Truro, we increased our holdings of brood sows from 14 kept last year to 22 kept this year.

Our Provincial Health officer, Dr. W. H. Hattie, of Halifax, corresponded with every county institution in the province asking for information as to how many extra sows were kept in these institutions due to the campaign. From the answers received we learn that the brood sows kept at these institutions have increased from fifty to seventy-five per cent.

NEW BRUNSWICK

BY W. R. REEK, B.S.A., SECRETARY FOR AGRICULTURE

UPON my return from the Hog Production Campaign held in Ottawa in November, we called in representatives of all the municipal councils. These bodies are made up of two men from every parish and are the only organizations that really touch every part of the province. We discussed the matter of swine production thoroughly at this meeting. Some were favourable, but owing to the difficulty of securing supplies of feed they advised that it was impossible to do anything, the grain crop for 1917 being poor. Shortly after we consulted men in every part of the province, who were closely in touch with the live stock and feed situation, and, with the exception of one case, we were advised against a campaign. However, immediately we received word from Ottawa that feed was available, we circularized every newspaper and every agricultural society (secretary and president), and previous to that we had our district men at work. If the agricultural societies take the matter up with energy, we expect to have to go to Montreal to buy breeding sows. In some counties quite large numbers of sows have been kept, which otherwise would have gone to the market this winter, as a result of the personal work done by our county men. I do not expect a large increase in hogs next spring in this province, simply because the feed question held us up so long, and, until that was cleaned up, we were working under a great handicap. Now that through the combined agency of the Live Stock Commissioner and Food Controller, mill feeds are being made available, we expect to secure a fairly good response in pork products in 1918.

QUEBEC

BY J. A GRENIER, DEPUTY MINISTER OF AGRICULTURE

A campaign for an increased production of pork, wheat, beans and peas in the province of Quebec was launched on the 29th of November. A meeting had been called for the purpose, at the Quebec Government building, of our nineteen District Representatives, all the regular lecturers and instructors, some forty farmers, a representative from each of the three agricultural colleges, and some members of the clergy. The Dominion Department of Agriculture was represented by Professor Day. The meeting lasted a day and a half and was divided in three sessions: the first on pork production; the second on wheat and the third on peas and beans.

After explaining the food situation in the allied countries, it was shown that the country and the province had reason to expect the following from the farmers: (1) an increase from 20 to 25 per cent in the number of hogs; (2) an increase in the production of wheat from 4,000,000 bushels, the crop of 1917, to 12,000,000 bushels, the quantity required to feed the population of the province of Quebec; (3) an increase in the production of beans and peas.

All present pledged themselves to urge upon the farmers the necessity of increasing the production of these food products on this scale.

Arrangements were made to cover the province in the shortest possible time, the territory being divided into 35 districts for this purpose. Two lecturers were stationed in each district and instructed to visit all

the parishes. One of these is a District Representative or an instructor; the other one, a practical farmer. So that we have, at the present time, over 70 lecturers, who are urging the farmers to produce more, giving the reasons for this request and showing them practical ways and means to achieve their object. The English districts were put in charge of the professors of Macdonald College and some English farmers. It is hoped that all the parishes will be visited by the end of January.

The Minister also appealed to the priests and clergymen, asking them, by circular-letter, to lend their co-operation. Other letters will be forwarded to the mayors, teachers, bank managers, and postmasters. A large distribution of circulars, posters and pamphlets, bearing on the main issue of the campaign, will also be made.

Our efforts have so far been met with much enthusiasm and there is no doubt that they will be fruitful, if the farmers do not experience too great difficulty in securing fertilizers, corn and seed grain, at reasonable prices.

In order to encourage the production of pork, the Provincial Government has purchased over 400 sows, which will be wintered at Macdonald College, Ste-Anne-de-la-Pocatière agricultural school, Cap Rouge, Lennoxville, and Ste-Anne-de-la-Pocatière experimental station, and at the Levis quarantine with the co-operation of Mr. J. H. Grisdale, Director of the Dominion Experimental Farms, and of Dr. F. Torrance, Veterinary Director General of the Dominion Government. These sows will be served at the earliest moment and sold next spring by private sale or auction.

SASKATCHEWAN

BY F. H. AULD, DEPUTY MINISTER OF AGRICULTURE

ALMOST immediately after the return of our representatives from the Pork Production Conference in Ottawa, we undertook to acquaint the public regarding the serious need for more bacon. District conventions of the Grain Growers' Association at each point explained the situation and urged the hearty support and co-operation of their members. The Saskatchewan Co-operative Elevator Company held its annual meeting about the same time, and Hon. Geo. W. Brown outlined the situation to their 350 delegates from all parts of the province. The Saskatchewan legislature being in session at the time adopted the resolution given in THE AGRICULTURAL GAZETTE for December, page 1071.

Hon. W. R. Motherwell, on behalf of the Government, outlined the plan for distributing sows in districts where the local supply was insufficient. It was proposed that the Government should buy sows in carloads, assemble them at convenient centres in the province, and fill the farmers' orders as received. It was announced that when desired sows would be bred before being shipped. In order to further the campaign two conferences were held —at Regina and Saskatoon—and to these reeves and secretaries of rural municipalities and presidents and secretaries of agricultural societies were invited. Their cordial support of the plan was announced and much organization work is being done. At each conference the following resolution was adopted:—

"Whereas it has been clearly demonstrated that the herds and flocks of meat-producing animals in all countries of the world have enormously decreased in the last three years; and

"Whereas, a serious shortage exists in the supply of pork products for our armies in the field, and for the civilian population, especially the women and children behind the lines in France:

"Therefore, be it resolved, that we, the delegates to this conference, do our utmost in our respective localities to promote in every way possible the Hog Production Campaign which has been inaugurated by the Department of Agriculture."

The Government farms at Regina, Moosomin, North Battleford and Prince Albert will be able to supply a large number of weanling pigs next spring, and it is expected that not only boys' and girls' clubs, but farmers as well, will purchase largely from this source of supply. The University Farm, operated by the College of Agriculture, has always kept a large number of brood sows, and has sold the over-supply for breeding purposes. Their efforts in this respect will be maintained. It is hoped also that there will be a substantial demand from urban communities.

Every urban municipality in the province has received a letter asking for amendment of municipal by-laws where necessary to enable residents of urban municipalities to keep hogs. A considerable number have signified their willingness to make the necessary amendments.

ALBERTA

BY J. McCAIG, B.A., EDITOR OF AGRICULTURAL PUBLICATIONS

THE authorities and the people of Alberta are giving united assistance to the hog production campaign. Such presentation of the condition of the allies with respect to the scarcity of meat has been made that no one is holding back for guarantee of fixed prices for pork for either a short or long time. This bump has been got over, and the feeling is universal among producers that an increase in hogs is a plain necessity and duty.

WORKING WITH THE FOOD CONTROLLER

A delegation, consisting of H. A. Craig, Deputy Minister of Agriculture; W. F. Stevens, Live Stock Commissioner; E. L. Richardson, Manager of the Calgary Exhibition; W. J. Stark, Manager of the Edmonton Exhibition; Secretary Woodbridge and P. Baker of the United Farmers' Association, and G. H. Hutton and W. H. Fairfield of the Experimental Farm, attended a conference with the Food Controller in November and are back to carry on the campaign. The Minister of Agriculture called meetings at Edmonton and Calgary, to which the secretaries of the agricultural societies, prominent breeders, and others were invited, and the need of the time was set out and the steps necessary to secure greater production discussed. The secretaries of the agricultural societies will institute a canvass among members to ascertain the chances of increase as well as to encourage it.

The Department of Agriculture is co-operating with the Federal Live Stock Branch in making increased feed available. Already several cars of "A" screenings have been sold by the Seed Branch. It is expected that one hundred cars will be used in the province.

DISTRIBUTION OF BREEDING SOWS

W.F. Stevens, provincial Live Stock Commissioner, is directing the work chiefly. In addition to the meetings held at the larger centres, he, along with President Wood of the United Farmers' Association, has held meetings in the chief pork producing districts of the province, particularly in Central Alberta, and has met with encouraging success. He

is also carrying out the work of the Department of Agriculture in the distribution of sows. An agent of the Department purchases thin, fairly well-grown sows at the packing plants to be bred and sold to farmers at cost. About two hundred were purchased in the first two weeks of the campaign, and the number will be much greater later on. Reports from agricultural societies show that from ten to twenty-five additional sows will be required in most places. Grande Prairie will use from fifty to one hundred, and Waterhole, also in the Peace River country, is speaking for a car. The sows are bred to Berkshire, Yorkshire, Duroc, and Hampshire boars. One dollar is charged for service and the sows redistributed at the ruling price per hundredweight on the date sold. H. H. McIntyre, District Agent from Stony Plain, is in charge of the distribution at the exhibition grounds in Edmonton. A representative has been placed at Calgary also.

The town of Lacombe has had a campaign of its own. The local regulations forbidding the keeping of pigs have been suspended and many of the residents are now keeping a pig or two.

WINTER AND SUMMER FEEDING

The provincial press is being used to give the greatest publicity to the work, the matter furnished relating to all phases of the question, such as the conditions as to meat supplies in allied countries, the farm conditions favourable to pig-keeping and the best methods of winter and summer feeding. For winter keep, the main reliance of the farmer is whole oats fed outside on the ground in order to give the sows exercise. A small allowance of roots is desirable where they are grown, and there should be available also a mixture in the proportions of one ton of coal slack, ten pounds of salt and one pound of sulphur.

The problem of summer feeding is rather troublesome in parts of Alberta on account of the difficulty of securing good catches of tame grasses and clovers where range grasses are turned over. For summer feeding the Commissioner recommends the early sowing of a combination of one-half bushel of oats, one-half bushel of beardless barley, and one bushel of winter wheat. The winter wheat stools well, forms a good mat that remains succulent all summer. It is better than spring grains in this respect, but the mixture furnishes grass and grain feeding throughout the season. Rape is a good supplement to this pasture. It may be grazed on loose sandy land, but should be cut on sticky clay land.

The Department of Agriculture is increasing the breeding stock on all of the Demonstration Farms to the extent of doubling the number. Generally about four or five sows are kept, but the number is now eight or ten on the eight demonstration farms.

BRITISH COLUMBIA

BY WM. E. SCOTT, DEPUTY MINISTER OF AGRICULTURE

WE are alive to the necessity for using every effort towards increasing the production of hogs as an essential food for Great Britain and her allies, and are carrying on an educative campaign during the winter months, in order to induce as many farmers as possible to increase the number of hogs kept by them.

We are in communication with the Live Stock Branch of the Federal Government, under whose direction this campaign is being carried out

throughout Canada, on the subject of reducing the price to farmers of bran, shorts, corn, etc., by a system of Governmental distribution of these necessary feeds. We have not as yet been able to adjust the matter in a completely satisfactory manner, but I hope before long arrangements will be made whereby these feeds will be acquired in bulk by the Live Stock Branch of the Federal Government and sold to the provincial Governments at cost price, to be distributed by them to farmers also at cost price.

The crux of the whole situation appears to me to be cheaper food stuffs for hogs, and any action along these lines which will result in materially reducing the present high prices that our farmers have to pay for mill feeds will result in a large increase in production.

Our Department does not intend to breed any brood sows and keep them on Government farms for distribution to farmers. We consider that, as things are at present, there should be no difficulty in farmers securing themselves any extra brood sows that they want. Every day hundreds of good sows ranging from 100 to 200 pounds in weight are being shipped to butchers.

We contemplate putting several good practical men with a thorough knowledge of the most successful methods of hog raising in the field. These men will visit the farmer on his place and tell him of the present situation as regards the world's supply of hogs, and the necessity of every effort being used by farmers to do their share to help in this world crisis by increasing the supply of fats which are so scarce at the present time, and so essential for maintaining human vitality; to advise him as to the correct methods of raising stock, to show him how he may feed them most economically, and, generally, to persuade him to keep one more brood sow and to raise one more litter for the sake of the Empire. We consider that work of this nature on the farm will secure better and more permanent results than evening lectures.

As soon as we have definite information to give the farmers as to the price he will have to pay for bran, shorts, corn, etc., through the system of distribution to the farmer arranged for by the federal and provincial Governments our men will start on their field work.

An educative campaign through the medium of the press, our *Agricultural Journal*, and circular letters to secretaries of Farmers' and Women's Institutes, and Government agents, has already been carried out and will be maintained.

We are endeavouring to get all civic and rural municipalities to amend their by-laws, whereby hogs can be kept within the confines of the cities or municipalities, under, of course, proper sanitary conditions.

Not a few of our best teachers have learned to correlate the garden work and nature work with their regular school subjects. Such teachers often say, "Rural Science is not on my time-table; but, under various headings, I teach it every day."—*L. A. DeWolfe, Director, Rural Science Schools, Nova Scotia.*

SCIENTIFIC RESEARCH IN AGRICULTURE

NOVA SCOTIA

BY L. C. HARLOW, B.SC., B.S.A., CHEMIST, COLLEGE OF AGRICULTURE

THE Department of Chemistry realizes that the soil must, at the present time, be depended upon to PRODUCE! PRODUCE!! PRODUCE!!!—that it should assist in every way possible in the call for increased production.

The study of typical soil areas, in order to get some idea of the latent plant food, continues to be one of our lines of work. The thoughtful farmer should be encouraged by knowing that his soil has a good supply of locked-up potash awaiting the application of the chemical principles for setting it free. After last year's work, we again emphasize the need of phosphoric acid, organic matter and nitrogen. During the past season the soils of parts of Inverness, Hants, Lunenburg and Queen's counties have been studied.

Our second line of work is to investigate local sources of materials which may be added to increase the productive power of the soil. To this end many rocks, mud, swamp deposits, fish waste and fertilizers have been analyzed.

After two years of field work, we are quite convinced that for increased soil fertility, the material most available in this province is limestone. Many farmers report increases of from one half to one ton of hay per acre, better clover and turnips, from the use of ground limestone.

Results of pot experiments with various grades of basic slag, and free sulphur with various fertilizers, are as yet incomplete.

QUEBEC

SOME OUTSTANDING FEATURES OF THE WORK AT MACDONALD COLLEGE

IN several branches of scientific research, the work carried on at Macdonald College in 1917 has resulted in facts being ascertained that are of much importance to agriculture, particularly in the province of Quebec. Research work at the Macdonald College is assisted financially from the grant made to the province under THE AGRICULTURAL INSTRUCTION ACT. The application of the knowledge obtained from these investigations will tend to increase farm yields and profits at a time when greater production is so essential to the successful prosecution of the war.

ANIMAL HUSBANDRY

In the animal husbandry department some results of special interest were obtained during the past year. The self-feeder for swine was introduced and an experiment on the "cafeteria" plan proved suggestive for further work. The hogs fed with the self-feeder were allowed four kinds of meal—shorts, ground corn, tankage, ground oats and barley mixed. These were placed in separate compartments in the feeder, and water was supplied in the regular troughs. The pigs that had access to the feeder made an average daily

gain of 1.2 lb., and for each pound of gain 4.66 lb. of meal were required. Those fed on the same feeds by hand three times a day averaged 1.0 lb. gain per day and required 4.99 lb. of meal per pound of gain.

Other lots of hogs were allowed different amounts of exercise during development from weaning time. The hogs that were closely confined required more care to keep them clean, but led all others in rate and economy of gain, as the following results show:—

Close confinement.—1.1 lb. average daily gain, requiring 3.44 lb. of meal per pound gain.

Limited exercise.—.95 lb. average daily gain, requiring 3.70 lb. of meal per pound gain.

Large paddock.—.92 lb. average daily gain, requiring 3.96 lb. of meal per pound gain.

The dressing percentages of the different lots were in the reverse order, ranging from 74.4 for large paddock lot to 71.7 for close confinement lot.

Records of the feed cost of raising calves and developing heifers have been kept. The following table affords a comparison between calves dropped in the fall and those dropped in the spring:—

No. of Animals.	Average cost of 1st 6 mos.	Average cost of 2nd 6 mos.	Average cost of 1st year.	Average cost of 2nd year	Average cost for 2 years.
10 spring calves	17.53	9.72	27.25	15.27	42.52
10 fall calves	16.70	6.01	22.72	15.66	38.38
Average	17.11	7.86	24.98	15.46	40.45
Difference	.83	3.70	4.53	.39	4.14
Record of 10 heifers now in milk	18 19	8.47	26.66	13 97	40 63
62 head	17.32	8.11	25 43	.....	....
36 head	....	.....	....	14.73	.....

It will be seen that the fall calves cost less money, largely because of the fact that after the first six months the extra time on grass is possible with fall calves. The first six months is the most expensive period, because higher-priced feeds, including skim milk, have to be employed. Skim milk is indispensable for good results, but, nevertheless, runs into money at 20 cents per hundredweight. The total cost until 2 years of age for feed alone is $40.45. An extra six months before calving brings it up to $48.46. When other charges are included, it will be obvious that, even with the cheapest feeds available, a heifer that is fully developed must be worth at least $75.00 at calving time to square her account.

SHEEP INVESTIGATIONS

Returns from the demonstration sheep flocks show an increased cost of maintenance, the average total cost per breeding ewe being $3.97 per year. The commercial returns per ewe averaged $10.70, the fleece value amounting to $2.40 of this, and the net profit per ewe being $6.73.

CEREAL HUSBANDRY

Many of the cultural experiments have given results of value, indicating weaknesses in methods commonly practised and pointing the way to increased yields by a change of method. This may be illustrated by a study of the figures given below, showing the advantage to be gained by early seeding of small grains. The yields reported are the average of six years' experiments. In each year the first seeding was made as soon as the land was in good condition for seeding. The other seedings followed at intervals of one week; the second seeding being one week later than the first; the third, one week later than the second; and so on.

EFFECT OF DATE OF SEEDING ON YIELDS OF SMALL GRAINS

Seeding.	Oats Early Triumph Yield per acre	Wheat Red Fife Yield per acre	Barley Mandscheuri Yield per acre.
	Bus.	Bus.	Bus.
First	73.16	35.83	60.78
Second	64.95	29.10	61.06
Third	59.98	28.47	56.81
Fourth	58.45	24.79	54.46
Fifth	53.13	18.78	55.49

The decrease in yield with the later seeding is most marked with oats, but there is also a decided falling off in the yield of wheat. The figures show that it is not so necessary to hurry the seeding of barley to secure maximum yields, so that the seeding of this crop may to advantage be delayed until the other cereals are sown. The yields all indicate how important it is that as much work as possible be done toward preparing land in the fall, and how essential is good drainage to permit early work and early seeding in the spring.

RESULTS WITH CORN

Corn continues to receive close attention. Trial varieties have been limited to those commonly grown in South-western Ontario, so that good seed may be obtained in quantity each year. To compare with these several of the large late varieties such as the Red Cob and Mastodon have been grown. The experiments have clearly shown that the late maturing varieties, while they produce a high tonnage of green fodder, frequently contain a much higher percentage of water than the earlier sorts at cutting time, so that their dry weight is actually less than many of the smaller growing sorts. This may be illustrated by comparing the green and dry weights of Red Cob and several smaller varieties. These yields are for the year 1915:—

Variety	Green Weight Tons	Dry Weight Tons
Red Cob	21 651	.801
Barley	14.075	3 468
Goden Glow	15.216	3.843
Wisconsin No.	14.962	3 494
Longfellow	14.836	3.991
North Dakota	13.821	3.873

If the green weights only were considered, Red Cob would, of the above named varieties, be considered the most profitable, but since the value depends more on the percentage of dry matter this variety in actual food value is at the end instead of the head of the list. In growing corn it is, therefore, important to select varieties that will give a comparatively high percentage of dry weight, or, in other words, those which will approach maturity by cutting time.

In those sections of Quebec that have the longest growing season such varieties as Wisconsin No. 7, Bailey, Golden Glow, White Cap and Compton's Early, have all proven satisfactory. In shorter season districts, Longfellow, Golden Glow, North Dakota and King Philip have all done well, while for the very late districts such varieties as North-western Dent and Quebec Yellow would be more suitable.

In methods and rates of planting exhaustive experiments have been carried on for a number of years. The results seem to warrant the conclusion that moderately thin planting—rows three and a half feet apart and the plants eight to ten inches apart in the row—will give a better crop than either very thick or very thin planting. If the planting is in hills three and a half feet apart, three to five plants per hill is a sufficiently heavy stand to insure maximum yields.

ALFALFA EXPERIMENTAL WORK

The work with alfalfa has been continued and extended. On the college grounds upwards of one

hundred different varieties and strains from all parts of the world have been tested for hardiness and yield. Less than half a dozen have proven suitable for growing in the climate of Quebec, many of the others killing out completely and most of them over fifty per cent. For ten successive years, however, Grimm alfalfa has wintered with little perceptible loss, and we now have several pieces that we are cutting for the fifth season. This variety has repeatedly shown itself to be hardier than either common red clover or alsike, as it has come safely through several winters that were fatal to the clovers.

Our experience with alfalfa at many points in the province during the last five years has led to the conclusion that Grimm alfalfa will succeed and produce profitable crops where the proper precautions are taken. It is essential to success, first, that the variety be hardy; second, that the land be given a dressing of lime; third, that it be free from grass and perennial weeds, and, finally, that it be well drained, either naturally or with tile. A circular on the growing of alfalfa in Quebec has been prepared in the cereal department and may be obtained on application.

ROOT CROP INVESTIGATION

Root crops, in view of their particular adaptability to the climate of this province, and the all too general lack of appreciation of their value, have continued to receive close attention. To secure the greatest possible economy in production is the ultimate object of the work with these crops. The cost per acre being high at best, it is essential for economical production to obtain heavy yields. The factors that influence the yield have, therefore, been the subject of investigation. This has resolved itself into a study: First, of classes of root crops; secondly, types within the classes; and, thirdly, varieties within the types. From the best varieties an effort has been made, fairly successfully, to isolate the superior strains; taking into consideration not only production of dry matter per acre but also seed-producing ability.

Mangels, swedes (ruta bagas), carrots, turnips, sugar mangels, and sugar beets are being studied. In these tests attention is given to yield of roots, per cent of dry matter and uniformity as to type, colour and quality. The results show that under the conditions existing here, the mangels and carrots give considerably higher returns than do the swedes and the turnips. On account of the expense of production, particularly in connection with harvesting, carrots can be produced profitably only on limited areas for special purposes. The low yield of turnips combined with poor keeping qualities will naturally limit the production of this crop. Being easily produced and rapid in development, turnips will be found valuable for autumn feeding. Mangels and swedes remain as the most important root crops.

Through the province generally swedes are grown more extensively than are mangels and in some cases rightly so. In many sections, however, mangels should replace swedes as they would give considerably heavier yields. Where the land is in a good cultural condition, fairly deep, and well drained, mangels are to be recommended. On the other hand swedes are superior on soil in ordinary or poor condition and on land that is poorly drained. In the tests here, covering a period of five years, mangels have given over eleven per cent greater yield than swedes.

In the experiments with types, the results indicate that in mangels the Intermediate is superior to the others. Here belong the Yellow Intermediate Yellow Leviathan, Danish Studstrup, etc. The so-called sugar mangels and sugar beets have shown no

superiority; some varieties have ranked high, but most of them have been inferior. With swedes, the results have been markedly in favour of the Globe type; the others being lower in yield, in percentage of dry matter and in general quality. Variety testing has not been sufficiently extensive to warrant a statement as to the best kinds, but it has been found that the seed of many varieties placed on the market is of poor quality. In mangels, to a greater extent than in swedes, the crop has frequently been lacking in trueness to type and uniformity, and often extremely prongy and coarse. This condition induced an effort to select the more desirable types, and, by producing seed to secure more valuable strains.

RESULTS OBTAINED

No difficulty was found in producing high quality seed of mangels, swedes, carrots and turnips. The seed grown has been markedly superior in power of germination and in vitality to commercial seed. In addition, a superior crop has been grown because of the fact that the seed was produced only from good roots. From the beginning greater smoothness and greater uniformity as to general type and colour were obtained. The attempt to isolate superior pure strains has given very encouraging results. A few have yielded as high as 15 per cent above the best commercial varieties. It is necessary to test these still further to ascertain whether or not the superiority is permanent and to determine which of the strains are the best.

A number of cultural experiments are being conducted, to determine what influence certain practices have on the yield. In these investigations two factors have shown themselves to be of special importance. These are, the time of seeding and the time of thinning. The experiments have shown quite clearly that the root field should be sown as early as the season will permit and that the stand should be thinned out at a very early stage in the development of the crop. For the first seeding, May 8th was arbitrary chosen; the other seedings follow at intervals of two weeks—till June 8th for mangels, and June 22nd for swedes. Over a period of six years the delay of two weeks in the time of seeding has, with mangels, reduced the yield by fourteen per cent and with swedes by fifteen per cent. This decrease in yield is equivalent in feeding value per acre, in the first case to 30 bushels of oats, and, in the second case, to 28 bushels. The experiments in time of thinning have shown that the stand should be thinned out as the first true leaves are formed between the two seed leaves. Any delay in thinning after that time has the effect of decreasing the yield.

THE BUD MOTH

Experiments conducted by the department of Biology showed that two sprayings with arsenate of lead before blossoming time were quite effective in controlling the Bud Moth, an insect that is probably more destructive to the apple than is the Codling Moth in Western Quebec.

ONTARIO AGRICULTURAL COLLEGE

THE SOIL SURVEY; THE STUDY OF WHEATS

BY R. HARCOURT, B.S.A., PROFESSOR OF CHEMISTRY

MUCH time is spent in the chemical laboratory in the examination of materials of various kinds, sent in to us by correspondents. Sometimes there arises from these matters for investigation, as, for instance, regarding some new insecticide or fungicide, or some new fertilizer. The main line of our work this year, however, has been in connection with our soil survey, and with our study of wheats and wheat flours and the flours of other grains than that of wheat.

The main portion of our time has been devoted to our soil survey. The province, from Windsor as far east as Kingston, has been covered in the preliminary survey, and a great variety of types of soils have been found. Demonstration plots on some of these types have been started, and are giving exceedingly interesting results.

The most interesting part of the work in connection with the wheats this season, has been the studying out of the proportion of flour of other grains than wheat that may be used in the making of bread. With the present shortage of wheat it would seem as though the use of certain amounts of these flours in all our bread should be made compulsory.

FARM BUTTER-MAKING PROBLEMS

BY H. H. DEAN, B.S.A., PROFESSOR OF DAIRYING

EXPERIMENTAL work in dairying at the Ontario Agricultural College carried on in 1917 related chiefly to butter-making. The cause of difficult churning and of variation in weight in print dairy butter received special attention.

The causes of difficult churning were studied as to the effects of: breed of cows, feed of cows, lactation period, percentage of fat in or richness of cream, temperature of the cream at time of churning, ripened vs. sweet cream, and amount of cream in the churn. Briefly, the results were: little or no difference was observed by churning separately the cream from three breeds of dairy cattle—Ayrshire, Holstein and Jersey. Sometimes the cream from one breed took a long time to churn and sometimes that from another breed. Neither was there very much difference in the losses of fat in skim milk and buttermilk, nor in the quality of the butter made from the three breeds.

Cream from cows fed in the stable churned as readily, or even more so, than did cream from the same cows when on grass feed.

The cream from cows on stable feed milking for less than two months churned in 21 minutes; and, from those milking two months and under six months on stable feed, the cream churned in 39 minutes, an increase in the time required for churning of eighteen minutes. On grass in September, the cream from the group, over two and under six months milking, took 52 minutes to churn, and, a group milking over six months, took 33 minutes to churn. Owing to scarcity of milk in the dairy herd, it was not possible to make further tests, but the results indicate more difficult churning of cream from cows advanced in lactation as compared with churning cream from fresh cow's milk. The work will be continued.

The churning tests as to the effects of richness, ripeness and temperature of cream were made in a No. 3 size barrel churn, having from two-and-one-half to three gallons of cream for each churning. The results were:

Kind of Cream	Lb. cream churned	Per cent fat in cream	Temp. cream D F.	Minutes churning	Per cent fat in butter milk	Average score of butter Max. 100
Rich	30	28	52	29	.14	95.75
Thin	30	16	56	38	.10	95.75
Thin and warm	30	16	56	38	.10	95.75
Thin and cold	30	16	52	54	.15	93.
Rich and warm	30	28	52	29	.14	95.75
Rich and cold	30	28	46	40	.07	95.5
Normal temp	25	26	54	41	.35	95.
High temp	25	26	69	12	2.40	93.5
Ripe cream	32	26.5	50	30	.15	94.5
Sweet cream	32	24	50	48	.70	94.5
Normal quantity in churn	32	26.5	50	30	.15	94.5
Churn half full	63	26	50	70	.15	94.5

CONCLUSIONS:

1. A thin cream (16 per cent fat) took a longer time to churn than did rich cream, or cream containing from 25 to 30 per cent fat. A thin cold cream was still more difficult to churn, taking nearly double the time to churn as did normal cream at ordinary churning temperature.

2. A rich cream, too cold, also required a long time for churning, but gave an exhaustive churning; that is, one with very little loss of fat in the buttermilk.

3. A high churning temperature caused the butter to come quickly, but caused an excessive loss of fat in the buttermilk, and the quality of the butter was poor.

4. A well-ripened cream churned in a shorter time nd with less loss of fat in the buttermilk than did similar cream churned sweet. It is advisable on the farm to ripen cream, as a rule.

5. A small barrel churn filled half full of cream took 40 minutes longer to churn than did a churning of similar cream when the churn was but one-third full. The churning, one-half full, rose four degrees in temperature after churning for thirty minutes. A churn with too much cream in it is a cause of difficult churning.

SHRINKAGE AND VARIATION IN WEIGHT OF FARM DAIRY PRINT BUTTER

Print butter wrapped in parchment paper, or cheese cloth, both dry and wet, and held for two weeks in cold-storage at a temperature of 35 degrees to 37 degrees F. lost in weight from .11 to .16 of an ounce. Similar lots held in a cellar at a temperature of 48 degrees to 55 degrees F. lost in weight from .3 to .4 of an ounce in fourteen days. Print butter held for about two weeks would require to weigh from 16¼ to 16½ ounces when made and wrapped in damp parchment paper, in order that the package of butter might weigh full sixteen ounces when sold.

The more salt that is added to the butter at the time of making, the greater the shrinkage under similar conditions of storage. Butter containing less than one per cent of salt, lost weight to the extent of 6.32 of an ounce per pound in two weeks, while similar butter, under similar conditions containing 3.2 per cent salt, lost 15-32 of an ounce; and butter with 7.2 per cent salt lost 27-32 of an ounce per pound in fourteen days.

There are also considerable differences in weight of prints out of the same lot of butter, and made by the same person using the same printer. These variations may run from 3-32 of an ounce to as much as 11 0-32 of an ounce more by packing the butter firmly into the printer as

compared with loose printing. Different persons using the same printer on similar butter got variations of from 1-8 to ¼ of an ounce in the weight of prints.

CONDITIONS AT THE TIME OF SEPARATING WHICH AFFECT THE PERCENTAGE OF FAT IN THE CREAM

The tests of 1917 showed the following rates:

1. An increase in the temperature of the milk from 70 degrees to 85 degrees and to 100 degrees F. at the time of separating, with four-hand machines, caused a decrease in the average percentage of fat in the cream from 43 to 41.6 to 39.5 respectively. Similar results were got with a belt power machine and with a steam turbine, when the cream screws were set to give a cream testing from 30 to 40 per cent fat. When the cream screw on the turbine machine was changed so as to produce a cream testing 50 per cent fat, the temperature at which the milk was separated (80 degrees to 140 degrees F.) had little or no effect on the fat content of the cream.

2. When hand cream separators were run at an average of six revolutions of the handle per minute below normal speed, the effect was to lessen the percentage of fat in the cream an average of 4.5 per cent., and to cause a greater loss of fat in the skim milk. On the other hand, when the speed was increased six revolutions of the handle per minute above normal speed, the cream tested an average of six per cent higher in fat. A fairly general effect of varying speed on a cream separator is, an increase of one per cent fat in the cream for each increase of one revolution of the separator handle above normal, and a corresponding decrease in fat percentage for speed below normal. For uniform tests of cream the speed should be as uniformly normal as possible. Any variations in speed cause a variation in the test of cream.

3. When a uniform quantity of either water or skim milk is used for flushing the cream from a hand separator bowl, after creaming varying quantities or weights of milk, will cause a variation in fat percentage of the cream. In tests with four makes of machines, and where one quart of warm water was used for flushing the bowls after separating 100 lb. milk, and allowing all the flushing to run into the cream pail, the average percentage of fat in the cream was 42; under similar conditions, but separating only 50 lb. milk, the average test of the cream was 41.1 per cent.

Where one quart of skim milk was used after separating 100 lb. and then 50 lb. whole milk, the cream tests were respectively 42.4 and 41.9 per cent fat.

MANITOBA

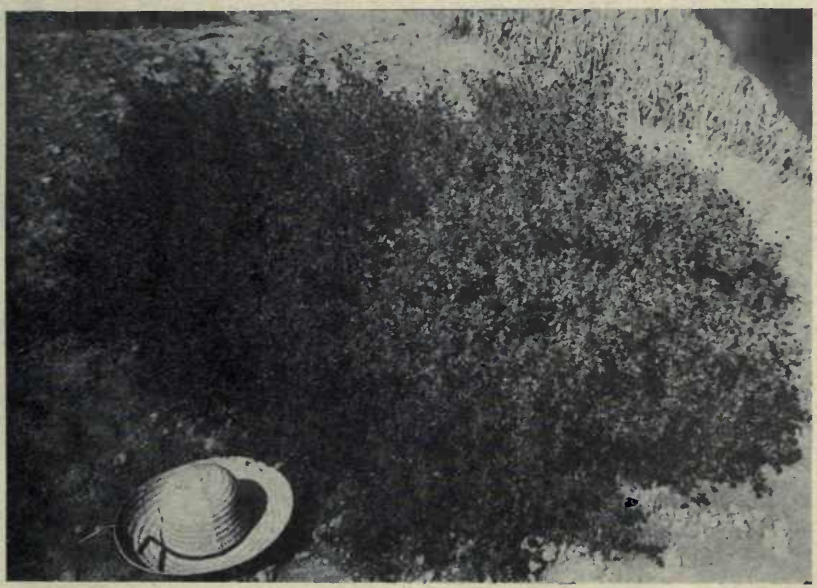
FORAGE CROP IMPROVEMENT—REPORT OF PROGRESS

BY WILLIAM SOUTHWORTH. M.Sc.. Agr., AGROSTOLOGIST, AGRICULTURAL COLLEGE

TO the intelligent farmer the question as to how he may profitably increase his crop production has always been one of outstanding importance. At this time, when he is asked to produce "More than usual," this question is brought to his attention with even greater force than usual. In order to increase the total amount of our food supply it is necessary that the producer adopt either one or more of the following practices:—

1. Increase the area devoted to the growth of the best food producing crops.
2. Introduce improved methods of land and crop management.
3. Plant good seed of the best varieties of the best food producing crops.

From the above it will be readily seen that to ensure that the producer may either increase the area under cultivated crops, or attend more thoroughly to land and crop management, he must have more farm labour, which is rapidly becoming more and more difficult to obtain.



YELLOW FLOWERED ALFALFA PLANT

FIG 1—A very hardy and vigourous type. This plant has been crossed with common alfalfa. From the resulting hybrids, seed has been obtained from which it is hoped that plants may be developed having the hardy properties of the yellow alfalfa combined with the good forage qualities of common alfalfa.

Under such conditions it is of the utmost importance that the labour employed should be used to the greatest possible advantage. In order to attain this end, we at once see the importance of growing crops having the highest productive power, and of selecting improved varieties of grains, forage crops, root crops, or any other crops which may be grown; and, by this means, endeavouring to increase crop production to the greatest possible extent with the limited amount of labour which is available.

With a view to increasing crop production by plant improvement, experiments have been conducted at the college during the past two years, special attention having been given to alfalfa.

SCHEMES FOR THE IMPROVEMENT OF ALFALFA

In a former issue of THE GAZETTE* a brief outline of the cross-breeding schemes for the improvement of alfalfa was given. Attention was there directed to the poor seeding properties of existing strains of alfalfa, and to the urgent necessity of trying to breed strains having superior seeding qualities. With this object in view, experiments in crossing alfalfa with Black Medick were commenced in 1911, and subsequently, in 1913, in order to enhance the vigour of the hybrid, sweet clover

* See May, 1916, pages 445-447.

was introduced into one of the original first generation cross-bred plants.

The work commenced at the Ontario Agricultural College in 1911 was transferred to the Manitoba Agricultural College in 1915, and over 1000 plants of the second and third generations were raised and planted out in individual hills. They made good growth during the summer and came through the unusually severe winter of 1916-17 with very little injury. During the past summer the plants grew luxuriantly, and opportunity was afforded of making definite observations and notes on the various types. The outstanding plant characteristics most closely studied were *seeding properties, quality of forage; and rooting habits.*

In summarizing the results of the observations made we have come to the conclusion:—

1. That out of the thousand plants studied there are at least two plants which show outstanding merit as seed producers.

2. There are three plants which apparently have superior merit for quality of forage.

3. Several plants exhibit a tendency to spread by means of underground stems and give good promise of being well adapted for pasturing.

4. No single plant has yet appeared which possesses both good seeding ability and good forage properties. The plants which seed well produce inferior forage, and those which are the best forage plants are almost sterile.

However, having isolated distinct types of plants, each having its peculiar merit, our purpose now is to test these plants to see if they have the power to transmit their distinctive properties to their progeny. In other words, to test the plants to see if they breed true to type.

If we are fortunate in having isolated individuals, each one breeding true to its own particular valuable characteristic, then our future schemes must be designed with a view to bringing about a combination of

YELLOW FLOWERED ALFALFA PLANT

FIG. 2—The soil has been removed, exposing the root system. A small percentage of yellow flowered alfalfa plants produce this spreading root system. By crossing such plants with common alfalfa it is anticipated that a variety will be developed which will be hardier than existing strains of common alfalfa, and also better adapted for grazing.

the good qualities possessed by each several plant into one single plant. To accomplish this we shall, of course, have to resort to the intercrossing of these select plants. As to the best method to adopt by which a combination of these varied characteristics may be brought together and fixed, this cannot be decided upon in advance, and our methods may require frequent modification so as to suit the varied conditions that are likely to arise as the work progresses.

We can, however, be certain that several years of steady and persistent work will be necessary in order to make any satisfactory progress toward a solution of the problem.

HARDY AND TENDER STRAINS OF ALFALFA

To ensure the rapid spread of alfalfa in Canada, and enhance its productive power, it is essential not only to have strains which seed well and yield well, but these strains must also be hardy and withstand winter killing at least for several years. Seed from hardy strains of alfalfa is usually expensive and not always easily obtained. Seed from tender strains costs less money and can be readily obtained. Many Canadian farmers have been unfortunate in purchasing seed produced from these tender strains, which, on killing out during the first or second winter, has led some farmers to stop sowing alfalfa, and now they naturally look upon the crop with suspicion.

HYBRIDS OF COMMON ALFALFA WITH YELLOW-FLOWERED ALFALFA

Generally speaking, the yellow-flowered types of alfalfa are of inferior quality and seeding ability, yet they generally stand winter killing much better than the common violet-flowered types.

Having in mind the necessity of developing hardy strains of alfalfa for Canadian conditions, and at the same time keeping up its value for forage and seeding ability, an attempt is being made to effect a combination of the hardy properties of yellow-flowered alfalfa with the forage qualities and seeding properties of common alfalfa.

Fertile crosses of common alfalfa with the yellow-flowered type can be obtained without any great difficulty. For the purpose of this cross a yellow-flowered plant, specially selected for vigour and hardiness, was crossed with a plant of common alfalfa, selected for its good forage properties and seeding habits.

Reciprocal crosses were made, and, in all, thirty-six first generation plants were raised. These were planted in the spring of 1916, and the present season they all proved to be strong, vigourous plants, and sufficient seed was secured from each plant to continue our studies of the second generation. In this generation we may hope to find one or more plants having a combination of some of the valuable characteristics of the original parents—common alfalfa and yellow-flowered alfalfa.

IMPROVEMENT BY SELECTION

In conjunction with the above schemes, an attempt is being made to develop superior types of alfalfa by straight selection. The method practised is briefly as follows:—

1. Superior plants from the best strains obtainable were first selected and allowed to seed.

2. Seed from these choice plants was planted out in individual hills and singled out to one plant; after the plants had reached maturity further selections were made and seed obtained to plant a new plot.

By repeating this process of selecting and planting from the best plants it is hoped eventually to weed out all inferior plants, and thus markedly increase the average productive capacity of the remaining plants. There is also just a possibility that a plant may be isolated which is decidedly superior to the average

of the best plants, and that, by reproducing this plant, a distinct strain of alfalfa may be established having an all-round superiority to the average. Such a plant has not yet been found.

At the present time we are working with selections from eight different lines represented by over 4,000 individual plants. Of these eight lines there are three which have been carried through three selection periods. One of these lines appears to have both good forage qualities and seeding ability, but it remains yet to be tested as to whether it will succeed equally well under ordinary field conditions, and also continue to successfully withstand our western winter.

THE VALUE OF PEDIGREED SEED

NOVA SCOTIA

BY JOHN M. TRUEMAN, B.S.A., PROFESSOR OF AGRICULTURE

WE have no experiments to report from the Farm Department showing the difference in yield between pedigreed and ordinary seed. The only figures we have at hand show results obtained for three years from two strains of one variety of oats. The seed has been carefully selected for some years for both strains, and yet invariably one strain shows a higher yield than the other. This illustrates the value of pedigree in grain even where both strains are from selected seed.

NOVA SCOTIA, STAND OF STRAIN No. 1 IN 1914

	Yield in Bushels per Acre		
Banner Oats:	1914	1915	1916
Strain No. 1.....	72	58	70
Strain No. 2.....	64	50	43

QUEBEC

BY JAMES MURRAY, B.S.A., PROFESSOR OF CEREAL HUSBANDRY

THE outstanding requirement in good seed is that it be able to reproduce plants with desirable characters. A pedigree is valuable only in so far as it serves as a guide to the purchaser in identifying the seed as having these desired qualities.

Pedigreed seed might be defined as that grown from plants with a known record, and strictly speaking the definition is correct. But for practical purposes it might better be described as seed of desirable varieties that has been grown with sufficient care to insure its genuineness and purity. To arrive at a fair estimate of the value of a lot of pedigreed seed it is necessary to know the behaviour of the variety under the climatic and soil conditions where it is to be grown. If information on this point be lacking it can best be determined by an actual trial with other varieties under control conditions. This comparative testing of varieties is essential to a proper valuation of the characters of any one sort. Statements of yield, quality, date of maturity, disease resistance, strength of straw, etc., for any variety may be expressed in percentage of an ideal, but it is more generally intelligible if it be in comparison with one or several well-known varieties.

The extent to which varieties differ in character and behaviour is illustrated by the following figures:—

VARIETIES OF OATS—MACDONALD COLLEGE

Average of Eight Years

VARIETY	Days Maturing	Per Cent Hull	Yield per Acre
Early Triumph	95	31.9	74.64
Early Gothland	97	30.7	60.60
Daubeney	82	25.5	72.20
Banner	95	30	72.05
Joanette	94	26.9	58.20

VARIETIES OF MANGELS—MACDONALD COLLEGE

Average of Five Years

VARIETY	Yield per Acre, Tons Roots	Yield per Acre, Tons Dry Matter	Keeping Quality
Giant Yellow Intermediate	27.085	3.119	8.5
Barres' Cylinder	30.657	3.334	8.
Golden Tankard	26.241	2.821	10.
Our Ideal	29.700	2.643	4.
Yellow Leviathan	27.713	2.760	8.

It is apparent that of the oat varieties mentioned some are more valuable than others for conditions similar to those obtaining here. Under other climatic conditions their behaviour would probably be quite different. For example, Daubeney, a very early maturing sort, usually yields remarkably well here because it is well filled before the extremely hot weather of July interferes with its growth, while the later maturing varieties suffer severely. In districts not subject to hot dry weather in midsummer, Daubeney would probably yield poorly compared with Banner or Early Triumph. The Joanette variety again is a very heavy producer of grain on deep rich soils, but gives a poor account of itself on soils that are light or poorly supplied with moisture. In the mangels, too, the comparative standing of the varieties would probably be altered if the trials were conducted under different soil and weather conditions. Varieties of crops must, therefore, be selected on a basis of

their performance under conditions similar to those under which they are to be grown.

METHOD AND SELECTION

Even our best varieties are, in many cases, mixtures of plants of varying usefulness. The plants probably resemble one another in many general characters, but differ widely in economic value. Selection within the variety is, therefore, necessary not alone to insure purity, but more particularly to isolate heavy yielding from light yielding individuals. In this work different methods are followed by different workers. The system of mass selection is practically that followed by the members of the Canadian Seed Growers' Association. The operator selects during the growing season typical heads from plants that appear to be vigourous and productive. The seed from the selected heads is sown *en masse* in a separate plot, and a further selection made the following year. The value of the method depends largely on the care with which the selection is made. An improvement in purity usually results if care has been taken to select only typical heads of the variety, but careless selection may result disastrously. An actual increase in yield may result if the operator has been fortunate in selecting heads from plants of better than the average yielding ability, but there may be a decrease in yield if heads have been selected from plants specially favoured in location and abnormal in growth. There is almost sure to be an *apparent* increase in yield through the specially selected seed being planted with unusual care on well prepared land.

In the other method the selections are made of individual plants that have been grown in large numbers and in such a way that the general character of each plant may be studied. Only those are retained that have desirable field characters and are high producers. The progeny of each selected plant is grown separately under control conditions, and by a process of elimination only a few of the best are retained for increase. The details of the methods followed differ with different operators, but all work on the principle that a commercial variety is made up of plants with different projected efficiency, that by growing large numbers as individual plants under uniform conditions the differences become apparent and permit selections to be made intelligently, and that by propagating separately the desirable plants that are heavy yielders superior strains may be produced. Field trials of the selected strains must be carried on to finally test the value of the selections. Many varieties of grain now extensively cultivated have been produced by this system of selection.

The following particulars relating to several numbered pure-line selections of Joanette oats and Mandscheuri barley convey some idea of the possibilities of this method of selection.

SELECTIONS OF JOANETTE OATS AND MANDSCHEURI BARLEY

Average of Five Years

STRAIN NO.	Days Maturing	Length of Straw	Per Cent Hull	Yield per Acre
Joanette (Original)	99.2	2′-9½″	26.9	59.67 bus.
" No. 407	105.6	2′-6″	25.4	59.56 "
" No. 607	98.6	3′-1½″	25.3	70.09 "
" No. 2007	94.	2′-11″	28.8	55.28 "
" No. 2707	103.4	2′-9½″	28.1	55.02 "
" No. 3307	97.	2′-6″	24.4	53.89 "
Mandscheuri (Original)	86.8	3′-1½″	.....	62.84 "
" No. 6908	86.8	2′-11″	.....	69.95 "
" No. 7008	84.6	3′-1½″	.....	66.09 "
" No. 7408	86.2	3′- ½″	.....	67.29 "

Of the Joanette strains, No. 607 is undoubtedly superior to the original; No. 407 is of about equal value, while the others are of decidedly lower value. All of the barley strains on the other hand are an improvement on the original variety. The pedigrees of all these strains are equally long, each represents careful work over seven years, but the strains are not of equal value under any given set of conditions.

The other method of improvement —hybridizing—is undertaken with the object of uniting in one individual plant—the progenitor of a variety—the good points of two or more plants. A number of our best varieties of cereal crops are of hybrid origin. Many others with a long record of careful work behind them have been introduced only to be discarded after a few years. With hybrid varieties, as with those of other origin, the final test of usefulness is their behaviour under field conditions on the ordinary farm. Unless they are able there to demonstrate their superiority they are soon superceded by others better able to stand the test. Performance is the final test of value, and unless a variety or strain has a record for this it is doomed speedily to disappear.

MANITOBA

BY T. J. HARRISON, B.S.A., PROFESSOR OF FIELD HUSBANDRY

THE value of good seed in field crop production makes itself manifest in three ways, namely, higher yields, better quality, and cleaner farms. This has been demonstrated during the last three years on the field husbandry experimental field at the Manitoba Agricultural College.

The value of the fanning mill as a means of preparing seed was tested out in the following manner: A sample of No. 3 Northern wheat, weighing 60 pounds per bushel, was secured from a farmer's wagon at the elevator. This was cleaned through a standard fanning mill three times, drawing approximately 10 per cent at each cleaning. The average yields on the table below show the important part that the fanning mill plays in the increased production:—

	Bus.	Lb.
Uncleaned, No. 3 Northern	30	20
Cleaned once	33	
Cleaned twice	34	
Cleaned three times	34	30

The increase due to fanning is 4 bushels and 10 pounds. If wheat is worth $2.00 per bushel it means an increase in the wealth of the individual and nation of $8.30 per acre. This increase is not possible, however, on most of the farms, because better wheat than No. 3 Northern is kept for seed and would have been cleaned at least once. The experiment is of value in indicating the advantage of thoroughly cleaning the seed from the standpoint of yield alone, because much of the grain sown is only run through the fanning mill once and contains some weed seeds and many small and immature grains.

The quality of the grain produced from the different classes of seed was also interesting. Since the quality of the wheat varies according to the season the crops for the year of 1915 only are cited:—

Uncleaned, No. 3 Northern	No. 4 rejected
Cleaned once	No. 4
Cleaned twice	No. 3 Northern
Cleaned three times	No. 3 Northern

It must be noted that the original seed contained enough wild oats to reject the sample; naturally the crop from that would be badly contaminated with wild oats and grade rejected. The fanning mill not only

made the succeeding crop go into the straight grades, but on the second and third cleaning raised the quality one grade. The effect of the use of the fanning mill in the control of weeds is not so easy to arrive at. The plot, which was seeded with the uncleaned seed, was fall ploughed and sown the succeeding year with absolutely clean seed. The estimate of the growing crop was that it contained 10 per cent wild oats. Therefore, if the farmer has a reasonably clean farm he should exert every possible effort to secure clean seed.

In connection with this experiment one plot was each year sown with Canadian Seed Growers' Association registered seed:—

KIND OF SEED	YIELD	
	Bus.	Lb.
Registered Seed, No. 2 Northern	39	40
No. 3 Northern, cleaned three times	34	30

This table shows the advantage of selecting the seed while growing. Unfortunately there are not enough C.S.G.A. members to produce sufficient seed for the market. The next best thing then for the farmer is to use the fanning mill on the grain he has selected for seed this winter. The cleaning can be done in a comparatively slack time, and it will have a material effect on the increasing of production.

NOVA SCOTIA

AGRICULTURAL INSTRUCTION ACTIVITIES

BY J. G. ARCHIBALD, B.S.A., DEPARTMENT OF CHEMISTRY, AGRICULTURAL COLLEGE

THE Government of Nova Scotia have by order-in-council appointed a Development of Agricultural Resources committee constituted of six members of the legislature selected from both sides of the House. The chairman is D. A. Cameron, K.C., M.P.P. for Cape Breton.

This committee is at present deliberating on the best methods for securing seed and fertilizer. It has authorized the publication of a series of bulletins, number one of which is just off the press. The title of this bulletin is "Wheat Growing in Nova Scotia." The object of the bulletin is the encouragement of increased wheat production this year. The wheat situation in the province is reviewed and prospective growers are urged to obtain their seed supply at once. Complete and up-to-date information is given as to the best methods of cultivation, manuring and seeding, also as to the varieties most suitable for our conditions. One million bushels of wheat from Nova Scotia in 1918 is the standard set by the Department. The policy of the committee is to assist seed firms and co-operative farmers' organizations, to purchase seed wheat in carload lots, so that they will get the advantage of lower prices and be in a position to sell to farmers proportionately.

A second bulletin on bean culture by Prof. P. J. Shaw has just been completed. Prof. Shaw is making a study of hardy varieties of beans. For local purposes, he divides beans into three classes, namely, early, second early and late. For the counties that are particularly adapted to bean growing, namely Annapolis, Kings, Hants and Lunenburg, he recommends varieties coming in the second class. Good representatives of this class are the Early Yellow Eye, Soldier and Goddard. For the other counties, he advises nothing later than the early varieties, such as the Early Yellow Six Weeks and what is known locally as the Antigonish bean.

LIMESTONE GRINDING

The limestone crusher which was operated throughout the Margaree Valley all last season has been forced into idleness by the severity of the winter in that district. The following excerpts from the report of Prof. L. C. Harlow, Chemist, regarding the amount of work done, cost of grinding, etc., will be of interest:—

"Reports of the work are complete to Nov. 10. The following summary shows the cost of the stone outside the quarrying:

Total cost	$1,918.81
Total tons ground	940.
Cost per ton	2.04

"With what is considered to be a fair charge for quarrying, namely, 50c. per ton, added, the cost of preparing the ground limestone would be $2.54. In reaching this conclusion, it is only fair to state that the cost is much higher than it would be were the machine owned and operated by private parties, or, what would be better still, by the eight agricultural societies in the Margaree Valley, working in co-operation. The aim has been to get as many as possible to use the stone. In some cases it was necessary to limit parties in the amount taken. There are 114 who used the stone, in quantities varying to one-half a ton to twenty-four tons. Were the stone used in any one of these sections as it should be, the machine could be busy six months, steadily grinding about 1500 tons or more. The expense of moving has added very much to the cost of the stone.

"The reports of the weeks ending September 15th, when conditions were the most favourable, and October 27th, when least favourable, will give an idea of the relative cost. When conditions were good, the cost as far as labour is concerned, was 75c. per ton. When under the worst conditions, the cost ran up to $3.00 per ton. While it is impossible to state, from the present experiment, what ground limestone would cost when produced commercially, our experiment is designed to show what the farmers can prepare it for when working co-operatively."

ONTARIO

JUDGING AT SEED FAIRS

BY C. A. ZAVITZ, B.S.A., D.Sc., PROFESSOR OF FIELD HUSBANDRY, AGRICULTURAL COLLEGE

IT is undoubtedly true that incompetent judging is one of the reasons why seed exhibits at fall fairs throughout the country have not been a greater success. In many instances local judges are employed who do not have an expert knowledge of what constitutes an ideal sample of seed grain. In numerous cases the judging is done quickly and carelessly. It frequently happens that the judges appointed are well acquainted with the various exhibitors, and sometimes jealousies arise on that account, and the best exhibitors become discouraged and discontinue the work. At many exhibitions a comparatively few professional exhibitors who make a business of securing some samples of grain which they carefully prepare and then exhibit from one place to another in order to secure as much of the prize money as possible throughout a circuit of fairs held during the season. From exhibits of this kind but little value accrues as the exhibits do not represent a supply of good seed that is purchasable. If the directors of agricultural societies hope to make their exhibits of real service, they should exclude the professional exhibitor as much as possible and have the exhibits only from the seed grain growers, and all the entries judged entirely on their merits.

At the Provincial Winter Fair held in Guelph in December of each year, entries in the Seed Grain Department are made in one or more of three divisions, viz., (1) The Open Class, in which all farmers are eligible to enter exhibits; (2) the Field Crop Competitions Class, in which seed can be entered that was taken from fields receiving prizes in

the Standing Field Crop Competitions, and (3) the Canadian Seed Growers' Association Class, which is open only to entries by the members of this Association.

THE RULES THAT GOVERN

It is stated in the general rules and regulations that in the Open Class "each exhibit must be a true sample of the total quantity offered for sale by the exhibitor." It will, therefore, be noted that in every instance the seed shown at Guelph, in any of the three classes, represents a larger supply of seed on the farm where it is grown. In many cases the home supply is represented by hundreds and, in some instances, thousands of bushels. In the catalogue the names and addresses of the exhibitors are given, the varieties are named, the home supply of seed is stated, and the price per bushel is usually mentioned. Much of this information, besides being entered in the catalogue, is also mentioned on the exhibits themselves. Before the close of the exhibition all the grain from the Field Crop Competitions, and in the Open Class, and part of that shown by members of the Canadian Seed Growers' Association, is sold by auction for seed purposes to the highest bidders. It will, therefore, be seen that the seed exhibit of the Provincial Winter Fair is unique in several respects, and embodies features which might well be practised at some of the other agricultural exhibitions.

JUDGING AT SEED FAIRS

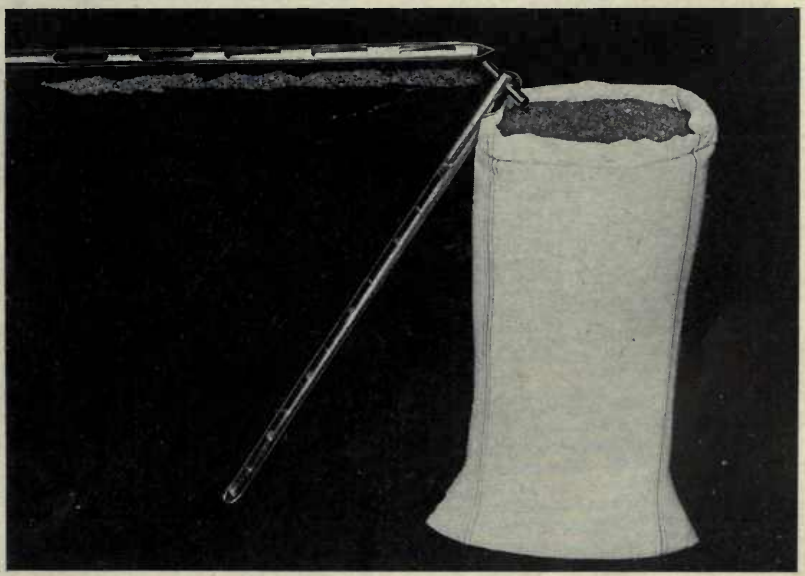
Samples of forty-nine entries of white oats comprising four sections of Class 351 of the Seed Exhibit of the Provincial Winter Fair held in Guelph in December, 1917. Each plate next to the sample bag contains a definite quantity of oats taken from the one bushel lot as required in the contest. The defective grains and the impurities taken from the samples are shown along the outside edges of the table, either loosely or in plates.

THE JUDGING

Judging at the Provincial Winter Fair is carried out with an unusually large amount of detail. This is made possible from the fact that parts of two days are allowed for judging, and that a sufficient amount of help in the Field Husbandry Department at the college is thus enabled to make a very careful examination of each exhibit. Even though the number of exhibits is large, thorough work can be accomplished. It is true that the same process cannot be carried out in all exhibitions; and yet there are features of the judging work at Guelph that might with advantage

be applied at every seed fair.

In the first place, special attention is directed to the method of examining the exhibits. The plan frequently practised at the small fairs has been to make awards from casual observations of the grain at the tops of the bags as they are shown by the exhibitors without making any determinations from the lower portion of the sacks. A far better way is to take samples from throughout each bag and place these samples on a table, where they can be carefully and critically examined for uniformity, maturity, soundness and purity, etc., of each lot. This can, and should, be carried out at practically all exhibitions throughout the country. It enables the judge to be more accurate in his work, and insures the confidence of the exhibitors. In all cases samples should be taken from the lower as well as from the upper part of the bag. This can be readily accomplished without difficulty by pushing the hand deeply into the bag. The work, however, can be facilitated by the use of a grain sampler made in the form of a double cylinder about three feet in length. By opening the cylinder after it is pushed to the bottom of the bag a sample can be secured representing the entire column of grain. By emptying on the table the grain from the seed sampler it is comparatively easy to make a minute examination of the entire exhibit as it actually exists throughout the contents of each bag. At the Provincial Winter Fair the winter wheats, spring wheats, buckwheats, ryes, peas and beans are judged in this way. The oats and barleys, however, which have larger entries and keener competitions, are judged by making definite determinations at the college from a mixture of two cylinders of grain taken from each entry.



JUDGING AT SEED FAIRS

An exhibition bag of oats with sample taken from the entire length of the column of grain by use of a sampler

THE JUDGING OF WHITE OATS

In order to illustrate this work, tabulated results are here presented showing the determination made of the entries of white oats in the open class at the Provincial Winter Fair held in Guelph, December, 1917:—

Catalogue number	Prizes	Percentage				Number of Grains Picked out of Four Ounces															
						Defective Grains of Oats									Other Grains				Weed Seeds		
		Beard	Maturity	Brightness	Plumpness	Double	Hulled	Black	Dun	Yellow	Brown	Badly Weathered	Green	Slim	Wheat	Barley	Rye	Flax	Wild Buckw.	Wild Tares	Thistle Balls
Class 351, Section 5—Oats (Banner)																					
15	7	2	100	80	100	62	14				20	8		20	2	4					
16	2	0	98	80	90	4	16			2	6					2					
17	4	0	96	90	100	28	24				50	10	2								
18		7	98	70	60	220	12				4	4	20	50		4					
19	1	1	97	100	90	14	16														
20	6	4	90	70	80	14	38		2		2		12	44							
21		2	100	30	100	32	48				20	60	4			10				2	
22	8	2	96	80	80	22	36	2				2				8					
23		4	100	40	80	114	4		2	30				20		22					
24	3	0	99	90	90	14	32				44	8	8			2					
25		3	100	40	70	46	10				30		6	40		2					
26	5	6	96	80	90	40	4				12	4	6	30							
Class 351, Section 6—Oats (O.A.C. No. 72)																					
27	7	2	98	85	90	11	92				6	3	2								
28		6	100	40	90	52	121				36	15									
29		2	100	90	90	18	19	1			6		4			2				2	
30		3	98	100	100	3	111			2	5	2	9			36					
31		1	100	20	90	20	212				26	60	7		1	3					
32	10	8	95	80	100	49	38						12								
33	3	1	96	90	90	7	152					2									
34	4	1	100	80	100	4	186						1	1							
35	1	0	97	100	90	2	69										1				
36	9	2	100	90	100	61	50					1				2					
37	5	0	99	80	110	10	9				1	4									
38		1	100	100	100	93	2				6	4	2		4	2½					
39		7	99	90	90	35	17	1			8		4			14				1	
41		3	99	90	100	3	59								1	88					
42	8	1	98	90	80	78	49				1		3		1						
43	2	0	98	90	100	10	105														
44	0	4	98	50	80	6	48					1	15	20		1					
45	6	2	100	70	100	1	27					9				1					
Class 351, Section 7—Oats (O.A.C. No. 3, Daubeney or Alaska).																					
46	1	1	99	90	100	5	190				18	3	6	3		4			2		
47	6	0	96	90	80	39	25				3		25	30	4	262			3	1	2
48	5	1	99	30	100	25	19						6			14					
49	3	2	98	90	90	24	49						1	5		7					
50	7	0	100	50	90	9	89				4		10	1		19		1			
51	4	0	92	80	80	12	65							20		15					
52	2	2	100	80	100	0	55									4					
Class 351, Section 8—Oats (any other White, correctly named.)																					
53	2	0	100	100	90	184	18				1										
54	4	0	100	60	110	4	14				60	16	2								
55		1	100	70	90	20	68				34	22				147					
56	7	2	99	90	100	5	82	1		3		8				16					
57	9	18	98	80	90	44	35	4		4	3	2		1	2	10	3				2
58	8	2	96	60	90	31	29	3			2	3				16	3				
59	6	2	98	50	100	7	95				1	20			1						
60	3	0	99	80	90	26	70				2	2				1					
61		18	98	70	90	17	16			2	2		1		5	107		2			
62		1	96	80	80	136	57	3			40	5	20			51					
63	5	0	100	80	110	39	1					1									
64	1		100	9	100	2	19					1									

Similar records were made for the black oats and the barleys in the Open Class and for all entries of oats and barleys exhibited in connection with the Canadian Seed Growers' Association, and also with the Standing Field Crop Competitions conducted through the medium of the agricultural societies.

THE USEFULNESS OF SEED EXHIBITIONS AT STAKE

The critical examinations made of the different samples of oats, as shown in the accompanying tabulated results, furnish important information regarding the quality of grain of the various entries. In addition to this information, determinations were made regarding the purity and the trueness of the varieties, the apparent weight per bushel, the freedom from foreign matter, the percentage of hull, etc. But few people realize that one hundred pounds of a thin hulled variety of oats might furnish from twelve to fifteen pounds more meal than one hundred pounds of an equally good sample of another variety of oats, but which is thick in the hull; or that two samples of the same variety of oats may vary to a marked degree in the amount of meal which they are capable of furnishing. In making a true record of oats entered in competition it is absolutely necessary to take many points into consideration. This is true, not only of oats, but of all classes of grain entered in competition. Much responsibility, therefore, rests upon the judges in knowing as many of the facts as possible and in making just awards. It is undoubtedly true that the work of the judges has a marked influence on the usefulness, the stability and the permanency of seed exhibitions.

EDUCATIONAL FEATURES OF THE BETTER FARMING TRAIN

COMMENCING the 27th of November and ending on December 21st, two cars equipped to demonstrate better methods in farming were run over the Grand Trunk lines from Cornwall to Port Hope on the main line and then on branch lines north and west, winding up at Agincourt.

Besides the demonstrations themselves, there were several experts who gave short talks to groups, or consulted with individuals about farming problems in which they were interested.

The attendance at the beginning was more or less affected by the Dominion election campaign. After that the attendance averaged much better. Probably from 100 to 600 and more visited the cars daily, including the senior pupils from the public schools and collegiate institutes of the places visited.

The Department of Education had advised the principals of the various schools to visit the cars. In most cases this was done. Their special time was from 10 a.m. to 12 noon. When they came they were organized in groups and each demonstrator explained his exhibit and emphasized the most important problems and how they might assist in helping to solve some of them.

In a number of cases we learned that the pupils were tested out as to what they learned and the teachers said the result was very satisfactory.

An evening meeting was held in a large number of the places and moving pictures were used to illustrate farm and household problems. A lady speaker was present to give a special address.

ACRE PROFIT COMPETITIONS IN 1917

BY C. F. BAILEY, B.S.A., ASSISTANT DEPUTY MINISTER OF AGRICULTURE

THE Ontario Department of Agriculture through its Agricultural Representatives conducted 35 acre profit competitions during 1917, as well as eleven hog feeding competitions. These are open to young men who have taken the four weeks' courses in agriculture conducted by the Agricultural Representatives. The prize in each case is a two weeks' short course at the Ontario Agricultural College, transportation to Guelph and return and board and lodging while there. Where eight or more contestants finished in a competition two men are sent to Guelph.

In estimating the cost of operation, in the acre competitions, $5.00 per acre is allowed for the rent of the land, $2.00 for ploughing, 15c. per hour for manual and 10c. per hour for horse labour.

In the grain crops the competition was conducted on the five-acre basis. This was done to allow the contestants to enter the field crop competitions should there be one in their district. Calculations are made on the basis of one acre.

Following is the list of winners in the acre competition, giving also some interesting figures as to the cost of production and the profits:—

OATS
(65c. PER BUS.)

COUNTY	WINNER	Yield	Cost Prod.	Profit
		Bush.		
SIMCOE	Arthur G. Tudhope, R.R. No. 1, Hawkestone	80	15.78	36.22
BRANT	Russel A. Templar, Burford	72	15.13	32.19
KENORA	Chas. Skene, Oxdrift	67	14.80	28.75
NORFOLK	Erle Mott, O.A.C., Guelph	61	14.38	25.27
DUNDAS	Geo. Timmins, Inkerman	62 1/5	15.21	25.25
VICTORIA	J. P. Wilson, Woodville	54	14.53	20.24
WELLAND	K. W. Sexsmith, Ridgeway	54	14.53	19.11
YORK	Wilfred Maginn, Aurora	46	12.16	17.68
GLENGARRY	Donald McKinnon, R.R. No. 1, Alexandria	47	13.67	16.75
LAMBTON	Frank Burgua, Sombra	35	12.57	10.18

POTATOES
(90c. PER BUS.)

MANITOULIN	Jos. Hodgson, Mindemoya	463	130.40	286.60
FORT WILLIAM	Valentine Bliss, Slate River	376	72.80	265.60
MUSKOKA	Gordon Hill, Hillside	364	83.05	244.55
FORT WILLIAM	Robt. Denison, Slate River	304	58.15	215.14
PORT ARTHUR	Wm. T. Price, Conmee	327	82.30	212.00
GRENVILLE	Arnold Goodin, Spencerville	321	82.90	206.00
PORT ARTHUR	Clair Kenny, Dorion	261	61.77	173.13
MIDDLESEX	Frank Farrow, R.R. No. 2, Mt. Brydges	231	55.55	152.35
LANARK	Lindsay J. Duncan, McDonald's Corners	107	85.32	107.28
RAINY RIVER	Fraser Ross, Devlin	187	63.70	104.60
RENFREW	D. L. Cameron, R.R. No. 2, Pembroke	165	148.50	87.25
NORFOLK	Elmo L. Riddle, R.R. No. 1, Wilsonville	126	44.81	68.59
YORK	Wilfred Holden, R.R. No. 2, Markham			
		Tons		
GREY	W. T. Riddell, Annan	26	18.85	78.56
SIMCOE	Ernest Smith, Smithdale	26	23.01	74.19
MIDDLESEX	Edmund Wark, R.R. No. 1, Strathroy	20¼	14.91	61.03
PETERBOROUGH	W. J. Barrie, R.R. No. 2, Norwood	18	17.28	51.03
PETERBOROUGH	Earl Barrie, R.R. No. 1, Birdsalls	15	12.22	45.53
BRUCE	Eldon Nicholson, Tara	14	18.55	35.26

CORN FOR SEED.
($1.75 PER BUS.)

		Bush.		
LAMBTON	Stewart MacDonald, R.R. No. 2, Port Lambton..	26	21.67	24.40

TURNIPS
(15c. PER BUS.)

BRANT	John Edgar ,R.R. No. 3, Paris	867	22.94	107.11
WENTWORTH	Jas. Beaton, R.R. No. 2, Hamilton	560	21.80	62.20

MANGELS
(15c. PER BUS.)

DURHAM	Clarence R. Lovekin, Newcastle	650	32.10	178.35
BRUCE	Jas. G. Armstrong, Formosa	531	25.57	54.08

WHEAT
($2.15 PER BUS.)

RENFREW	John D. MacLaren, R.R. No 2, Arnprior	34	18.20	54.90

WINNERS IN FEEDING HOGS COMPETITION

BY R. S. DUNCAN, AGRICULTURAL REPRESENTATIVE SUPERVISOR

THE object of the Feeding Hogs for Profit Competition is to encourage young men to raise and feed hogs by keeping accurate records of the feed they consume and to market their hogs when they have attained the proper weight for bacon purposes.

The hogs were selected when six weeks old, at which time the record work began. A value of $4.00 was placed on the young pigs at this age. Contestants were to feed three hogs, though a fourth was allowed to be fed and used as a spare in case of accident or disease. They were fed until 22 weeks of age, the records of feed being kept every week. In some cases hogs were weighed every week in order to note the gain.

Feed was valued as follows:—

	Per Ton
Ground Oats	$28.00
" Barley	40.00
" Peas	60.00
" Rye	38.00
" Wheat	50.00
" Corn	35.00
Corn on the cob	30.00
Bran	30.00
Low-Grade Flour or Red Dog	36.00
Shorts or middlings	30.00
Tankage	50.00
Oil Cake	50.00
Grain Feed (name kind in report)	2.00
Skim Milk	5.00
Butter Milk	5.00
Whey	3.00

For pasture, the credited charge is $1.00 per hog.

The profit was estimated by valuing hogs, live weight, fed and watered at 17½c. per lb.

In awarding the prizes 50 per cent was allowed for highest net profit and 50 per cent for type and finish, which was arrived at by the use of the bacon hog score card.

The following are the winners.

COUNTY	WINNER	Breed	Average Cost Prod	Average Value	Average Profit
MANITOULIN	Walter Galbraith, Spring Bay	Yorkshire	$10.48¾	$36.05	$25.56¼
KENORA	Jas. Hutchinson, Dryden	Yorkshire	16.56	42.00	25.44
WATERLOO	Roland E. Maeder, Ayr	Yorkshire	15.87	40.42	24.55
OXFORD	Harry L. Kaufman, R.R. No. 4, Bright	Yorkshire	17.12	39.81	22.69
GRENVILLE	Willard K. Whitley, Spencerville	Yorkshire	13.66	36.10	22.44
CARLETON	Orval Daley, North Gower	Yorkshire	9.47	30.98	21.51
LANARK	Harry S. McArton, R.R. No. 4, Almonte	Yorkshire	12.51	33.19	20.68
LENNOX & ADDINGTON, GRENVILLE	Clarence M. Spafford, Napanee	Chester White & Yorkshire	12.32	32.85	20.53
PEEL	Floyd Barber, Merrickville	Yorkshire	12.99	33.42	20.43
PORT ARTHUR	Harvey Speers, R.R. No. 3, Caledon	Yorkshire	9.73	28.00	18.27
SIMCOE	C. R. Bingham, Murillo	Cross Breed	9.09¼	24.26	15.17
	W. S. Somerville, Stayner	Yorkshire	10.21	25.20	14.99

HAMILTON BOARD OF TRADE HELPS

FINAL arrangements have been made in regard to the programme which the Hamilton Board of Trade are putting through in order to increase hog production in Wentworth Country, reports Mr. W. G. Marritt, Agricultural Representative in that county. By collecting ten dollars from the members of the Board of Trade, the committee raised over four hundred dollars. They then bought nine young sows which were going to market. These sows were placed with farmers in different parts of the county. The farmers are to keep track of the feed, and the Board of Trade will pay them for this when the young pigs are ready to wean. The sows will then be disposed of, if possible, to the farmer who raised the pigs. One boy from each school will be allowed to have one of these pigs. The boy will be required to give his note to the committee of the Board of Trade for the value of the young pig, the note to come due in the fall when the boy makes a sale. The committee have made a conservative estimate of the money which they will have available in the fall. The sows will be worth about $150 to $175 more than the cost of the feed which they have consumed. It is figured that the boys will pay off the $400 indebtedness. That would leave $150 over to be used as prize money. Several business men have also offered cash prizes to be used in any way the committee see fit.

MANITOBA

TESTING SEED

THE cereal division of the Manitoba Agricultural College is carrying on a seed-testing service for farmers in the province of Manitoba. Below is an analysis of the first eighty-five samples received of the 1917 crop:—

Number of Samples Germinating	
91 to 100 per cent	12
81 " 90 "	12
61 " 80 "	24
41 " 60 "	15
31 " 40 "	8
21 " 30 "	4
11 " 20 "	7
0 " 10 "	3

From the above figures the following facts may be noted:—

1. Only 14.1 per cent of grain received will make first-class seed.
2. 14.1 per cent grades as second-class seed.
3. 28.2 per cent grades as third and fourth-class seed.
4. 43.6 per cent is unsuitable for seed purposes.

SASKATCHEWAN

THE LIVE STOCK PURCHASE AND SALE ACT

THE regulations adopted for the Live Stock Purchase and Sale Act of Saskatchewan, provide that applications for milch cows must be made to the Live Stock Commissioner by May 1st of the year in which delivery is desired. Applications for all other cattle, as well as of sheep and swine, will be received up to October 15th. Credit is to be given to the returned members of the Canadian Expeditionary Force to the extent of 90 per cent of the cost of the stock purchased, the loan to cover a period of three years. In order to receive stock under the provisions of any credit option, an applicant must be actively engaged in farming and a member of a grain growers' association, or a member of

an agricultural society, or a shareholder or patron of a creamery operated by the Saskatchewan Co-operative Creameries, Limited, or a shareholder of a live stock improvement, or marketing, association organized and incorporated under The Agricultural Co-operative Associations Act, or an ex-soldier recommended by the secretary of the Returned Soldiers' Employment Commission of Saskatchewan. Applications from returned soldiers must be accompanied by a certificate signed by the Secretary of the Returned Soldiers' Employment Commission, declaring that the applicant has served overseas and is actively engaged in farming and worthy of credit. Patrons of a creamery operated by the Saskatchewan Co-operative Creameries Limited may be required to sign an order authorizing the manager to deduct the full amount of every alternate cream cheque, or such sums as will approximate one-half of the amounts due from time to time for cream or other dairy products supplied to the creamery by such patrons. These deductions are to be continuous until the entire debt is liquidated.

In the purchasing of pure-bred males credit will not be given for more than 90 per cent of the total cost of the animal supplied under this option. The notes are to be made payable, one-half at the end of the year following the purchase, and one-half at the end of the next succeeding twelve months. Not more than one bull, two rams, or one boar, may be supplied. The credit for grade females is also limited to 90 per cent. The amount of credit in this connection to any ex-soldier must not exceed $500.

A NEW DAIRY COMMISSIONER

MR. W. A. Wilson, who has been connected with the Dairy Branch of the Saskatchewan Department of Agriculture since 1906, has resigned the position of Dairy Commissioner to take the position of manager of the Saskatchewan Co-operative Creameries, Limited. Mr. F. M. Logan, formerly assistant to Mr. Wilson, has been appointed his successor. The change took place with the new year. Mr. Wilson, prior to the organization of Saskatchewan as a province, represented the Dominion Government dairy interests in Assiniboia and Saskatchewan. Mr. Wilson was born in Renfrew county, Ont., and Mr. Logan in Nova Scotia, where he was Superintendent of Dairying for the province. After taking his B.S.A. degree at Guelph, Mr. Logan joined the Live Stock Branch of the Dominion Department of Agriculture, from which he became Dairy Commissioner for British Columbia. He accepted the Assistant Commissionership for Saskatchewan in 1915.

ALBERTA

THE NEW STALLION ENROLMENT ACT IN FORCE

THE revised Stallion Enrolment Act, passed at the 1917 session of the Alberta Legislature, came into effect on January 1st, this year. The Act provides for the appointment of three sets of inspectors, who are required to report to the Stallion Enrolment Commission, which is composed of Dr. Percy Talbot, Provincial Veterinarian; W. J. Stark, representing the Horse Breeders' Association of Edmonton; and E. D. Adams, representing the Horse Breeders' Association of Calgary. The following have been appointed inspectors: No. 1, A. G. Eadie, of the Department of Agriculture, and Dr. Hayworth of Camrose; No. 2, W. R. Lowes, Edmonton, and Dr. Moon of Vermilion; No. 3, Jas. Clements, Department of Agriculture, with the accompanying veterinary to be appointed later.

The horses inspected are put into four classes, three of which are for pure-bred animals. The first includes animals of pure breeding, sound and good conformation; the second, pure of breeding, sound, but of type regarding conformation; the third, pure-breds, of good type, unsound, but fit for service; the fourth, sound grade stallions. Owners who do not have their horses inspected at the time that the officials are in their vicinity will be required to have them examined by the authorized inspectors at their own expense.

Inspection commenced on January 2nd and will not be completed till the middle of April.

HEAD OF THREE AGRICULTURAL SCHOOLS APPOINTED

MR. A. E. Meyer has been appointed the official head of the three schools of Agriculture with headquarters at Edmonton. Heretofore the schools have been conducted as more or less official units, the heads being directly responsible to the Minister of Agriculture. Under the new arrangement the teaching of the three schools will be standardized. Mr. Meyer is an ex-student of Toronto University and a graduate of the Ann Arbor University of Michigan. He was for a number of years a breeder of pure bred stock at Guelph, Ontario. Since going to Alberta, three years ago, Mr. Meyer has been an instructor in Animal Husbandry at Olds and has been associated with Mr. S. G. Carlyle in the superintendency of the Provincial Demonstration Farms.

PART III
Elementary Agriculture

BOYS' AND GIRLS' PIG CLUBS

Ambitious hopes are entertained for the work of boys' and girls' clubs. Whether concerned with the raising of pigs, poultry, calves, or other things, the movement is calculated to foster initiative and leadership and to rivet to the soil the sympathy of the rising generation. A competitive enterprise inspired by a sense of proprietorshuip turns a task into a joyous recreation. Boys' and girls' club work belongs to a class of extension work that has arisen largely from the Smith-Lever Bill in the United States and The Agricultural Instruction Act in Canada. It has so appealed to business men as to gain their moral and financial support. Under The Agricultural Instruction Act more than $30,000 is set aside for boys' and girls' competitive activities in Canada this year.

NEW BRUNSWICK

BY W. R. REEK, B.S.A., SECRETARY FOR AGRICULTURE

REALIZING that the swine industry of the province was not developing as it might, and also realizing that the boys were most likely to take a keen interest, the Department of Agriculture decided to form "Boys' Pig Clubs" in every county. Immediately the information spread, there were requests from several sections that clubs be formed, but it was decided to organize two only last fall and arrange for the balance in the spring, because supplying young pigs to boys in the fall is rather risky, due to the long winter when exercise becomes a serious question. The boys were not prepared to purchase the pigs outright, consequently the sections where the clubs are in existence were canvassed very carefully, and ten of the most promising boys chosen, who agreed to the rules laid down by the Department. They organized under definite names, and elected officers. Several of the older men became very much interested and honorary officers were appointed, who will undoubtedly offer assistance where required.

Community breeding is one of the principal ideas to be guarded; every club will adopt one of the bacon types of hogs and agree to register all progeny used for breeding purposes. In this way there will soon be an ample supply of high-class breeding hogs throughout the province, and the general quality of hogs marketed should be of a high order.

CONSTITUTION

A. THE NAME OF THIS CLUB SHALL BE:—
THE.....

B. THE AIMS OF THIS CLUB SHALL BE:—

1. To increase bacon production in New Brunswick.
2. To improve the native stock of the province.
3. To develop this district into a community breeding centre, that is, a single breed for this district.

4. To study bacon type, practice better feeding and housing methods and to learn the value of selection when purchasing a pure-bred sire or dam.
5. To become proficient in judging bacon hogs.
6. To hold a Boys' Pig Club fair once a year.
7. To study marketing problems, such as: the standard weight of a bacon hog, the proper time to market hogs, the proper way to market them.
8. To register all animals kept for breeding purposes.
9. To study all the available literature on bacon production.

C. THE OFFICERS OF THIS CLUB SHALL CONSIST OF:—

1. A president, vice-president, a secretary-treasurer and an honorary president and vice-president.
2. Officers shall be elected for a period of one year and shall continue to hold office until new officers have been elected.

D. THE DUTIES OF THE OFFICERS:—

1. The president shall preside at all club meetings, he shall keep himself posted on all club affairs, at club meetings he shall introduce the speakers, in the case of selection of officers he shall not have a vote, except when there is a tie. Then he may vote.
2. The vice-president occupies the chair in the absence of the president and carries out the duties outlined for the president in clause D, paragraph 1.
3. The secretary-treasurer keeps the records of the club and also attends to financial affairs. The secretary-treasurer, when called upon by the president, reads the minutes of the last meeting. He shall be provided with a book upon which to record all meetings of the club and to record all moneys deposited with him. He shall be in a position to give a statement at any time and will look after the club correspondence.

E. THE RULES OF THIS CLUB SHALL BE:—

1. Club members must agree to one breed.
2. A Club must have at least ten members.
3. Boys between the ages of twelve and eighteen years may become members of a Boys' Pig Club.
4. No boy can join a pig club unless he has the consent of his parent or guardian.
5. Boys cannot join a pig club unless they have the proper facilities to care for and house the pig. They must also have feed available. It is not advisable for a boy to join a club unless he can obtain a certain amount of milk for his pig.
6. No club will be allowed to select a breed other than one of the recognized bacon breeds. This means that the Yorkshire and Tamworth will in the main be the breed chosen. The Chester White and Berkshire are known as fat hogs. There is, however rapidly developing what is known as the bacon type of Berkshire and Chester White. The Agricultural Department has no objection to clubs selecting either of these breeds, providing they conform to the bacon type.
7. It is imperative that one member of the club should maintain a pure-bred male animal for breeding purposes. Thus members of a club would be assured of an opportunity to get their sows in pig. The person maintaining the male animal to charge a service fee sufficient to pay him for his trouble, which rate would be $1.50 up to fifteen pigs, $1.00 for sixteen pigs and over, all non-members to be charged $1.50 with guarantee of castration if pigs bred are not pure-bred. Should a non-member in the vicinity have a desirable sire the club members can breed to same after first having received the consent of the Department of Agriculture and no male to be considered fit for service until it is.....months old. No female to be bred until it is..... months old.
8. The club must hold an annual pig fair in the fall of each year. The date selected subject to the approval of the Department of Agriculture. Whenever possible the club pig fair shall be held on the same date as the local fair of the district.
9. All members of the club must show their pigs at the club fair.
10. A membership fee of twenty-five cents shall be paid to the treasurer of the club by each member at the time of joining. This money to be devoted to carrying on the business of the club.
11. The annual meetings will be held on the 1st Monday in January, when the officers for the ensuing year will be elected by ballot. Club meetings are to be held regularly every two months on the first Monday of the

following months: — January, March, May, July, September, November.

12. Special meetings may be called by the president at any time to transact important business.
13. The secretary-treasurer shall notify the members when a special meeting is to be called.
14. Once a year or oftener the Agricultural Department will send a representative to discuss problems, etc., with the club.
15. The Live Stock Division of the Department of Agriculture will supply the president of the club with papers on bacon production which shall be read at the regular meetings by members of the club.

THE PLAN OF OPERATION

The Department was prepared to buy the pigs if necessary, but sufficient wealthy, public-spirited men have become interested and see the possibilities, and they have so far supplied the pigs, and one firm has offered to stand behind a club in every county, but this will not be necessary, because residents in each county are prepared to do this. The boys agree to give back two pigs, one out of each of the first two litters, which will be used to form other clubs. When a number are formed the equivalent, in money, or pigs, can be returned to the donor, if necessary, thus making it a loan rather than a gift, which enables boys to become actual owners of live stock. Confidence is placed in the boy, and he is made to feel that an honest effort is his part of the contract.

One of the rules is that the pigs shall be exhibited at the local fall fair if possible, and if there is no such exhibition then a pig club fair will be arranged.

Throughout the season the boys will be visited by members of the Live Stock Division as often as necessary to promote success.

CONTRACT

This contract made and entered into by and between..... party of the first part, and..... .....party of the second part, both of the county of.....and province of New Brunswick.

Witnesseth:—That the party of the second part has this day secured from the party of the first part one registered..... .....sow which he agrees to take possession of and treat in the most careful manner. That the second party also agrees at the same time to become a member of the.....Boys' Pig Club and binds himself to abide by the rules and regulations for the government of the club for two years to the best of his ability, and will when called upon, exhibit his sow at the club pig show and return a complete record to the Live Stock Division of the Department of Agriculture according to the provisions found in the record sheet furnished him.

He further agrees to breed the sow in the fall of the first year to a pure-bred boar of the same breed as the sow, approved by the Live Stock Division. In payment for the original sow, he will deliver to party of the first part two choice females not less than six weeks of age in good health. One of these to come from the first spring litter and the second from the second spring litter. The second party further agrees to register all of the female progeny from the original sow for a period of two years, and also all males that are sold entire for breeding purposes. If the original sow should die before producing any progeny the party of the first part shall sustain the loss.

If for any reason either party shall fail to fulfill this contract or any part thereof, he shall forfeit all rights to the sow and any progeny therefrom.

In testimony whereof the parties have hereunto set their hands this the ..... day of.....191

.....
Party of the First Part.

.....
Party of the Second Part.

I hereby consent that Party of the Second Part may enter into the above contract.

.....Parent or Guardian
.....191

Disappointment was carefully guarded against by particular supervision from Mr. Thomas Hetherington, B.S.A., who had charge and planned the work; he interviewed all parties interested, and carefully selected the pigs. He is directing the feeding operations and assisting them to secure the best available literature upon bacon production.

NOTE.—In Part IV of this number of THE AGRICULTURAL GAZETTE there appears two forms of contract commonly used in boys' and girls' pig clubs in the United States.
—EDITOR.

MANITOBA

BY S. T. NEWTON, DIRECTOR, AGRICULTURAL EXTENSION SERVICE

PIG-raising has been part of Boys' and Girls' Club work in Manitoba for the past five years, but it was not until two years ago that it really came into its own. In that year eight or nine managers of the Bank of Commerce who had taken considerable interest in club work, were persuaded to act as organizers or supervisors of the clubs in their vicinity.

Pig-raising naturally appealed to them as being particularly adapted to club work, and, although young pigs were very scarce, they set about finding out where they could be procured, with the result that each of these clubs was able to muster between 15 and 20 pigs, while Virden and Dauphin each had 66.

In a considerable number of cases the bankers loaned money to the children to buy their pigs, the amount needed generally being $8.00 for a pair of pigs, the security asked being a note signed by the boy or girl getting the money and a promise to show the pigs at the school fair. As the children were not of age, the banker asked the parent or guardian to sign the following agreement:—

.....191....

$.....

On.....after date I promise to to pay The Canadian Bank of Commerce at its office in.....the sum of.....Dollars, with interest at the rate of eight per cent, per annum as well after as before maturity. Value received.

.....

The undersigned promises and agrees to maintain a membership in the..... Boys' and Girls' Club and conform to the rules and regulations of the said Club, to invest the amount represented by the promissory note at the head of this agreement in....., and to care for same under the direction of the Club representatives. The undersigned also agrees to repay to the Bank at maturity the said amount out of proceeds of sale of original stock or increase.

(Borrower's signature).....

I hereby consent to above contract, and agree not to claim any interest or right in the.....purchased, their increase, or proceeds of sale of same.

(Parent's signature).....

The same general plan was followed last year with more than double the number of entries, the cost of six-weeks-old pigs this year being generally $10.00. The banks report every member as being able to meet his obligation when it fell due. Very often the parent entered into the spirit of the game and handed over to the banker a sufficient amount to buy the pigs, and the banker loaned the money to the boy in the regular way. In some cases the agricultural society loaned the money and in a considerable number of cases the club member invested his own money.

In some clubs an extra charge of 25 cents was made and the pigs insured, but we have not heard of any cases of pigs dying.

PRIZES AND METHODS

In Manitoba there has never been much difficulty in securing prizes, provided the contests are honestly conducted, and we are firmly convinced that unless the boy or girl purchases the pigs either from his parents or some other person, and commences feeding them as soon as they are weaned, and continues taking care of them until they are six months old, the pig-raising contest is not producing the best results, and that two months does not allow sufficient time for a boy or girl to demonstrate his superiority in feeding pigs. Pigs make their most profitable gains during the first six months, consequently, the contestant needs to plan ahead for the most prafitable feed at different periods during the four and a half months of actual feeding.

Many farmers are feeding hogs at a loss, consequently, each contestant is required to keep an accurate record of all feeds, and if possible to weigh the pigs once a month in order to determine when the greatest gains are made.

HONESTY THE ONLY POLICY

In Manitoba we have endeavoured to take every precaution against dishonesty, but occasionally some one gets ahead of us. The average boy is a good sport and does not mind being fairly beaten, but loses interest at once if he is beaten by dishonest means. For this reason we are insisting on all records being duly witnessed by disinterested persons.

A LONG PRIZE LIST ADVISABLE

Another point that makes for success is a good long prize list, whether the first prize is large or not. At one fair as many as twenty prizes were offered in the one class, and the delight of the little fellow who won twentieth place was really good to see. He remarked that he had no idea he could win a prize. From an educational standpoint it is a big advantage, for were only three or four prizes offered none of the exhibitors coming between fourth and the lowest would have any idea as to where they actually stood in the contest.

In order to encourage the children the prize list should be so framed that every child who puts forth a real effort and does his best will win a prize, even if it is only a ribbon.

Prizes have often been decribed as being an unworthy incentive to effort. There are few people who ever get anywhere who are not striving after some prize or distinction, and rightly so. We have never noticed much difference in the effort put forth by the children when the first prize was $10 and where it was only $1.

GIRLS ALSO COMPETE

Although we have twelve contests, some particularly suited to boys, and others planned especially for girls, there are no limitations, and the winner of the pig-raising contest is often a girl, and occasionally a boy carries off highest honours in cooking or canning.

At Rivers this year one of the brightest girls in the neighbourhood exhibited a pair of Yorkshire pigs exactly six months old that weighed 500 pounds and were sold for $80.00 on the day of the fair. One of the judges declared they were pink pigs, but evidently cleanliness had something to do with the rapid growth made. This little girl was only thirteen, but she was able to answer any question asked her in regard to those two pigs, and there was not the slightest doubt in anyone's mind as to who fed them.

HOW MANY SHOULD A CHILD CARE FOR?

Where children who take part in the pig-raising contest are under eighteen, the contest should not extend over too long a period, nor should the number of pigs fed be so large as to weary the contestant. Two pigs are about as many as a boy can finance without undue assistance, hence, we intend to continue with that number for the present. Where a boy is allowed to feed six pigs belonging to his parents, and then show the two best at the fair, it is not a real contest, nor does the boy get as much good from it as if he has two pigs of his own. It should not be a case of "Johnnie's pig and Daddie's pork." That is what is driving boys and girls from the farms.

THE REPORT REQUIRED

A sample of the report required is herewith given:—

MANITOBA BOYS' AND GIRLS' CLUBS

PIG, CALF OR COLT RAISING RECORD, 1917

Report of.....
Exhibitor Age Post Office
School: Central Club:

1. Kind of animal chosen.....
2. Breed.....Colour.... Sex.....
3. Date animals were born.....
4. From whom obtained.....Cost.....
5. Weight when you acquired possession .....
Witness.....
6. Intermediate weighings:—
.....June.....lb. .....July....lb.
Date Date
.....August.....lb.
Date
7. Record of feed and its cost:— $ cts.
New milk....quarts at 3c per qt.....
Skim milk....quarts at 1c per qt.....
Chop..... lb. at 1¼c per lb...
Shorts..... lb. at 1¼c per lb...
Other grains..... lb. at 1¼c per lb...
Cut green feed.....at $3.00 per ton...
Pasture on basis of 1c per pig per day.....
Total cost of feed for..... weeks.....
8. Original cost of pig (or calf or colt).... .....
9. Value of labour.....
10. Weight of pigs (or calf or colt) on Fair day.....
11. Total gain during.....weeks.....
12. Value of pigs (or calf or colt) on Fair day at.....c per lb.....
13. Net profit.....

Certified correct.....
Teacher or Organizer

ALBERTA

A PLEASING feature in connection with a recent show and sale was the pig-feeding competition for boys and girls under 17 years of age, the conditions requiring that the competitors should have been in entire charge of the pig since June 1, and the awards were based on the average gain and the best evidence of care and attention. The prizes and winners were as follows:—

First prize—$15 and championship: Robert Ball, West Salisbury, aged 16.

Second prize—$12 and reserve championship: Verna Bacon, North Edmonton, aged 11.

Third prize—$10: Leslie Ball, Lougheed, aged 10.

Fourth prize—$8: Constance Ball, Lougheed, aged 12.

Fifth prize—$6: Roy Bacon, North Edmonton, aged 14.

Sixth prize—$5: John H. Pearse, Edmonton, aged 15.

Seventh prize—$4: Oliver Bell, Horse Hills, aged 11.

Eighth prize—$3: George Jackson, Leduc, aged 15.

The pigs entered in this contest were decidedly high-class, and a company of packers, influenced, no doubt, by a wish to encourage the boys and girls in such practical and praiseworthy pursuits, paid a high price per pound for all the pigs which the competitors wished to dispose of.

Working in intimate and sympathetic relation with rural people, the county agent (Agricultural Representative) is able to secure the application of scientific knowledge and discoveries to the business of the farmer and the home life of country prople. In the present war he has been ready to meet the emergency and to concentrate all rural forces and organizations in working out the great problems of food production and food conservation. In recognition of his value as a local leader, Congress has provided funds for the immediate extension of th s system to every agricultural county in the United States. State and county councils of defence and all rural organizations can do a patriotic public service by assisting the Government and the State in accomplishing this end.—*D. F. Houston, Secretary, United States Department of Agriculture.*

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications and Notes

A KHAKI UNIVERSITY FOR CANADIAN SOLDIERS

THE following extracts are taken from a paper by Dr. H. M. Tory, President of the University of Alberta, read before the annual meeting of the Commission of Conservation:—

While the day for demobilization may be far off, yet it should be thought about and plans should be made for that time. From the point of view of the soldier this will be the most critical period in the whole history of our army.

AN AGRICULTURAL COLLEGE

In this college I would offer the equivalent of a full year's work as set forth in the calendars of our agricultural schools in Canada. I firmly believe that 5,000 to 10,000 men could be got together to study agricultural problems under such conditions. I would include the following subjects: "Animal Husbandry," "Field Husbandry," "Dairying," "Farm Mechanics," "Operation of Tractors and Motors," and, if possible, "Elementary Chemistry and Physics."

As I have previously stated, in a group of 200 men to whom I spoke about this matter, 57 definitely gave their names as being willing, first, to attend such a course; secondly, to remove from their own units for the purpose of getting the course, and many of them agreed to remain behind, if their units were sent home, for the purpose of finishing such a course.

AN EXTENSION DEPARTMENT

The Extension Department could be organized on a basis similar to that existing in some of our modern universities. The aim would be the organization of lecture courses in every camp, which would be accessible to every soldier. It would be administered from the University centre and would use the very best men obtainable in England and Canada. . . . Further, short courses in agriculture along the lines now in operation in short course schools in Canada could be organized in all the camps among the men who did not care to attend a fixed curriculum. As there are said to be over forty thousand farmers in the army, the significance of such work could hardly be over-estimated.

THE LOCATION

If it were possible to get the military authorities to set aside one camp in England, and to bring all the men who wish to take intensive educational work to that camp, that is the work described under all the departments above except the Extension Department, it would greatly facilitate matters.

THE STAFF

In carrying out the plan a large staff of men would be necessary. . . . All the universities of Canada have given quite largely of their staffs to the army and in addition high school teachers, business college instructors, and graduates of agricultural schools are scattered everywhere through the army. It would enormously diminish the difficulties of the plan if the military authorities would place at the disposal of the teaching organization such men of the above standing as were willing to serve..... I am confident that every university in Canada would be willing to share its teaching powers with the Khaki University to help in the emergency.

THE EQUIPMENT

In agricultural equipment, machinery could be obtained I have no doubt from the agricultural implement companies, who would, I think, regard the advertisement as worth the effort involved.

FORMS OF CONTRACT FOR PIG CLUBS

PIG Clubs, as conducted for boys and girls in Canada, are discussed in Part III of this number. They have for several years been operated on a large scale in many parts of the United States. The Department of Agriculture at Washington has suggested two forms of contract. One is termed "The Promissory Note Plan", and the other, "The Endless Chain Plan." Following is a copy of each of these plans:—

PROMISSORY NOTE PLAN

.....19.....

One year after date, for value received, I promise to pay to the order of..... $....., with interest at six per cent per annum. .....County Pig Club Plan Contract.

It is hereby agreed by and between..... ....., party of the first part, and.....party of the second part, that the party of the first part lend to the party of the second part $..... at six per cent interest, principal and interest payable one year after date. The party of the second part agrees to maintain a membership in the Pig Club conducted by the Extension Division of the State Agricultural College of ....., and the United States Department of Agriculture, and conform to the rules and regulations of the club and invest said $..... under the direction of the county club representatives. Party of the second part also agrees to repay said loan at maturity out of proceeds of sale of original stock of increase.

Signed.....

I hereby consent to above contract, and agree not to claim any interest or right in pigs purchased or their proceeds, which may accrue to the party of the second part.

Parent's Signature.....

"ENDLESS CHAIN" CONTRACT

This contract made and entered into this..... day of..... 19...., between..... ....., party of the first part, and..... party of the second part, both of the county of..... and state of.....

WITNESSETH:

1. That the party of the first part agrees to furnish to the party of the second part, without cost, a registered sow pig.

2. The party of the second part agrees to receive the pig mentioned, to join the.....Pig Club, to abide by its rules and regulations to feed and care for the sow according to the instructions furnished to the members, and to make all reports required to Pig Club members.

3. It is further agreed that the party of the second part will breed the sow when not less than eight months of age to a registered boar of the same breed, and to raise the resulting litter under the same rules and regulations applicable to the raising of the sow.

4. It is further agreed that the party of the second part will deliver two choice gilts (not less than eight weeks old) from the first litter of pigs to the party of the first part in payment for the original sow.

5. It is further agreed that the party of the second part will take out registration papers for all of the pigs of the first litter unless disposed of for immediate slaughter.

6. It is further agreed by the party of the first part that when the conditions of this contract have been complied with by the party of the second part the original sow mentioned, together with all her increase not otherwise provided for in this contract, shall become the personal property of the party of the second part.

7. It is further agreed that in case there should not be two sow pigs raised and given to the party of the first part from the first litter this contract shall extend to the second litter, or until the terms of this contract are complied with.

8. In the event of the death of the original sow before farrowing a live, healthy litter the party of the first part will bear the loss.

8. In the event of the death of the original sow before farrowing a live, healthy litter the party of the first part will bear the loss.

9. If for any reason the party of the second part is unable to carry out the provisions of this contract, or willfully violates them, he shall forfeit all rights to the sow and progeny therefrom.

In testimony whereof the parties have hereunto set their hands this.....day of..... 19.....

Signed .....
Party of the First Part.

.....
Club Member.
Party of the Second Part.

I hereby consent to the conditions of the above contract. It is further understood that the sow, all her increase, not otherwise provided for in this contract, or any proceeds therefrom, will remain the exclusive possession of the party of the second part.

Signed.....
Parent or Guardian.

THE MEANING OF PEDIGREED SEED

BY L. H. NEWMAN, SECRETARY OF THE CANADIAN SEED GROWERS' ASSOCIATION

Before discussing the value of what is known as "Pedigreed" seed, it might be well to determine the meaning of this class of seed.

When we speak of pedigreed seed we have in mind seed whose exact history is known. All seed, like all other living things, has a pedigree, that is, it has its own particular line of ancestors, but these are not always known. When an animal or plant is "pedigreed," we understand that the ancestry is known and that it contains "blood" which is usually of known value. In seed, as in living stock, the ruling principle is that "like tends to produce like," as a result of which it is of the greatest importance that the seed or the animal used be of the very best both in quality and "breeding."

HYBRIDIZATION AND SELECTION

In Canada a good deal of attention has been given during the past ten or fifteen years to producing strains of our leading

cultivated plants which combine to a high degree the more important industrial qualities. Two methods have been used, namely, *hybridization followed by selection*, and *selection* alone. The work of hybridization being a highly technical work is confined almost exclusively to experimental stations, where trained men are available. Straight selection work without hybridization is carried on to a considerable extent throughout Canada by members of the Canadian Seed Growers' Association on their own farms. When these men first started to select, some seventeen years ago, most of the varieties they worked with were composite in character, that is, they were made up of strains of varying practical values. By continuously selecting for a certain type many of these men have effected definite improvements. The application of selection work to such crops as potatoes and corn, which are constantly varying, has proven of decided value. In the case of cereals which ordinarily self-fertilize, the value of continuous selection is very considerably minimized, especially where the grower starts with what is known as a pure line, that is, with a strain of seed which has come from a single fixed plant. Even here, however, selection has shown its value in helping to maintain the purity and vigour of the type.

WORK OF THE ASSOCIATION

The propagation of pure strains throughout the country is carried on largely by members of the Canadian Seed Growers' Association. Nowadays the foundation stock obtained by each new member is secured either from another member of the Association or from an Experimental Station. The member then applies a certain system of selection to the seed produced. His crops are inspected by an expert during the growing season and a detailed report on the same submitted to the Secretary of the Association at its headquarters at Ottawa. When the grower has a quantity of seed to sell, samples are sent to Ottawa for examination and testing. If the samples comply with certain standards as regards germination, purity and quality, the seed may be catalogued for sale under the name of "Registered Seed." This term is, therefore, synonymous with "Pedigreed Seed," and is the name under which this class of seed is now officially known in Canada.

SUPERIORITY OF REGISTERED SEED

As to the exact value of "Registered Seed," experiments have been conducted at a number of stations to compare this class of seed with ordinary seed of the same variety, and in practically all cases "Registered Seed" has proven its superiority. A great many farmers have also tested out "Registered Seed" in comparison with ordinary seed on their own farms and have spoken in the highest terms of the former. In 1912, for instance, comparison was made between Registered and Non-Registered Banner by 30 farmers. In this test "Registered Seed" averaged 7.5 bushels per acre more than did the Non-Registered. It also weighed 5.2 pounds per bushel more than the latter. The majority of the farmers also commented specially on the speriority of "Registered Seed" as regards uniformity of growth and maturity.

INSPECTION A GUARANTEE

All seed offered for sale as "Registered Seed" must be inspected in the sack by an expert, who compares the seed offered with a part of the sample which has been sent to headquarters for approval. If the seed in the sacks is representative of the sample, the inspector has the sacks sewn up in his presence, after which he attaches a certificate tag and a metallic seal. The seed so inspected and sealed is now ready for shipping, and may go through any number of hands and still retain its identity.

Catalogues containing the names of the growers having such seed to sell are printed by the Association and distributed widely, so that growers of this class of seed receive wide publicity for their offerings. Our leading seed houses are coming to be the biggest buyers of "Registered Seed," as they find there is a growing demand throughout the country for the very best class of seed available.

Farmers are becoming educated as to the value of "Registered Seed," and many do not object to paying a good price for it because they have a pretty definite assurance that the seed they are getting is all that they expect it to be. The demand for "Registered Seed" is increasing more rapidly than is the supply, and special efforts are being put forth to increase its production.

THE FEDERAL GOVERNMENT GRANT

The work which the Association is doing throughout Canada is made possible by a Federal Government grant which comes through the Seed Branch of the Department of Agriculture. Formerly this work was directly under Departmental supervision, but later it was thought advisable to have the members form themselves into an association and work independently of direct Governmental control. The work which the Association is doing may be regarded as an extension of the work of the Seed Branch and of the Experimental Stations, a fact which clearly justifies the relatively small expenditure necessary to carry on the work on this basis.

CONVENTION ON WHITE PINE BLISTER RUST

A CONVENTION recently held on White Pine Blister Rust at Pittsburg, Pa., was attended by Mr. W. A. McCubbin of the Division of Botany, of the Dominion Experimental Farms. It was shown that the disease was far more common in the eastern states and Ontario and Quebec than in other sections of the North American continent. It was stated that reports from Ontario indicated that infection is very general throughout the province. Disease was found during the summer by scouts and by a campaign carried out in the public schools. Currant rust was found to be present in 38 counties out of 42. In several cases the rust occurred far to the north, well within the pine area. In Quebec a number of scattered infections were found, but there are no records of any disease in Nova Scotia, New Brunswick or Prince Edward Island. No inspection has been made in the northern part of Ontario, the Prairie Provinces or British Columbia.

Committees were appointed to consider the situation and to make recommendations on the problem involved. A unanimous desire was expressed that Canada should co-operate with the United States in the matter. Some of the delegates urged that a general quarantine should be established prohibiting the importation of nursery stock to the United States.

ASSOCIATIONS AND SOCIETIES

THE MONTH'S MEETINGS

Interprovincial Butter Show and Dairy Convention, Winnipeg	Jan. 31 & Feb. 1
Dominion Breeders' Association Meetings, Toronto	Feb. 5-8
British Columbia Dairymen's Convention, Chilliwack, B.C.	Feb. 6 & 7
Provincial Seed Grain Fair, Winnipeg, Man.	Feb. 11-23
Ontario Corn Show, Chatham, Ont.	Feb. 12-14
Saskatchewan Grain Growers, Regina, Sask.	Feb. 12-15
Manitoba, Bee-keepers' Association, Winnipeg	Feb. 19-22
Manitoba Home Economics Societies' Convention, Winnipeg, Man.	Feb. 19-21
Manitoba Soil Products Fair, Winnipeg, Man.	Feb. 19-22
Manitoba Potato Conference, Winnipeg, Man.	Feb. 20
Alberta Provincial Dairy Convention, Edmonton, Alta.	Feb. 20-21
Manitoba Agricultural Societies' Convention	Feb. 20-22
Manitoba Horticultural Societies' Convention	Feb. 21-22
Good Roads Conference, Toronto	Feb. 25-28

The Manitoba Winter Fair will be held at Brandon on March 4-9; the Spring Horse Show and Bull Fair at Calgary on March 26-29; and the Edmonton Spring Horse Show and Fat Stock Show at Edmonton, April 2-6.

THE CANADIAN NATIONAL LIVE STOCK RECORDS

The following table gives the number of pedigrees and transfers recorded by the Canadian National Live Stock Records Board of different breeds and classes of horses, cattle, sheep and swine for the five years 1913 to 1917, inclusive, and of Brown Swiss cattle and dogs for 1915, 1916 and 1917:—

ASSOCIATION	Pedigrees Recorded					Transfers Recorded				
	1913	1914	1915	1916	1917	1913	1914	1915	1916	1917
Aberdeen Angus	1010	1541	1255	1431	2567	652	761	797	1103	1448
Ayrshire	3629	3496	3682	4000	4368	1418	1364	1407	1976	3205
Belgian	106	132	76	131	241	92	83	96	94	169
Brown Swiss	....	....	432	270	57	....	....	4	23	25
Clydesdale	3678	2900	2555	3132	3885	3616	2773	2255	3266	3715
Dogs	....	....	877	1542	1661	....	....	183	1224	1428
Canadian Cattle	341	338	319	268	327	86	117	124	141	199
French Coach	6	19	10	7	2	8	5	14	10	5
Canadian Horse	96	53	85	64	52	24	15	51	30	23
Galloway	23	91	63	30	19	6	7	22	45	6
Goats	....	....	....	....	....	....	....	....	....	....
Guernsey	87	154	230	146	183	48	35	39	88	55
Hackney	167	101	128	94	77	162	129	142	132	123
Hereford	1820	2543	2147	3207	5353	634	869	769	1087	1971
Jersey	1135	1215	1065	1308	1703	675	732	887	1014	1151
Percheron	1560	962	825	1323	2304	556	486	493	642	913
Pony	329	228	67	69	40	15	25	31	32	25
Red Polled	459	102	80	477	331	24	37	45	52	94
Sheep	3934	4826	6019	7958	8411	645	1372	1376	2509	3874
Shire	274	135	93	121	158	149	93	79	107	149
Shorthorn	9173	10186	11135	14333	16863	3647	5813	5063	6987	9414
Standard Bred	560	361	319	382	324	93	164	157	192	164
Suffolk	86	31	35	28	34	18	29	13	32	37
Swine	11509	14441	9718	13594	12204	1231	1916	1507	3493	9270
Thoroughbred	313	194	219	151	158	70	69	59	91	89
Totals	40295	44049	41434	54066	61322	13869	16894	15613	24370	37552

MEMBERSHIP OF LIVE STOCK ASSOCIATIONS

The following table shows the membership of the different associations represented in the National Live Stock Records Board in 1917:—

ASSOCIATION	Ont.	Man.	Sask.	Alta.	B.C.	Que.	N.B.	N.S.	P.E.I.	U.S.	G.B.	Total
Aberdeen Angus	130	64	70	85	3	5		1		4	1	363
Ayrshire	430	34	40	79	34	753	54	64	29	14		1531
Belgian	2	5	32	21		22				1		83
Brown Swiss	3		1			10		1				15
Clydesdale	1449	392	348	204	38	75	12	17	16	11	2	2564
Kennel	573	83	64	58	136	123	19	9	2	22		1089
Canadian Cattle	2	1				167	1					171
French Coach			3	10								1 3
French Canadian Horse	1	1				158					1	161
Galloway	6	7	2	7								22
Goat	1	1		2	16		1					21
Guernsey	6	1			11	9	6	35	4			72
Hackney	84	9	12	21	12	14	1	2	1	8	1	165
Hereford	167	66	90	133	6	4	5	1	17			489
Jersey Cattle	210	18	24	23	65	56	20	24	5	1	1	447
Percheron Horse	93	60	153	180	6	12	3	2	1	7		517
Pony	40	3	7	7	3	6						66
Red Polled		19	19	11	8			1				58
Sheep	367	54	71	94	20	388	21	25	23	9		1072
Shire	39	11	14	29	5	2	1			1		102
Shorthorn	1668	368	296	336	17	96	23	44	19	5		2872
Standard Bred	97	16	42	37	12	18	2	2	2	2		230
Suffolk Horse	1	1	4	16								22
Swine	400	156	340	333	54	385	23	20	16	3		1730
Thoroughbred Horse	85	5	9	27	9	10						145
Totals	5844	1375	1651	1713	455	2313	192	248	135	88	6	14020

PRINCE EDWARD ISLAND EGG AND POULTRY ASSOCIATION

The fourth annual meeting of the Prince Edward Island Egg and Poultry Association was held in Charlottetown on January 14th and 15th, 1918. Hon. Murdock MacKinnon, Provincial Commissioner for Agriculture, Mr. W. A. Brown, of the Poultry Division of the Live Stock Branch, Ottawa, and Mr. J. W. Mitchell, Assistant Commissioner under THE AGRICULTURAL INSTRUCTION ACT, took part in the proceedings. Last year's officers were re-elected, namely, President, Rev. P. P. Arsenault; first vice-president, Edward Bulpitt, Cardigan; second vice-president, J. B. Millman; third vice-president, A. Schurman, Central Bedeque; Secretary, Wm. Kerr, Charlottetown.

UNITED FARMERS OF ONTARIO

The United Farmers of Ontario met in their fourth annual convention at Toronto on December 19th and 20th, 1917. Many subjects came up for discussion, especially regarding the scarcity of labour and the campaign for increased production of hogs. Resolutions were passed asking for the removal of the duty from agricultural machinery, implements and clover seed; favouring the prohibition of the use of any grain for the making of alcoholic beverages during the progress of the war; asking the Railway Commission to have fertilizers in bulk put in the same class as crushed rock for carriage as freight; asking the Dominion Government to investigate the cost of making cheese and to make reports to the Imperial Government with a view to having the price arranged in accordance with the cost of production. It was decided to accept an invitation to extend the organization to Quebec. A committee was appointed to consider the advisability of publishing an official organ. In his report the secretary, Mr. J. J. Morrison, said that in the previous year 200 organizations were in affiliation with the United Farmers, comprising 8,000 members. At the present time there were 315 organizations and 12,000 members. The following officers were elected: President, R. H. Halbert; vice-president, E. C. Drury, Simcoe; secretary-treasurer, J. J. Morrison, Arthur, Ont.

ONTARIO AGRICULTURAL AND EXPERIMENTAL UNION

THE 39th annual meeting of the Ontario Agricultural and Experimental Union was held at the Ontario Agricultural College on January 8th and 9th, 1918. The gathering was one of the largest and best the Union has held. Among the subjects discussed were: "Co-Operative Experiments in Agriculture" introduced by Dr. C. A. Zavitz; "Ontario Agriculture in the Present Crisis", introduced by Dr. G. C. Creelman; "Co-Operative Experiments and Eradication of Weeds," by Professor Howard; "Root Seed Production in Canada," by Dr. M. O. Malte, Dominion Agrostologist; "Northern Ontario as a Source of Seed Potatoes," by Mr. Justus Miller, Assistant Commissioner of Agriculture; "Co-operation in Wool Marketing," by Mr. R. W. Wade, Director of Provincial Live Stock Branch; "Field Crop Competitions," by Mr. J. Lockie Wilson, Superintendent of Agricultural Societies, and "Underdrainage and Tile Making," by Mr. J. R. Spry, Lecturer on Physics.

A symposium on the production of food materials for the present year was a feature participated in by Dr. C. A. Zavitz, who spoke on wheat and beans; Professor G. E. Day, on beef and bacon; Professor H. H. Dean, on butter and cheese; Professor W. R. Graham, on butter and eggs, and Mr. P. W. Hodgetts, Director of Fruit Branch, on fruit, vegetables and honey. Professor D. H. Jones addressed the gathering on the proposed co-operation of the Union with farmers in testing cattle for tuberculosis; Professor J. W. Squirrell referred to the objects of the Experimental Union; Mr. R. S. Duncan, Supervisor of Agricultural Representatives, to the work of that body; Mr. G. H. Clark, Dominion Seed Commissioner, to the activities of his branch, and Mr. L. H. Newman, secretary of the Canadian Seed Growers' Association, to the work of his organization.

The convention concluded with an address by Mr. S. C. Johnston, Chief of the Bureau of Motion Pictures, on what his division was aiming to do for Ontario agriculture. Mr. Johnston's address was followed by a series of motion picture illustrations of the bacon industry; mangel seed production; history of the Ontario Agricultural College No. 72 Oats; poultry raising; the canning of vegetables, etc.

The following officers were elected for the current year: President, Mr. H B.. Webster, R.R. No. 1, St. Marys; vice-president, Mr. P. S. McLaren, R.R. No. 2, Perth; secretary, Dr. C. A. Zavitz; assistant secretary, Professor W. J. Squirrell; Treasurer, Mr. A. W. Mason.

EASTERN ONTARIO DAIRYMEN'S ASSOCIATION

The forty-first annual convention of the Eastern Ontario Dairymen's Association was held at Perth on January 10th and 11th. There was a large attendance. Addresses were delivered: by Mr. J. M. Stone, President of the Association, who, in his opening remarks, referred to the many changes that had taken place in recent years and to the progress that dairying industries had made; by Mr. J. A. Ruddick, Dairy and Cold Storage Commissioner for Canada, who detailed at some length the work of the cheese commission; by Mr. Jas. Alexander, Chairman of the Cheese Commission, who went into some particulars of the difficulties encountered in carrying out the work; by Mr. A. A. Ayer, "Montreal, on men, food and money;" by Professor H. H. Dean on "experiments in dairying;" by Mr. G. G. Publow, Chief Dairy Instructor for Eastern Ontario, who, in delivering his report, dealt with details regarding his work; by Professor J. H. Grisdale, Director of the Dominion Experimental Farms, who went into particulars regarding the necessity for increased production and briefly reviewed the difficulties of the situation; by Mr. Geo. H. Barr, Chief of the Dairy Division at Ottawa, who took for his subject "The Improvement of Dairy Herds;" by Mr. J. H. Scott, Official Grader of Butter, Toronto, on "the grading of butter by sample;" by Mr. L. A. Zufelt, Superintendent of the Dairy School, Kingston, who explained various difficulties that butter makers are labouring under; also by Dr. J. W. Robertson, Chairman of the Commission of Conservation, Mr. C. F. Bailey, B.S.A., Assistant Deputy Minister of Agriculture for Ontario, Mr. W. J. Bell, B.S.A., Principal of Kemptville Agricultural School, Dr. A. Hanna, M.P., and others.

Resolutions were passed regarding the sale of oleomargarine, trusting that the restrictions under which the sale is permitted will be rigidly enforced, and relative to the price of cheese.

The officers elected were: President, R. G. Leggatt; 1st vice-president, J. McGrath; 2nd vice-president, Neil Fraser; treasurer, J. R. Anderson, Mountain View; secretary, T. A. Thompson, Almonte.

WESTERN ONTARIO DAIRY CONVENTION

The annual convention and exhibition of dairy products of the Western Ontario Dairymen's Associaion was held in Stratford on January 16th and 17th. In addition to the reports of officials concerning the condition of the industry, addresses were given by Mr. J. A. Ruddick, Dominion Dairy Commissioner, Dr. C. A. Zavitz and Professor H. H. Dean of the Ontario Agricultural College and others, on subjects vital to the industry. The value of the systematic grading of cream for buttermaking was emphasized by Mr. L. A. Gibson, Dairy Commissioner for Manitoba, who stated that it had done more than any other one thing to put the dairy industry of the Prairie Provinces on its feet. Ontario officials concurred in this opinion. Resolutions were adopted expressing sympathy with the system of grading butter adopted last year, also asking the Government at the conclusion of the war to rescind the order-in-council allowing the importation, manufacture and sale of oleomargarine. Mr. James Donaldson, Atwood, was elected president; Mr. F. Boyes, Dorchester, first vice-president; Mr. W. G. Meade, Winchelsea, second vice-president, and Mr. F. Herns, London, secretary-treasurer.

THE WESTERN ONTARIO POULTRY ASSOCIATION

At the annual meeting of the Western Ontario Poultry Association held in Guelph on Tuesday, December 4th, the following officers were elected: President, W. W. Simpson, Guelph; first vice-president, George Henderson, Hamilton; second vice president, A. E. Field-Marshall, Beamsville; secretary-treasurer, R. W. Wade, Toronto.

EASTERN ONTARIO POULTRY BREEDERS' ASSOCIATION

The Eastern Ontario Poultry Breeders' Association at the annual meeting elected the following officers: Hon. president, Hon. T. A. Crerar; president, Geo. Higman, jr.; first vice-president, A. W. E. Hellyer; second vice-president, Harry Carleton; secretary-treasurer, W. D. Jackson, Carp.

VACANT LOT GARDENING IN HAMILTON

Relative to the article on Vacant Lot Gardening, published in the December number of THE AGRICULTURAL GAZETTE, the secretary of the Hamilton Horticultural Society, Mrs. R. B. Potts, furnishes additional information of the work done by that society. She states that 2,500 pamphlets were distributed, dealing with garden work, the growing of vegetables, control of insect pests and the conservation and preservation of food, that many meetings were addressed by members, that encouragement was given to garden work by Italians and other foreigners, that attention was paid to the cultivation of plots around the convalescent homes, that assistance was rendered by inspection to the work of the community clubs on the Mountain, and that interest was taken in the conservation of bird life. The year 1917 was reported to have been the most progressive in the history of the society. This year it is intended to extend the vacant lot garden work and to have among other enterprises an Italian home-garden exhibition. Extension of mission work to the cultivation of the soil is to be encouraged. The society, and individual members of the society, offered prizes of definite value for vacant lot products at various exhibitions and local shows in 1917, and will do the same this year. The president of the society is Mr. John A. Webber; the first vice-president, Mr. Jas. Anderson; the second vice-president, Mr. John R. Thompson; the third vice-president, Rev. G. W. Tebbs; the treasurer, Mr. J. M. Robinson; the secretary, Mrs. R. B. M. Potts, and the associate secretary, Miss I. M. Walker.

THE MANITOBA GRAIN GROWERS' ASSOCIATION

The Manitoba Grain Growers' Association at its annual meeting held in Brandon, Man., on January 9th, 10th and 11th, 1918, passed resolutions among others, recommending that the Dominion Government unify the railroads in one system; deciding to petition the placing of farm machinery and implements on the free list; suggesting that the time had come for the complete mobilization of man power in the Dominion, including the closing of non-essential businesses and the drafting of men for farm

work, that *bona fide* farmers and farm labourers be exempted from military service so long as they remain in such occupation, except in the case of large families who have made no voluntary contributions to the military forces of the Dominion, that all available men should immediately be reached with a view of placing them in positions where they may render most effective service to the nation, that a maximum wage be fixed for competent men and a minimum wage for boys and inexperienced men, that there should be an immediate registration of all engaged in the production of food stuffs, with a view of bringing together employer and employee, and that the relations of employer and employee be placed under the supervision of a competent authority appointed by the Government. This association, also by resolution, expressed itself in favour of the co-operative Hail Insurance Act now on the statute book of the province, and suggested that said Act should be submitted to the electors in June, 1918, with a view to bringing at least 25 municipalities under its provision. A motion was passed favouring a national convention of representatives of Canadian agriculture to deal with agricultural matters affecting the Dominion as a whole.

The officers elected were: President, R. C. Henders, Winnipeg; 1st vice-president, J. L. Brown, Pilot Mound; 2nd vice-president, Mrs. J. S. Wood, Oakville; secretary, W. R. Wood, M.L.A., Franklin.

MANITOBA CATTLE BREEDERS' ASSOCIATION

At the annual meeting of the Manitoba Cattle Breeders' Association, held at Brandon, January 8, 1918, the principal matter up for discussion was the report of the bull sale, when it was stated that in 1906, the year of the first sale, the average price was $84.87, whereas in 1917 the average was $247.81. A resolution was passed favouring an offering of selected females at future bull sales. The officers elected were: President, W. H. English, Harding, Man.; vice-president, Jas. E. Chapman, Hayfield, Man.; secretary, W. I. Smale, Brandon; who was absent from the meeting through illness.

A SHORTHORN CLUB FOR MANITOBA

The Shorthorn breeders of Manitoba met recently and formed a club with the following officers: Andrew Graham, Roland, president; J. G. Washington, Ninga, vice-president; J. B. Davidson, Myrtle, secretary.

MANITOBA WOMEN'S GRAIN GROWERS' ASSOCIATION

The Manitoba Grain Growers' Association at its annual meeting in Brandon on Jan. 10, 1918, having adopted a resolution approving the organization of a women's branch of the association, a meeting of women members was held and the following resolution passed:

Whereas, we, the women members of the Grain Growers' Association of Manitoba, believe that the time has come when it is necessary and expedient for the farm women of Manitoba to have their own organization, and

Whereas, it is believed that only as a separate section, can they further their educational, social, economical, political, and æsthetic interests in the way deemed necessary; and,

Whereas, it is deemed imperative and expedient in the interests, and for the welfare of the Manitoba Grain Growers' Association, and of the farm women of Manitoba, that they continue in unison and co-operation and so preserve the unity of the association;

Be it resolved that a woman section of the Manitoba Grain Growers' Association be formed; and be it further resolved that the constitution of the Manitoba Grain Growers' Association be amended to include these clauses:

(1) Women shall have the same standing in the Association as men.

Clauses 2, 3, 4, 5 and 7 having dealt with the method of organization and governance, the resolution proceeded;

(6) The objects of the women's section are those of the Association as a whole, and, particularly:

(a) Better rural schools. (b) The development of local taste for finer things of life. (c) Wholesale recreation for old and young. (d) The promotion of better legislation—Dominion and Provincial. (e) Education of women in the duties of citizenship. (f) Strengthening of the Association.

The officers elected were: President, Mrs. J. S. Wood, Oakville; vice-president, Mrs. A. Tooth, Eli; secretary and director at large, Mrs. Jno. Ames, Winnipeg.

MANITOBA SHEEP BREEDERS' ASSOCIATION

The Manitoba Sheep Breeders' Association at the annual meeting held in Brandon on Jan. 9, 1918, elected Thos. Jasper, Harding, Man.; president, and W. R. Bowman, vice-president. W. I. Smale, Brandon, is secretary.

THE MANITOBA SWINE BREEDERS' ASSOCIATION

At the annual meeting of the Manitoba Swine Breeders' Association in Brandon on January 9th, the officers elected were: President, John Strachan, Pope, Man.; vice-president, David Agnew, Douglas; Man.; secretary, W. I. Smale, Brandon. A sale of sows is to be held during the spring stock show in March and a sale of pure-bred boars and sows during the time of the annual fall show.

THE SASKATCHEWAN'S DAIRYMEN S ASSOCIATION

The annual convention of the Saskatchewan Dairymen's Association was held at Saskatoon on January 9th and 10th. A new feature of this convention was the Stock Judging Competition for teams of three boys under twenty years of age. Owing to severe weather and to the scarcity of farm labour, only four teams took part in this competition. Unusual interest was taken in the better scoring competition for creamery men. Two groups of six samples representing various grades of butter were submitted for scoring. The men coming nearest to the judge's score of the twelve boxes were the winners of the prizes. Following is a summary of the more important resolutions adopted:—That this convention favours the organization of a federal dairymen's association; that strict supervision and control should be maintained over the manufacture and sale of oleomargarine; protesting against the raising of freight and passenger rates on the railways; suggesting that the Food Controller should control the production, price and distribution of bran, shorts and all commercial stock feeds and feed contributions; suggesting that a Federal Farm Products Standards law should be enacted; pledging the support and co-operation in the establishment of cold storage warehouses, creamery and dairy produce distributing systems, poultry feeding, packing and marketing stations and egg buying and shipping circles under the direction and management of the Saskatchewan Co-operative Creameries, expressing appreciation of assistance granted by the Federal Government for the establishment of cow-testing branches; favouring the better regulation, registration, selection and conscription of labour for the farm; relative to improved regulation of manufacturing establishments and firms engaged in dealing in food stuffs; urging that the sale of all cattle reacting from the tuberculin test be prohibited, and that the testing of herds be made compulsory. The officers elected were: President, A. H. Salmon, Kelso; vice-president, J. C. Moore, Fiske; secretary-treasurer, K. C. Mackay, Saskatoon.

SASKATCHEWAN LIVE STOCK ASSOCIATIONS

BY P. F. BREDT, SECRETARY

The annual meetings of the Saskatchewan live stock associations were held in Regina on January 3rd and 4th, and were well attended. A joint evening meeting took place on January 3rd, which was addressed by the Hon. W. R. Motherwell, Dean Rutherford of Saskatoon, and Prof. J. B. Reynolds, president of the Manitoba Agricultural College. Greater production and food conservation were the outstanding features of the addresses.

HORSE BREEDERS

Speakers:—Dr. Creamer on "Federal Aid to Horsebreeding"; F. H. Auld, Deputy Minister of Agriculture, on "The New Saskatchewan Horse Breeders' Act." A resolution was passed increasing the number of directors from three to twelve. Officers elected: President, A. Mutch, Lumsden; vice-president, Dr. Head, Regina; secretary, P. F. Bredt, Regina.

CATTLE BREEDERS

Speakers:—Dr. McGillivray of Winnipeg on "Prevention of Blackleg"; Dean Rutherford on "Problems of the Breeder". A resolution was passed that the Dominion Government authorities be urged to pass laws or regulations which shall effectively prevent the sale of all cattle which have reacted to the tuberculin test, except for immediate slaughter. The number of directors to be increased to six instead of three. Officers elected:—President, R. M. Douglas, Tantallon; vice-president, B. H. Thomson, Boharm; secretary, P. F. Bredt, Regina.

SHEEP BREEDERS

Speakers:—W. W. Thomson, on "Co-operative Wool Marketing"; Professor Tisdale, of Saskatoon, on "Improvement, Care and Handling of Wool". A resolution was passed to petition the Dominion Government not to place an embargo on the free marketing of wool. Officers elected:—President, H. H. Follett, Duval; vice-president, F. T. Skinner, Indian Head; secretary, P. F. Bredt, Regina.

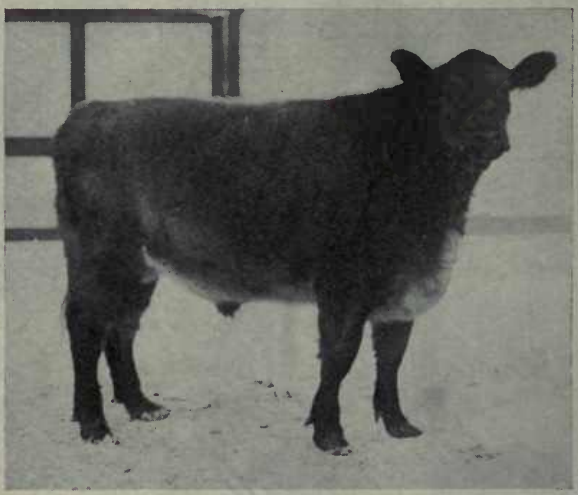
SWINE BREEDERS

Speakers:—Professor J. B. Reynolds, of Winnipeg, and Professor A. M. Shaw, of Saskatoon, both dealing with "Greater Hog Production", and the problems which are incident thereto. Officers elected: President, P. Leech, Baring; vice-president, S. V. Tomecko, Lipton; secretary, P. F. Bredt, Regina.

ALBERTA WINTER FAIR, CALGARY

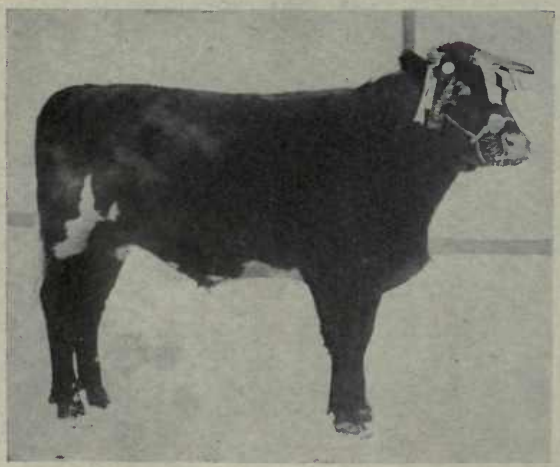
BY E. L. RICHARDSON, SECRETARY, ALBERTA LIVE STOCK ASSOCIATIONS

The Alberta Winter Fair which was held at Calgary, December 11th to 14th, 1917, was most successful. The attendance, number of animals shown, the quality of the exhibits, and the value of the sales made during the week, showed that great progress was being made. The outstanding feature of the show was the Baby Beef Competition for steers and heifers born in 1916 fed by boys and girls between the ages of nine and seventeen years. There were 53 entries, of which 44 were actually shown, namely, 22 heifers and 22 steers. Cash amounting to $1,790 and trophies to the value of $325 were awarded in this class alone. Fourteen prizes were offered for heifers and the same for steers. Several special classes were also organized. The competition was such a success that it will be continued for a number of years and other similar competitions held for other kinds of live stock.



ALBERTA WINTER FAIR, CALGARY, 1917, BABY BEEF COMPETITION

1st prize steer and champion, sold for 36c. per lb.



ALBERTA WINTER FAIR, CALGARY, 1917, BABY BEEF COMPETITION

1st prize animal sired by a Shorthorn, 2nd in steer class and reserve champion Baby Beef

There were 1,650 animals on exhibition and for sale, as against 1,172 the previous year, 659 in 1915 and 469 in 1914. In 1916 approximately $125,000 changed hands for live stock during the week, while in 1917 fully $242,000 was realized.

At the annual meeting of the Winter Fair Association the following officers were elected

for 1918: President, W. F. Stevens, Provincial Live Stock Commissioner; vice-president, Wm. Sharpe, Lacombe, president of the Alberta Cattle Breeders' Association; secretary-treasurer, E. L. Richardson, Calgary.

ALBERTA WINTER FAIR, CALGARY, 1917, BABY BEEF COMPETITION
Class of 22 heifers as awards were made from left to right

ALBERTA SWINE BREEDERS' ASSOCIATION

At the annual meeting of the Alberta Swine Breeders' Association, held at Calgary on December 11th, 1917, the following officers were elected: President, W. J. Hoover, Bittern Lake, Alta.; first vice-president, Steve Swift, Viking, Alta. second vice-president, E. J. C. Boake, Acme, Alta.; secretary-treasurer, E L. Richardson, Calgary, Alta.

ALBERTA SHEEP BREEDERS' ASSOCIATION

At the annual meeting of the Alberta Sheep Breeders' Association held in Calgary on December 12th, the financial statement presented showed a turn-over of $103,000 for the year's business, including wool and sheep sales, and a balance of $789 to the credit of the association. It was decided to give every possible encouragement to the feeding and the care of sheep by boys and girls. Contributions were volunteered towards prizes for a class of Alberta-bred lambs, fed, cared for and exhibited by the young people. It is anticipated that at least $500 and perhaps $1,000 will be given in prizes in this connection. A boys' and girls' sheep shearing competition is also suggested to be held at the summer exhibition, and it is likely $150 to $200 will be offered in prizes. The following officers were elected: President, R. Knight, Calgary; first vice-president, H. S. Currie, Castor; second vice-president, Herbert Smith, Camrose; secretary-treasurer, E. L. Richardson, Calgary, Alta.

BRITISH COLUMBIA FRUIT GROWERS' ASSOCIATION

At the annual meeting of the British Columbia Fruit Growers' Association, held in Victoria, on January 17, the following officers were elected:—President, C. E. Barnes, Walachin; vice-president, J. E. Reekie, Kelowna; executive, Thomas Abriel, Nakusp; R. M. Palmer, Cowichan Bay; W. E. Chapple, Armstrong; L. E. Taylor, Kelowna; and secretary, Prof. F. M. Clement, of the University of British Columbia, Vancouver.

NEW BRUNSWICK POTATO GROWERS' ASSOCIATION

The third annual convention of the New Brunswick Potato Growers' Association was held at Woodstock, N.B., on January 24, when the following officers were elected: President, A. A. H. Margeson, East Florenceville; vice-president F. E. Henderson, Andover; secretary, A. C. Taylor, Woodstock; treasurer, W. H. Moore, Scotch Lake.

NEW PUBLICATIONS

THE DOMINION DEPARTMENT OF AGRICULTURE

Report of the Minister of Agriculture, for the year ending March 31, 1917. This Report, which is of the customery comprehensive character, covering synopses of the prceeedings and operations, of all the departmental branches and divisions, along with appendices, giving the reports of the Director General of Public Health and the Commissioner of Exhibitions, makes a blue book of 134 pages. The Report also contains a record of the patents of invention issued, and of copyrights granted, with statistical tables covering the last eleven years.

THE HEALTH OF ANIMALS BRANCH

The Poisoning of Horses by the Common Bracken Fyeris Aquilina L. Messrs. S. Hadwen, D.V.Sc., Pathologist, Veterinary Research Laboratory, Agassiz, B.C., and E. A. Bruce, V.S., assistant in the same laboratory, are the authors of this sixteen-page bulletin, No. 26, Scientific Series, dealing with a complaint from which 16 horses died out of 24 owned by 11 farmers at St. Elmo, B.C. The subject is as exhaustively dealt with as the space permits, with illustrations of victims and details of curative experiments.

THE SEED BRANCH

Cleaning Seed: Pamphlet No. 1, January, 1918. In the 16 pages which make up this pamphlet, full descriptions, with diagrams and illustrations, are given of the principles that should be adopted and the methods that should be followed in cleaning grass and clover and grain seed.

THE PUBLICATIONS BRANCH

Vacant Lot Gardening in 1917. The article that appeared in THE AGRICULTURAL GAZETTE of December, 1917, has been reprinted in 16-page pamphlet form, being Publications Branch Pamphlet, No. 6.

THE PROVINCIAL DEPARTMENTS OF AGRICULTURE

NOVA SCOTIA

Wheat Growing in Nova Scotia is the subject and title of 1918 Food Production Bulletin, No. 1, published by order of the Development of Agricultural Resources Committee of the Legislature of Nova Scotia. Messrs. M. Cumming, Provincial Secretary for Agriculture, and S. J. Moore, Dominion Seed Inspector, are the responsible authors. The bulletin consists of 12 pages and is a concise review of the situation combined with advice as to seed, soil cultivation, and treatment for the prevention of smut.

ONTARIO

The More Important Fruit Tree Diseases of Ontario, by J. E. Howitt, M.S. Agr., Professor of Botany and Lawson Caesar, B.A., B.S.A., Practical Entomologist and Associate Professor of Entomology. The object of this bulletin, which is number 257 of the Ontario Agricultural College series, is to furnish fruit-growers with information that will enable them to identify the more common diseases to which their trees are subject, and to apply the treatments that experiments and observations extending over eight years have shown to be the most effective. The bulletin consists of 48 pages, treats of upwards of 40 diseases, and is explanatorily illustrated.

MISCELLANEOUS

Canadian Seed Growers' Association, Thirteenth Annual Report, being for the year ending March 31st, 1917. The report, which makes a publication of 40 pages, is divided in two parts, the first consisting of the minutes of the annual meeting, held at Ottawa on July 31st last and recorded in the September number of THE AGRICULTURAL GAZETTE, page 815, and the second of contributions by Dr. C. A. Zavitz, of the Ontario Agricultural College; W. F. Elliott, Galt, Ont.; W. C. Barrie, also of Galt; W. J. Squirrell, O.A.C.; E. D. Eddy of the Seed Branch, Ottawa; the Minister of Agriculture and Secretary for Quebec; W. E. Palmer, Scotch Lake, N.B.; and W. H. McGregor, Miscouche, P.E.I. A list of members and the minutes of the Manitoba branch of the Association are also given.

Commission of Conservation, Canada. The report of the eighth annual meeting held at Ottawa, January 16-17, 1917, recently issued, makes a handsomely illustrated bound volume of 344 pages. It contains 14 pages of introduction, a review of the work of the Commission by the Chairman, Sir Clifford Sifton, C.M.G., and, besides a dozen other papers, the following relating to agriculture and kindred topics: "The Use of Commercial Fertilizer," by H. J. Wheeler, Ph.D., D.Sc.; "Fertilizers and their Use in Canada," by Frank T. Shutt, M.A., D.Sc.; "Memorandum on Soil Tests," by Dr. F. B. Linfield; "Co-operative Forest Protection," by Henry Sorgius; "The Conservation of a Neglected Source of Food Supply," by J. B. Fielding; "Fur Resources of Northern Canada," by C. Gordon Hewitt, D.Sc., and "Production and Preservation of Food Supplies," by P. H. Bryce, M.A., M.D. In addition 22 pages are devoted to appendices and 19 pages to a copious index.

NOTES

More than 700 county agents and emergency demonstration agents are now at work in thirty-three northern and western states of the American union and the number is increasing rapidly.

Mr. C. B. Curran, Agricultural Representative for Lennox and Addington counties, estimates that as a result of the campaign going on to increase hog production, there will be about fifty per cent of an increase in the counties he represents.

The article "How the Sheep Campaign in New Brunswick was handled," published in the January number of THE AGRICULTURAL GAZETTE, was inadvertently credited to Mr. W. R. Reek, Secretary for Agriculture. The author of the article was Mr. Thomas Hetherington, B.S.A., Live Stock Instructor.

The term District Representative, as applied to officials of Provincial Departments of Agriculture stationed at points throughout the provinces, has not been entirely satisfactory. By mutual arrangement most of the provinces have agreed to the designation "Agricultural Representative." Steps are being taken to bring about the change of title in every province.

After the statement of the number of students in attendance at the Manitoba Agricultural College, given in the December number of THE AGRICULTURAL GAZETTE had been made up, 51 names were added to the enrolment for agriculture and 15 for home economics, bringing the total in the first case to 164 and, in the second, to 99.

Mr. J. W. Stark, Agricultural Representative in Peel county, Ontario, tells of a survey that he made for a farmer. He has a springy piece of land not far from the house and wished to get water for his stock without pumping. Mr Stark took some levels and found that he had a good fall to put in two branches of tile up through a field, and these will meet and go into a cement tank, and the water will be conducted from this to a watering trough. Mr. Stark says he sees no reason why this scheme should not work satisfactorily, winter and summer. He thinks there should be many places in Ontario where the same system of securing an easy water supply would work satisfactorily.

Mr. L. A. DeWolfe, Director of Rural Science Schools, Nova Scotia, suggests, in the *Rural Science Monthly*, the establishing of seed exchanges amongst the pupils of the public schools. Mr. DeWolfe points out that children having saved seeds from their garden will have quantities to spare to exchange with others who have saved different sorts.

On the nomination of H. W. Foght, rural education expert of the Bureau of Education, Washington, D.C., Mr. A. Kennedy, Inspector of Schools at Weyburn, Saskaskatchewan, has been appointed Director for Saskatchewan on the Executive of the National Education Association. As a result of this appointment it is expected that this organization will be made constitutionally and truly international. Mr. Kennedy will attend the convention of this Association to be held in Atlantic City from February 25th to March 2nd.

Col. R. Innes, B.S.A., has been appointed, by the Lands, Forests and Mines Department of the Ontario Government, to supervise the work of the Soldiers' Land Settlement scheme in New Ontario. Colonel Innes is an ex-student of the Ontario Agricultural College and a graduate of Macdonald College. He enlisted almost at the beginning of the war and was invalided home after a year's service in France.

The Ontario Agricultural College, from October 8th to December 10th, 1917, provided a series of lectures in road construction, assisted by a series of models of roads of various descriptions prepared by the Ontario Department of Public Highways. Officials of that Department delivered one lecture a week to the students in the second year. These lectures were as follows: "History of Road Development, Growth of Traffic and Economic Value of Roads," by C. R. Wheelock; "Outline of Road Construction," by Geo. Hogarth; "Road Drainage and Grading," by A. A. Smith; "Road Foundations and Subordinate Structures," by Geo. Hogarth; "Road Surfaces and Materials," by R. C. Muir; "Road Maintenance and Dust Prevention," by G. C. Parker; "Road Machinery and its Operation," by W. Huber; "Road Laws and Organization," by S. L. Squire; "Financial Aspects," by W. Huber, and a "General Summary," by W. A. McLean.

Mr. John Steer of Holland township called at the office of Mr. H. C. Duff, Agricultural Representative, Grey county, Markdale, to report on the results of some sweet clover seed the Department gave him two years ago for experimental purposes. As a result of the small amount of seed which he received Mr. Steer had last year 80 bushels of unhulled seed which he obtained from 10 acres. He expects to have 40 bushels of the hulled seed. He sowed the clover at the rate of 17 pounds per acre on land that would not grow a good crop for seed, which yielded at the rate of 2 bushels per acre. This year he intends trying to sow the clover at the rate of 30 pounds per acre with the expectation of getting hay of finer quality. His cattle are fond of the hay and will now eat it more readily than alfalfa. Mr. Steer has found no difficulty in killing sweet clover by cutting it close to the ground.

At a meeting of members of the Board of Trade, the Rotary Club and prominent farmers of the district, held recently at Hamilton, Ont., Mr. Roy Tobey, of Montgomery, Alabama, outlined what had been done by the Rotary Club of his city to encourage boys between eight and fifteen years to breed pigs. Arrangements were made whereby every member of the club pledged himself to lend five dollars at 6 per cent interest to any likely boy to purchase a sow. Applications were to be made to a local bank by the boy in person accompanied by his father and mother, the members of the Rotary Club becoming responsible. In a short time, 95 pigs were purchased for 95 boys. This was in 1915. In the following year, the arrangements were improved, so that the boys should have only well-bred pigs. When the season of 1916 closed, money had been loaned to purchase 375 pigs.

INDEX TO PERIODICAL LITERATURE

Agricultural Journal, Victoria, B.C., December, 1917.
Cost of Producing Farm Products, A. B. Tweedle, Provincial Statistician, page 197.
Winter Butter-Making, T. A. F. Wiancko, Provincial Dairy Instructor, page 202.
Silo Problems, W. T. McDonald, Live Stock Commissioner, page 192
Cherry-Growing in British Columbia, M. S. Middleton, Horticulturist, page 193.

British Columbia Fruit and Farm, Vancouver, B.C., January, 1918.
Gardening for the Home, H. M. Eddie, F.R.H.S., Growing D partment British Columbia Nurseries, page 24.

The Canadian Countryman, Toronto, Ont., January 5, 1918.
Seed Situation in Ontario, C. A. Zavitz, Ontario Agricultural College, Guelph, page 16.
A National Policy for Grain and Live Stock, Herbert C. Hoover, United States Food Controller, page 4.
Jan. 19—The Ice Crop—A Winter Harvest for Dairymen, H. H. Dean, page 68.
Making a Small Flock Pay, Geo. Robertson, page 68.

The Farmer's Advocate and Home Journal, Winnipeg, Man., December 26, 1917.
Care of Cream Cans, L. A. Gibson, Dairy Commissioner for Manitoba, page 1856.
What about the Hog, W. J. Elliott Superintendent of School of Agriculture, Olds, Alta., page 1854.
Jan. 9—The Food Situation, W. J. Rutherford, Dean of College of Agriculture, University of Saskatchewan, page 53.
Jan. 9—How Would your Seed Grain Test, the Cerealist, Manitoba Agricultural College, Winnipeg, page 46.

Farmer's Advocate, London, Ont., January 10, 1918.
Feeding the Layers, M. A. Jull, Manager of Poultry Department, Macdonald College, page 48.

The Nor-West Farmer, Winnipeg, Man., December 20, 1917.
Cost of Producing Pork, W. C. McKil ican, Superintendent, Brandon Experimental Farm, page 1448.
Jan. 5—The New Year Call to Canadian Agriculture, Dean Rutherford, Saskatchewan Agricultural College, J. B. Reynolds, M.A., President, Manitoba Agricultural College, Hon. W. R. Motherwell, Minister of Agriculture, Saskatchewan, Hon. V. Winkler, Minister of Agriculture for Manitoba, and W. F. Stevens, Live Stock Commissioner for Alberta, pages 8 and 9.

Ottawa Farm Journal, January 18, 1918.
Work of the Cheese Commission, J.A. Ruddick, Dairy and Cold Storage Commissioner, page 8.
Cow Testing as a Factor in the Improvements of the Dairy Industry, C. F. Whitley, Chief of Dairy Records, page 10.
The Improvement of the Dairy Herd, Geo. H. Barr, Chief of the Dairy Division, Ottawa, page 12.
Jan. 18—The Use of Pepsin in Making Cheese, G. H. Barr, Chief of the Dairy Division, page 12.

The Canadian Horticulturist & Bee-keeper, Toronto, January, 1918.
Air Conditions in the Bee Cellar, F. W. L. Sladen, Apiarist, Dominion Experimental Farms, page 7.

PART V

The International Institute of Agriculture

T. K. Doherty, LL.B., Commissioner

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty, International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

699—**Agricultural and Economical Development of Venezuela.**—DUHAUT, in the *Bulletin de l'Office de Renseignements agricoles du Ministere de l'Agriculture de France*, Year 15, October-November, 1916, pp. 441-453. Paris, 1916. (5 pp. in Institute Bulletin).

Venezuela has an area of 424,710 square miles and a population of 2,800,000, not including the Indians. The official language is Spanish. From an agricultural point of view the country is divided into three regions: (1) the *maritime region* which is the true agricultural region; 2) the *breeding region*, in the plain of Orinoco basin; (3) the *forest district* on the South.

Before the war the imports into Venezuela came chiefly from England, Germany, France and Holland, and consisted in a large part of agricultural products. The imports from England and Germany were chiefly agricultural implements.

Most of the agricultural industries are still only slightly developed in Venezuela. Among the industries which give opportunity for development is cattle breeding. Large companies might be formed for the improvement and working of the immense pasture lands of the northern and western basin of the Orinoco in conjunction with the Venezuelan land owners, who would willingly support such an undertaking. There are no diseases of cattle in the country. Reports of an epidemic of disease are false, and were probably spread by foreign agents.

Among other resources are fibre plants, a large variety of which are found in the Cumana and Barquisito, the Andes and the Orinoco Delta. Immediate use of the fibre plants would give profitable results. The e are many oil yielding plants in the country, and petroleum wells in the coast districts, with great resources of asphalt and bitumen near them. Many plants yielding tannin and dyes could be put to use immediately and the raw products sent to Europe. Among the fertilizers found in Venezuela are guano, phosphates, saltpetre, magnesite and copper sulphate in a pure state.

The principal products which require the use of special machinery for their extraction and special transport are iron ore, copper ore, lead ore and silver ore for export, coal gypsum and alumina for home use. There are great opportunities for the cultivation of gums, chiefly the rubber of *Hevea brasiliensis*.

700—**Agriculture in Queensland in 1915-1916.**—*Annual Report of the Department of Agriculture and Stock for the Year 1915-1916*, pp. 1-158. Brisbane, 1916. (2 pp. in Institute Bulletin).

701—**The Relation of Farm Weeds to Hay Fever.**—HALL, H. M., in the *Monthly Bulletin of State Commission of Horticulture*, Vol. VI, No. 2, pp. 44-47. Sacramento, California. February, 1917.

CROPS AND CULTIVATION

704—**Factors Affecting the Evaporation of Moisture from the Soil**—HARRIS, F. S. and ROBINSON, J. S. (Utah Agricultural Experiment Station), in the *Journal of Agricultural Research*, Vol. VII, No. 10. pp. 441-461. Washington, D.C., 1916.

Soil moisture, which is of great importance in agriculture, may, in arid districts, be lost either by capillary attraction, which draws the water to the surface, or by evaporation, which is one of the most important factors in preserving the moisture of the soil. This paper gives, first a critical review of the scientific literature on this subject, then a description of a series of experiments undertaken from 1912 to 1916 in different soils and under varying conditions.

The results show that the evaporation of the water of the soil is in direct connection with the original moisture; the differences are slighter when there is much moisture than when there is little, and there appear to be critical points at which evaporation undergoes sharp variations. Evaporation in moist soil diminishes very rapidly in proportion as the moisture in the air increases. Air currents cause an increase in evaporation, which, however, becomes very slight beyond a certain velocity. In completely saturated soils evaporation is greater when the soil particles are fine than when they are coarse. Decrease in sunshine causes a great decrease in evaporation, which is also affected by sudden variations in temperature, however slight they may be. Evaporation is effectually restricted by a thin, dry mulch but more so when the particles are coarse than when they are fine. Compacting the surface increases evaporation. Finally, evaporation may be reduced by the addition of a concentrated solution of soluble salts.

A bibliography of 41 publications is appended.

705—**The Effect of Soil Moisture Content on Certain Factors in Wheat Production.**—HARRIS, F. S. and MAUGHAN, H. T., in *Utah Agricultural College Experiment, Station Bulletin*, No. 152, pp. 1-15. Logan, Utah, February, 1917.

A knowledge of the intimate relations between the crop and the moisture of the soil is important to every farmer, particularly to those in arid districts. For this reason the authors carried out experiments to determine the water requirements of wheat and the water content of the soil during various stages in the growth of the crop.

The experiments were carried out during the years 1913, 1914 and 1915 in 36 galvanised iron tanks, each of which contained 476 pounds of water-free loam with a high lime content. Spring wheat was sown and evaporation prevented first by a ½-inch sand mulch, and later with paraffined paper; any loss was made up with very pure tap water. The tanks were divided into 18 series of 2 tanks each, the series having varying moisture conditions. The life of the plant was divided into 3 periods: 1) from planting until there were 5 leaves; 2) from the 5-leaf stage to full earing; 3) from full earing to maturity.

The results showed that the highest yield of grain was obtained when the soil contained about 20 % moisture throughout the season. This was about ⅓ of the moisture required to saturate the soil completely. Wheat seems particularly sensitive to soil moisture during the period immediately preceding earing.

There was a greater loss of moisture by evaporation and transpiration from soil producing a large crop than from a free water surface, but the loss was greater from the water surface than from a soil producing only a small crop.

Under favourable moisture conditions the crop was 20 times as great as under unfavourable ones. Wheat may suffer as much from excessive moisture as from excessive dryness; the importance of favourable soil moisture conditions is, therefore, clear.

706—**Rainfall, Irrigation and Subsoil Water in the United Provinces of Agra and Oudh.**—MOLONY, E. A., in *The Agricultural Journal of India*, Vol. XII, Part I. p. 84-89. Calcutta, January, 1917. (1 page in Institute Bulletin).

707—**The Drainage of Irrigated Shale Land.**—MILLER, D. G., and JESSUP, L. T., in *United States Department of Agriculture, Bulletin* No. 502, pp. 40, Washington, D.C., April 23, 1917. (2 pp. in Institute Bulletin).

708—**Spray Irrigation.**—WILLIAMS, MILO B., in the *United States Department of Agriculture Bulletin* No. 495, pp. 40, figs. 19. Washington, D.C., February 14, 1917. (4 pp. in Institute Bulletin).

During the last ten years spray-irrigation (1) has spread greatly through the United States, particularly in the Atlantic Coast from Massachusetts to Florida. It is particularly well adapted to supplement uncertain rainfall in market gardens and orchards. The economic conditions must, however, be favourable, as the cost of

(1) See also *Bulletin of Foreign Agricultural Intelligence*, March, 1915, No. 1090, and April, 1916, No. 1330.

installing this system is relatively high. While a portable outfit may cost only $50 per acre, a stationery distribution system may cost as much as $150 per acre, not including the cost of a pumping plant and the laying down of a main pipe line to the fields.

The cost of installing a stationary plant for a small acreage amounts to $250 per acre, and the annual incidental expenses come to $51 per acre. The high cost prohibits the use of this method for many crops, but if it is combined with ordinary irrigation methods the expenses are less heavy. Spray irrigation is practically independent of the topography of the field, and can be applied to land too rolling or rough for surface methods.

As spray irrigation is comparatively recent, the author carried out various tests to determine the amount of water required by this system.

In damp climates amounts not exceeding ¼ inch are considered sufficient for seed beds and young vegetables, whereas maturing garden crops and strawberries require ½ to 1 inch. In the growing season market gardens need from 4 to 6 inches. The Florida citrus groves may require as much as 3 inches per irrigation.

In arid districts market gardeners irrigate every 3 or 4 days, while citrus growers apply from 4 to 6 inches each time. As a rule in damp districts a depth of 1 inch per week suffices, but in arid districts 1½ inches per week is required. Information is given on the installation of pumps, and the sinking of shallow wells and deep wells.

Three types of spray irrigation have been generally adopted:

1) Hose and movable nozzle or movable lines fed from an underground pipe system and hydrant;

2) Circular nozzles fed from an under ground pipe system;

3) Overhead spray lines fed from an underground main feed pipe.

Details of each type are given with appropriate illustrations in the article in the Institute Bulletin.

709—**Rotations and Tillage Methods in Western Nebraska.**—SNYDER, W. P., and OSBORN, W. M., in *The University of Nebraska Agricultural Experiment Station Bulletin* No. 155, pp. 1-48. Lincoln, Neb. June 1, 1916. (1 page in Institute Bulletin).

710—**The Plant Food Materials in the Leaves of Forest Trees.**—SEREX, P. Jr., in *The Journal of the American Chemical Society*, Vol. 39, No. 6, pp. 1286-1296. Boston, Pa., June, 1917. (2 pp. in Institute Bulletin).

711—**The Chemical Composition of Basic Slag.**—JANSSENS, VAN RAAIJ, C., *Verslagen van Landbouwkundigen Onderzoekingen der Rijkslandproefstation*, No. XX, pp. 26-33. (1 p. in Institute Bulletin).

712—**Estimation of the Cyanamide Nitrogen in Calcium Cyanamide and Lime Nitrogen.**—BERKAUT, A. D., HENDRICKSZ, R. D., and WIND, G., in *Verslagen van Landbouwkundige Onderzoekingen der Rijkslandbouwproefstation*, No. 20, pp. 43-51. The Hague, 1917. (1 page in Institute Bulletin).

713—**Inoculation Tests on Lucerne and Lupin Seedlings, in Denmark.**—CHRISTENSEN, HARALD R., in *Tidskrift for Planteol*, Vol. 21, pp. 97-131. Copenhagen, 1914; and (as original abstract) in *Centralblatt fur Bakteriologie, Parasitenkunde ind Infektionskrankheiten*, Vol. 46. Jena, 1916. (1 page in Institute Bulletin).

714—**Report on Humogen.**—RUSSELL, E. J., in *The Journal of the Board of Agriculture*, Vol. XXIV. No. 1 pp. 11-20. London, April, 1917.

This paper gives an account of experiments carried out in 1915 at the request of the Board of Agriculture in order to determine the fertilising value of "humogen". This product is prepared by Prof. W. B. Bottomley's method as follows: peat is first neutralized, bacterial decomposition is then brought about to a certain point, and the peat finally inoculated with a culture of nitrogen-fixing organisms.

The author reviews the results obtained by other workers—those of the dis overer, at Kew (1) of Chittenden, at Wisley (2), of Voelcker, at Woburn, and at the Midland Agricultural College. These experiments were largely unfavourable, whereas others, carried out at Sparsholt, were favourable up to a certain point, without, however, offering sufficient guarantees. Further tests made at the Lea Valley Experiment Station were also unfavourable(3)

In the experiments described, carried out partly at Rothamsted and partly at the Harper Adams Agricultural College, two qualities of humogen we e used, one prepared by the Manchester Corporation cleansing Department, from peat rom Chat Moss, the other prepared by the Entwistle Mountain Peat Estate Company from peat overlying limestone deposits, Usually 10 cwt. per acre were used. The experiments were made with mangolds, pot plants and mustard in pots, and water cultures of barley.

All the experiments gave negative results and do not permit the assumption that

(1) See *Bulletin of Foreign Agricultural Intelligence*, July 1914, No. 410.

(2) See *Bulletin of Foreign Agricultural Intelligence*, October 1916, No. 497.

(3) See *Bulletin of Foreign Agricultural Intelligence*, February 1915, No. 982.

humogen possesses any particular agricultural value. This is all the more notable as it was said to be 50 times as efficacious as manure, whereas it does not surpass any other organic manure with the same content of nitrogen. The price asked, $20 per ton, is in no wise justified by the results obtained. As these results contradict the statement made by the authors, two circumstances must be borne in mind: *a*) good results were without doubt obtained in the pot experiments at Kew and Wisley; *b*) the composition of humogen is obviously very variable.

Humogen, in the proportions used at Kew and Wisley (1 part to 7 or 8 parts of soil), may be a valuable addition to the compost used for potting up plants, but it does not appear to be superior to an equal amount of untreated peat in an equally fine state of division. This finely-divided organic matter is useful for several purposes in pots and when it forms 12% or more of the whole bulk it may have a favourable effect. It is quite possible that heavy dressings would have good effects on poor soils, but they would have to be on a far larger scale than is possible at present prices.

The composition of humogen is far from uniform. Prof. Bottomley's analyses show it to contain 4.310 % of total nitrogen. Analyses made at Rothamsted of humogen from Manchester showed a nitrogen content of 0.570 % in the fertilizer as sent out, and 1.29 % in the dry matter; analyses of Entwistle humogen showed the corresponding values to be respectively 0.431 % and 1.32 %. In some samples Dr. Voelcker found 0.48 % of soluble nitrogen, in others only 0.08 %.

This variability is very unfortunate. It is possible that some samples have acted well in the field; it is certain that others have not. There is no definite evidence that "bacterisation" really adds to the value of the peat. The wisest plan would seem to be to concentrate on experimental work and to stop all propagandist operations until some definite basis of incontrovertible fact has been attained. It will take a long time to obtain this result as the problem of utilizing peat is sufficiently difficult to occupy the whole attention of a laboratory for some years.

A proof of this paper was sent to Prof. Bottomley, who, in a note, states that the product sent to the author as humogen was wrongly prepared and was in no way composed of bacterised peat.

715—**The Use of Bakers' Ash as Artificial Soil Almost free from all Mineral or Organic Matter, Suitable for the Study of Plant Growth and the Influence of various Chemical Fertilizers.**—GAUTIER, A., in *Comptes rendus des séances de l'Académie des Sciences*, Vol. 164, No. 26, pp. 985-986. Paris, June 25, 1917.

717—**The Influence of Water and Mineral Matter on the Germination of Peas.**—MAQUENNE, L., and DEMOUSSY, E., in *Comptes rendus des séances de l'Académie des Sciences*, Vol. 164, No. 26, pp. 979-985. Paris, June 25, 1917. (2 pp. in Institute Bulletin).

718—**"Giovanni Raineri" and "Emilio Maraini", New Varieties of Autumn Barley Selected in Italy.**—STRAMPELLI, NAZARENO, in *L'Italia Agricola*, Year 54, No. 5, pp. 208-209, No. 6, pp. 240. Piacenza, May 15 and June 15, 1917.

721—**Thirty-seven Years of Spruce Selection, in Austria.**—REUSS, in *Centralblatt fur das gesamte Forstwesen*, Year 42, Pts. 11-12, pp. 383-417. Vienna, November-December, 1916. (3 pp. in Institute Bulletin).

723—**Fall-Sown Grains in Maryland and Virginia.**—STANTON, I. R., in *United States Department of Agriculture, Farmer's Bulletin* 786, 23 pp., 6 figs. Washington, D.C., February, 1917.

725—**Experiments in Oat-Growing in the North of Sweden.**—RHODIN, SIGURD, in *Kungl. Landtbruks Akademiens Handlingar och Tidskrift*, No. 2, pp. 150-160. Stockholm, 1917. (1 page in Institute Bulletin).

732—**The Contribution of Forestry to the Problem of Public Nutrition during the War, in Germany.**—BORGMANN, in *Tharandter Forstliches Jahrbuch* Vol. 67, Pt. 6-7, pp. 367-456. Berlin, 1916. (3 pp. in Institute Bulletin).

LIVE STOCK AND BREEDING

733—**Notes on Some Animal Parasites in British Guiana.**—BODKIN, G. E., and CLEARE, L. D., in the *Bulletin of Entomological Research*, Vol. VII, Pt. II, pp. 179-190. London, October, 1916. (2 pp. in Institute Bulletin).

734—**Mercury Compounds in the Treatment of Epizootic Lymphangitis.**—FINZI GUIDO, in *Bulletin de la Société de Pathologie exotique*, Vol. X, No. 6, pp. 428-430. Paris, June, 1917. (1 page in Institute Bulletin).

735—**Ulcerative Stomatitis in Horses.**—RENE, CH., in *Le Progrès agricole*, 31st

year, No. 1537, p. 311. Amiens, July 1, 1917.

736—**Rabies and Haemorragic Septicaemia in some Young Buffaloes, in Italy.**—MORI, NELLO, in *La Clinica Veterinaria*, Year XI, No. 7, pp. 177-191; No. 8, pp. 211-223. Milan April 15 and 30, 1917. (1 page in Institute Bulletin).

738—**Studies in Milk Secretion.**—HAMMOND, J., and HAWK, J. C., (*School of Agriculture, Cambridge*) in *The Journal of Agricultural Science*, Vol. VIII, part 2. I. The Effect of Nutrition on Yield and Composition, pp. 139-146. II. The Relation of the Glands of Internal Secretion to Milk Production, pp. 147-153. (2 pp. in Institute Bulletin).

Cattle Breeding in the Argentine Republic at the Present Day.—MARTINOLI, G., Professor of Zootechny, National University of Buenos Aires, in *International Review of the Science and Practice of Agriculture*, Year VIII, No. 8, pp. 1073-1084. Rome, August, 1917.

The Argentine cattle are descended from the Andalusian breed imported by the Spaniards at the beginning of their conquest. They excel neither in the production of meat nor in that of milk, but did good service so long as local and export demands were limited. During the second half of the the 19th century breeding cattle of various British races began to be imported. By far the greater number were Shorthorns. The cattle entered in the Argentine Herd Book to date are classified as follows: Shorthorn 93,833; Hereford 19,407; Aberdeen Angus 8,334; Red Shorthorns 334; Red Polled 211; Devon 35; Jersey 78 and Flemish 599.

The last estimate made in 1913 placed the number of cattle in Argentina at 30,796,000. With the exception of the bulls the cattle are kept on open pasture lands, and live almost exclusively on natural pasture or alfalfa; it is very rarely they are fattened by being fed maize, ensilage or bran, etc.

A serious problem, the rational solution of which will have a large influence on the future of cattle breeding in practically the whole of northern Argentina, is the improvement of the native "criolla" cattle. Such improvement is greatly hindered by "tristeza" (bovine piroplasmosis), and the climate. The "criollas" are relatively immune but the improved breeding stock introduced are very susceptible to the fever. Strenuous efforts are being made to eliminate the disease. The climate also has a very bad effect on the imported breeding stock, and attempts are being made to gradually acclimatize a certain number.

In 1914 Argentina exported 115,556 live cattle, 1,100,080 metric tons of frozen meat, 2,500 metric tons of "tasajo", and 153,000 metric tons of meat extracts and preserves. The live cattle are chiefly sent to the markets of the other South American Republics, and the frozen meat to the United Kingdom. In 1914, 3,211,485 cattle were slaughtered in the abattoirs, cold storage slaughter houses and the salt meat factories.

In 1908, 2,163,900 dairy cows were in milk in the Argentine; about 800,000 of these were Shorthorns. The average yield is very low, barely exceeding 220 gallons per annum. This low production is due to life in the open pasture lands, lack of fodder reserves, and lack of selection.

In 1915 Argentina produced 19,436,000 pounds of butter, and exported 10,185,000 pounds. In 1913 the production of cheese was 12,530,000 pounds and the imports 11,110,000 pounds. The following varieties of cheese are manufactured: Cheddar, Cheshire, Dutch, Fontina, Grana, etc. All are of excellent quality.

740—**Feeding Trials with Cattle at the Model Farm of Dikopshof, Germany.**—RICHARDSON, A., in *Landwirtschaftliche Jahrbucher*, Vol. 49, Parts 3-4. Berlin, 1916. (4 pp. in Institute Bulletin).

741—**I. Feeding Cottonseed Meal and Hulls to Dairy Cows.—II. Feeding Value of Cottonseed Meal vs. Cold Pressed Cottonseed Cake.—III. Feeding Value of Purchased Feeds vs. Pasture vs. Soiling Crops.**—MOORE, J. S., in *Mississippi Agricultural Experiment Station Bulletin* No. 174, pp. 1-16. Agricultural College, Mississippi, 1917. (3 pp. in Institute Bulletin).

742—**Skim Milk and Milk Substitutes for Calf Feeding.**—HUNZIKER, O. F., and CALDWELL, R. E., in *Purdue University Agricultural Experiment Station Bulletin* No. 193, Vol. XIX, pp. 1-104. Lafayette, Indiana, September 1916. (3 pp. in Institute Bulletin).

743—**The Production of Baby Beef.**—RAY, S. H., in *U. S. Department of griculture, Farmer's Bulletin* No. 811, pp. 1-24. Washington, D.C., April 1917.

During recent years the United States live-stock markets have undergone a great change which has reacted strongly on the breeding industry. This change is expressed by the ever-increasing demand for high-grade, well-fattened calves weighing from 900 to 1200 lbs. This demand could only be satisfied by animals of from 14 to 20 months belonging to the early-maturing beef breeds, Hereford, Aberdeen-Angus or Shorthorn. As this class of animal differs markedly from other beef classes it is called "baby beef."

The production of this type of cattle demands more skill than that of older

slaughter animals, since the latter is chiefly fed on the cheaper roughages of the farm. Farmers are also attracted to this industry by the increasing scarcity of feeder cattle, a scarcity often connected with the progressive increase in land-values, the cost of labour, taxes, etc., which, in many districts, make it difficult to realize profits on older cattle. Thus butcher's cattle of from 3 to 5 years bred on ranches were replaced, first by adult animals fattened on mixed farms, then by baby beef raised on intensive breeding farms. Baby beef is obtained by using the maximum producing capacity of the earliest maturing breeds, and by intensive feeding.

This change is due to many causes. Foremost of all is the fact that young cattle make better gains than older cattle on the same quantity of foodstuff. Yearlings can make 25 to 40 % more gain than mature cattle on the same amount of food. As the period of production is shortened, it is possible, with the same amount of feed and pasture, to increase the number of breeding cows and the number of calves produced every 18 months. Heifers, fattened on the same system, may be sold when 18 months old as they will then weigh from 900 to 950 lbs. and will have cost the same amount as the steers. When over 2 years they are already subject to he depreciation of all butcher's animals. Moreover, baby beef, when fattened for market under 2 years of age, allows the farmer to choose the moment when good prices may be realized, for, between the age of 14 months and 2 years the animal is always in good condition for the market. The period of fattening may thus be lengthened when prices are low and shortened when they are high. This greatly helps to keep the market steady. The consumer prefers the size and quality of the cuts from a well-bred, highly finished yearling, and markets, which are more stable for this class than any other class of cattle, are paying premium for this product. Prime baby beef usually commands a price equal to that of the highest grade of mature fat cattle.

All breeding farms are not suited to the production of baby beef, in fact there are certain conditions under which it is inadvisable. A good breed of early maturing cattle, good pasture and a plentiful supply of concentrated foodstuffs are essential to success.

As a rule pure-bred cows are not necessary, but they should have two or three crosses with a pure beef-strain to avoid a preponderance of dairy blood which prebents the successful rearing of baby beef. The most satisfactory results are obtained with pure-bred selected Aberdeen-Angus, Shorthorns and Herefords, and the herd bulls, in all cases, should be chosen from these breeds. The most recent experiments show that it is most advantageous to breed and fatten the calves on the same farm.

When breeding baby beef it is important to give them concentrated foodstuffs with a grain basis. Except in cases in which the cows produce a certain amount of milk during the weaning period it is best to give these foods to the calves as early as possible, that is to say, when they are from 4 to 6 weeks old. Where pasture is available, autumn-born calves are turned out to graze in spring; this enables the amount of roughage fed to be reduced to a minimum, while as much concentrated foodstuffs as possible is still given. In some cases very good pasture prevents the animal from consuming the desired amount of grain, and causes a set-back in the increase of weight. During the last fattening period pasture should not be used. Where winter pastures are available they will greatly decrease the cost of both growing and fattening the calves.

The baby beef industry also helps to develop the hog breeding industry, as the residues of the concentrated foodstuffs used may thus be best utilized. Shoats from 70 to 100 lbs. are used, and consume the undigested cereals given to the cattle. As maize is the chief concentrated foodstuff used during fattening, the breeding of hogs on the residues of the fattening adds greatly to the pro ts. From 1 to 2 lbs. of pork may be obtained for each bushel of maize fed to the alves.

Tables are given of the progressive quantities of concentrated foodstuffs which should be given to the calves month by month, both for those to be finished in 15 months and for those to be finished in 18 months, autumn and spring born calves being considered separately.

744—**The Shorthorn in Ireland.**—*Live Stock Journal*, Vol. LXXXVI, No. 2257, p. 3. London, July 6, 1917.

745—**Experiments in the Disposal of Irrigated Crops through the Use of Hogs.** HOLDEN, JAMES A., in *U. S. Dept. of Agriculture, Bulletin* No. 48, 25 p. Washington, D.C., Feb. 26, 1917.

The farmer who makes a success on high-priced irrigated land must not only grow large crops, but he must market these crops in the most advantageous way. Most crops grown in localities far removed from the large consuming centres should be marketed in condensed form, so as to reduce the cost of transportation. For example, a hundred pounds of butter can be shipped to market much more cheaply than the hay and grain required to produce this butter. The farmer should take advantage of this fact in organizing his operations. In addition to this saving, the manure resulting from the feeding of the crops makes it possible to produce larger crops in subsequent years.

Because of the relatively small capital and short time required to get a start in the swine industry and because of the high efficiency of hogs in utilizing certain field crops, swine production is a specially promising industry for irrigation farmers. In order to secure information regarding methods of utilizing hogs in the disposal of certain field crops produced on irrigated lands, experiments were conducted at the Scottsbluff Experiment Farm on the North Platte Reclamation Project in 1912, 1913, 1914 and 1915.

In three years' experiments, with eight lots of hogs, and during which alfalfa pasture was supplemented with a 2 per cent ration of corn, an average gain of 3.181 pounds per season was made from an acre of alfalfa pasture and 7.844 pounds of corn. It required an average of 2.47 pounds of corn in addition to alfalfa pasture to produce 1 pound of pork. If the gains are valued at 7 cents a pound and corn at 60 cents a bushel, or $1.07 a hundred-weight, the average annual return was $138.75 per acre of alfalfa pasture. If the corn fed is valued at 60 cents a bushel and the alfalfa pasture at $15 an acre the average cost of 100 pounds of gain was $3.11. If the average yield of the alfalfa plats in the same field is assumed to represent the yield of the pastured plats the hogs paid an equivalent of $25.13 per ton of hay.

In two years experiments with alfalfa pasture, with and without supplemental feed, an average annual return of $45.08 per acre was secured where no supplement was used as compared with $70.20 where a 1 per cent ration of corn was used—$128.49 from a 2 per cent ration of corn—$121.96 from a 2 per cent ration of barley, and $168.25 from a 3 per cent ration of corn. The rate of gain and the carrying capacity of the pasture increased with the quantity of grain fed. Ground barley appeared to be as good, pound for pound, as shelled corn as a feed for hogs on alfalfa pasture.

Sows and pigs on alfalfa pasture, with a 2 per cent ration of grain, made an average gain of 1,574 pounds per acre of alfalfa pasture from May 1 to July 1, or a net return of $66.84 per acre. When corn was used the return varied from $54.11 to $69.97 per acre, and when barley was used the return was $77.76 per acre.

In three years' experiments, hogging corn without supplementary feed produced an average of 896 pounds of gain, worth $65.72 per acre, or $1.50 per hundredweight of the estimated yield of corn.

In two years' experiments, hogging corn without supplementary feed produced an average of 744 pounds of gain, worth $52.08 per acre, as compared with 930 pounds of gain, worth $65.10, where the hogs had access to alfalfa pasture, and 1.029 pounds of gain, worth $72.03, where the hogs were fed tankage in addition to the corn. Where no supplementary feed was used the hogs paid $1.34 per hundredweight for the estimated yield of corn, as compared with $1.55 per hundredweight where the hogs had access to alfalfa pasture and $1.50 per hundredweight where tankage was used. The use of either alfalfa or tankage resulted in more rapid and cheaper gains than were secured where no supplementary feed was used.

746—**Profitable Pork Production in the United States.**—WALTER, H. B., in *Missouri State Board of Agriculture*, Monthly Bulletin, Vol. XIV, No. 8, pp. 21-25. Columbus, Mo., 1916.

The pork production branch of the live stock industry of the United States supplies over sixty per cent. of the meat diet of the country.

One reason the hog is such a great factor in meat supply is because of his prolificacy. The increase from cattle is estimated to be from 80 to 90 per cent in one year; of sheep it is from 100 to 150 per cent; while in hogs it is from 1000 to 1800 per cent yearly. The hogs can populate the farms with meat producing animals in a short time and *overcome any meat shortage that may exist.*

The hog is a very efficient animal because he can produce a pound of meat from less than any other animal. It requires about thirteen pounds of dry matter to produce one pound of gain in cattle, about eight to nine pounds in sheep and only four to five pounds in hogs.

The hog dresses a higher per cent of edible meat. Cattle dress from 60 to 65 per cent, sheep 55 to 60 per cent, while hogs dress from 75 to 80 per cent.

There is more energy in a pound of pork than in either a pound of beef or mutton. Comparing fresh ham with fresh hindquarter of beef and mutton, a pound of the ham has 60 % greater energy value than a pound of mutton and 45 % greater energy value than a pound of beef

The essentials in producing hogs at a profit in the United States are the following: the person engaging in the business must have a liking and capability for the business; have a good location; select well bred animals, have a reasonable amount of equipment; feed a balanced ration, *including pasture*; keep the herd free from disease; find or make a good market for the product and last, but not least, keep an account with the herd, so that it may be known whether the hogs are making a profit or loss, and how much.

747—**Breeding for Egg Production—A Study of Annual and Total Production.**—BALL, E. D., BYRON ALDER and EGBERT, A. D., in *Utah Agricultural College Experiment Station Bulletin* No. 148, 60 pp., 22 tables. Logan, Utah,

December, 1916. (1 page in Institute Bulletin).

749—**New Hive with Store Chamber: the "Sans Souci".**—FOURNIER, M., in *L'Apiculteur*, 61st Year, Nos. 3 and 4, pp. 50-54. Paris, March April 1917. (2 pp. in Institute Bulletin).

751—**On the Biology of the Shad (Alosa finta Cuv.) of the Algerian Coast.**—BOUNHIOL, J. P., in *Comptes rendus des Séances de la Société de Biologie*, Vol. LXXX, No. 10, pp. 480-483. Paris, May 19, 1917.

752—**Fish-breeding in Switzerland during 1916.**—*Bulletin Suisse de Pêche et Pisciculture*, Year XVIII, No. 5, pp. 75-78. Neuchatel, May, 1917. (1 page in Institute Bulletin).

FARM ENGINEERING

753—**Mechanical Cultivation in France.** DANTHIN, CH., in *Le Génie Civil*, Vol. LXX, Year 37, Nos. 15 and 16, pp. 237-240 and 256-260. Paris, April 14 and 21, 1917. (8 pp. in Institute Bulletin).

The writer emphasizes the importance of mechanical cultivation and gives an account of the legislative measures taken in France in order to encourage its development. He then examines the conditions which govern the use of mechanical power and describes the principal types of tractors tested during the last 2 years. He also gives an account of the economic results obtained in recent trials.

754—**The Actual Extent of the Use of Motor Tractors on American Farms.**—*The Economic World*, N.S., Vol. XIII, No. 14, pp. 482-483. New York, April 7, 1917. (1 page in Institute Bulletin).

755.—**The New Ford Tractor.**—I *Le Génie Rural*, Year 9, No. 67, p. 13. Paris, 1917.—II. *The Implement and Machinery Review*, Vol. 43, No. 507, pp. 293-294. London, July 1, 1917. (1 page in Institute Bulletin).

756—**The "Once-Over" Tiller.**—*The Implement and Machinery Review*, Vol. 43, No. 506, p. 176. London, June 1, 1917. (1 page in Institute Bulletin).

757—**Devices for Disabled Farm-hands.**—GUILLAUME, A. C., in *La Nature*, No. 2275, pp. 278-283. Paris, May 5, 1917.

In France, 70 % of the total number of labourers are employed on farm work, and it is therefore logical to suppose that the same proportion will occur among the wounded.

The writer reviews the various methods for making use of disabled men according to the type of and the possibility of their improvement. With regard to those who have been wounded in the lower limbs it would be best to eliminate them from work which required much walking or rapid movement. They could be utilized either for the indoor work of the farm or as drivers of tractors, or again for working stationary machinery such as threshers.

On the other hand, the place for a man with a disabled arm is in the fields; with the help of an artificial aid he is capable of performing various kinds of work in turn; drive a team, reap, even dig and look after crops and trees generally.

The improvement of injuries depends upon medical or surgical treatment and upon education. The latter involves the following:

a) Education of the healthy limb to act as leading aid. This will be the personal care of the wounded man himself.;

b)The modification of the stump, which forms a kind of preparation of the patient before receiving his apparatus. This is the domain of the doctor or surgeon;

c) The choice of the apparatus requires exceedingly careful study.

The devices for the lower limbs differ very little from those in ordinary use. They should be strong, not too heavy, and with interchangeable parts, easy to procure at a minimum expense.

A longer description is given of the devices for arms. These are highly specialized for agricultural use. The artificial aid consists of a cap fitting over the dama ed part and of a stem ending in a socket to receive a hook or other substitute for a hand.

Fig. 1 shows an apparatus for an arm amputated about third of the way down. It consists of: 1) a stem replacing part of the humerus; 2) a joint; 3) a stem representing the bone of the forearm and ending in a socket for artificial hand.

Instead of the straps which serve for a hand, the Jullien tool-holder is preferable for the farm labourer. The Bourreau series of hands permits of a much greater number of different actions than the other systems. They fit into the tool-holder and have the advantage of being interchangeable according to the different requirements.

Bourreau has thought out 6 different hands, of which 5 are for working purposes and one for use when at rest.

The working hands are: for navvy (fig. 3), for vine-dresser and forester (fig. 4 and

Devices for disabled farm hands

Fig. 1.—Forearm with elbow joint.

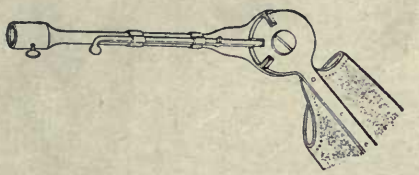


Fig. 2.—Elbow joint with bol for fixing arm at different angle.

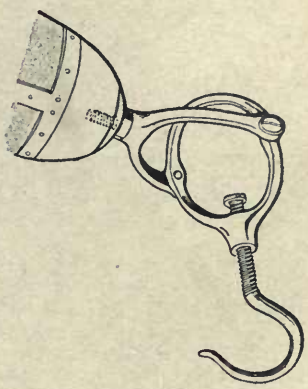


Fig. 3.—Hook for navvy.

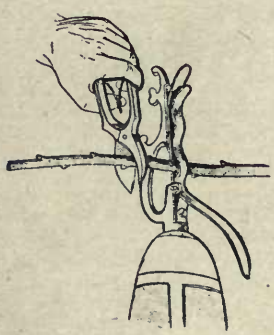


Fig. 5.—Hand for vine-dresser.

Fig. 4.—Hand for pruning.

Fig. 6.—For holding reins.

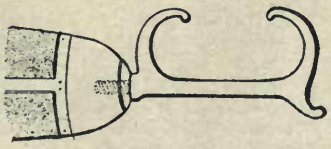


Fig. 7.—Hook for driver of tractor.

5), for driver of vehicles (fig. 6) and two hands for drivers of tractors (fig. 7.)

These devices allow all wrist movements to be copied. The hand for the navvy is formed of a moveable ring furnished with a hook, which can either swing or be fixed. It can serve for a number of actions: digging, ploughing, pushing a wheel-barrow, pulling a hand-cart, working a pump, holding a pail, a basket, etc., loading manure, driving a cart.

For driving a team the hook is replaced by a reingrip which allows the driver to drop the reins easily when necessary. The hands are capable of being used for pruning and certain indoor jobs, such as the preparation of scions for the vine-dresser, cuttings for the gardener, etc.

The object of the double hook for motor drivers is to allow of the movements of pushing and pulling and such other actions as are required for working the levers.

759—**Mechanical Installation for a Stable (Naegeli Patent.)**—*Le Génie Rural*, Year 9, No. 68, pp. 12-13. Paris, 1917. (3 pp. in Institute Bulletin).

The object of this invention is to equip a stable in such a way as to reduce the amount of labour to a minimum. It is particularly intended for carrying food and litter and distributing same among the stores, at the same time removing the manure by means of endless conveyors, elevators, etc.

760—**Reinforced Concrete Buildings.**—ESPIÉALLIER, G., in *Le Génie Civil*, Vol. LXX, No. 20, pp. 322-324. Paris, May 19, 1917. (2 pp. in Institute Bulletin).

761—**The New Decauville Cement Brick.**—LANORVILLE, GEORGES, in *La Nature*, No. 2278, pp. 326-329. Paris, May 26, 1917. (1 page in Institute Bulletin).

M. Decauville has invented a new brick already used with success in constructing water-wings, and which will be very useful in constructing farm buildings cheaply and rapidly.

RURAL ECONOMICS

762—**Labour Requirements of Crop Production.**—COOPER, T. P., PECK, F. W., and BOSS, A., in *The University of Minnesota Agricultural Experiment Station, Bulletin* No. 157 (Division of Agronomy and Farm Management), pp. 1-55. University Farm, St. Paul, Minnesota, March, 1916. (8 pp. in Institute Bulletin)

The cost of producing farm products under actual farm conditions has been studied at the University of Minnesota Experiment Station for more than 10 years (1). The data thus obtained have been used to determine the actual labour requirements of farm crops in terms of man and horse hours per acre and to define some of the principles underlying the use of man labour on the farm, so as to furnish a basis which will allow a better estimation of the cost of production.

A summary of the above Bulletin is given in the Institute Bulletin.

(1) Cf. HAYS, W. M., and PARKER, E. C., The Cost of Farm Products, in *U. S. Dept. of Agriculture, Bureau of Statistics, Bull.* 48, and *Minnesota Experiment Station Bull.* 97, 1906.

PARKER, E. C., and COOPER, THOMAS, The Cost of Producing Minnesota Farm Products, *U. S. Dept of Agriculture, Bureau of Statistics, Bull.* 73, and *Minnesota Experiment Station Bull.* 117, 1910.

COOPER, THOMAS, The Cost of Minnesota Dairy Products, *U. S. Dept. of Agriculture, Bureau of Statistics, Bull.* 88, and *Minnesota Experiment Station, Bull.* 124, 1911.

PECK, F. W., The Cost of Producing Minnesota Farm Products, 1908-1912. *Minnesota Experiment Station, Bull.* 145, 1915.

763—**Labour Requirements of Dairy Farms as Influenced by Milking Machines.**—HUMPHREY, H. N., in *U. S. Department of Agriculture, Bulletin* No. 423 (Professional Paper by the Office of Farm Management), pp. 1-18. Washington, November 25, 1916.

This bulletin gives the results of a series of studies on the organization of dairy farms, undertaken to determine the influence of the introduction of milking machines on the amount and distribution of labour on such farms.

The data were obtained from 109 New York dairy farms, 56 of which were using mechanical milkers, and from 160 farms in Ohio, Michigan and Illinois, 100 of which were using milking machines. Whereas, on the New York farms, dairy produce represented 90 % of the total business, on the other farms labour was largely devoted to general farming.

The principal facts obtained are as follows:

The time gained by mechanical milking increases with the number of dairy cows in the herd. In herds of 15 cows or less, the average time required to milk one cow by hand is more than 7 minutes, and the corresponding time by machine less than 5 minutes. In herds of more than 50 cows the average time for hand-milking is a

little less than 7 minutes, for machine milking, 4.15 minutes. In herds of more than 50 cows one man can milk 28 cows by machine, whereas, by hand he can only milk 17.

The cost of hand milking changes but little with an increase in the herd, whereas that of machine milking decreases rapi ly.

The average annual cost of milking a herd of 15 cows by hand is $10.91 per cow; in herds of 50 cows this cost is $10.45. In the first case mechanical milking costs $11.77, in the second, $7.34.

This does not mean that, in herds of less than 15 cows, mechanical milking is more expensive than hand milking. On 32 farms with less than 15 cows, machine milking allowed an annual economy of $2.63 per cow as the result of labour saved.

The appended table gives a summary of the labour employed on farms milking by hand and those milking by machine in the states of New York, Michigan, Ohio and Illinois. The total area and the labour devoted annually to crops (i.e. not including the meadows) are taken into consideration).

Farms without milking machines

State	Number of farms	Average size (acres)	Number of men employed per farm per acre	Acres of crops raised per farm	Acres of crops per man	Number of dairy cows per farm	Number of dairy cows per man
New York	53	191.4	2.16	73.8	34.2	30.8	14.3
Michigan, Ohio, Illinois	60	146.7	2.14	90.75	42.4	20.5	9.6
Farms with milking machines.							
New York	56	213.9	2.12	71.4	33.7	34.9	16.5
Michigan, Ohio, Illinois	100	166.4	2.22	98.3	44.3	23.7	10.7

The Michigan, Ohio and Illinois farms have a larger proportion of acreage under crops than many of the New York farms. They raise more crops per man employed and keep fewer dairy cows. From the point of view of the labour employed they are better organized than the New York dairy farms. Moreover, owing to the lack of good milkers and the high wages demanded, mechanical milking is of great importance on these farms.

764—**The Theory of Correlation as Applied to Farm Survey Data on Fattening Baby Beef.**—TOLLEY, H. R., in *U. S. Dept. of Agric., Bulletin* No. 504, Professional Paper; Office of Farm Management, pp. 1-14. Washington, May 23, 1917. (1 page in Institute Bulletin).

AGRICULTURAL INDUSTRIES

768—**Home-Made Beet Syrup as a Substitute for Sugar.**—TOWNSEND, D. C., and GORE, H. C., in *United States Department of Agriculture, Farmers' Bulletin* 823, pp. 13. Washington, May 1917

The authors describe a method for the manufacture of beet sugar (Patent No. 1,555,806 of October 5th, 1915).

The beets are carefully cleaned by soaking for a few minutes and then washing with a brush. A barrel is placed upright and the beets finely sliced with a sharp knife on the barrel, so that the slices fall inside. Boiling water is then immediately poured over the beets so that they are well covered. The barrel is then covered, wrapped in a cloth folded many times, and left for an hour; from time to time it is shaken without being uncovered. The liquid is then filtered through a cloth or run out through a tap in the cask. The filtered liquid is then evaporated over an open fire till it becomes syrupy. Thirty-five litres of beet give 70 litres of slices which are covered with 38 litres of boiling water. The slices are not crushed after maceration; as they still contain a little sugar they make an excellent food for poultry, pigs, etc. The scum which rises during heating must be carefully removed, by this means the syrup loses the disagreable taste of the beets. The syrup, while still hot, is put into boxes or bottles, which are carefully closed up so as to prevent the formation of moulds.

769—**Method of Bread-Making with Previously Soaked Grain.**—LINDET, in *Comptes Rendus de l'Académie d'Agriculture de France*, No. 18, pp. 508-513. Paris, May 16, 1917.

The French Department of Agriculture nominated a special commission to study the method of bread-making tested at Bergamo (Italy) (1). The commission used good Australian wheat and medium La Plata wheat. Half of each wheat was ground, all the products mixed and worked in the usual way. The other two halves were heated by the Italian method, and all the bread cooked in the same oven. The bread made with soaked wheat and that

(1) See also *Bulletin of Foreign Agricultural Intelligence*, November 1916, No. 679.

made with ground wheat differed very slightly in appearance. As regards taste the results were as follows:

No. 1) Australian ground wheat: slightly unpleasant.

No. 2) Plata ground wheat: marked taste of bran making it slightly sour.

No. 3) Australian soaked wheat: sour.

No. 4) Plata soaked wheat: unpleasant.

Whole-meal bread made with ground grain is superior to whole-meal bread with soaked grain. This latter method can only be used with well-cleaned and well-washed wheat.

770—**Utilization of Rotten Potatoes in the Manufacture of Starch.**—I. Observations de M. DUCOMET.—II. Remarques de M. GIRARD, A., Ch. in *Comptes rendus des Séances de l'Académie d'Agriculture de France*, Vol. 3, No. 26, pp. 716-719. Paris, July 11, 1917.

771—**Some Observations upon the Relation of Humidity to the Ripening and Storage of Fruits.**—SHAMEL, A. D., in *The Monthly Bulletin of the California State Commission of Horticulture*, Vol. VI, No. 2, pp. 39-41. Sacramento, California, February, 1917. (1 page in Institute Bulletin).

772—**Temperature Relations of Apple-Rot Fungi.**—BROOKS, C., and COOLEY, J. S., in the *Journal of Agricultural Research*, Vol. VIII, No. 4, pp. 139-163. Washington, D.C., January, 1917. (1 page in Institute Bulletin).

PLANT DISEASES

774—**Decree of the Italian Minister of Agriculture Regulating the Issue of Certificates of Immunity to Growers and Sellers of Plants or Portions of Plants.**—*Gazzetta ufficiale del Regno d'Italia*, Year 1917, No. 180, p. 3443. Rome, July 31, 1917.

775—**Factors Determining the Occurrence of "Silver-Leaf" on Trees.**—PETRI, L., in *Annali del R. Istituto sup. forestale nazionale*, Vol. II, 11 pp. Florence, 1917. (1 page in Institute Bulletin).

777—**On the Specific Susceptibility of Barley to Leaf Stripe Disease (Helminthosporium gramineum).**—KIESSLING, in *Zeitschrift fur Pflanzenzuchtung*, Vol. 5, Part 1, pp. 31-40. Berlin, March, 1917. (2 pp. in Institute Bulletin).

INJURIOUS INSECTS

781—**New Mites, mostly Economic (Arach. Acar.)**—BANKS, N., in *Entomological News*, Vol. 28, No. 5. pp. 193-199. Philadelphia, May, 1917.

782—**Relation between Climate and Life-Cycle of the Tussock Moth (Liparis monacha = Lymantria monacha)**—.SEDLACZEK, in *Oesterreichische Forst- und Jagdzeitung*, Year 34, No. 44, pp. 259-260. Vienna, 1916. (1 page in Institute Bulletin).

785—**Ceratomyza femoralis ("Wheat-sheath Miner"), a Dipterous Pest of Wheat.**—SEAMANS, H. L., in *Journal of Agricultural Research*, Vol. IX, No. 1, pp. 17-25. Washington, D.C., 1917. (1 page in Institute Bulletin).

787—**The Horse-Radish Flea-Beetle (Phyllotreta armoraciae Koch): its Life History and Distribution.**—CHITTENDEN, F. H., and HOWARD, NEALE F., in *United States Department of Agriculture Bulletin* 535, pp. 1-16. Washington, D.C., 1917.

788—**Notes on the Black Apple Leaf-Hopper (Idiocerus fitchi Van D.).** —BRITTAIN, W. H., and SAUNDERS, L. G., in *The Canadian Entomologist*, Vol. XLIX, No. 5, pp. 149-153. London, May 1917.

This insect was first described by Fitch as existing in New York State, but seems to occur generally in the North-eastern United States and anada. It is also very common in the Annapolis Valley of Nova Scotia.

Contrary to the opinion generally held it has been proved experimentally that *Idiocerus fitchi* Van Duzee does not do serious damage to fruit trees, and that even a large number of these insects in an orchard does not justify the alarm sometimes caused by their appearance.

A description is given of the different life stages of the insect.

Fitch records this species as living on *Crataegus* and Osborne mentions it on *C. Oxyacantha* and on crab. In Nova Scotia it is very common on apple and pear trees in spring and early summer.

The eggs begin to hatch several days before the apple blossom petals open and

continue for some time after their fall, that is to say, generally from the latter part of May to the beginning of June. The nymphal stage lasts from 7 to 8 weeks. Some days after emergence copulation takes place, and, shortly after this, the eggs are laid. By means of her beak the female makes a hole, usually in the fruit spur, or in a roughened surface on one of the smaller twigs, and deposits an egg therein. There is only one brood a year, the winter being spent in the egg stage.

A bibliography of 8 references is given.

AGRICULTURAL ECONOMICS

INTERIOR COLONIZATION IN CALIFORNIA

The legislature of California in 1915 passed a law providing for a commission to "investigate and consider the question of land colonization, and the various forms of land banks, co-operative credit unions and other rural credit systems adopted or proposed in this country or elsewhere, with especial view to the needs of the rural communities of this State".

Since 1910 questions of land tenure have assumed a hitherto unthought of importance in the United States. The causes for this are the disappearance of free, fertile lands, the rising prices of privately owned farm lands, the increase of tenant farming and the growing attractions of city life which lead young people to leave the farms.

The State of California has had no State land settlement policy but has left the matter entirely to unregulated private enterprise. There has been no public control of the selection of colonists, and no public scrutiny of the soil and conditions of purchase.

The task of the commission has been to study the methods and results of private colonization in California in recent years, and compare them with those found in other countries in which colonization is helped and directed by the State. The endeavour has been to get as much first-hand information as possible. Statements have been obtained from many settlers in nearly all parts of the State in which colonization has recently been active. Conferences with men active in m tters of colonization and with interested commercial bodies have been held.

The results of the commission's investigations have been arranged in a report, published in 1916, which we will analyse in detail.

AGRICULTURAL CONDITIONS IN CALIFORNIA

California has an immense area of fertile and unpeopled land. Only eleven million out of the twenty-eight million acres of farm land are being cultivated. Nevertheless comparatively few settlers are immigrating and many who arrived in recent years have gone away. Costly advertising and still more costly personal solicitations have failed to attract colonists. The principal causes for this arrested development seem to be the high prices of land, the high rates of interest, and the short terms which colonization contracts allow for payment. Moreover great properties, owned by nonresidents, ought to be subdivided and cultivated by residents. 310 landed proprietors own more than four million acres of land suited to intensive cultivation and capable of supporting a dense population.

The enquiry obtained the following data as to the financial condition of settlers:

Number of settlers interviewed 991; average area of a farm 37 acres; average price paid for unimproved land $160 (minimum $56 and maximum $512); average time allowed for payment 5.8 years; average capital of settler $4,814; average cost of improvements $2,367 (minimum $850 and maximum $6.615); number of colonists still debtors 719; average amount of indebtedness $2,931; average rate of interest 8 per cent when money is furnished by a bank or privately, 6.9 per cent when it is furnished by contract.

In the whole of California the rate of interest on deferred payments for land and money borrowed to pay for land or its improvement or stocking varies from 6 to 10 per cent and the time allowed for repayment from three to eight years.

The following table shows the average price per acre in 1916 of farm land in the United States:

Geographical Division	Improved Lands	Unimproved Lands
North Atlantic States	$ 64.30	$ 38.71
South Atlantic States	38.02	23.79
North Central east of Mississippi River	100.67	74.95
North Central west of Mississippi River	78.21	59.68
South Central	33.38	24.09
Far West	102.58	58.40
California	180.00	110.00

As regards the prices paid by colonists in California for their lands these averaged according to their own statements $190.72 an acre, according to the statements of the commercial bodies in the State $260.97. an acre. The purchase price of unimproved land is, in fact, higher in California than in other parts of the United States or in countries which have a State system of land settlement.

The comparison of the price of land and conditions of land purchase in California with those obtaining elsewhere makes it seem wonderful that settlers in California pay for farms in from three to ten years while in other countries it takes them from thirty to seventy-five years to do so. The explanation is that in California the settler who has not had a large capital in cash or some outside income has not been able to buy a farm at all.

The experience of practically every colonizing company, no matter how successful, shows that it would have been better, both for the settlers and for the company, if the original enterprise had been organized on a basis which gave the settlers more money for improvements and a longer time in which to pay for their farms.

In the past men paid for land in California in five years: but the task of paying for a farm out of its products has become much harder in the last ten years. Thus when colonization began in Orland the price of land was from $10 to $40 an acre. The same land, unimproved, now sells for from $75 to $150 an acre and the water right costs an additional $40 an acre.

In fact, throughout the area of colonization the price of land has been multiplied by from two to ten, while the profits of farming have increased little if at all. Hence some years ago men who bought land at $50 an acre could pay high interest and also free themselves from debt, while those who have bought recently have to struggle even to pay interest.

The higher prices of land have made intensive cultivation necessary, and this entails costlier improvements and equipment. The investigation of the United States census showed that while the average area of a farm diminished between 1900 and 1910, the average capital invested in it increased by 86 per cent.

The average cost of improvement and equipment also increases as the size of the farm diminishes. Even if the cost of a house and stable on a twenty acre farm is no more than it used to be on a farm of 160 acres, its average cost per acre is about eight times as great.

The estimates made by the commercial organizations show that the ultimate cost of improvements on the small intensively cultivated farms averages $180 an acre.

The short time given in which to pay for land in most contracts of colonization implies a profit following on cultivation of between 20 and 25 per cent of the cost of land and equipment. Such profits are occasionally made but they are not the rule. Investigations of the United States Department of Agriculture shows that the fully improved farm rarely pays more than 5 per cent on the investment; if reasonable allowance be made for the wages of the farmer and his family.

The United States Reclamation Service has kept a careful census of the yield and value of crops grown under federal projects. It reports the following as the average values of crops: $31 an acre in 1910, $27 an acre in 1911, $26.60 an acre in 1912, and $24.50 in 1913. The reductions are mainly due to the declining prices of products, and prices for the last two years are higher. The total area cultivated under various projects, namely 1,364,149.9 acres (of which 703,424 were cultivated under government reclamation projects) was found to yield a crop worth, on an average. only $23.45 an acre.

In all districts exceptional single farms and single acres yielded far more than the average returns. For example single acres in Orland planted with citrus fruits have brought in $249 each, and single acres planted with small fruits $252 each. Single acres devoted to truck farming in Californian colonies have brought in more than $100 each. But plans for payment for colonists' farms should of course be based not on exceptional instances but on averages.

The United States census gave $43.50 an acre as the gross value of crops grown on irrigated land in California, but beginners cannot expect to reach this average because the calculation covered the highly improved orchards and vineyards in full bearing. Alfalfa crops, which are the beginner's main dependence, had an average value of only $22.94 an acre. Even in such industries as the growing of citrus fruits, which need a large investment in land, a long wait for returns, and exceptionally skilful and careful cultivation and marketing, the net profits over and above expenses of cultivation only average, according to a report prepared by the California Citrus Growers' Association, 4.3 per cent on land valued at $1,000 an acre.

Real estate agents from the overdone and less profitable fields of the Middle West flocked to California, not to develop agriculture but to exploit it. The prosperity of the settler was his own affair. The land agent's business was to make money out of him rather than to make money for him.

The underlying causes for much of the failure of the colonizing schemes are: 1) the selection of unfit land; 2) the selection of unfit settlers; 3) ignorance, on the part

of the promoters, of proper colonizing methods, and, on that of the settlers, of the crops they should grow and how and when they should plant them; 4) the excessive cost of land; 5) the insufficient capital of the settler; 6) the excessive rates of interest on borrowed money and deferred payments; 7) the short terms allowed for payment; and 8) improper marketing facilities.

CONCLUSIONS AND RECOMMENDATIONS

After having made a detailed exposition of the position of agriculture in California, and having noticed all the disadvantages and abuses due to the complete liberty left to individuals as regards colonization, the commission advances, in the last part of its report, its conclusions and recommendations on which legislation should be based.

In the first place the commission considers that the State should have a land settlement policy and deal with this matter as a public problem.

In the greater part of the United States there has been little need for public supervision of rural development. The kind of crops which can be grown and the preliminary outlay they require are so restricted that little variation in methods is possible. It is otherwise in California. There much of the best land has to be irrigated, much has to be drained, and some has to be protected against floods. Every acre of irrigated land must have a right to water, and the character of such right is nearly as important as the validity of the title to the land. To prepare some areas properly for settlement involves an immense expenditure of money. It is practically impossible for an immigrant to protect himself against misrepresentation in these matters.

Water and climate, as well as soil, influence the value of agricultural land in much of California. Wherever irrigation is required plans for colonies should provide for the efficient use of streams. As the irrigated area extends and population increases, so does the demand for water increase and in like measure the struggle for its control. In great irrigable areas, like the San Joaquin and the Sacramento valleys, all agriculture will in time be bound together by a common dependence on the streams. For this reason the ultimate results will be more satisfactory if colonization is carried out in accordance with a carefully thought out plan embracing all the irrigable land in each watershed.

State supervision of colonization ought not to include ordinary sales of land among individuals but only enterprises, of sufficient magnitude to have public importance, which seek to attract settlers, unacquainted with local conditions, from a distance or from a particular neighbourhood. It should be the aim of such supervision to provide: 1) that adequate attention has been given to water supplies and drainage in irrigated areas; 2) that the land is suited to the purposes for which it is being sold; 3) that there is no misrepresentation in advertising. It should also aim at helping those engaged on colonization by pointing out to them features in their plan which are likely to lead to failure.

In the past settlers and land settlement have been helped by the large increase in the price of land which accompanied development. This made it possible to borrow money for improvements or to sell a part of the original purchase for nearly as much as it all cost at first. This aid must be replaced by a more generous system of personal credit and more efficient and cheaper methods of preparing farms for intensive cultivation.

The experience of other countries and of some American colonizing enterprises indicates that it is cheaper for an organization having ample capital to level and sow the land and finance the building of houses, rather than leave this work to the individual settler.

The commission makes the following suggestions as to the future financing of settlers in California:

1) They should have from twenty to thirty years in which to pay for their land;

2) After they have made the initial payment they should be required to pay nothing further on principal for the first two years, but the selling contract should stipulate the character of the improvements they must make;

3) The payment for land should be amortized; and the amount of annual or semi-annual payments equal throughout the period of payment.

It also seems desirable that the State should establish one or more offices in which information as to approved colonizing enterprises could be obtained. California might, like West Virginia, distribute printed lists of land held by approved enterprises, stating the conditions of settlement and what crops might be grown on them.

The commission believed that over a considerable part of America the different States will soon have made colonization a public matter. In the east this will be done to lessen tenant farming and improve agricultural practices, in the west to settle unoccupied and uncultivated land rapidly. The tendency towards the adoption of this policy in the west is shown by the decision of the United States Reclamation Service to level and improve farms before offering them for settlement; by the introduction of and hearings on the Crosser Bill which, if enacted, will go far towards financing settlers on public lands; and by the report of the Co-operative Land Settlement Board in Wyoming, which has recommended that

the federal government build irrigation works, and the State subdivide the land, select settlers. and finance their necessary improvements. It is understood that legislation to carry these recommendations into effect is being framed.

The immense area of land in the large estates of Cailfornia would make progress too slow if it depended entirely on action by the State; but the State can do much to promote the adoption of right policies by showing on a model colony the advantages of considering real agricultural development rather than local or immediate benefits. It is suggested that for this an area of about 10,000 acres be taken, from which there would have to be deducted approximately 300 acres for roads, canals, schoolhouses and recreation grounds, and 100 acres for farm labourers' allotments and a few small orchards and gardens. There would remain 9,600 acres or enough land to provide about two hundred farms varying in size from 20 to 100 acres. If these farms were all settled by alert, ambitious young men and women the advantage to agriculture in California would be great. The value of the demonstration would be increased if no settlers were admitted who were not experienced and trained, between eighteen and thirty years old, possessed of no farm land elsewhere in the State, and able themselves to reside on and cultivate their farms. The land should be paid for in thirty-six years, the initial cash payment being 5 per cent while interest at 4½ per cent, and amortized annual payments of 1½ per cent of principal should begin at the end of the fourth year, the settler paying for his land and having a clear title while he does so by paying 4½ per cent on the cost in the first four and 6 per cent in the remaining thirty-two years. Each settler should be required to have enough capital to pay in cash one fourth of the cost of all improvements made by the State, the payment of the other three fourths to be amortized and bear the same interest as payments for the land. It is believed that on these terms existing financial institutions can give whatever credit is necessary for buying stock, including dairy cows.

The selection of colonists should be entrusted to a board, and the subsequent management to a single competent superintendent reporting to this board. The State agricultural college should systematically provide information as to farming, and the superintendent should advise as to buying live stock and equipping farms. The State should, by contract, build houses, level land for irrigation, and lend money to settlers, within a fixed maximum limit, on insurable improvements carried out under the direction and to the satisfaction of the authorities in control.

The prices of farms, after subdivision, should be so adjusted that they pay for land lost on roads and canals, interest on the cost of the land between the time of subdivision and the time of settlement, and all other incidental expenses.

The selection of the land should be entrusted to an expert committee who would buy it at its productive value. This policy would, if it were understood, be a guarantee to settlers that they were getting their money's worth. The land might be paid for with State bonds bearing interest at the rate of perhaps 4 per cent, or it might be bought under a contract by which the landowner gave deeds to the settler directly, the State guaranteeing his payments and having the right to complete the purchase and enter into full ownership at any time deemed advisable. Existing State authorities could plan the works for a water supply, subdivide the area and fix the size of farms. The amount of capital to be provided for financing the settlers could be greatly reduced by making full use of the possibilities of loans under the Federal Farm Loan Act.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the September number of the International Review of Agricultural Economics. Persons interested in any of the articles in this list may obtain the original Bulletin on application to the Institute Branch, so long as the supply for distribution is not exhausted:

THE WORLD'S LIVE STOCK AND THE WAR

BY T. K. DOHERTY, LL.B.

The purpose of this article is to investigate the numbers of live stock in the world over a period immediately before the war and compare them with the numbers ascertained in years nearest to the present. The data necessary for such an enquiry are not at all complete; in many countries the numbers of live stock are not ascertained annually, as they are in Canada and the United States, but only in census years, so the data available do not coincide with the period under consideration. Not only is recent information not at hand for Germany and her Allies, but for some of the Entente Allies, such, for instance, as Italy, and India, and for Argentina, the chief exporting neutral. However, from the presentation in the following tables "A" and "B," of such details as are available, a useful comparison may be made between certain groups of countries and a more general survey made of others. The data for Italy and Argentina, and a few other less important countries, although for years that do not permit of proper comparison, are, for the purpose of illustration, placed alongside of comparable data. The latter alone, however, figure in the group totals.

In so far as possible the grouping has been made to show separately our allied countries which are importers (Group I), the neutrals which are importers (Group II), the Allies and neutrals which are exporters (Group III), and miscellaneous other countries which have furnished the Institute incomplete reports and for years that make comparison difficult (Group IV).

In table "A," for each country separately the differences between the earlier and later years mentioned have been established to show either an increase or a decrease in the number of live stock as the case may be. Increases are indicated by a plus sign and decreases by a minus sign.

In table "B" the totals of the first three groups are similarly compared and the differences stated, so that some general idea may be formed as to whether the European demand can be met from the Overseas supplies that appear available.

TABLE A

COUNTRIES	Date of Enumeration	Horses	Milch Cows	Other Cattle	Sheep	Pigs
Group I:—						
Great Britain & Ireland	June 5, 1916	2,108,445	4,499,321	7,952,219	28,849,655	3,615,891
	June 4, 1914	1,915,533	4,576,852	7,567,711	27,886,095	3,939,887
		(+ 192,912)	(— 77,531)	(+ 384,508)	(+ 963,560)	(— 323,996)
France	July 1, 1917	2,282,560	6,238,690	6,204,614	10,586,594	4,200,280
	July 1, 1916	2,281,415	6,337,799	6,386,147	12,079,211	4,448,366
	Dec. 31, 1913	3,222,080	7,794,270	6,993,440	16,131,390	7,035,850
		(— 939,520)	(—1,555,580)	(— 788,826)	(—5,544,796)	(—2,835,570)
Italy	March, 1914	.....	.....	6,646,000(a)	13,824,000	2,722,000
	1908	955,878	.....	6,198,861(a)	11,162,926	2,507,798
				(+ 447,139)	(+2,661,074)	(+ 214,202)
Group II:—						
Spain	Dec. 31, 1916	488,715	.....	3,070,903(a)	16,012,277	2,814,465
	Dec. 31, 1912	525,853	.....	2,561,894(a)	15,829,954	2,571,359
		(— 37,138)		(+ 509,009)	(+ 182,323)	(+ 243,106)
Denmark	July 12, 1917	572,412	1,147,183	1,310,975	480,007	1,650,623
	Feb. 20, 1917	538,395	1,140,649	1,312,204	267,979	1,980,727
	July 15, 1914	567,240	1,310,268	1,152,594	514,918	2,496,706
		(+ 5,172)	(— 163,085)	(+ 158,381)	(— 34,911)	(— 846,083)
Switzerland	Apr. 19, 1916	136,613	848,652	766,993	171,635	544,021
	Apr. 21, 1911	144,128	796,909	646,574	161,414	570,226
		(— 7,515)	(+ 51,743)	(+ 120,419)	(+ 10,221)	(— 26,205)
Netherlands	Apr. 1917	.....	1,234,375	1,066,632	520,810	1,185,565
	June, 1913	.....	1,109,679	986,213	842,018	1,350 204
			(+ 124,696)	(+ 79,712)	(— 321,208)	(— 164,639)
Norway	Sept., 1916	189,175	.....	1,119,306(a)	1,281,030	221,217
	Sept., 1915	186,217	.....	1,120,517(a)	1,329,559	208,552
	Sept., 1910	167,714	.....	1,133,613(a)	1,398,383	333,709
		(+ 21,461)		(— 14,307)	(— 117,353)	(— 112,492)
Sweden	June 1, 1916	701,099	1,769,689	1,143,470	1,198,469	1,065,396
	Dec. 31, 1913	596,188	1,843,074	879,572	972,394	977,612
		(+ 104,911)	(— 73,385)	(+ 263,898)	(+ 226,075)	(+ 87,784)
Group III:—						
Canada	June 30, 1917	3,412,749	3,202,283	4,718,657	2,369,358	3,619,382
	June 30, 1916	3,258,342	2,833,433	3,760,718	2,022,941	3,474,840
	June 30, 1914	2,947,738	2,673,286	3,363,531	2,058,045	3,434,261
		(+ 465,011)	(+ 528,997)	(+1,355,126)	(+ 311,313)	(+ 185,121)

TABLE A

COUNTRIES	Date of Enumeration	Horses	Milch Cows	Other Cattle	Sheep	Pigs
United States	Jan. 1, 1917	21,126,000	22,768,000	40,849,000	48,483,000	67,453,000
	Jan. 1, 1916	21,159,000	22,908,000	39,812,000	48,625,000	67,766,000
	Jan. 1, 1914	20,962,000	20,737,000	35,855,000	49,719,000	58,933,000
		(+ 164,000)	(+ 2,031,000)	(+ 4,994,000)	(— 1,236,000)	(+ 8,520,000)
New Zealand	Jan. 31, 1917	367,167	760,108	1,742,592	24,753,324	278,156
	Apr. 1, 1911	404,284	804,078	1,216,093	23,996,126	378,754
		(— 37,117)	(— 43,970)	(+ 526,499)	(+ 757,198)	(— 100,598)
South Africa	 1913	.....	.....	.....	35,710,843	.....
	 1911	714,414	.....	5,796,949(a)	33,473,410	.....
					(+ 2,237,433)	
Argentina	Dec. 31, 1913	9,366,455	.....	30,796,447(a)	81,485,149	3,197,337
	Census, 1908	7,537,314	.....	29,124,336(a)	67,383,962	1,404,269
		(+ 1,829,141)		(+ 1,672,111)	(+ 14,101,187)	(+ 1,793,068)
Australia	 1915	2,378,514	.....	9,931,345(a)	69,244,603	752,961
	 1913	2,251,983	.....	11,483,882(a)	85,057,402	800,505
	 1900	1,609,654	.....	8,640,225(a)	70,602,995	950,349
		(+ 126,531)		(— 1,552,537)	(— 15,812,799)	(— 47,544)
Brazil	 1916	6,065,230	.....	28,962,180(a)	7,264,920	17,329,210
	 1912	7,289,690	.....	30,705,400(a)	10,549,230	18,400,530
		(— 1,224,460)		(— 1,743,220)	(— 3,345,010)	(— 1,071,320)
Uruguay	 1916	.....	.....	7,702,442(a)	11,482,251	.....
	 1908	.....	.....	8,192,602(a)	26,286,296	180,099
Group IV:—				(— 490,160)	(— 14,804,045)	
British India	 1914					
	 1915	1,653,379	37,481,273	48,644,710	23,015,836	.....
	 1912					
	 1913	1,554,830	35,711,694	47,022,902	22,934,265	.....
		(+ 98,549)	(+ 1,769,579)	(+ 1,641,808)	(+ 81,571)	
Chili	 1915					
	 1916	442,642	.....	1,869,053(a)	4,557,800	258,025
	 1913					
	 1914	457,845	.....	1,968,620(a)	4,602,317	221,384
		(— 15,203)		(— 99,567)	(— 44,517)	(+ 36,641)
Tunis	Apr. 30, 1916	30,963	86,376	153,613	1,147,910	10,252
	Dec. 30, 1913	37,416	.....	217,304(a)	728,540	17,399
		(— 6,453)		(— 63,691)	(+ 419,370)	(— 7,147)
Egypt	 1916	34,403	.....	492,650(a)	687,696	8,580
	 1913	47,911	.....	637,098(a)	.....	.....
		(— 13,508)		(— 144,448)		
Russia-in-Europe	 1916	23,007,539	.....	37,562,954(a)	59,950,742	16,299,508
(47 governments)	 1914	20,600,608	.....	28,926,122(a)	37,691,318	12,132,524
		(+ 2,406,931)		(+ 8,636,832)	(+ 22,259,424)	(+ 4,166,984)
Germany	Dec. 1, 1915	3,341,627	10,970,009	9,376,939	5,073,478	17,287,211
	Dec. 2, 1912	4,523,059	10,944,283	9,237,738	5,803,446	21,923,707
		(— 1,181,432)	(+ 25,726)	(+ 139,201)	(— 729,968)	(— 4,636,496)

(a) All cattle.

TABLE B

COUNTRIES	Date	Total Horses	Total Cattle	Total Sheep	Total Pigs
1st Group:—					
Great Britain & Ireland, and France	Latest date	4,391,005	24,894,844	39,436,249	7,816,171
	Pre-war	5,137,613	26,932,273	44,017,485	10,975,737
2nd Group:—		(— 746,608)	(— 2,037,429)	(— 4,581,236)	(— 3,159,566)
Spain, Denmark, Switzerland, Netherlands, Norway, and Sweden	Latest date	2,088,014(a)	13,478,178	19,664,228	7,481,287
	Pre-war	2,001,123(a)	12,421,097	19,719,081	8,299,816
3rd Group:—		(+ 86,891)	(+ 1,057,081)	(— 54,853)	(— 818,529)
Canada, United States, New Zealand, Australia, Brazil, Uruguay	Latest date	33,349,660(b)	120,636,607	163,537,456	89,432,709(b)
	Pre-war	33,213,366(b)	115,030,872	197,666,799	81,947,050(b)
		(+ 136,294)	(+ 5,605,735)	(— 34,129,343)	(+ 7,485,659)
Totals, above countries	Latest date	39,828,679	159,009,629	222,637,933	104,730,167
	Pre-war	40,352,102	154,384,242	261,403,365	101,222,603
Totals of all countries mentioned in Table "A" including Italy, South Africa, Argentina, and the countries in Group IV. with the exception of Russia-in-Europe		(— 523,423)	(+ 4,625,387)	(— 38,765,432)	(+ 3,507,564)
	Latest date	54,698,148(c)	305,526,699(d)	387,452,949	128,204,992
	Pre-war	56,180,769	301,244,027	407,492,231	126,997,160
		(— 1,482 621)	(+ 4,282 672)	(— 20 039,282)	(+ 1,207,822)

(a) Less Netherlands. (b) Less Uruguay. (c) Less Italy, and South Africa. (d) Less South Africa.

NOTES ON THE PRECEDING TABLES

GROUP I.—*Great Britain.*—The increase of "all cattle" is 306,977, resulting from an increase of 384,508 cattle and a decrease of 77,531 cows. The increase in sheep compensates for the decrease in swine.

France.—All cattle show a decrease of 2,344,406. Note that the decrease occurs every year in all classes of stock except horses, which remain unchanged during the last two years. There is a decrease of 29% in horses; 20% in milch cows; over 11% in other cattle; nearly 34½% in sheep; and 40% in pigs.

Italy.—Data not comparable owing to census dates. General condition parallel those of France to such an extent that an equally serious depletion of stock might be inferred. Assuming for Italy decreases of stock since 1914 equivalent to one-half the percentage of the decreases recorded for France, we have, instead of the increases shown for Italy in table "A," really decreases of 95,587 horses, 398,660 cattle, 2,350,000 sheep, and 544,400 swine.

Leaving Italy out of consideration, and including only Great Britain and France in Group I, it is seen from table "B" that the decreases of cattle, sheep and swine aggregate 9,778,831 head.

GROUP II.—*Neutrals.*—Note that increases appear in all classes of stock in Spain and Sweden. Netherlands has done well in cattle, and Switzerland in cattle and sheep, but both have fallen behind in other lines. Taking Group II as a whole (table "B"), the decrease in swine, 818,529, is more than accounted for by the decrease for Denmark alone, of 846,083 head

GROUP III.—*Exporting Countries.*—The North American section of this group shows generally substantial increases, except for a decrease of 1,236,000 in sheep in the United States.

With regard to the increase of 8,520,000 swine in the United States from 1914 to 1917, it should be noticed that 5,685,000 of this increase occurred between 1914 and 1915, the increase between 1915 and 1917 being only 2,835,000. For Canada and United States there are increases of 2,035,000 cows, 5,137,000 "other cattle," totalling 7,172,123 in "all cattle."

The increases reported for nearly all classes of stock are considerable, and that is evidence that "Greater Production" campaigns have been effective in producing results. It should be noted, however, that for Canada the data for 1917 are not strictly comparable with those for 1914. In 1917 the estimates for the provinces of Quebec, Saskatchewan, Alberta, and British Columbia are based on returns from individual farmers. For 1916 the estimates of the three Prairie Provinces are those of the census of 1916. That there are really increases, however, especially in the number of cattle, cannot be doubted.

In view of the increased production of live stock in these two countries, it is interesting to observe that the exports of live stock and live stock products have increased to a marked extent, as the following table shows:—

EXPORTS OF ANIMAL PRODUCTS FROM CANADA AND THE UNITED STATES

CANADA	1916-17	1915-16	1913-14
Lard	1,405,633	24,998	125,619
Bacon	207,213,267	144,918,867	23,859,754
Beef	45,546,176	47,422,564	13,133,205
Hams	4,403,244	8,732,857	1,890,182
Mutton	167,993	99,593	65,167
Pork	13,987,460	13,142,169	1,811,204
Canned meats	6,676,094	11,031,893	638,583
Total	279,399,867	225,372,941	41,523,714

Year ending March 31st.

UNITED STATES	1916-17	1915-16	1913-14
Fresh beef	197,181,101	231,214,000	6,394,404
Canned beef	67,576,725	50,803,700	3,464,733
Pickled and other cured beef	58,693,667	38,114,600	23,265,974
Bacon	667,156,061	579,808,700	193,964,252
Hams and shoulders	266,655,581	282,208,600	165,881,791
Lard	444,787,521	427,011,300	481,457,792
Total	1,702,050,656	1,609,160,900	874,428,946

Year ending June 30th.

New Zealand does well in cattle and sheep, but exhibits decreases in horses and swine to the extent of 37,117 and 1,598 respectively.

The southern division of this export group shows results that are decidedly unfavourable, due undoubtedly to the droughty conditions prevalent in the latest year for which each country reports. New Zealand, to which we have just referred, was doubtless as badly affected in 1915 as Australia, but had recovered by 1917, the year to which the above report refers. On the other hand the latest reports to hand for Australia (1915), Brazil, Uruguay and Chili (1916), coincide with years when the destruction of all crops was exceptionally severe. It would not be unreasonable to assume that by this time the stock in these countries would, in consequence of better crop conditions since, be in good part replenished, or on the way to replenishment.

Argentina's census report, as taken last summer, will not be available before February. Only pre-war figures are now available. Data, if available as referring to 1916, would probably have shown a marked decrease as compared with those for 1913. Now we learn that South America is reaping record harvests, and we can infer that there will be a rapid replenishment of her depleted live stock.

From these observations it may be doubted whether the details in Group III reflect the real present conditions, and whether the totals in table "B" can be relied upon as even approximately correct.

GROUP IV.—The results in India, although not recent, are uniformly favourable, there being an increase of 3,411,387 head in all classes of cattle, 98,549 in horses, and 81,571 in sheep. Crops have since been good, and probably the progress in live stock has been well maintained.

Except for the increase in Chili of 36,741 pigs, and in Tunis of 419,370 sheep, these two countries, as well as Egypt, show general decreases.

Russia.—The big increases in Russia recorded in 1916 followed two seasons which had yielded large crops. The comparative failure of crops of 1916 and 1917 might enable us to infer that she must by this time be incurring a serious depletion in live stock. Then the official figures given in table "A" show such large increases, especially for sheep and cattle, as to create a suspicion that they are exaggerated. In dealing, therefore, with aggregate figures, at the end of table B. those for Russia have been omitted.

Germany.—The report for 1915, the last official one, indicates that even so early in the war, decreases in pigs, horses and sheep were quite marked. With smaller crops since that year, and from other knowledge that has leaked through, it is probable the present depletion of stock is extermely serious. As much can be inferred concerning Austria Hungary, whence no report has issued since the war.

INTERNATIONAL INSTITUTE CROP CABLE, JAN. 30th

A cablegram received from the International Institute of Agriculture gives the following crop data:—

Production of wheat in Uruguay, 18,372,000 bushels, or 340.8 per cent of the 1916-17 crop, an increase of 12,980,000 and 273.6 per cent of the five years' average 1911-12 to 1915-16, an increase of 11,660,000; in Union of South Africa, 8,833,000 bushels, 184.4 per cent of last year, an increase of 4,050,000, and 135.5 per cent of the five years' average, an increase of 2,320,000; in New Zealand, 8,000,000 bushels, 160 per cent of last year, an increase of 3,000,000, and 125 per cent of the five years' average, an increase of 1,600,000.

Production of oats in New Zealand, 21,138,000 bushels, 337 per cent of last year, an increase of 14,870,000, and 137 per cent of the five years' average, an increase of 5,710,000.

In England and Wales the area sown to wheat shows an increase of 15 per cent and rye 3 per cent. The area sown to barley and oats is practically the same as last year.

The total production of cotton in United States, India, and Egypt is 15,355,000 bales of 500 pounds, or 94.5 per cent of last year and 81.7 per cent of the five years' average.

Total production of wine in Spain, France, Luxemburg, and Algeria is 1,448,209,000 imperial gallons, or 100.3 per cent of last year, and 96.4 per cent of the five years' average.

CANADIAN CROPS OF 1917

The final estimates of the cereal crops of Canada are as follows: Wheat, 233,742,850 bushels, compared with 262,781,000 in 1916; oats, 403,010,000 bushels, compared with 410,211,000; barley, 55,057,750, compared with 42,770,000; rye, 3,857,200, compared with 2,876,400; flaxseed, 5,934,900, compared with 8,259,800; corn, 7,762,700, compared with 6,282,000.

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DEPARTMENT OF AGRICULTURE

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of Canada

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The AGRICULTURAL GAZETTE of Canada is published monthly, in English and in French, by the Dominion Department of Agriculture. It is not intended for general circulation. A limited number of copies, however, are available to subscribers at $1.00 per annum, or 10 cents per copy.

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SEED SUPPLIES AND DISTRIBUTION

THE seed situation in Canada in its relation to crop production in 1918, was, on due investigation by the Seed Commissioner, found to warrant the continuation in active operation of the Seed Purchasing Commission that last year insured a supply of the seed of wheat, oats, and barley. This year, the Commission is extending its operations to include peas and beans.

Seed of cereal grains is this year being purchased in the Prairie Provinces and in Ontario. Supplies are assembled in the Canadian Government elevators at Calgary, Saskatoon, Moose Jaw, Transcona, Port Arthur, and Quebec, where they are cleaned ready for distribution in carload lots either in bulk or in sacks, as required. The head office of the seed Purchasing Commission for the west of Canada is in the Post Office Building, Regina, Sask., and for the east of Canada in the Post Office Building, Quebec City. The sale and distribution of seed peas and seed beans are controlled by the agent of the Seed Purchasing Commission, Department of Agriculture, Ottawa.

The main purpose of the Commission is to guard against possible seed shortage by purchasing and holding in store supplies of food grains that may safely be used for seeding purposes. Its operations do not interfere unduly with the business of seedsmen, since the Commission does not handle named varieties of seed grains, with the exception of a commercial grade of Marquis wheat. All of the grains purchased for seed is obtained subject to inspection as to definite standards of quality for seed grades.

The Commission has been able to procure an abundant supply of Marquis wheat of good quality to take care of estimated requirements. They have had difficulty in getting supplies of oats suitable for seed, and have had repeatedly to lower the standards of quality in respect to the prevalence of wild oats, and to increase the premiums over current market values in order to get delivery of oats that might be considered at all suitable for seed. The same difficulties have been met with in respect to seed barley.

Because of weather conditions during 1916 and the spring of 1917, the area devoted to peas in Eastern Canada became very much reduced. In consequence, the price of peas has continued abnormally high. At $4.00 per bushel, paid to farmers for uncleaned peas, this grain is too expensive for feeding to live stock for animal products production. Peas have consequently been in demand almost entirely for human food and for seed. As the world's supply of meat becomes further decreased, the demand for food grain rich in protein, such as peas and beans, will undoubtedly increase. A substantial supply of seed peas has been purchased, and is now held in reserve by the Seed Purchasing Commission.

SHORTAGE OF BEANS

In large part, because of weather conditions, the bean crop of Ontario has been a partial failure during each of the last two years, and at the present time it is difficult to obtain seed beans in the bean areas of Ontario and Quebec that are free from anthracnose, and are otherwise suitable for holding in reserve for seeding. It has been possible to secure a limited quantity of seed beans free from disease from the Okanagan Valley in British Columbia, and these will be made available for planting in the bean districts in Eastern Canada.

The Seed Purchasing Commission is not operating for the purpose of making profit. The prices fixed for the sale of seed grain held by the Commission are calculated to cover the net cost of the recleaned seed so far as it is possible to determine that cost.

FIELD ROOT AND GARDEN SEEDS

The situation in respect to field root and garden seeds has become acute, not only throughout North America, but in parts of Europe from which these seeds were formerly imported. Indeed, at the present time, Europe is looking to Canada for supplies of some of these seeds that were formerly exported. Arrangements for production have to be made two years in advance. It is not reasonable to expect that Canadian farmers will grow these seeds unless they have an order in advance, because when produced the seeds cannot be used for any other purpose. The wholesale prices for these seeds now range as high as ten times the normal, and at these prices seed merchants are disinclined to place contract orders for more than their estimate of bare requirements. This condition leads to further difficulties in respect to seed shortage. To help to overcome these difficulties, the Dominion Experimental Farms Branch has undertaken the production of fifty per cent. of Canada's requirements of those field roots and garden seeds that were formerly imported from Europe. In addition, the Board of Governors of the University of British Columbia, in agreement with the Government of British Columbia, has undertaken the war-time emergency production of practically the remaining half of Canada's requirements. This work has been allotted to Professor L. S. Klinck and his staff of the Agricultural Department of the University. Dean Klinck is now in a position to receive requisitions for seed supplies from any seed house, and arrange for the production and inspection of seed crops among British Columbia growers. To further support him in this work, the Minister of Agriculture has undertaken to accept delivery at the Canadian Government elevator at Vancouver on or before the thirty-first day of January, 1920, of the following kinds and quantities of these seeds recleaned at the prices set opposite each:—

The Seed	lb.	Price per lb.
Mangel	300,000	25c.
Sugar beet	150,000	25c.
Garden beet	100,000	40c.
Swede turnip	300,000	35c.
Fall turnip	50,000	35c.
Garden turnip	20,000	40c.
Rape	200,000	8c.
Field carrot	3,000	50c.
Garden carrot	7,500	60c.
Parsnip	5,000	25c.
Radish	50,000	40c.
Onion	10,000	1.00
Lettuce	2,500	50c.
Cabbage	15,000	1.50
Celery	1,000	1.50

In view of the present and prospective prices of these seeds, and the fact that growers will have the privilege of selling at any price which they can obtain, it is not contemplated that it will be necessary for the Department of Agriculture to take delivery of any considerable quantity of such seeds.

DATA BEING GATHERED

In order to obtain accurate data as to supplies of seeds available in Canada, the Minister of Agriculture has taken authority under the War Measures Act to require seed merchants promptly to supply accurate information regarding grasses, clovers, forage crops, field roots, and garden seeds of all kinds, respecting stock in hand, total receipts for the year, and arrangements for production for the ensuing year. This information is being collected concurrently in Canada and the United States, and the total when obtained, indicating shortages and surplus of each kind, will be published.

Canadian farmers and gardeners have no occasion for serious alarm as to seed supplies for the ensuing season. They may suffer considerable inconvenience because of being unable to procure particular varieties, or because of difficulties of transportation in getting their seed supplies. Difficulties in respect to seed supplies are expected to be more pronounced for the planting of 1919. Since the outbreak of the war, repeated intimations have been given through the media of press articles, and otherwise, that farmers and gardeners should carefully preserve a supply of the best specimens of field and garden roots, and transplant them early in the spring to produce seeds for themselves and to spare for their locality. Unfortunately, this has been done to a very limited extent, and is not apt to be done by many farmers or gardeners during the ensuing season. The larger efforts now being made by the Experimental Farms Branch and the Province of British Columbia are expected to yield a seed supply sufficient to guard against a shortage for the spring of 1920.

THE CANADA FOOD BOARD

ON Monday, the 11th day of February, 1918, His Excellency the Governor General in Council, on the recommendation of the Minister of Agriculture, and under and by virtue of the powers in that behalf conferred on the Governor in Council by the War Measures Act, 1914, was pleased to order:

That a Board be created to be called The Canada Food Board;

That the said Board consist of a Director of Food Conservation, a Director of Food Production, and a Director of Agricultural Labour;

That the Board shall be under the jurisdiction of, and shall report to, the Governor General in Council through the Minister of Agriculture.

AND IT IS HEREBY FURTHER ORDERED:—

1. That the Board shall generally direct the production, conservation and distribution of food stuffs in the interests of Canada and the other British Dominions as well as the Allied Nations;

2. That all the powers and duties now vested in the Food Controller be transferred to and vested in The Canada Food Board, and that all relevant Orders in Council and regulations conferring powers or imposing duties upon the Food Controller shall have force and effect as if the Canada Food Board had been named and designated therein instead of the Food Controller.

3. That for the better accomplishment of the said purposes the Board shall have power:—

(a) To expend any sums of money approved by the Governor General in Council for any of the purposes aforesaid.

(b) To co-operate with the Provincial Governments with a view to co-ordinating the activities of all local bodies for the aforesaid purposes.

(c) To enter into agreements for the cultivation of idle land on such terms as may appear to the Board to be advisable.

(d) To utilize and direct the co-operation in the work of the Board of any member of the Outside Service for the purposes of publicity and of securing information.

(e) To mobilize and utilize on a voluntary basis the farm labour resources of Canada.

(f) To make such regulations consistent herewith for carrying out their duties and for the internal economy of the Board, as the Board may deem advisable.

OFFICERS OF THE BOARD

Following is a certified copy of a report of the Committee of the Privy Council, approved by His Excellency the Governor General on the 11th February, 1918:

The Committee of the Privy Council, with reference to the Order in Council of even date hereof, constituting THE CANADA FOOD BOARD, advise, on the recommendation of the Minister of Agriculture, that Henry B. Thompson be appointed Director of Food Conservation and Chairman of the Board; that Charles A. Dunning be appointed Director of Food Production; and that James D. McGregor be appointed Director of Agricultural Labour.

PURCHASE OF TRACTORS

Acting on the authority given in the foregoing Order in Council, The Canadian Food Board purchased at cost 1000 Ford tractors. These tractors will be sold to Canadian farmers at the same price, plus the freight. In addition, option has also been secured on another thousand of the tractors. At present the Ford factories are engaged on an order for the British Government which it is anticipated will be completed by the end of March. Delivery of the Canadian tractors will then commence. The tractor is designed as a two-plough machine.

NEAT CATTLE DUTY FREE

His Excellency the Governor General in Council, under date of Feb. 8, 1918, on the recommendation of the Minister of Customs and under and by virtue of the power in that behalf conferred by The War Measures Act, 1914, or otherwise vested in the Governor General in Council, has been pleased to order as follows:—

During the period of one year from the seventh day of February, 1918, remission and refund of duty is hereby authorized in respect of neat cattle when imported by *bona fide* residents of Canada under regulations by the Minister of Customs.

TRACTION ENGINES DUTY FREE

His Excellency the Governor General in Council, under date of Feb. 8, 1918, on the recommendation of the Minister of Customs and under and by virtue of the power in that behalf conferred by The War Measures Act, 1914, or otherwise vested in the Governor General in Council, has been pleased to order as follows:—

During the period of one year from the seventh day of February, 1918, remission and refund of duty is hereby authorized in respect of traction engines costing not more than one thousand four hundred dollars in the country of production, designed to be moved by steam or other motive power for farm purposes, and parts thereof for repair; and traction attachments designed and imported—to be combined with automobiles in Canada for use as traction engines for farm purposes and parts thereof for repair.

PART I

Dominion Department of Agriculture

THE DOMINION EXPERIMENTAL FARMS

ASSISTANCE GIVEN BY THE EXPERIMENTAL FARMS BRANCH TO FARMERS IN SECURING GOOD SEED

BY J. H. GRISDALE, B. AGR., DIRECTOR OF EXPERIMENTAL FARMS

IT does not come within the scope of the work of the Experimental Farms Branch to arrange to supply farmers with seed, other than that produced on the farms themselves. It finds its work in this connection to lie in the endeavour to raise the standard of the seed used in Canada, to originate more productive and more hardy varieties, and hence, not only to increase the yield per acre of our staple field crops but also to extend the area over which such crops may be successfully grown.

The work in this line carried on year by year may be briefly described as follows:—

EXPERIMENTAL PLOTS OF WHEAT IN STOOK, EXPERIMENTAL STATION, ROSTHERN, SASK.

Cereals.—From Ottawa a distribution of free samples of the purest seed of the best varieties is carried on every winter and spring. Thousands of samples are sent out annually. While these do not materially affect

the crop of the current year, they produce very significant results in the course of two or three years from the time the samples are given out.

In addition, at most of the Experimental Farms and Stations, a certain amount of high-class seed grain is produced every year for sale to the farmer at reasonable rates. This is intended to supplement, and not to interfere with, the business of the seedsmen.

In connection with the Illustration Station work, there is, as a rule, a considerable quantity of first-class seed grain which is disposed of at fair prices by the operators of the Stations.

Grasses and Clovers.—Efforts are being made to stimulate the production of clover seed in Quebec and of western rye grass and alfalfa seed in the West. Breeding work is being carried on, having for its object the production of improved strains and better varieties.

Field Roots.—A shortage of field root-seed in 1919 having been foreseen, the Experimental Farms has arranged to produce, during 1918, a sufficient seed of mangels, swede turnips, field carrots, and rape, to supply a large proportion of the normal demand of the Dominion. The necessary stecklings for this purpose were grown at ten of the Dominion Experimental Farms, and are now in storage ready for planting for seed production in the spring.

Potatoes.—A free distribution of samples of some of the best varieties of potatoes is carried on each year from Ottawa and from most of the branch Farms. Surplus stocks remaining after this distribution is provided for are sold to farmers at fair prices.

DUSTING VERSUS LIQUID SPRAYING

BY W. S. BLAIR, SUPERINTENDENT EXPERIMENTAL STATION, KENTVILLE N.S.

TESTS were conducted by the Experimental Station, Kentville, N.S., in 1917, to find out the relative efficiency of sulphur dust as compared with the regular lime-sulphur spray. Twelve trees were included in each plot. The sulphur dust, composed of 85 per cent finely ground sulphur, and 15 per cent arsenate of lead, was applied by using a machine which blew it on the trees in the form of dust. The lime-sulphur, made according to the regular formula, 1 gallon of concentrate lime sulphur to 40 gallons of water, to which 2½ pounds of dry arsenate of lead was added to 100 gallons, was sprayed on the trees with the regular power spraying machine. Both applications were made on the same day, and uniform trees of the same varieties were used. Four applications were given, two before and two after bloom. The results obtained were as follows:—

Variety—Baldwin. How treated:	Per cent Clean	Per cent Scab	Per cent Insect Injury
Dust	97.5	1.85	.56
Sprayed	91.03	6.56	2.39
Not treated	79.93	12.24	7.80
Variety—Gravenstein. How treated:			
Dust	84.2	12.77	.28
Sprayed	80.02	14.60	.00
Not treated	33.29	63.81	.52

From the above it would appear that under the seasonal conditions of 1917, the dust was equally efficient a fungicide as the lime-sulphur. This, however, may not always hold true, and these results should not be considered conclusive. The dust spray gave a better control of canker worm and other insects. The foliage injury was also less where the dust was used, the foliage on these plots being better during the summer than on the sprayed plots. The comparative cost of the two methods is given in the following table:—

	Dust	Spray
Total amount used on plot of 12 trees	84 lb.	210 gals.
Amount used per tree, 4 applications	7 lb.	17.5 gals.
Amount used per tree for 1 application	1.75 lb.	4.37 gals.
Total time required on plot of 12 trees	45 min.	210 min.
Time required per tree, 4 applications	3.75 min.	17.5 min.
Time required per tree for 1 application	.94 min.	4.37 min.
Total cost of material on plot of 12 trees	$5.58	$2,31
Cost of material per tree, 4 applications	.46	.19
Cost of material per tree for 1 application	.11	.04
Total cost of application on plot of 12 trees	.60	2.80
Cost of application per tree, 4 applications	.05	.23
Cost of application per tree for 1 application	.01	.05

Assuming 40 trees to the acre, which is a general average, the quantity required for an acre and the time required to do the work, and cost of same for four applications, would be as follows:—

	Dust	Spray
Quantity used per acre	280 lb.	700 gals.
Time required to do one acre	2½ hrs.	11⅔ hrs.
Cost of material per acre	$18.62	$7.70
Cost of application per acre	2.00	9.33
Total cost	$20.62	$17.03

The sulphur-arsenate dust cost $6.65 per 100 pounds. The lime-sulphur arsenate cost 1·125 cents per gallon. The concentrate lime-sulphur cost 20c. per gallon, the dry arsenate of lead 25c. per pound. One team and two men were employed and their time was charged at the rate of 80 cents per hour, 50 cents for team and man, and 30 cents for one man.

From the above it will be seen that it cost $3.59 more to dust one acre than to spray it. The cost of material is very much greater where the dust is used, but this is offset by a much less cost in application. There is a great advantage in being able to do the work quickly, thus giving time for other important farm work.

THE DIVISION OF APICULTURE

THE CANADIAN HONEY CROP 1917

BY F. W. L. SLADEN, DOMINION APIARIST

INFORMATION received indicates that less honey than usual was produced in Canada in 1917, the principal cause being unsettled weather during clover bloom in Eastern Canada. The important producing region of Southern Ontario had almost an average crop of white honey, the eastern part of this area having about the average, and the south-western part below the average. The buckwheat honey crop was not very large here. The province of Quebec had a short white honey crop, but the buckwheat crop was fair. The Maritime Provinces had

a short white honey crop, but in Nova Scotia fruit-bloom yielded well for one or two days. In most places in Northern Ontario the honey crop was a failure. In Manitoba, it was not much more than half the average. In British Columbia, the Interior valleys had a somewhat light crop owing to the very dry weather, but on the lower mainland the yield per colony was high on account of the settled fine weather during clover bloom following a wet spring.

Most of the extracted honey was sold at from 2 to 5 cents per pound above last year's prices, but comb-honey advanced less.

THE DIVISION OF HORTICULTURE

ROOT SEED PRODUCTION A WAR MEASURE

BY M. O. MALTE, PH. D., DOMINION AGROSTOLOGIST

RIGHT from the outbreak of the war, the Dominion Experimental Farms realized that Canada was running a certain risk of having her supply of root seed from Europe curtailed, or even wholly cut off. In order to encourage root-seed growing in Canada for the purpose of offsetting a possible falling-off in the import from Europe, the Central Experimental Farm at Ottawa issued, early in the spring of 1915, a bulletin entitled "Field Root, Vegetable, and Flower Seed Growing in Canada," by M. O. Malte and W. T. Macoun.

In 1916, the root-seed situation—as it stood then, and as it threatened to develop should the war last much longer—was discussed in two issues of the THE SEASONABLE HINTS. Attention was called to the fact that

PITS OF SWEDE TURNIP STECKLINGS AT EXPERIMENTAL STATION, KENTVILLE, N.S., LATE FALL, 1917

root-seed growing had been neglected in Europe during the season of 1915, and that, on account of threatening shortage in the supply, the chief root-seed producing countries of Europe had restricted their export of seed for the duration of the war. It was also pointed out, not only that certain varieties were already becoming scarce, or, in cases, could not be obtained at all, but also that, for the immediate future, seed of poor quality, and at high prices, would likely be brought on the Canadian market. For these reasons, farmers were sincerely urged to grow at least what seed they needed for their own use.

In 1917, the scarcity of root-seed, and the threatening shortage in the supply, were repeatedly brought to the attention of the public, through THE SEASONABLE HINTS and through press articles, and as a result a number of farmers arranged to grow their own seed.

However, when the situation was looked into from a commercial standpoint last year, it was found that arrangements had to be made to produce quite large quantities in order to safeguard an adequate seed supply for 1919 and coming years. The Dominion Experimental Farms were called upon to meet the emergency, and acted accordingly.

Large quantities of the best seed obtainable of swede turnips, mangels, carrots and rape were secured, and the necessary acreage arranged for, chiefly by the renting of land adjoining Experimental Farms and Stations, in Eastern Canada, and also in Alberta and British Columbia. The land was seeded in July to stecklings, to be used for seed raising in 1918.

How many acres will be employed in root-seed growing the coming season, is almost impossible to tell accurately at present. The last summer was on the whole a very unfavourable one for root growing, the harvesting was made difficult, at least in Eastern Canada, on account of continuous wet weather, and the winter has so far not proven very suitable for storing roots. However, if the remainder of the winter, and the early spring, prove to be reasonably normal, the Dominion Experimental Farms expect to have a total of about 350 acres planted to root seed next spring.

By far the largest areas will be planted in Eastern Canada. Turnip seed growing is planned for at the Central Experimental Farm, Ottawa, the Experimental Station, Charlottetown, P.E.I., the Experimental Station, Kentville, N.S., the Experimental Farm, Nappan, N.S., the Experimental Station, Fredericton, N.B., the Experimental Station, Ste. Anne de la Pocatière, Que., the Experimental Station, Cap Rouge, Que.

For mangel seed raising roots have been stored at the Central Farm, Ottawa, the Experimental Station, Charlottetown, P.E.I., the Experimental Station, Kentville, N.S., the Experimental Station, Lethbridge, Alta., the Experimental Station, Summerland, B.C., and the Experimental Farm, Agassiz, B.C.

Carrot seed raising has been provided for at the Central Experimental Farm, Ottawa, and the Experimental Station, Summerland, B.C. A small quantity of rape has been stored for seed raising at the Central Farm, Ottawa.

Granting that the estimated areas are planted for seed production the coming spring, and assuming that fair crops will be realized, the Experimental Farms expect to be in a position to bring on the market next fall considerable quantities of a class of seed which, it is feared, would otherwise be scarce, and consequently expensive. It should be clearly understood, however, that the seed production planned for next summer is strictly an emergency measure, made necessary by the war. It is a Government intervention for the purpose of providing the farmers

with a class of seed which, judging from the situation as it reveals itself at present, will be available from normal pre-war sources in too small quanties to meet even very moderate demands.

THE POULTRY DIVISION

WAR-TIME RATIONS FOR LAYING HENS

BY F. C. ELFORD, DOMINION POULTRY HUSBANDMAN

WAR prices and the fact that milling wheat is required for human consumption, make it necessary to revise from time to time poultry rations. The fluctuating prices, and the inability at times to get even feed wheat, corn, and other grains and mill feeds, make it impossible to lay down any hard and fast rule as to what to feed. This must be left to the individual feeder.

A good poultry ration is composed of two main characters of feed: the whole or cracked grain which is fed in a litter on the floor and for which the birds have to scratch; and the mash feed which may be fed in an open self feeding hopper or in a moist mash or in both ways. As a rule, the proportion in weight consumed of the two feeds is two of grain to one of mash, depending on the relative palatability and systems of feeding.

In addition to these two feeds, green feed, grit and shell should be given and also animal feed of some kind.

Add as much variety to the ration as possible; coarse grains mixed with feed wheat and corn make a good grain feed and for a mash ground oats alone or mixed with mill feeds answer very well. Feed the best you can get even if the desired variety and composition are not present. Results are not entirely dependent upon feed. Give the birds plenty of fresh air, clean quarters and do not stint the feed because it is not just what you want or high in price.

A suggested ration:—

GRAIN FED IN DEEP LITTER

One part oats, 1 part barley, 1 part feed wheat, 2 parts cracked corn.

Oats and barley are mostly home grown and can usually be obtained. The feed wheat and corn may not be so easy to get. If corn cannot be secured and buckwheat can, substitute one part of buckwheat for the corn. If corn, feed wheat and buckwheat are not obtainable use equal parts good barley and oats until other grains can be added.

Feed this morning and afternoon in litter so that the birds have to work for it.

MASH FED IN OPEN HOPPER OR IN A MOIST MASH AT NOON

One part bran, 1 part shorts, 2 parts ground oats and 1 part beef scrap.

At present beef scrap is very high and not always satisfactory. This may be substituted by a quantity of green bone, beef heads, etc., or, better, by skim or butter-milk given the hens to drink. In most cases on the average farm, milk will supply all the animal feed required, and in the back-yard plants, the table scraps are sufficient.

Grit and shell should be before them all the time, and drink and green feed as they require it.

THE CEREAL DIVISION

NEW CEREALS

BY DR. CHAS. E. SAUNDERS, DOMINION CEREALIST

A new variety each of wheat and oats produced in this Division has been sufficiently tested to justify their introduction in agricultural practice.

The new wheat, which has been named Ruby, Ottawa 623, possesses characteristics in ripening and other qualities midway between Marquis and Prelude. It is beardless, possesses hard red kernels, gives a fair yield, and makes flour of the highest quality in regard to colour and strength. Bread made from it ranks in the first class. This wheat is the result of a cross between Downy Riga and Red Fife. Downy Riga was produced from two early sorts, Gehun, an Indian variety, and Onega from Northern Russia. Ruby is recommended for trial where Marquis does not ripen satisfactorily. A very limited distribution of five-pound samples is being made to farmers requiring an early sort. A sufficient crop will be grown this year on the Experimental Farms to provide for a generous distribution next spring.

The new oat is a hulless variety named Liberty, Ottawa 480. It was produced by crossing Chinese Naked with Swedish Select. It is early ripening and possesses a stiff straw. It yields slightly less in weight of grain per acre than the standard varieties, such as the Banner, that is, when allowance is made for hull. Being hulless, this new oat should occupy a very important position in the feeding of young poultry and young pigs. For household use it requires only grinding in an ordinary chopping mill. This sort will be tried on a few farms this year. A sufficient acreage will be grown this season to provide for a distribution of seed samples in 1919.

THE ENTOMOLOGICAL BRANCH

DUSTING vs. LIQUID SPRAYING IN QUEBEC

BY C. E. PETCH, DOMINION ENTOMOLOGICAL LABORATORY, HEMMINGFORD, QUE.

THE experiments comparing the value of dusting and liquid spraying as methods of applying insecticides and fungicides were performed in the demonstration orchard of the Quebec Department of Agriculture at Havelock, Que. The conditions were as nearly similar as possible in the experiments on Fameuse trees, which touched each other, planted 33 feet apart each way.

It must be constantly borne in mind that the following results were obtained from one season's work in a single locality, and therefore, are not conclusive. However, even in the extremely wet season of 1917, dusting gave excellent results, and, if equal success could be attained in future years, it might replace liquid spraying in many commercial orchards.

At present with such a shortage of labour, dusting will appeal to many growers, because it is a time-saver, as the following figures for a 10 hour day will show:—

	Acres.
Dusting machine and 2 men	32.2
Power sprayer with spray gun and 2 men	10.4
Power sprayer with bamboo poles and 3 men	8.6
Barrel pump and 2 men	3.6

Dusting is much more expensive than liquid spraying, and unless the cost of commercial mixtures is reduced 50 per cent., it will not be as economical. This objection could be largely overcome by purchasing a mixer and the raw materials and mixing them at home. The principal item, which could be utilized to reduce the cost, is the carrier or filler.

*Petch, C.E.—Carriers and Diluents for Dusting: 9th Ann. Report Quebec Society for the Protection of Plants from Insects and Fungous Diseases, p. 28.

The following prices were paid for materials, etc.: 90% sulphur, 10% lead arsenate dust, $6.25 per cwt.; 45% talc, 45% sulphur, 10% lead arsenate dust, $5.50 per cwt.; lime sulphur 13⅛ cents per gal.; paste lead arsenate 11¼ cents per lb.; men, 25 cents per hour, horses, 7½ cents per hour; machine expenses, 5 cents per hour. These prices made the following average cost per tree for each application:—

	Cents
Dusting	14.46
Power sprayer and spray gun	5.77
Power sprayer and spray rods	5.94
Barrel pump	7.13

The applications were made on the same day when possible, and the plots received five applications as follows:—

DUSTED PLOT

Date	When applied	Weather	Mixture Used
May 21	Leaf buds quite open	Heavy rain 2 days later	90% sulphur 10% lead arsenate.
June 2	Blossom buds pink	Heavy rain day following	Same as for 1st application.
June 13	Petals had fallen	Rain 2 days later	Same as for 1st and 2nd application.
July 14	Apples well formed	Light shower at night	45% sulphur, 45% talc, 10% lead arsenate.
Aug. 1		No rain for 7 days	Same as for application 4.

SPRAYED PLOT

Date	When applied	Weather	Mixture Used.
May 24	Leaf buds quite open	Heavy rain 2 days later	Lime-sulphur 1.009 & paste arsenate lead 1 lb. to 15 gals. water.
June 2	Blossom buds pink	Heavy rain day following	Same as for 1st application.
June 13	Petals had fallen	Rain 2 days later	lime-sulphur reduced to 1.008; no change in the poison.
July 9	Apples well formed	Four fine days followed	lime-sulphur reduced to 1.007; no change in the poison.
July 25		Three fine days followed	Same as for 4th application.

No appreciable difference was observed in the foliage of either plot, except a few very scabby limbs in the sprayed area, which probably did not receive the last application. A small amount of burning was observed on the sprayed area, but the dusted foliage was not injured.

The examination of several thousand apples gave the following results:—

DUSTED

Scab (scab spots very small)	3.8%
Apple curculio injuries	11%
Injured by other insects	12.8%

SPRAYED

Scab (apples from very scabby limbs not encountered in examinations)	1%
Apple curculio injuries	10.7%
Injured by other insects	8.6%

Results compiled from such examinations are generally not to be relied upon, because they do not represent the product ready for the market, but are formed from isolated examinations. According to the above figures, better results were obtained from liquid spraying than dusting, but the reverse was found

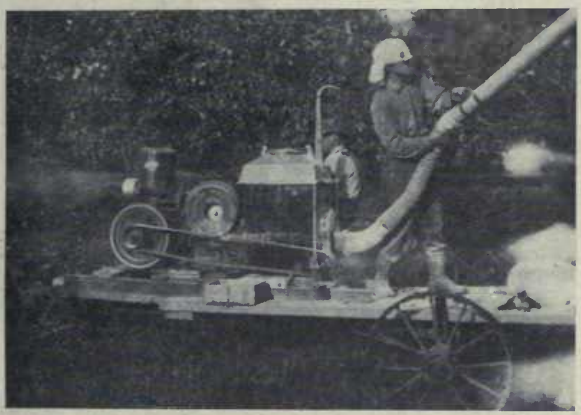
to be the case when the fruit was ready for the market.

DUSTED

No. 1 grade 21 barrels—	44.68%
No. 2 grade 17 barrels—	36.17%
No. 3 grade 9 barrels—	19.15%

SPRAYED

No. 1 grade 12 barrels—	35.3%
No. 2 grade 12 barrels—	35.3%
No. 3 grade 10 barrels—	29.4%



DUSTING MACHINE

Showing, from left to right: Engine, Blower, Hopper and Delivery Pipe. (Original)

SUMMARY

Dusting has many advantages over spraying under average conditions. Only a minute or two are required to refill the hopper on a dusting machine, whereas fifteen minutes are necessary for a tank, and fully an equal length of time is required to reach the water supply and return to the orchard. When full, the sprayers weigh three or four times as much as the duster, which means considerable extra work for horses, especially on soft ground. The amount of work accomplished with the duster is more than three times as much as with sprayers, which is very important in wet seasons such as last summer. This reduction of time, also, means a big reduction in the cost of operating the machines. The spreading qualities of fine dust are greater than liquids, consequently, more thorough work would be expected from the use of the former in the hands of an inexperienced or careless worker.

A decided disadvantage of dusting is the higher cost, but this could be reduced considerably by mixing the materials at home. The dust is very irritating to the eyes, and it is probable any large amount inhaled would be injurious owing to the presence of arsenic.

The results obtained with dust were more satisfactory than with liquids, but they are not conclusive; consequently, we do not feel in a position to recommend its general use.

THE PREDACIOUS MITE, *HEMISARCOPTES MALUS* SHIMER, AND ITS RELATION TO THE NATURAL CONTROL OF THE OYSTER-SHELL SCALE, *LEPIDOSAPHES ULMI* L.

BY JOHN D. TOTHILL, IN CHARGE OF NATURAL CONTROL INVESTIGATIONS

IF in the autumn or winter one turns over with a needle a few specimens of the oyster shell scale (*Lepidosaphes ulmi* L.) and looks at them with a pocket lens, tiny, pearly-white eggs will be found (Fig. 1). If the scales happen to come from orchard or other trees in eastern Canada, a closer examination will often show that not all of these pearly-white bodies are eggs, but that some of them are supplied with four pairs of minute legs. If brought into a warm room, these bodies supplied with legs begin to creep, and are seen to be full grown mites. A still closer examination will show that there are two kinds of these whitish mites. One of them, *Monieziella angusta* Banks, is longer than the other, and is supplied with claws on the end of its legs (Fig. 3), while the other, *Hemisarcoptes malus* Shimer, is turtle-shaped, and supplied with tarsal suckers instead of claws (Fig. 2). Each of these mites makes a living under scales, but each in a different way. The turtle-shaped *Hemisarcoptes* is a true predator, and lives on the fresh scale eggs; the longer and more sluggish *Monieziella* is a scavenger, and lives upon debris such as is left in the wake of the *Hemisarcoptes*. A recent study of material gathered from representative places throughout the Dominion has shown that in eastern Canada this predacious mite is by far the most important single factor in the natural control of the scale. A brief account of this useful little animal may be of interest.

The mite *Hemisarcoptes malus* Shimer, which attacks the eggs, though apparently of European origin, was first discovered in Ohio in 1868 and described by Shimer, who made a careful study of its habits, and who clearly recognized its importance in the control of the scale. In France, it was rediscovered and described by Lignières, who likewise understood its function and significance. In Canada, Mr. T. D. Jarvis has specifically referred to the useful activities of this little animal at St. Catharines, Ontario. More recently, Messrs. H. E. Ewing and R. L. Webster have called attention to the usefulness of this mite at Ames, Iowa.

In discussing distribution it seems convenient to commence with the single tree and to pass by easy transitions to the question of continental distribution.

From an unsprayed apple tree at Fredericton, N.B., heavily infested with oyster-shell scale, and known to be moderately infested with the mites, collections were made from six main branches. From each of the six sets of twigs one hundred scales, containing 1916 eggs or egg remains, were examined under a binocular microscope for the mites. The mites were present on every twig, the lowest egg destruction being ten per cent and the highest twenty per cent; in no case was a scale found packed with mites, and dozens were found with one or two or three mites. Thus although the mite was rather scarce on the tree, it was scattered over it in very regular fashion. Such regularity in distribution on a single tree seems to be the general condition, and tends greatly to enhance the value of the organism as a factor in the control of the scale.

The mite evidently passes quite readily from tree to tree, perhaps through the medium of tree-visiting animals, such as birds, etc. The result is a comparative evenness of

distribution through orchards and districts. At Moncton, N.B., scale-infested twigs were examined from ten trees selected at random from the city and the surrounding two miles of country. In the case of each twig the turning of one hundred 1916 scales revealed the mite. Seven collections out of ten from various parts of Mount Royal, Quebec, revealed the mites. In twenty-one collections from trees in various places in and around the city of Fredericton, N.B., the mite was found to be present in seventeen cases, in none abundant enough to be controlling the scale, but entirely absent in only four cases. This fairly regular distribution, as at Fredericton, Moncton, and Mount Royal, seems to indicate the ability of the mite to spread rapidly from tree to tree. The same ability was indicated by finding the mite on a young thorn bush situated rather more than a hundred yards from the nearest possible source of infestation.

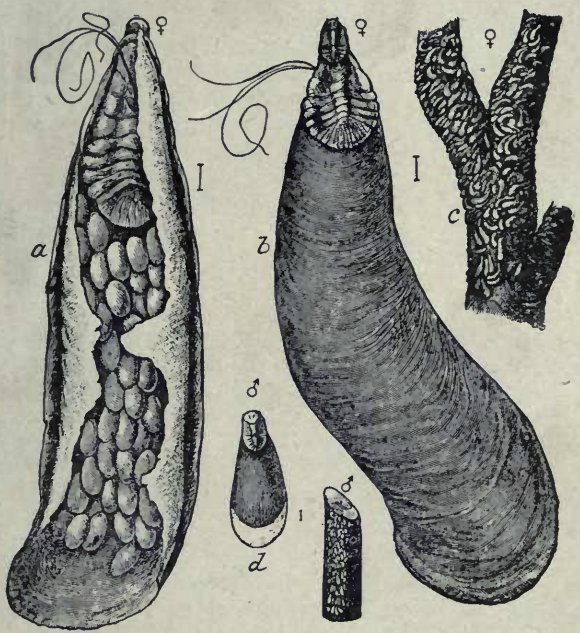


FIG. 1—OYSTER-SHELL SCALE

a, Female from beneath filled with eggs; *b*, same from above; *c*, twig infested by female scales; *d*, male scale and twig infested therewith. (After J. B. Smith)

In the province of New Brunswick, scaly twigs were examined from Moncton, Nerepis, St. Stephen, Woodstock, Kingsclear, Fredericton, Chipman, and Chatham; the mite was found to be present in material found at the first six places and absent in material collected at the last two localities. Its presence at Moncton and absence at Chipman is interesting, because these places are a little less than sixty miles apart.

Finally, as to continental distribution, the mite is known to occur in Nova Scotia, Prince Edward Island, New Brunswick, Quebec, Ontario, Massachusetts, Ohio, Illinois, and Iowa. Efforts to secure oyster-shell scales from the prairie provinces have met with no success and in those places, probably owing to the scarcity of suitable food plants, the scale insect is evidently exceedingly scarce, if not entirely absent. A number of good collections of scale material have been examined from British Columbia, but so far the mite has not been discovered west of the mountains. Europe seems to have been the original home of the mite. To what extent it has followed the oyster-shell scale in its now almost world-wide distribution remains to be determined.

So far as I am aware, *Hemisarcoptes* has been recorded feeding only on oyster-shell scale and on San Jose scale, and my own observations are confined to its work on the former in Canada.

As soon as the eggs of the scale are deposited the mite begins to feed upon them. By glueing scales to cover glasses and depending them into cells, it is possible to observe this nonspectacular process. The

short proboscis is inserted through the egg shell, and as the contents are sucked slowly out the shell collapses. In experiments of this kind some mites would not feed at all, and others seemed to feed ravenously; in one case, six mites ate twenty-four eggs in ten days; in another, a large mite ate seven eggs in eight days.

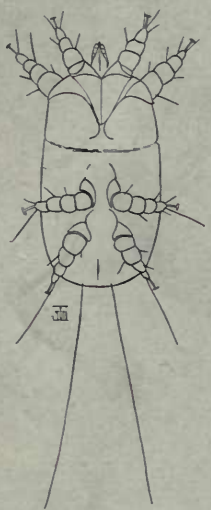


FIG. 2—*HEMISARCOPTES MALUS* SHIMER, ventral view. In Eastern Canada this mite is the most important single factor in controlling the Oyster-shell Scale. (Original)

The ability to feed upside down with apparently as great ease as when in the more normal position is due to the presence of long tarsal suckers, on the tips of which the mites walk, and to the long caudal hairs that adhere tenaciously to surfaces as slippery as polished glass. On glass slides, it was found that *Monieziella*, which has no tarsal suckers and much shorter caudal hairs, could not walk at all; *Hemisarcoptes*, however,—perched up, as it were, on tip toe—would walk quickly out of the microscopic field quite as actively on the lower surface of the slide as on the upper surface. In either case, the long caudal hairs were invariably dragged along the surface of the slide, and were never carried in the air. This ability to walk on slippery surfaces is probably of considerable assistance in climbing young apple and thorn twigs.

Scaly twigs warmed up in the laboratory were frequently found with some of the adult mites migrating from one scale to another. When the mites have not had a meal for some time they are flat enough to crawl through a very slight opening usually found between the bark and the caudal end of the scale. In a few

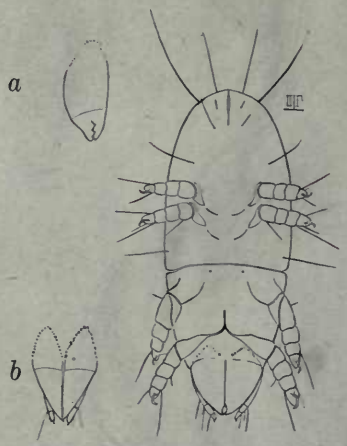


FIG. 3—*MONIEZIELLA ANGUSTA* BANKS, ventral view. A scavenging mite liable to be confused with *Hemisarcoptes*. *a*, dorsal view of head; *b*, lateral view of jaws or chelicera. (Original)

cases, mite-free scales have been encountered where the surrounding ones had all been mite infested. It seemed that these few scales were so closely attached to the bark that the mites were deterred from entering. The eggs were evidently deposited by these wandering mites in groups of from one to six per scale; they are small, less than half the diameter of the oyster-shell scale eggs, whitish, and usually to be found in the posterior end of the scale. Scales have been repeatedly found showing no trace of mite work other than a tell tale little group of minute eggs in the caudal extremity.

In Canada, as in France, the mite is able to hibernate in any or all of its stages. In material collected in the winter, I have found eggs, six-

legged forms, and eight-legged adults, though the last have been found in far the greatest abundance.

The species maintains its activity at comparatively low temperatures, and this is, to a considerable extent, responsible for its usefulness, as it enables the destruction of scale eggs to be continued until the days as well as the nights become frosty. At Fredericton, N.B., the mites were found to be active on warm days even in December, although most of the pre-winter feeding was accomplished, as Shimer found in Ohio, during August and September. Mites brought into the laboratory n January warmed up sufficiently to walk in a very few minutes, so that the species can evidently make use of any warm days during late autumn and early spring.

The importance of *Hemisarcoptes* as a factor in the control of the oyster-shell scale has been recognized particularly by Shimer, Lignières, Saunders, Dearness, Jarvis, Ewing, and Webster. The present observations seem to show that the animal is perhaps even more useful than has been supposed. Two districts have come to notice in which the scale is evidently on the verge of total destruction on account of the immense numbers of these mites. One of these is Moncton, N.B.; at this place the infestation of the scale was fairly heavy in 1916, but the mites were so abundant that by October 16 they had ki led nearly al the eggs; an estimate of the ten collections itemized on the chart (page 238) indicated an egg destruction of over ninety per cent, and mites were found in all but 2.7 per cent of the 1400 sample scales examined; with the mites increasing and the food supply decreasing, it seemed certain that by hatching time in 1917 there would be exceedingly few scale eggs left, and a field examination made in October 1917, showed this promise of enormous destruction to have been amply fulfilled. Similar conditions were found in a group of places in Huntingdon county, Quebec, including Havelock, Hemmingford, Covey Hill, and Barrington; the conditions at Havelock are typical for the four places: in this case, of the hundred new scales turned over, nine still had a full complement of healthy eggs, and of ninety-one which were infested with *Hemisarcoptes* only four contained a few healthy eggs.

In these two districts the oyster-shell scale has been plentiful, and the mites have had an abundant food supply. With these favourable conditions, the mites have evidently increased, until the scale has been almost completely destroyed. The conditions at many other places, however, were found to be quite different. In the Arboretum of the Central Experimental Farm at Ottawa, Ont., the scale is abundant, and the mite is rather less so than at Moncton and the group of places in Huntingdon County, Quebec, (cf. table p. 238). On Mount Royal, Montreal, Quebec, the scale is also abundant, and the mite still less abundant than at Ottawa. At the end of this series comes Chipman, N.B., with the scale exceedingly scarce and difficult to find, and with apparently no mites whatever.

Such a series of conditions seems capable of interpretation by supposing that when the scale is thick the optimum conditions for the mite prevail, and that the mite then increases until finally, as at Moncton, N.B., it practically exhausts its food supply. The conditions in the Ottawa Arboretum and at Montreal would be transition stages, in which the mite is gradually increasing in proportion to its host. Chipman has probably been all but freed of scale in this way, as Mr. A. B. Baird reports that it was abundant there only a few years ago, and that the elimination has come about without spraying.

Such an interpretation would explain, also, the almost complete absence of the scale at Campbellton,

ANALYSIS OF OYSTER-SHELL SCALE EGGS, LAID IN 1916, EXAMINED FOR *Hemisarcoptes*.

Locality	Date collected	By whom collected	Trees collected from	Scales examined	Trees with Hemisarcoptes	Scales with Hemisarcoptes	Host eggs destroyed
Moncton.....N.B.	Oct. & Nov	W. N. Keenan .	10	1400	10	1362	90%–95%
Chatham.....N.B.	Nov.....	G. P. Walker...	3	300	0	0	0
Woodstock.....N.B.	Mar.....	G. P. Walker ..	1	100	1	37	35%
Kingsclear .....N.B.	Mar.....	G. P. Walker ..	2	200	2	129	60%
Fredericton ....N.B.	Oct. & Nov	J. D. Tothill...	21	1600	17	483	15%–20%
Chipman.....N.B.	Nov.....	A. B. Baird....	5	250	0	0	0
Nerepis.....N.B.	Nov.....	G. P. Walker ..	3	100	1	21	5%
St. Stephen ....N.B.	Nov.....	G. P. Walker ..	4	250	1	53	5%
Truro .....N.S.	Mar.....	W. H. Brittain.	5	24	1	6	1%
Halifax.....N.S.	Mar.....	F. C. Gilliatt ..	5*	36	0	0	0
Kentville.....N.S.	Mar.....	F. C. Gilliatt ..	5†	245	0	0	0
Middleton.....N.S.	Mar.....	F. C. Gilliatt ..	5	435	4	173	35%
Annapolis.....N.S.	Feb.....	F. C. Gilliatt ..	5†	230	4	80	25%
Meteghan.....N.S.	Mar.....	F. C. Gilliatt ..	5	475	5	250	55%
Weymouth.....N.S.	Mar.....	F. C. Gilliatt ..	5	425	5	241	50%
Yarmouth.....N.S.	Mar.....	F. C. Gilliatt ..	5	500	5	319	55%
Montague ... P.E.I.	Dec.....	M. H. Coughlan	5	100	1	20	15%
O'Leary..... P.E.I.	Dec.....	M. H. Coughlan	6	32	1	5	2%
Stanstead.....P.Q.	Nov.....	C. E. Petch....	13	1300	3	132	3%
Huntingdon....P.Q.	Nov.....	L. S. McLaine .	5	500	5	466	90%–95%
Mount Royal...P.Q.	Nov.....	A. B. Baird....	10	1000	7	150	10%
Ottawa 1.....Ont.	Nov.....	A. B. Baird....	5	500	2	8	5%
Ottawa 2.....Ont.	Nov.....	A. B. Baird....	4	400	4	326	50%
Guelph.....Ont.	Nov.....	A. B. Baird....	10	1000	4	27	1%
Kaslo.....B.C.	Feb.....	J. W. Cockle...	1	46	0	0	0
Grand Forks....B.C.	Dec.....	E. C. Hunt....	4	650	0	0	0
Vernon.....B.C.	Mar.....	M. H. Ruhmann	4	500	0	0	0
Lillooet.....B.C.	Dec.....	A. W. A. Phair	2	100	0	0	0
Agassiz.....B.C.	Dec.....	R. C. Treherne	5	500	0	0	0
Harrison.....B.C.	Feb.....	T. Wilson.....	1	400	0	0	0
N. Nicoamen...B.C	Jan.....	T. Wilson.....	2	515	0	0	0
N. Vancouver ..B.C.	Dec.....	T. Wilson.....	2	355	0	0	0
Kuper Island...B.C.	Mar.....	T. Wilson.....	1	200	0	0	0
Indian Reserve .B.C.	Mar.....	T. Wilson.....	1	300	0	0	0
Victoria.....B.C.	Jan.....	E. W. White...	4	1700	0	0	0
Alberni.....B.C.	Feb.....	T. Wilson.....	2	500	0	0	0
Duncan.....B.C.	Mar.....	T. Wilson.....	1	110	0	0	0
Ithaca.....N.Y.	April	R. Matheson ..	4	550	0	0	0
			181	17839	83	4288	

* Very lightly infested. † Sprayed trees.

This table shows the importance of the mite *Hemisarcoptes* as a controlling factor of the oyster-shell scale in places where the insect is abundant. It also indicates that the mite has not apparently yet found its way into British Columbia.

N.B., and along the St. John River in Madawaska and Victoria counties, N.B., where its food plants are somewhat abundant and where very little spraying has been done. It would also explain the present scarcity of the scale on some derelict apple trees close to this laboratory that four years ago were heavily infested. The curious eliminations of the oyster-shell scales noted by Professor L. Caesar may have been due to an attack by *Hemisarcoptes*. Mr. Caesar says, "I have on several occasions seen trees that were badly infested throw off the scales in some inexplicable manner, and take, as it were, a new lease of life."

It at least seems certain that when the scale is abundant this mite is

the most important single factor operating toward control in eastern Canada. In places where the host is less abundant, the mite becomes proportionately less efficient.

In this account I have spoken of *Hemisarcoptes* only as a predator on the eggs of the oyster-shell scale. Lignières has shown, in France, and Mr. A. B. Baird, in New Brunswick, however, that in the summer time the mite busies itself by feeding upon the growing and even full grown scales.

In conclusion, I wish to thank the many kind friends whose names appear on the analysis table, for assistance in gathering the material upon which this study is largely based; and also to point out that the apparent absence of *Hemisarcoptes* in British Columbia (where the Entomological Branch has already established experimental colonies) suggests that there may be other odd corners of the earth where the oyster-shell scale now flourishes and to which the mite has not yet found its way.

MAKING BORDEAUX MIXTURE

BY G. E. SAUNDERS, DOMINION ENTOMOLOGICAL LABORATORY, ANNAPOLIS ROYAL, N.S.

THE old established method of making Bordeaux mixture after the 4-4-40 formula, by slaking the four pounds of fresh stone lime and dissolving it in 20 gallons of water, and dissolv ng another 4 pounds of copper sulphate in another 20 gallons and pouring the two together into the spray barrel, either by alternate buckets or by running the streams from the two buckets together as they enter the barrel, usually resulted in a very excellent mixture, but had the disadvantage of being a little slow.

As hand syringes changed to barrel pumps, and they, in turn, to power pumps, and the power pumps developed into outfits capable of keeping up a pressure of from 200 to 400 pounds and throwing from 5 to 20 gallons of spray per minute, the importance of methods of mixing spraying materials quickly increased. Systems of overhead tanks and stock solutions of the two ingredients have been widely used, and have helped in cutting down the t me taken in preparing Bordeaux mixture. At various t mes during the past 20 years powdered bluestone has been placed on the market and subsequently withdrawn, as in use it was dissolved in water before being put into the spray ng tank, and represented only a slight saving in time and no saving in trouble, so did not appear to justify the small add tional cost. In the same way, hydrated or prepared l:me has been frequently used, but always dissolved in water before being put into the tank. In addition to costing more, than the stone lime it was found that hydrated lime could not be used in conjunction with "arsenoid" or sodium arsenate in the manner in which that poison was used in Bordeaux in many potato sections.

In the course of our investigations on insecticides, we carried on during 1916 and 1917 many experiments in the making of Bordeaux at the Dominion Entomological Laboratory, Annapolis Royal, N.S., with a view to shortening and simplifying the methods of mixing, as it was felt that the trouble and time spent in mixing had been an important factor in eliminating this valuable spraying material from the spray calendar. It was found by using bluestone, powdered finely enough to pass a screen of 20 meshes to the inch, and hydrated lime, that the agitator of an ordinary power spray pump may be made to do the work of dissolving the bluestone and slaking the lime,

and the system of overhead tanks in mixing. The method is as follows: weigh out the bluestone and dump it into the empty tank, start the engine and fill the tank; this will take from five to fifteen minutes, giving a good safety margin, as the bluestone will dissolve in one minute; when the tank is full, with the agitator still running, add the proper quantity of hydrated or prepared lime, and in another minute the Bordeaux is ready to apply. This method does not make the most perfect Bordeaux possible, but it will make a Bordeaux that is better than the average made from materials usually obtained, and has the advantage of saving time and trouble at a season of the year when time is at a premium.

In using powdered copper sulphate one is sure of the amount going into the tank by the scales. In using stock solutions, a gallon from the top does not contain as much bluestone as a gallon from the bottom, so unless one is careful to stir before dipping out variation in the amount going into each tank is apt to occur. The hydrated lime, as we have indicated, is not so active as freshly burned stone lime but it is better than the average stone lime. The reason for this is that hydrated lime does not carbonate or air slake so rapidly as stone lime, and may be kept for six months in a cotton sack and still will make a good Bordeaux; this is not possible with stone lime.

In using hydrated lime, one should always use an excess quantity over the bluestone, although in actual tests 2 pounds of hydrated lime neutralized 4 pounds of bluestone. In this connection it may be said that the Thomson-Buchanan Bordeaux made up of 2 lbs. of bluestone, 10 lbs. lime to 40 gallons of water, is going to be very widely used on apple trees in 1918 in the localities in which it has been tested. It gives less russetting than the old 4-4-40 formula, and may be used four times on apple foliage with no Bordeaux bronzing of the leaf.

The method of making Bordeaux described was used in the orchard of S. B. Hatheway, of Fredericton, N.B., in 1917, with complete success, and it was found that it was at least no more trouble than drawing lime sulphur and pouring it into the tank. The method can, of course, only be used in power outfits equipped with a mechanical agitator.

THE SEED BRANCH

SEED TESTS MADE IN JANUARY

BY E. D. EDDY, B.S.A., CHIEF SEED INSPECTOR

DURING January, 1809 samples were received for test at the Ottawa Seed Laboratory. Of these, 373 were from farmers, 1,111 from seed merchants, and 325 from institutions. The total number received is about 500 less than during the same month a year ago. With most kinds of seed there has been an increase, but this is more than offset by the decline in the number of red clover samples, which was 287 in January, 1918, compared with 893 a year ago. This is a good indication of the scarcity of this kind of seed. Fewer samples of timothy and alfalfa seed were received in January, 1918, than during the same month the year before, but there was an increase in the number of alsike samples. The following indicates the proportion of the samples tested coming within the various grades:—

Timothy, total,	277;	No. 1,	39;	No. 2,	120;	No. 3,	82;	Rejected,	36.
Red Clover "	287	"	88	"	82	"	77	"	40
Alsike "	272	"	63	"	105	"	45	"	59
Alfalfa "	29	"	7	"	15	"	5	"	2

The proportion of timothy samples tested that graded No. 1 was 14%, compared with 17% a year ago. With red clover the proportion of No. 1 this January was 30%, compared with 25% in 1917. The percentage of alsike seed grading No. 1 was 23, an increase of 5 over last year.

Of the total number of samples received during January, 875 were for germination test. During the month, germination test reports were issued on 1,234 samples. Quite a large proportion of the oat samples from Western Canada showed evidence of frost injury, and were low in vitality. The corn samples so far received indicate poor average germination .

THE HEALTH OF ANIMALS BRANCH

SWINE IMPORTATION REGULATIONS

HIS Excellency the Governor-General in Council, on the recommendation of the Minister of Agriculture, has been pleased to order that the regulations established under "The Animal Contagious Diseases Act," of the 30th November, 1909, and amendments thereto, shall be amended by rescinding Section 42, and substituting in lieu thereof the following section:—

Swine—

Sec. 42 (*a*) All swine must be accompanied by a certificate signed by a veterinarian of the United States Bureau of Animal Industry, stating that neither swine plague or hog cholera has existed within a radius of five miles of the premises in which they have been kept for a period of six months immediately preceding date of shipment, but such swine shall nevertheless be inspected, and shall be subject to a quarantine of thirty days before being allowed to come in contact with Canadian animals.

Non-immunized Hogs.—

(*b*) The importer will be required to produce an affidavit to the effect that the swine he proposes to import have not been immunized to hog cholera by the simultaneous injection of hog cholera virus and serum.

Double Treated Hogs—

(*c*) Pure bred hogs immunized by the simultaneous method of injecting serum and virus will be permitted to enter Canada when accompanied by the affidavit of the breeder or last owner that they were immunized not less than thirty days prior to importation, and have been immersed in a satisfactory disinfectant solution previous to shipment. Thirty days quarantine is required for these and all other hogs.

NOTE.—Sub-section (c), the third and last sub-section here given, is an addition to section 42 of "The Animal Contagious Diseases Act," as it originally stood, and constitutes the only change to the section.

THE DAIRY AND COLD STORAGE BRANCH

THE CHEESE COMMISSION

BY J. A. RUDDICK, DAIRY AND COLD STORAGE COMMISSIONER

THE appointment of a Cheese Commission, and the export of the Canadian surplus through that channel in 1917, has probably been more widely discussed than any other aspect of the dairy situation as affected by the war.

The Commission was necessary to handle the cheese under the growing difficulties of finance and transportation. Without some arrangement of this kind it is difficult to say what would have happened, because the export of cheese could not have been continued on the old lines at any price.

The Commission had no power to take the cheese unless producers were willing to sell. There has not been, nor is there any regulation, or other legal obstacle, as far as the Commission is concerned, to prevent a Canadian exporter, or producer, from selling his cheese at a higher price than the Commission is paying, if he can get it.

NEW ZEALAND'S FIGURE

As a matter of comparison, it is interesting to know that the British Board of Trade purchased the entire output of New Zealand cheese for the season of 1916-17 at 19c., f.o.b. steamer, New Zealand, and were not at first inclined to pay more for the Canadian surplus of 1917. In view of the difference in the market value of Canadian and New Zealand cheese, and the further fact that the value of all food products has risen during the interval, it did not seem reasonable the Canadian cheese should be sold at the same price as that paid for New Zealand cheese some months previously, and it was so pointed out to the proper authorities. The British authorities have just concluded another deal with the New Zealand cheese manufacturers, to take their surplus for the season of 1917-18 at a price which will net them between 19c. and 19½c. per pound, f.o.b. steamer. Canadian cheese has been sold between these two New Zealand seasons at 21¾c.

WAREHOUSING AT MONTREAL

When the Commission got to work and adopted rules for the acceptance of cheese, strong objection was taken by exporters in Western Ontario to the rule which required all cheese to be warehoused at Montreal. It was felt at first that there was a discrimination in favour of the Montreal exporters. Now that the situation with regard to shipping is better understood, I feel assured that the dealers are prepared to concede that the plan adopted was the only feasible one. It would have been impossible for shippers in Western Ontario to have carried on business along the accustomed lines, as through billing was out of the question; all regular sailings were cancelled, and it was impossible to book space ahead. The Commission was often called on to load large quantities of cheese at 24 hours' notice. Space, after being allotted, was frequently cancelled at the last minute. Nothing could be done on the old basis.

THE SAVING EFFECTED

A great saving has been effected by delivering the cheese to the British Government, f.o.b. steamer, Mont-

real. In normal times an exporter, when he delivers cheese to a steamer, gets his receipted bill-of-lading and other documents. These he takes to his banker to whom he sells them at a price, the banker undertaking to collect the money from the consignee of the cheese in the United Kingdom. Of course the banker charges for doing this, especially as he is generally out of his money for sixty days. The charge varies from day to day according to circumstances, and this is known as the rate of exchange. At the present time the rate of exchange is very low, or in other words, if it is desired to sell bills of exchange a very high rate would be charged by the banker for collecting the money in England. The difference in these charges between pre-war days and the present time would amount to $1,461,000 on the total cheese export of 1917. That would be part of the cost of delivering the cheese to Great Britain, and would have to come out of the cheese. Then again, the British Government, on taking delivery of the cheese at Montreal, assumed the marine insurance and the war risk insurance, which would have amounted to an additional sum of $2,210,000 on the season's exports. If these two items had been paid by exporters in the usual way, as part of the cost of delivering the cheese, the price would have been reduced accordingly and it would have amounted to about 1¾c. per pound on the total exports.

EXTENT OF THE PRODUCER'S BENEFIT

It is doubtful if there is any article exported from Canada other than cheese on which the producer receives such a large percentage of its value f.o.b. steamer, even in normal times. Under the Cheese Commission the producer has received more than usual. There are certain charges, such as freight, cartage, storage, cooperage, etc., which may be called fixed charges, to be paid no matter how the cheese are handled. The prices paid in this country last season were too high on the average to leave any profit to the dealer, so the producer got the whole value, less the fixed charges. The expenses of the Cheese Commission have amounted to only eight-tenths of a cent per box. The members of the Cheese Commission have given their services without any remuneration whatever. There are some things about the situation as it existed last spring that cannot be made public, but I am convinced that the handling of the cheese by the Commission has put millions of dollars into the pockets of the Canadian producers.

TOTAL EXPORTS, SEASON 1917

Down to December 31 the Cheese Commission had accepted a total of 1,860,237 boxes of cheese, weighing 155,662,463 pounds. Of this quantity 1,087,359 boxes were from Ontario, 755,390 from Quebec and 17,488 from Prince Edward Island. Western Ontario, that is to say the district west of Toronto, supplied 61,538 boxes, but it should be added that this district made relatively heavy shipments before the Commission began operations, and it is said that there are several thousand boxes of Western Ontario make yet to come forward, on which the holders are very kindly carrying the storage and shrinkage charges and thus saving that much to the Commission. It is also to be noted that a large proportion of the cheese which goes into the home trade are from Western Ontario. I have no figures as to the exact quantity so disposed of.

BEFORE THE COMMISSION TOOK HOLD

I have taken the trouble to ascertain the total number of boxes and the weight of the cheese of the 1917 crop, which were exported through the regular channels before the

Cheese Commission began operations, and I find that there were altogether 123,909 boxes, or 10,656,174 pounds thus exported. There are probably 10 to 15 thousand cheese yet to be delivered to the Commission of the crop of 1917, so that the total exportable surplus for the year will be very close to 2,000,000 boxes, or 172,620,000 pounds, with a value of $37,544,850, an increase of over $4,000,000 as compared with 1916. These figures cover only the cheese shipped to the United Kingdom. There have been small shipments as usual, probably amounting to 1,000,000 pounds, to other countries. The unrevised figures of trade and navigation published by the Customs Department show that the exports to the United Kingdom for the 12 months ending March 31, 1917, which represents approximately the crop of 1916, amounted to 179,000,000 pounds. It would appear, therefore, as though our exports of cheese for 1917 will show a slight decrease as compared with 1916. If it is true, however, as I am inclined to think it is, that the home consumption has increased, it is probable that the total production of cheese in Canada for 1917 was just about the same as it was in the previous year. When we consider the large quantities of milk which have been diverted from cheese factories into other channels, the showing is a very good one indeed. Our exports to the United Kingdom for the season of 1914 were only 135,000,000 pounds, so that we have increased our exports since the beginning of the war by 35 to 40 million pounds; or in other words, the value of the cheese output of 1917 was eight million dollars greater than it would have been if the production had been the same as in 1914.

THE LIVE STOCK BRANCH

REGULATIONS TO GOVERN STOCK YARDS

A conference of representative live stock officials and stock yards operators was held in Ottawa on February 11th to draft regulations for the putting into force of the Live Stock and Live Stock Products Act of 1917, reviewed in THE AGRICULTURAL GAZETTE of October, in so far as it relates to the operation of stock yards. The meeting was called by the Honourable the Minister of Agriculture and presided over by the Live Stock Commissioner. There were present representatives of the provincial Departments of Agriculture, of Live Stock Associations, the Eastern and Western Canada Live Stock Unions, stock yards managements, Live Stock Exchanges and federal officials. Suggested regulations prepared to conform with the Act were gone over with full deliberation and so amended where necessary as to meet the requirements of practical operation.

During the course of the meeting it was announced that Mr. D. M. Johnson would represent the Department on behalf of the Live Stock Commissioner in the administration of the Act in so far as it affects Stock Yards and Live Stock Exchanges.

PART II
Provincial Departments of Agriculture

SEED SUPPLY FOR THE CURRENT YEAR

PRINCE EDWARD ISLAND

BY W. J. REID, B.S.A., DIRECTOR OF AGRICULTURAL INSTRUCTION

DURING late years the production of high class grain, especially oats and barley, has been substantially encouraged by the various forms of instruction received through such mediums as agricultural meetings, seed centres, and especially seed fairs. The demand for high class seed has so grown with the encouragement that has been directed towards the production work, that even during the present year when many other parts of the country are feeling a stringent need for greater supplies of seed grain, the province of Prince Edward Island will be able to supply its own needs and have a surplus for export; needless to say, the export for this year will be smaller than in previous years, owing to one or two sections of the province being affected by rust on last season's oat crop. However, it is felt that the usual agencies of distribution will be sufficient for the demand, namely, the seed centres established by, and operated under, the instruction of the Canadian Seed Growers' Association and the Farmers' Institutes.

No need has been found for any special provision in financing associations to handle the seeds, as it is purely a co-operative undertaking on the part of the agricultural associations, the buying and distribution being carried out by the secretary of each organization and the financing proportionate among those interested.

NOVA SCOTIA

BY M. CUMMING, B.A., B.S.A., SECRETARY FOR AGRICULTURE

THE Department of Agriculture for Nova Scotia has taken steps to insure a supply of seed to the farmers of the province for the coming spring. The Department has also taken a step in the direction of making available a quantity of fertilizer.

1. We are guaranteeing certain representative seed firms against loss on the unsold surplus of cars of seed wheat which they purchase on our advice, and which they in turn agree to sell to farmers at not more than a moderate profit. Through this arrangement we think that we have insured an ample supply of imported seed wheat to supplement the local supplies available.

2. The same policy is being used in connection with seed oats, but it has not yet been brought to quite

as successful a conclusion, mainly for the reason that difficulty is being experienced in getting satisfactory quotations on supplies of seed oats.

3. To encourage the growing of shell beans in those parts of Nova Scotia where the crop has been precarious the Department has purchased and located several hundred bushels of hardy strains of early maturing seed beans, which are now being offered to the trade or to farmers at cost. This is being used as the centre of a campaign to get farmers and gardeners in each part of Nova Scotia to grow enough beans for their own use.

4. The turnip is one of the most important crops of Nova Scotia, and turnip seed is scarce and high. We have fortunately arranged with several firms that had not planned to do so to stock up with extra supplies, and we have one or two other reserve sources of seed supply to fall back upon should scarcity develop by seeding time.

The potato seed situation is not a serious one in Nova Scotia, as there is an ample provincial supply, the only occasion for shortage being in some localities in Western Nova Scotia where very large sales were made for the West Indies trade; but no difficulty is anticipated in securing seed for these sections from other parts of Nova Scotia.

In conclusion, the Department is issuing literature and holding a series of educational meetings, the aim of which is to encourage farmers to buy their oats and wheat immediately. If this policy proves successful it is hoped that a knowledge of the final seed requirements will be secured some time in advance of seeding, so that supplemental measures may be taken if necessary.

I may add that the Nova Scotia Government has purchased a reserve supply of fertilizer which will not be put on the market unless the local supply gives out. Fertilizer is fully as important as seed in Maritime Canada.

NEW BRUNSWICK

BY W. R. REEK, B.S.A., SECRETARY FOR AGRICULTURE

WHEAT, oats and buckwheat are the three principal cereals grown in the province. The crops of 1917 were below normal in yield and quality, a very large percentage being unfit for seed.

Normally large quantities of oats and some wheat are annually imported, but this year the requirements were so much larger that early action was taken. Seed had to be supplied also for the increased acreage obtained through the campaign for greater wheat production. Every farmer is requested and urged to grow some wheat. The objective is five times the average in the province.

The organization necessary to reach every farmer, if formed for this express purpose, would need to be large and is considered not practical. Instead the county councils were appealed to because there were, according to law, two councillors from every parish. A conference composed of representatives from the various councils was held at Fredericton, and those in attendance agreed to place the matter before their respective councils at the January session.

A wheat bulletin was issued and distributed by the schools, and enquiry cards were sent out through the same channels, thus bringing the question home to every farmer. Circulars were forwarded to every agricultural society, newspaper articles were frequently sent out, and every clergyman was requested to make particular reference to, and to

place emphasis upon, the necessity for the greater production of wheat for 1918. The result has brought a large enquiry for seed and for information about crops not generally grown.

A representative from the Department of Agriculture attended every county council meeting during January and placed the following propcsition before them:

(1) That the councillors become responsible for the canvass of their respective parishes, urging the production of cereals and to take orders for seed.

(2) That the council appoint a committee to co-operate with the Department of Agriculture and work out the details as required in every county.

(3) That the Department of Agriculture purchase the quantities of seed recommended by the various committees; finance the purchases, store, if necessary, and deliver to the county committees in late winter or early spring in car-lots at points recommended by them.

(4) That the councils reimburse the Government by meeting sight drafts where arrangements could be made, or, if necessary, thirty days be allowed, thus giving the councils an opportunity to dispose of much of the grain for cash.

(5) The method of distribution and collection to be as the councils considered in the best interest of production in their respective municipalities.

Two-thirds of the councils accepted the proposition as presented and the balance arranged for a campaign urging production, but requested the Department to distribute the seed. Thus about 400 men were morally bound, whereas under a Departmental staff the numbers would be very small.

The municipal councils were empowered to raise short term loans for such enterprises by an Act passed in the session of 1917.

Where farmers require credit to purchase seed the necessary arrangements were in several cases left with the parishes, whereas others decided that the municipality should advance the credit.

ONTARIO

BY W. BERT ROADHOUSE, DEPUTY MINISTER OF AGRICULTURE

IN view of the great need for the maximum production of foodstuffs this year, the Ontario Department of Agriculture has been giving special consideration to the subject of the seed supply. In the first place, it may be noted that the province is served by several well established and enterprising seed firms. Any action taken by the Department, therefore, is supplementary to the usual channels of trade designed to meet any additional demand there may be for certain kinds of seed for crops which may be emphasized in the general work of the Department, or to extend the use of varieties which the experiments of the Department have shown to be superior.

There is, of course, a considerable exchange among farmers in their purchase of seed. To assist farmers who have seed for sale, or those who desire to purchase, the District Representative offices located in the counties are used as a sort of clearing house. Farmers are requested to write advising of their needs, and the District Representative does his best to secure the grain, or make a sale, as the case may be. Last year this plan was adopted, thousands of bushels changed hands in this way, and there is no doubt it will again be taken advantage of to a large extent.

Then, too, the field crop competitions conducted through the agricultural societies usually result in the production of considerable quantities of grain suitable for seed, both because of the varieties included and their freedom from weeds. The names of prize-winners in these competitions are published by the

Department, and these reports are given a wide circulation, so that other farmers may have the addresses of men who are likely to have seed of the varieties mentioned available.

SHORTAGE OF CORN AND OTHER SEED

One of the most critical needs at the present time is an adequate supply of seed corn. Large quantities are imported from across the line each year, and this year the importations are likely to be larger owing to the unfortunate weather conditions which decreased the Ontario-grown crop last year. Ontario seed dealers have been fortunate in being able to place contracts for considerable quantities across the line, but, owing to the transportation congestion, it is very difficult to secure movement. The Department has had the matter up with the Food Controller, who, in turn, is negotiating with Washington, but the subject will no doubt continue to call for close attention until the supply is definitely secured.

Similarly, there are difficulties in regard to seed for crops such as peas grown for canning purposes. The American Food Administration has declined licenses for certain varieties which they claim are needed in their own country, and the question of refusing permission to ship varieties from Ontario has also been up for consideration.

In the matter of spring wheat, peas, and beans particularly, the Department is co-operating with the Federal Seed Commissioner, who has made arrangements for a reserve supply which will be available to farmers of this province in carload lots.

AS TO SEED POTATOES

Considerable attention has also been given to the matter of an adequate supply of seed potatoes. This has been taken up from the standpoint of the permanent improvement of the crop rather than from the standpoint of immediate increased production. Enquiries have proven that Northern grown seed gives the best results, but, unfortunately, this year only a small quantity of potatoes suitable for seed grown in Northern Ontario can be secured. These are, therefore, being supplemented by seed secured from New Brunswick that is certified as being reasonably free from disease and true to type. The Department is encouraging the standardization of two types of potatoes, being the Irish Cobbler as an early potato, and the Green Mountain as a late potato. The Department is undertaking to place farmers who are able to purchase in carload lots in touch with sellers who have seed available, and who can be relied upon as to quality, the inspection being done by the officials of the Federal Department of Agriculture. Arrangements are being made to provide a larger quantity of Northern grown seed for the 1919 crop.

The Department is also co-operating with the Seed Commissioner in endeavouring to provide a supply of home-grown root seeds.

Last year an arrangement was made with the banks, by which a loan up to $200 might be secured for the purchase of seed. This arrangement expired on July 1st last, and has not since been renewed. It undoubtedly assisted a considerable number to secure seed and produce foodstuffs who would not otherwise have been able to do so. It is possible that it may be renewed this year.

MANITOBA

BY T. J. HARRISON, B.S.A., PROFESSOR OF FIELD HUSBANDRY, PROVINCIAL AGRICULTURAL COLLEGE

THERE will be a serious shortage of good seed oats and barley in Manitoba this spring. In the south-western part of the province, the past season was so dry that very poor crops were obtained, with the result that many of the farmers will have to purchase feed as well as seed. Ordinarily this would be no great hardship, but this year, however, a new difficulty has arisen.

The north-western portion of the province produced an abundance of oats, and a fair amount of barley was raised in the east and central, while many of the oats in the north have been frosted, and will germinate very poorly. Out of a number of samples tested by the Field Husbandry Department, Manitoba Agricultural College, the following are the results:

Viability	Percentage of samples tested.
91% or over	14%
81 to 90%	14.1%
61 to 80%	28.3%
60% or below	43.6%

The above table emphasizes two things: first, the necessity of testing all seed oats, and, second, where the test is low, of securing good seed early, because good oats will be scarce. In addition to the limited supply of good seed, is the fact that mill feeds, screenings, etc., are high in price and difficult to secure, compelling many farmers to feed grain that would otherwise make good seed. If a farmer finds that his grain is low in vitality, there are three avenues through which he may secure seed. First—purchase from the neighbours, second—purchase from the farmers in other parts of the province, third—purchase from the seed houses, grain commission merchants, or the rural municipalities.

PURCHASING SEED FROM THE NEIGHBOURS

If good seed of the approved varieties can be secured in the district, this will be the safest and cheapest source. It will be the safest course, as there will be no danger of the introduction of weed seeds new to the district. This point cannot be overemphasized, because, when there is an inter-district or inter-provincial change of seed, there is always considerable loss to the district by the introduction of noxious weeds. Some years ago, the seed crop was a failure, in one of the better districts outside of the province. Considerable seed was supplied in Manitoba and other points, with the result that large quantities of quack grass seed was introduced, and it has since been a problem in that district. Purchasing from the neighbours is the cheapest method because there will be no freight or sacks to purchase, and, finally, it is the most satisfactory because the farmer can see the grain before he makes the purchase.

PURCHASE OF GRAIN PRODUCED OUTSIDE OF THE DISTRICT

The purchase of seed outside of the district by the individual farmer may be accomplished in any of the following ways:—First—by the farmer direct from the producer, second—through the seed grain exchange of the Field Husbandry Department, Manitoba Agricultural College.

In the first method the purchaser will get the better results by going into the district and purchasing the grain direct from the farmer, after he has examined it in the bin. If this is not done, there is always more or less danger of disappointment because the seed was not what the purchaser expected.

In the second method, the Field

Husbandry Department secures samples from the growers, and after making an analysis, and testing them for germination, supplies this information with the price, to intending purchasers. Where representative samples are secured, this method works very satisfactorily, and is much cheaper in that there is no expense in connection with the purchase.

PURCHASING FROM GRAIN COMMISSION MERCHANTS

Grain commission firms often handle seed grain as a side line. In the course of their regular business they often come in contact with carloads of grain that would make good seed. This is usually sold to groups of farmers in carload lots. Some concerns, however, bag the grain and sell it in smaller lots. By dealing with the commission man it is often possible to secure good seed at quite reasonable prices, because their purchases are nearly always made on the basis of commercial grain values.

PURCHASING FROM SEED HOUSES

The seed houses are very careful in their selection of the seed, much of it being grown under contract and inspected in the field. This insures the selling of pure strains. Naturally, seed produced and purchased in this manner costs considerably more than market grain, consequently the prices usually asked by the seed houses are much higher, but, when the quality of the seed is considered, it is probably as cheap as that bought in any other form.

If there are only a few farmers in the district requiring seed, any one of the foregoing methods will prove to be the best means of securing seed.

PURCHASING FROM MUNICIPALITIES OR GRAIN GROWERS' ASSOCIATIONS

Where there are a number of people requiring seed, it would be cheaper and more satisfactory to purchase it through the Grain Growers' Association local, or, better still, through the municipality. The Dominion Department of Agriculture, through the Seed Purchasing Branch, purchases on the commercial market, any cars of grain that are suited for seed purposes. These are stored in the terminal elevators, interior terminal elevators, and the Harbour Commission elevators. Seed bought west of Saskatoon and Moose Jaw is stored in the elevators at these points. This is to supply the farmers eastward. Seed bought east of these points is stored in the terminal elevators at the head of the lakes. This is used for distribution through Ontario and part of Quebec. Seed stored in the Harbour Commission elevator at Montreal, is used for distribution through part of Quebec and the Maritime provinces. This grain is graded by the commercial graders into the commercial grades such as No. 1 Northern, No. 2 C.W., etc. It is then inspected by a representative of the Seed Branch, to note if it is true to variety, and contains the limited number of noxious weeds. This seed is sold in carload lots to individuals, Grain Growers' Associations, or municipalities.

In Manitoba, a Seed Grain Act is passed each year that there is need for seed distribution, enabling municipalities to borrow money from the Government at 6%, for the purchase of seed grain only. This enables the rural council, after making a survey of the municipality, by which they can determine the amount of seed required, to borrow the money from the provincial Government, and purchase the seed from the Dominion Purchasing Commission. The seed is then distributed to the farmers from the car. The farmers who are in good circumstances are requested to pay cash. The more needy settlers may get the seed on credit, the amount becoming a charge upon the land. In the case of a tenant, he cannot secure the seed in this way without the consent of the landlord.

The Manitoba Department of Agriculture play a very important part in this distribution. By communication with their crop correspondents, members of the legislature and members of the rural local councils, they obtain the approximate needs for the province. They then circularize the municipalities, stating when and how the seed can be secured. In this way, practically every farmer who requires seed is assured of sufficient to sow his land.

SASKATCHEWAN

BY W. P. TULLIS, ACTING WEEDS AND SEED COMMISSIONER

THE average per acre crop of wheat for all Saskatchewan was not high in 1917, but a survey of the situation goes to show that but a small percentage of farmers did not reap a fair harvest. The most unfavourable returns came from the south-western district, and here it was that the oat crop principally gave poor yields.

A proper distribution of the seed already in Saskatchewan should be almost sufficient for the proper seeding of our 1918 crop. The Dominion Seed Purchasing Commission is bringing in seed oats from outside points to supply any deficiency that exists. As a whole, there is probably more good seed wheat in the province now than ever before in the history of Saskatchewan, and the farmers in general were never better able financially to obtain their seed and put it into the ground right. There are a number of cases, however, as in years gone by, where farmers have no seed and are unable financially to obtain it.

Where land is situated in organized territory, the municipality may borrow such sums as shall appear to the council to be necessary to supply seed grain to farmers who, owing to failures of crops or other adverse conditions, may be unable to procure the same for the ensuing spring season. A loan of money to the municipality for the above purpose does not limit the borrowing powers of the municipality, and, upon application of any municipality, the provincial Government may guarantee the repayment of money borrowed for seed grain advances, if such is deemed necessary. Thus needy ratepayers in organized territory may apply to their local municipal authorities for seed and the council, being on the ground, is in a position to know the exact circumstances of each individual farmer. Seed grain up to, but not exceeding, $250 in value, and feed up to, but not exceeding, $75 in value, may be advanced on each quarter section.

According to the Local Improvement Act the provincial Government may provide for the purchase, sale and distribution of seed grain in local improvement areas among such farmers and settlers as apply for the same.

It is possible that in the extreme south-west, the provincial Government will find it necessary to take care of a small number of settlers. It is understood that the Dominion Immigration Branch of the Department of the Interior intends supplying seed grain to homesteaders on unpatented lands, and that the provincial Government will, in all probability, assist farmers in the above mentioned areas who reside on patented lands.

It is not likely that any land property prepared for crop will go unseeded because of a shortage of seed.

ALBERTA

BY JAS. McCAIG, M.A., EDITOR OF PUBLICATIONS, EDMONTON, ALTA.

THE work of this Department to insure a supply of seed for 1918 is concerned with the following grains: wheat, oats, barley, peas, and flax. The seed fair is used to the fullest extent to increase the supply of reliable seed, and to promote interest in the purchase of good seed. Circulars are issued to the exhibitors and samples are requested. A list of those having desirable seed for sale is then mailed to all inquirers. This year the Department has undertaken work in conjunction with the College of Agriculture, the Schools of Agriculture, and the Demonstration Farms, to promote the systematic production and the increase of good wheat for seed. The exhibitors at the seed fairs will be this year offered special prizes for wheat and oats. In addition to this special prize, winners will be allowed to purchase 5 bushels of registered seed which is furnished at elevator prices. They will also be required to sow this on clean and prepared land, to allow inspection by Departmental and University officials, to have it carefully thrashed, to allow inspection in the bin and to clean it before offering it for sale. The Department will undertake as far as possible to find a market for clean seed. Under these conditions it is expected that the growth of this work will lead to the forming of a provincial association which will make its own regulations subject to the approval of the Department. For the present year the distribution is limited to wheat and oats, and the wheat will go to Calgary and points south, and the oats to the country north of Calgary.

THE SEARCH FOR GOOD SEED

Up to the present the Department has been concerned chiefly with trying to increase the production of good seed in the province. In the case of timothy, a bulletin was issued which was widely distributed and has had a good effect. At the Schools of Agriculture in their experimental plots, tests of alfalfa are being made to find out which kinds are best suited to district conditions, but the seed is not being distributed in commercial quantities.

In the case of field-root seed, nothing has been done in local production. The public have been advised from time to time in circular letters with respect to the necessity of securing seeds.

Potatoes have been a satisfactory crop in the province this year, and seed will likely be plentiful. The Department has been chiefly concerned in helping to dispose of commercial potatoes where the production has been large. The Department has purchased for a large western house a car-load of seed potatoes. The supply of good potatoes seed will probably be more than sufficient for all needs.

THE QUESTION OF FINANCE

With respect to the financing of associations, or individuals requiring credit, nothing has been done this year, but the matter is under consideration. What was done last year was that money to the extent of $50,000 was made available by arrangement with one of the banks for loans to farmers for the purchase of seed. The notes were made payable on the 1st of January following, and were guaranteed by the Department. Last year $40,000 of this money was used, and 9,000 bushels of wheat, 34,000 bushels of oats, and 2,700 bushels of barley were distributed.

BRITISH COLUMBIA

BY H. O. ENGLISH, B.S.A., CHIEF SOIL AND CROP INSTRUCTOR

WHILE British Columbia farmers have not, in the past, grown much grain other than oats, the prevailing high prices paid for wheat and the scarcity of hog feed has induced many to prepare for the seeding of increased acreages of wheat, oats, barley, and corn in 1918. There appears to be a strong demand for good seed.

To ensure an optimum distribution of the best seed of all the mixed farming crops grown in the province, the Department compiled and published a seed-growers' directory, containing the names of the provincial seed growers, the kind of seed grown, and the quantity offered for sale by each. This directory brings the prospective buyer of seed into touch with the local grower. Corn, grass, root, and vegetable seeds were also listed.

Since sufficient seed to meet the provincial demand was not available locally, steps were taken to ascertain whether it would be necessary to bring in seed from outside the province. The leading seed merchants were interviewed, and the 1918 seed stocks compared with the 1917. It was found that the supplies of oats, barley, corn, peas, vetches, and root seeds were somewhat limited.

The farmers have been advised of the seed shortage through the farmers institutes, and urged to purchase their seed early. The seed merchants have agreed to notify the Department of the threatened exhaustion of their supply of any one kind of seed. In the meantime, the Department is locating available supplies of seed outside the province, and is prepared to purchase, and deliver, such seed as is required, to the farmers of the province at cost.

Anticipating a scarcity of alfalfa and clover seed, the Department operated a clover and alfalfa huller in the interior during the fall of 1917. Several tons of seed were threshed and disposed of locally.

Provision is made under the Provincial Land Settlement Act for short term loans to farmers to enable them to purchase seed.

In addition to the foregoing, recent action has been taken that should place the seed industry of this province on a better basis. A British Columbia Seed Growers' Association has been formed, and officers elected. While this organization cannot be expected to render much assistance with the distribution of the 1917 seed crop, it should be an important factor in the future.

DUSTING vs. LIQUID SPRAYING

QUEBEC

BY GEORGES MAHEUX, PROVINCIAL ENTOMOLOGIST

BRIEFLY speaking, the position of Quebec as regards experiments is the following: In accordance with an agreement made between the Dominion Entomologist and the Provincial Entomologist, all experimental work on spraying in Quebec is to be carried on under the direction of the former officer. The Dominion Field Officer for the province of Quebec conducts all necessary experiments and the results obtained are communicated to the provincial officers. The latter spreads this information among the farmers and recommends the adoption of the best methods of control, when the efficiency of these methods has been clearly demonstrated.

The reasons for this system are obvious. The unity in direction and conception, the assurance of conducting successfully such work in all parts of Canada, the advantage of being able to employ a relatively large number of experts, are factors indispensable to achieve practical results. And it is considered that all these elements of success are to be found in Ottawa. Unfortunately, the organization elsewhere is not as perfect as it should be. Provincial officers, unless they have a large and complete staff, are not in a position to participate as much as they should in these experiments, as educational work requires their constant attention and most of their time.

As regards spraying, we think, it is infinitely better to continue with the solutions employed so far, so long as it has not been clearly shown that the dust sprayings are better and to what extent they are superior. That is to say, before recommending the use of dust sprayings, it would be necessary to find exactly the proportion of component elements, most suitable time, details of application, etc.

Our task is quite heavy enough for the present. We have to encourage the farmers to spray more, in order to protect their crops and increase production, and we have no time left for other undertakings.

OKA AGRICULTURAL INSTITUTE

BY REV. FATHER LEOPOLD, PROFESSOR OF HORTICULTURE, OKA AGRICULTURAL INSTITUTE

AS the acreage in orchards at the Oka Agricultural Institute is quite considerable—over 65 acres in all—I decided to purchase the largest dusting machine on the market, the D1 Niagara outfit, weighing a trifle over 300 lb., and to which I attached a 3 h.p. Fairbanks-Morse gasoline Z model, which gave perfect satisfaction. Power is needed to get the best results with a dusting machine. So I would not advise any machine less than 3 h.p. with a large dusting outfit. The whole outfit was rigged up and strongly bolted on a specially strong platform.

There was no comparison made between the dusting and liquid sprayings, as I believe both are good and serve their purpose. No liquid sprays were, therefore, used on the 65 acres of the apple orchards during the past season. It is, therefore,

a strictly commercial test of the dusting method applied in our orchards and outlined here that I offer in this summary of our work.

Dusting for the control of insects, especially for codling moth, was made over the entire acreage, comprising 3000 trees. This was not the case of the dusting for control of scab, which attacks, here at least, only such varieties of apples as the Fameuse, McIntosh, Russet and sometimes Wealthy and Ben Davis.

In the test for the control of scab, we dusted only 800 trees out of the 3000 in the orchard. So we will divide the cost of material and labour in two sections—A, *The Scab Control* on 800 trees, and B, *The Codling Moth Control* on 2200 trees.

AT OKA AGRICULTURAL INSTITUTE, FATHER LEOPOLD AT WORK; NOTE, DUST COMPLETELY HIDES TREE TO THE REAR

CONTROL OF SCAB AND CODLING MOTH

A.—Material used for control of scab and codling moth on 800 trees: The usual recommendation of materials for the control of these two pests is 90% sulphur (superfine), and 10% lead arsenate, costing $6.25 for 100 lb. of mixture. As I judged this was too costly, and not necessary, I used instead my own mixture, for the first application, when the buds were showing pink, namely, 50% sulphur, and 50% gypsum, as a filler, costing $1.66 per 100 lb. applied to 800 trees, at the rate of 1½ lb. (an average) per tree. I, therefore, used 1200 lb. of this mixture, costing $19.92 or 0.0249 per tree. (N.B.—We did not need to mix any arsenate of lead in this application nor in the following, as there were no insects to control.)

The second application was renewed once again before the opening of the flower buds, when the petals of the individual flowers were separated, but not open, buds showing pink or rosy, making the cost again 0.0249 per tree.

The third application for scab, and first for codling moth, when the petals of the flowers had nearly all fallen, the material used was: 40% sulphur, 10% lead arsenate, and 50% gypsum as a diluent, costing $3.88 per 100 lb. At 1½ lb. per tree on 800 trees, 1200 lb. costing $46.56, it made an outlay of 0.0582 per tree.

The fourth application for scab control, and the second for codling moth control, were made with the

same materials as the preceding one and at the same cost: 0.0582 per tree; the application being made two weeks after the preceding one.

Summarizing the expenses for the materials for the four applications on the 800 trees of test A:

Application	Per tree.
1st	0.0249
2nd	0.0249
3rd	0.0582
4th	0.0582
Total	$0 1662

A little over 16½ cents per tree.

The last dusting on the 2200 trees, after two weeks, was made with the same mixture as the preceding application, costing also 0.0468 per tree. Summarizing the B test:

1st application	0.0468
2nd application	0.0468
Total	$0 0936

or over 9 cents per tree.

COST OF LABOUR

The saving in dusting compared with liquid spraying is mostly in the cost of labour, as dusting can be done readily at least six times quicker than spraying thoroughly. But one must not be induced to think that dusting is an easy job and can be done in haphazard ways No, the work must be done as carefully as with spraying, but in a much quicker fashion. At the Oka Agricultural Institute, where we have some difficulty in getting water, we always lost a considerable lot of time in going from the orchards to the filling point, though the tank had a capacity of 250 gallons of water.

Taking everything into considera-

AT OKA AGRICULTURAL INSTITUTE: WIND DRIVING DUST RIGHT IN THE ROWS; DUST FLOWS OUT OF PIPE CONTROLLED BY LEFT HAND

CODLING MOTH ONLY

B.—Material used for control of codling moth only: 15% sulphur, 10% arsenate of lead, and 75% gypsum as diluent, costing $3.12 for 100 lb. With 1½ lb. per tree on 2200 trees, using, therefore, 3.300 lb. brought the total cost to $102.96 or 0.0468 per tree. This first application for the control of the codling moth, made when most of the petals were fallen, was made with little sulphur in the mixture, as the varieties were not subject to scab. But even the 15% sulphur seemed to have an excellent effect on the foliage of the trees.

tion, one can dust trees of a medium size, at the rate of 200 per hour, supposing no time is lost and the horses are kept continually in motion. The cost for one application of 800 trees would, therefore, be, counting two men at 20c. per hour and a team at 25c. per hour, $2.60, or 0.0325 per tree. For the four applications, this would make: 13 cents per tree. This is an average figure, as trees differ in size in an orchard, some being dusted quicker than others. Our trees are certainly smaller, as a general rule, than most trees in Ontario or in the States.

Adding 2 other cents for contingencies, gasoline, etc., per tree, the total cost per tree averaged 15 cents.

Thus, taking in account the cost of the material on Test A, of 0.1662, and 0.15 cents for labour, this makes an average of 31 cents per tree for the control of apple scab and coddling moth on Fameuse and McIntosh trees, on 800 trees.

The cost for the control of codling moth alone on 2200 trees amounted to: $0.0936 per tree for material, and 0.15 cents for labour, making a total cost per tree of 24 cents in Test B.

Remember that the cost in the latter case, is for two applications only, and, in the first case, Test A, for four applications.

RESULTS

In considering results, one must not forget that if ever we had a wet season, in the literal sense of the word, it was the season in which all spraying was done in the province of Quebec—in 1917. In the whole course of my personal experience, I never had to deal with such a bad season as the last one, and I can certainly say that it would have been absolutely impossible to get out in the orchard and go over the trees with a heavy gasoline spraying outfit, hauling around the orchard 250 gallons of water, and do the work in time as we have done with the dusting outfit. On the other hand, in a dryer season, the dust clings more to the foliage than in a wet season, thus more fungicide is apt to be present on the foliage to protect it against fungous attacks.

Taking the weather conditions into consideration, we had an average of 85% clean fruit, free from scab or codling moth injury, and I am perfectly safe in saying that this is as good, if not better, than we could have had in such a wet season with liquid sprayings.

One thing noted by everybody who had a chance of seeing the orchards during the past season was the notably clean foliage all over the trees, even on the 2200 that received only a mixture of 15% of sulphur. We expect that next season, after having such good foliage, the crop will be more abundant, as it has been noted by experts that the longer the foliage rests in good condition on a tree, the better the following crop. So good and thorough spraying is always a good investment for the next season's crop.

Prices obtained in the season of 1917 for boxed apples certainly are a fair compensation for the trouble and expenses incurred to keep the fruit clean.

DUST MIXTURES FOR ORCHARD WORK

Finely ground sulphur, arsenate of lead in powder form, and a filler were the substances used. The preparation and use of dust mixtures for orchard work is an important item to be solved. Fineness, purity and perfect blending are the essentials in the preparation of efficient dust mixtures. Fineness of material is the most important requirement, as in all other spraying operations, a complete, thorough and uniform covering of both leaf and fruit surfaces is absolutely necessary for satisfactory insect and fungous control. It should require no argument to prove that if the fineness of the material is increased four or five times, the spraying and covering power is in-

creased four or five times, but this is something which can be easily overlooked unless consideration is given the matter. Fineness of material in the case of dust mixtures is also all important from the point of uniform distribution. In dust application, the distribution is affected by the air, and only the finest material can be expected to carry and float through the air into the trees and coat the foliage. Finally, fineness is essential for both distribution and sticking, for coarse material will not float and carry like fine material, and even should coarse material reach the foliage and fruit, it will readily fall off, while a fine dust, as is well known, can hardly be brushed off.

Sulphur.—Of all the materials entering into dust mixtures, the most care should be taken to secure a superfinely ground refined sulphur, because there are so many brands on the market entirely satisfactory for other purposes, but not sufficiently pure, or finely ground, for use in dust mixtures. Insist upon having refined sulphur, guaranteed of such fineness that 95% or more will pass a sieve having 200 meshes to the linear inch, equal to 40,000 holes to the square inch. Excessive fineness means: greater covering power, more complete and uniform distribution, better sticking on the foliage, and better disease and insect control.

Arsenate of lead.—The same care should be used in securing dry arsenate of lead as in purchasing sulphur, as this also means, even application and greater adhesiveness, when mixed with sulphur.

Filler.—I have used two fillers in the orchards in dusting during the past season, gypsum and lime. Experiments carried on so far indicate that the best filler to be used for the purpose of reducing the cost of the mixtures is finely ground gypsum of the grade known to the trade as Terra alba. We used this filler mostly all over in our dustings, with the exception of a block of trees where we used slacked lime thoroughly pulverized. It is important to get a filler that has about the same specific gravity as the sulphur used.

A FEW SUGGESTIONS

The time of application is very important for both the control of scab and coddling moth. As stated already, I believe that one of the great advantages of dusting over the liquid sprayings is the facility of dusting in all sorts of weather, even when the ground is soaked with rain and foliage is dripping. I do not intend to mean that one must wait for rain to begin dusting. No; for we must not forget that if we wish to control or rather prevent scab, we must get the dust or liquid sprays on the foliage before the rain and not after. Fungous spores need moisture to cause germination, so it is necessary that the dust be on the trees to prevent this germination, BEFORE THE RAIN FALLS. This does not mean either that the dust must be put on immediately before the rain falls, as it must have an opportunity to set before the rain falls.

When dusting with a power machine in a light or moderate wind, the machine should not be driven too close to the row of trees being dusted, as the dust should have time to spread out in a cloud before passing in and through the foliage.

The best time to dust is early in the morning or later in the afternoon, when there is hardly any wind; but if one has to dust in the wind, then, if the wind is in the east, the application should be made by driving east and west.

It is necessary to cover both sides of every tree to do satisfactory work.

Be careful to cover lower branches as well as the top ones. It will sometimes be necessary to send the outlet pipe backwards in order to cover the low branches, after the outfit has passed the tree. The best manner to use the outlet pipe

to avoid unnecessary loss of dust while covering every point, will soon be learned by the man holding the pipe. It is impossible to give a fixed rule, but, generally speaking, a steady up and down movement is the best all around way. But wind and other factors have to be taken into account and we must adjust ourselves to different circumstances.

Dusting is a tiresome job after all and it is a great strain upon a man if he is giving his whole attention to his work; so it would be wise to change the man if a whole day's work is to be done.

The outlet pipe is regulated by a hand clutch and when the trees are far apart a saving of the material may be made by shutting off the flow of dust, which is done easily. It is rarely necessary to open the flow to its full capacity, generally we have maintained it half full, but always have the engine running at full speed. The dust must be forced into the leaf hairs, the calyx of the flowers, etc.

It is advisable to have a good pair of goggles. Those provided with a rim of soft wool felt to exclude dust are the best.

Asked if I would recommend dusting, distinctly, no; but, to the owner of a large orchard, I would say that he could invest safely in a large outfit if he has any trouble in getting over his orchard in time in wet weather like the one we had last season.

As to sucking insects, we have not yet found a substitute for the liquid sprays, though some say that in a dusted orchard aphids are less prevalent and do less harm. Personally I have not tried any tobacco dust to control sucking insects.

NOTE.—The dusting was done by Father Leopold himself and his assistant Mr Roméo Cossette, B.S.A., of the staff of the Oka Agricultural Institute.

ONTARIO

BY W. F. KYDD, FRUIT BRANCH, DEPARTMENT OF AGRICULTURE

OUR experience with the duster dates from 1916, when a medium-sized machine was used in a number of our experimental orchards. The season was bad and the results disappointing. The manufacturers claimed that for large trees, such as we were treating, the machine used was not efficient. In 1917 the latest type, large size outfit was purchased, and the dusting carried on in one orchard only, the work being done as carefully as our liquid spraying. Again the season was bad for scab, and the final results, except on Baldwins, were undoubtedly in favour of the liquid lime and sulphur.

Dusting is decidedly ahead of the spraying in saving time and labour, both important factors at this period in our history. For varieties not subject to scab, dusting will control the biting insects, while under normal weather conditions we might expect to secure better results for scab on all varieties. This can only be found out by continued experiments in coming years. Ontario has experienced unusually bad conditions now for several seasons.

We have examined other orchards where dusting was practised in 1917, and have seen both good and bad results. If improvement can be made in our methods of application, dusting may, and, we hope, will, yet prove a great boon to the commercial orchardist.

THE ONTARIO AGRICULTURAL COLLEGE

BY L. CAESAR, B.A., B.S.A., PROFESSOR OF ENTOMOLOGY

IN 1916, and again in 1917, the writer tested the comparative merits of dusting and spraying as methods of controlling fungous diseases and biting insect pests in apple orchards. The tests both years were conducted in the Niagara district, and all the orchards treated were old, somewhat neglected, and in the preceding year had a very low percentage of clean fruit. As several trees in each orchard were infested with San Josè Scale, the whole orchard in each case, (with the exception of 48 trees in one that were reserved for a special treatment which it is not necessary to discuss here), was given a thorough spraying with lime-sulphur a little before or just as the buds were bursting.

DUST SPRAYING AT ONTARIO AGRICULTURAL COLLEGE

THE TESTS

In 1916, the test orchard consisted of 165 large trees. Approximately one-third of these received three thorough sprayings, the first with lime-sulphur alone, and the second and third with arsenate of lead and lime-sulphur combined. The remaining two-thirds received, as stated above, the dormant or semi-dormant lime-sulphur spray, and after that two thorough dustings—one just before and one just after bloom.

In 1917, two orchards, which we shall call A and B, were treated. Each of these contained a little more than 250 trees, most of them large. One-quarter of the orchard was sprayed thoroughly three times with liquid in the same way as mentioned above in connection with the 1916 orchard. The remaining three-quarters received, first, the dormant or semi-dormant lime-sulphur spray to kill San Josè Scale, and then had two thorough dustings, one just before and the other just after blooming. Fifty-two trees received a third dusting three weeks later to test the effect on side-worms (codling moth larvæ entering the side of the fruit).

Orchard B in 1917 was treated in exactly the same way as orchard A of the same year, except that roughness of the ground made it more difficult to dust so thoroughly.

RESULTS

The following table shows the result:—

Method	Orchard	% free from scab	% free from worms
Liquid	1916	99	94
Dust	1916	97	92
Liquid	1917 A	99	70
Dust	1917 A	99	70
Liquid	1917 B	97	50
Dust	1917 B	92	60

Note.—In 1917 the crop was small in orchard A, 200 barrels, and in B only 20 barrels. This, and the fact that the codling moth had not been controlled the previous

year, accounts for the small percentage of worm-free fruit. In A, the 52 trees which received an extra application of dust three weeks after the regular codling moth application had 90% of wormless apples; so that such treatment for this pest would have paid well this year.

A study of the above table shows that so far as the Grimsby part of the Niagara district is concerned, dusting, where properly done, was satisfactory both in 1916 and 1917 in apple orchards, and gave almost as good results as the liquid spray both on apple scab and codling moth.

East of Toronto it seems to have been more difficult to obtain as good results from the dust as from the liquid. Reports from New York state and Nova Scotia indicate the same state of affairs: in one locality thorough and intelligent dusting gave excellent results, in another it gave unsatisfactory results and inferior to the liquid treatment.

CONCLUSIONS

Judging from what he has seen and heard, the writer thinks that in normal years dusting should prove satisfactory for apple orchards, but, in abnormal years, when scab is hard to control, it will not give so good results as the liquid method.

Dusting of large trees is about seven times as rapid as the ordinary method of spraying with a gasoline outfit. It is also much cleaner. The outfit is a great deal lighter, and, therefore, can be used in softer ground and at the proper time. The cost of the two methods for large trees is about the same, but for small trees liquid spray is much cheaper.

Many claim that it is easier to dust well than to spray well. The writer questions this very much. His experience leads to the belief that about 50% of fruit-growers would need a good deal of training to make them efficient dusters. The method looks vastly simpler than it is, and none but a very conscientious and interested man should be allowed to do the work. In many cases it will pay to dust from three or even from four sides instead of two. Three pounds is sufficient for a very large tree, or 600 pounds for an orchard of 200 trees for a single application; in fact this is sufficient for the codling moth application, and about 2½ pounds per large tree would suffice for earlier applications.

In orchards where the trees are free from San José scale, and only lightly infested by Oyster-shell scale, the first application may be given with dust instead of liquid, and in such cases should be applied when the leaves are about the size of a ten-cent piece. In many orchards the sulphur without any poison could be used for this application, thus reducing the cost by over 50%.

The time for the second and third applications should be just before and just after bloom. For any extra applications the spray calendar should be consulted.

"There is some individual who is unknowingly dependent upon you for life. It may be a soldier in the trenches; it may be a little child; it may be a peasant woman, who will not have anything to eat next spring if you do not think of him or her now."—*Mrs. Herbert Hoover.*

WAR TIME POULTRY RATIONS

In compliance with regulations of the Government of the United States prohibiting the use of more than 10% of any grade of wheat in rations for poultry, the officials in charge of poultry divisions and agricultural colleges in several of the Eastern States have adopted the following rations:—

Grain: 500 lb. cr. corn. with a variation of 400-600 lb.
100 " Feed, wheat, with no variation,
200 " Barley, with variation of 100-300 lb.
200 " Heavy Oats, with variation of 100-300 lb.

The scratch grain to contain not less than 10% protein, 68% carbohydrates and 4% fat, and not more than 5% fibre.

Mash: 100 lb. Wheat bran.
100 " Wheat middlings.
100 " Corn meal, corn feed meal or hominy.
100 " Gluten feed.
100 " Ground heavy oats.
100 " Meat scrap.

The mash must contain not less 20% protein, 58% carbohydrates and 5% fat and not more than 7% fibre.

In realization of the importance of conserving cereal grain in Canada without among other things, impairing the production of poultry and eggs, professors and officials of poultry husbandry were invited to send for publication in THE AGRICULTURAL GAZETTE, a criticism of the foregoing rations, with a statement of what each recommended as a standard ration for poultry. The following responses to the invitation have been received:—

QUEBEC

MACDONALD COLLEGE

BY M. A. JULL, B.S.A., MANAGER POULTRY DEPARTMENT

THE complicated features of the present food situation have placed the Canadian poultry industry in a peculiar position, inasmuch as eggs and poultry meat are required in enormous quantities for home consumption as substitutes for the regular meats in the human diet, and, on the other hand, wheat, which has always been considered the staple article of diet in the poultry ration, is also required for exportation for the human population of Allied countries. In other words, wheat has been considered the principle factor in egg production, but wheat is also a staple article of consumption in the human diet. The Allied countries need all the wheat that Canada can export, and the sole question is not whether it is more economical to feed wheat for the production of eggs and poultry meat to be used as substitutes for red meats, which in turn are demanded for export. Since an adequate supply of wheat seems to be of more immediate need to the Allied countries than beef and bacon, the proper course appears to be to despatch the maximum quantities of wheat at the earliest opportunity, and the principal question then becomes the most economical use of substitutes for wheat in poultry rations.

POULTRY FEEDING CONDITIONS

The Government of the United States has recently issued regulations prohibiting the use of more than ten per cent of any grade of

wheat in rations for poultry feeding. Farmers and poultry men throughout the United States should subscribe to such regulations, because they seem to be in the highest interests of the common cause. The feed situation in the United States, however, is not identical with the feed situation in Canada, simply because corn is the staple poultry food in the United States, and wheat is the staple poultry food in Canada. Therefore, it would seem that regulations affecting the feeding of wheat to poultry in Canada should not necessarily be identical to those recently adopted in the United States. Moreover, the partially paralyzed condition of Canadian transportation facilities does not seem to warrant the obtaining, in the near future, of adequate supplies of the enormous corn crop of the United States. In view of these facts, a criticism of rations suggested by poultry authorities in the United States may not seem quite pertinent. Since a criticism is requested, however, it is made in the light of the applicability of the suggested rations to poultry feeding conditions in Canada, and is of a general nature.

THE DIFFERENCE IN CANADIAN CONDITIONS

From what has been said above it follows that the rations recommended for adoption in the Eastern States, are not adapted to Canadian conditions, for the simple reason that we cannot get the corn, at present at least, and also the prevailing prices of corn (January 21st) does not justify its use in such large quantities as are suggested in the grain ration.

A second criticism of the rations would be that it is almost impractical for Canadian farmers to use definite amounts of any of the grains. This is particularly true of farmers and poultrymen who have to purchase all of their feeding materials. We have to use largely those grains on hand in the greatest quantity at different times. In view of the relative scarcity of barley, corn, and the prices demanded for oats of good feeding quality, we, in Canada, still have to depend upon feed wheat to carry us along.

A third criticism would be the inadvisability of stipulating the percentages of protein, carbohydrates, fat, and fibre. This seems inadvisable, because, in the first place, farmers and poultrymen have troubles enough in securing any kind of feeding materials at reasonable prices without having to worry over the exact composition of those materials, and, in the second place, very little is known regarding the digestion coefficients of the constituents of any of the grains, much less of compounded rations when fed to poultry.

EACH SECTION HAS ITS OWN PROBLEMS

Instructions regarding the economical feeding of poultry must be of a general nature. Conditions in Quebec are not comparable to those in the West, or to those in British Columbia. Each section of the country has its own poultry feeding problems to solve, though general principles apply everywhere.

The practice at Macdonald College is to feed the scratch ration in the litter morning and evening, thereby inducing the laying hens to take plenty of exercise. The mash ration is fed in self-feeding hoppers in a dry form, and a limited quantity only is fed in V-shaped troughs each day as a wet mash. The dry mash hoppers are kept closed until noon, thus inducing the hens to scratch for the whole grain in the litter instead of eating dry mash in the hoppers. Green food is fed daily about noon. Grit and oyster shell are provided in self-feeding hoppers. Water and buttermilk are fed *ad libitum*.

Scratch Ration.—The scratch ration is composed largely of feed wheat and oats, using barley and corn to a limited extent. The pro-

portions vary, depending upon the market situation.

Mash Ration.—The mash ration is composed of the following mixture:—

Ingredients.	lb.
Ground wheat screenings	132
Wheat bran	66
Crushed oats	66
Beef scraps	66
Cornmeal	33
Middlings	33
Charcoal	4

A large proportion of wheat screenings is used to lessen the cost of the mash, since it replaces largely cornmeal and middlings. This makes a mash which is quite palatable, and which the birds relish.

Animal Foods.—Ground green bone is fed daily, allowing ¼ oz. per bird. Buttermilk is also provided *ad libitum*. These forms of meat foods are fed in addition to the beef scraps in the dry and wet mash rations.

Green Foods.—Mangels are provided daily. Well cured alfalfa hay is also fed occasionally.

Mineral Foods.—Oyster shells and grit are fed *ad libitum*.

Drink Foods.—Water and buttermilk are provided *ad libitum*.

ONTARIO

BY W. R. GRAHAM, B.S.A., PROFESSOR OF POULTRY HUSBANDRY, ONTARIO AGRICULTURAL COLLEGE

BECAUSE of the extraordinary demand for wheat for human consumption the poultry keepers are expected to provide substitutes as far as practicable, in poultry rations. The two most palatable grains for poultry are wheat and corn. In Canada the standard is wheat, in the United States it is corn. If corn can be secured at a competitive price we should make the scratch feed 75 per cent of corn. Hens will lay well on a mixture of corn, barley and oats. Ground feeds are cheaper than whole feeds and when under normal consumption one-third of the ration is ground grain, I believe that we might feed 50 to 60 per cent of ground grain. Oats have been the cheapest feed on the market. We have fed them whole, rolled and sprouted. So long as they remain under $60 a ton we shall use oats generously. If oats get too high we will feed rolled barley. It should be remembered, however, that a change in the ration cannot be made without a drop in egg production. Changes should, therefore, be made gradually. This applies particularly to the use of elevator screenings that are being made available to poultry raisers. If chickens can be commenced on screenings there will be no trouble about them, but mature fowls are slow to adapt themselves to new feeds. Screenings should, therefore, be ground for fowls that have not been accustomed to them if we are to get the best results.

At the present time a scratch feed composed of about 20 per cent of feed wheat, 40 per cent of corn or buckwheat, 20 per cent of good oats and 20 per cent of barley, answers very well. Where this is used a certain proportion of meat or milk should be supplied to provide protein. Refuse meat obtained from the butcher shop or elsewhere might be cooked and mixed with bran, shorts, and crushed grain in the proportion of about 25 per cent each of bran and shorts and 50 per cent of mixed chop, moistened and mixed into a crumbly state.

For small flocks, kitchen refuse such as potato peelings and cabbage leaves can be advantageously used by boiling them and mixing with beef scrap. A half pound a day of

this mixture to 20 birds will give good results. After the flock has had a light scratch feed in the morning, it will be profitable in these times to allow them a full meal of the mash at noon.

Those who can grow their own poultry feed this spring should sow mixed grains, particularly oats, barley and wheat, as the mixture gives a better yield than any of these grains grown alone. Buckwheat also might very well be grown as a special poultry feed and will take the place of corn where the latter is not available.

MANITOBA

BY M. C. HERNER, B.S.A., PROFESSOR OF POULTRY HUSBANDRY, AGRICULTURAL COLLEGE

IN a comparison of laying rations as they are made up and fed, it appears that the kind and class of grains used depend very largely on what is available, and the price of each, in different sections of the country. The standard for the grain part of the ration as adopted by the poultry division of several of the eastern agricultural colleges has been out of the question entirely in Manitoba on account of the extremely high price of corn. It is only since the beginning of 1918 that corn has come down to a moderate price. Aside from the price altogether, the embargo placed on corn during the latter part of 1917 put it out of reach as food for poultry. The license and permit regulations have also prevented free use being made of corn. Lately these have been modified somewhat, and it is now possible for poultry raisers to get this commodity at a moderate price compared to other grains. There is no question about corn standing out as the food for winter eggs in our climate.

The standard for a scratch feed, as adopted by these eastern states poultry departments, is a good one where these feeds are available. It corresponds very closely to the scratch feed this Department has been using when the corn is available. The standard in use here now is:—

lb.	lb.
500 of corn with variation	400–600
200 feed wheat with variation....	200–400
150 barley with variation.....	100–200
300 oats (quite a percentage hulled) with variation.....	200–400

At the prevailing prices of each of these individual grains, the corn is cheapest, wheat second, oats third and barley last. The price of these in ton lots is to-day (February 5th) corn $56; wheat, $65; oats, $55, and barley, $64.

CONSTITUENT PARTS OF THE FEED

In regard to the percentage of protein, carbohydrates and fat some of the scratch feeds contain, I am inclined to believe that there is just a little tendency to figure too much on the composition of feeds without sufficiently taking into consideration their palatability and digestibility in poultry feeding. Take for instance the question of feeding Grade A re-cleaned wheat screenings, which from a chemical standpoint are very well balanced. An analysis showed them to contain:—Protein 14.70%; fat, 3.5%; carbohydrates, 69.63%, and fibre, 5.2%. These contained about 55% shrunken and cracked wheat, 15 to 20% tame and wild oats, 15 to 25% wild buckwheat seeds, about 1 per cent barley, and the balance weed seeds and chaff. These fed as a scratch feed to laying hens did not produce eggs. There was a heavy loss in buckwheat seeds that the hens refused to eat. Supplementing these screenings with a dry mash of equal parts of bran, shorts, and oat chop failed to produce the eggs when the cold weather came on. This feed was all right until winter weather set in, when it seemed to lack the heat-producing

qualities required, or, as the composition would indicate, the screenings were too low in fat. The value of these screenings will depend largely on the other feeds fed. The danger in feeding these is in underfeeding. Since most of the wild buckwheat is wasted it is necessary to feed a far greater quantity of screenings so that the hens will get enough to eat. This requires, skill, care, and close observation on the part of the poultry feeder, or else the hens will get thin before he knows it.

FEEDS RECOMMENDED

For farm feeding a scratch feed of equal parts of feed wheat, barley and oats is recommended. The point of using only feed wheat is emphasized. Where this is not available the use of equal parts of barley and oats is recommended, with a frequent change to feeding the barley boiled and mixed in a soft mash. Corn is out of the question on the greater number of farms.

For a dry mash that is fed in a self-feeding hopper, preference is given to oat chop, or crushed oats. This dry mash is rather high-priced, but there is practically no waste, and very good egg production follows its use when combined with the proper line of scratch feed. Equal parts of oat chop, bran and shorts will also make a good dry mash, and cheaper than the crushed oats alone. There is, however, more waste of the finer materials in the bran and shorts, and egg production is hardly so good from this mixture as from the crushed oats alone. Equal parts of crushed oats and chopped screenings make a fairly good dry mash, but there is always a tendency for the hens to waste the finer part of the mash, especially if the screenings contain some ragweed seeds. Chopped screenings alone as a dry mash are not palatable, and the hens do not eat the amount they will of any of the other three mashes. All of these dry mashes have about one-half to one per cent of granulated charcoal added. A flock of laying hens will eat about one pound of dry mash to every two pounds of scratch feed, providing both are equal in palatability.

For farm conditions we recommend the first named dry mash as the best, with an alternative of equal parts of chopped oats and barley, or equal parts of oat chop, bran and shorts.

EASTERN STANDARD NOT PRACTICABLE

The standard for a dry mash as adopted by the poultry division of the eastern colleges is not practicable for this country. First the entire mixture cannot compare favourably with crushed oats as a dry mash, or the crushed oats, bran and shorts, both in price and in results obtained. Corn meal and gluten feed are out of reach for our farmers. Beef scrap is also almost out of sight in price, and but few farmers can afford to use it. Buttermilk, or milk, in some form or other, will take its place, produce just as good results and be far cheaper.

The ration as outlined should be supplemented with a soft warm mash once a day. Equal parts of chopped oats and barley, bran and shorts, mixed and scalded, and fed once a day at noon, will make a good soft feed, and with green food, such as mangels, or cabbage, will help to balance up the ration and give better results. Chopped screenings and boiled potatoes or turnips mixed and scalded with hot water will also make a good soft mash. The effect of one food on the other may often change the food value of some materials considerably, and this side of the question must be considered along with the composition and palatability of feeds.

In recommending rations we keep in mind the need of letting every pound of good wheat go for milling purposes, even though it may be just

as cheap as any other grains. The farmers generally are ready to use the substitutes, but the small poultry raisers who have to buy all their feed are not quite so ready to feed the coarser grains which cost them almost the same price as No. 1 or No. 2 Northern.

BRITISH COLUMBIA

BY J. R. TERRY, CHIEF POULTRY INSTRUCTOR

I HAVE carefully studied the war-time poultry rations recommended by a number of United States agricultural colleges (see p. 262 of this issue of THE AGRICULTURAL GAZETTE). Personally, I have not much fault to find with the grain ration, with the exception of the corn at present prices. I would leave this out entirely.

Regarding the mash, I would also leave out the corn-meal at present prices, and in its place we are recommending the feeding of half-rice meal and half-barley meal. In this country we are unable to get the gluten feed, so would have to leave that out. Until recently, we have been advising the reduction of meat-scraps by half and substituting cocoanut meal in its place. Where this is impossible, we are recommending the feeding of fish scraps.

ALLOTMENT OF AGRICULTURAL EDUCATION AND RESEARCH

NOVA SCOTIA

BY M. CUMMING, B.A., B.S.A., SECRETARY FOR AGRICULTURE

IN Nova Scotia the heads of the various divisions of the Department of Agriculture, are also the heads of the corresponding divisions of the college. This plan might not work out in the larger provinces, but in a comparatively small province, where the economization of public funds is an important matter, I consider the Nova Scotia arrangement a very satisfactory one.

Agricultural education in the schools of the province, including the carrying on of such organizations as school fairs, school gardens, etc., is all under the direction of the Director of Rural Education, who is an officer of the Department of Education. This officer frequently secures the services of, and always has the co-operation of the officers of the Department of Agriculture.

NEW BRUNSWICK

BY W. R. REEK, B.S.A., SECRETARY FOR AGRICULTURE

AS we have no agricultural college in New Brunswick all agricultural extension or educational work is carried on by the Department of Agriculture. By an agreement with the Department of Education, this Department also supervises the work of elementary agricultural education.

QUEBEC

BY J. ANTONIO GRENIER, DEPUTY MINISTER OF AGRICULTURE

IN the province of Quebec, everything pertaining to agriculture, even the school fairs, is under the direction of the Department of Agriculture, but I may say that we receive the fullest co-operation from the Department of Public Instruction and school inspectors, as regards the teaching of agriculture in schools, the organization of competitions and of special lectures for school children.

Macdonald College takes special care of the English population of the province, conducts a large number of researches and experiments, organizes short courses of agriculture, in the college or outside, and visits farmers.

The agricultural schools of Ste-Anne de la Pocatière and Oka also do considerable work among the farmers, organizing short courses in the college or outside. These three institutions work hand in hand with the Department of Agriculture and, when necessary, lend their teachers.

ONTARIO

BY W. BERT ROADHOUSE, DEPUTY MINISTER OF AGRICULTURE

IN reference to the administration of agricultural work in the province of Ontario the plan is a very simple one. All the agricultural work comes under the Department of Agriculture presided over by the Minister of Agriculture. This includes the administration of the Ontario Agricultural College, the Ontario Veterinary College, the proposed new Agricultural School at Kemptville, and the Experimental Farms that are conducted in two or three sections of the province. At the same time the Agricultural College and the Veterinary College are affiliated with the University of Toronto for academic purposes, and the degrees for the final year are presented by that university. This arrangement works out most satisfactorily, giving to the students any prestige accruing from association with the larger seat of learning, but entering into the administration only to the very slightest extent. Ten years or more ago the Government appointed a commission to investigate the general subject of university education in the province. That commission devoted some attention to the Ontario Agricultural College and the system by which it was administered. They came to the conclusion that the system was working so satisfactorily that it was undesirable to make any change, and consequently it has been continued since. Both of these educational institutions, the Agricultural College and the Veterinary College, are presided over by presidents who are responsible directly to the Minister of Agriculture. In the discharge of their duties they are of course extended the maximum of freedom, the Government merely retaining such control as is essential on behalf of the people, who contribute the money for the support of these institutions.

THE RESEARCH WORK

In addition to the academic work carried on, the research work is also a branch of college activities, particularly of the Ontario Agricultural College, and it is administered in the same way, except that it does not come under the university authori-

ties. Practically all the extension work of the Department is directed from the head office of the Department at Toronto. The services of the staffs of the colleges and farms are available to a limited extent in carrying on this extension work. There is the closest co-operation between the officers in charge of the extension work and the professors and experimental staff of the colleges and farms. In this way the work is carried on with a minimum of duplication and a maximum of effectiveness.

All this does not of course in any way affect the jurisdiction of the Department of Education, which has the administration of the other educational bodies in the province—public schools, high schools, collegiate institutes, universities. The Department of Education has its own plans for the instruction which is given in these various grades, and they naturally have entire control of the instruction given in the public and high schools in agriculture, just as in other branches of science. In planning the agricultural work there are naturally conferences between the officials of the Department of Education and the Department of Agriculture, so that the former may have the benefit of the special training of the latter.

MANITOBA

INSPECTORS' COMMITTEE—BOYS' AND GIRLS' CLUBS

BY R. FLETCHER, B.A., DEPUTY MINISTER OF EDUCATION

THIS Department is in close co-operation with the Extension Department of the Manitoba Agricultural College, and everything relating to agricultural education affecting pupils in our schools is submitted to us for approval before it is put into effect.

Following is a report of a special committee appointed last October which has been dealing with the matter of the most efficient method of co-operation between our field forces and the other authorities

INSPECTORS' CONFERENCE COMMITTEE

Appointed October, 1917, re Boys' and Girls' Clubs.

DRAFT REPORT

1. *Organization of Club.*

Each inspectoral division should be divided into club districts by the inspector of the division. At a meeting in each club district of the teachers and trustees of each school and representative citizens such as officials of the Agricultural Society, Home Economics Society, Municipal Council, Grain Growers, Horticultural Society, Poultry Association, etc., a Central Boys' and Girls' club executive should be organized with the following officers: president, vice-president, club organizer, and an executive of three others. Every teacher should be a vice-president. The inspector will be a member of the executive *ex-officio*. Three members of the executive will form a quorum.

Duties of Officers.

The inspector's connection is general and supervisory. The president presides at all meetings of the executive. The vice-president acts as organizer for the local district, forms a local club with a president and secretary, who shall be *bona fide* residents of the school district, endeavours to encourage and inspire its officers and members with the right aims and proper attitude toward the various activities of these clubs, exercises a wise and watchful care over its life and work, and acts in an advisory capacity to its executive, of which she is, *ex-officio*, a member. She also, when possible, attends the meetings of the central executive, and is prepared, if called upon, to take upon herself the duties of the president in his absence.

The club organizer is also secretary-treasurer of the central club and the medium of communication between the local clubs and the head of the extension service. Through him all communications and supplies are forwarded from the Extension Service to the secretaries of the local clubs.

The other members of the executive, besides aiding in executive meetings along with the aforementioned officers, take ac-

tive control of one or more of the contests at the annual fair.

The local club is controlled by an executive committee of three—a president, a secretary, and the teacher. The president presides at all meetings of the club and executive. The secretary keeps all minutes and records of members and contests in which each enters, reports these to the central organization, conducts all necessary correspondence, and arranges for the receipt and distribution of all supplies. The teacher also acts as treasurer when there are any funds in the local organization, unless a treasurer for this purpose is locally appointed.

(Variations from the above may be made, in matters of detail, at the discretion of the inspector.)

2. *Educational Policy.*

The inspectors have observed that the contests as conducted hitherto have been made interesting and attractive to young people. There is no doubt that the success of the movement has been due in a great measure to the fact that the appeal is made to the practical, constructive, economic, and acquisitive instincts of boys and girls. Some fears have been expressed to the effect that the Boys' and Girls' club contests, appealing so strongly to these interests, might interfere with the success of the regular school work. Up to the present time, however, no such result has been observed. On the contrary a number of cases have been mentioned in which the regular school work of the pupils who had actively competed in contests and fairs was pronounced quite satisfactory. It is the opinion of some observers that active participation in club work tends to improve the work of the school in its regular branches. Time and experience alone can prove the ultimate value of the movement in this respect, but at present the omens are favourable.

These contests seem adapted, as already said, to fostering a greater interest in country life and farming activities, increasing the children's knowledge of the vital and mechanical processes of agriculture and home making, cultivating skill in the operations of the farm and household, and generally developing the industrial and commercial interest of young people and their industrial and commercial intelligence and acumen.

This is vocational training. It is frankly individualistic in tendency and chiefly concerned with economic productive capacity. But the inspectors are of opinion that the above statement does not exhaust the educational possibilities of Boys' and Girls' club work. They believe that something more might be done to give effect to the socializing and liberalizing value of education along agricultural lines. The contests might be improved in an educational sense by reducing somewhat the individualistic appeal. Team work and helping the other fellow should occupy a far larger place than it now appears to do. The inspectors are of opinion also that in the management of contests and fairs a great emphasis should in future be laid on fine art.

3. *Management.*

(a) To the end that these educational advantages may be secured, understanding on the part of the boys and girls is essential. They should be directly taught that, while they are in a keen contest, they are in reality co-operating with their opponents for the benefit of all. This principle should be constantly in the minds of all teachers and officers associated with Boys' and Girls' clubs, so that it may be impressed on all members.

(b) While the prizes granted are an incentive, the various contests afford a direct opportunity for teachers and officers to impress on the boys and girls the greater importance of conscientious effort, of generous appreciation of the worth of opponents' efforts, and of courage, cheerfulness, and perseverance under disappointment.

(c) Having in view the relative importance of various kinds of educational activity, the evil of over-absorbtion in one branch to the detriment of others, and particularly the danger that club contests might be allowed to engross all or nearly all of the spare time of the pupil, thus depriving him of necessary family and neighbourly intercourse and the performance of social duties generally, it is deemed desirable to limit the number of contests that they should be permitted to enter. Two or three contests should be the limit in most cases. The choice of the contests should be made as early in the season as possible, but the pupil may be permitted, within a reasonable time, to alter his choice, if he should deem it advisable to do so. After a certain date, preferably fixed by the local club, no change of choice should be permitted. In conducting these tests, the social side of the child's life should not be lost sight of, and if in the performance of the work connected with the club contests he is permitted to take up a burden too heavy for him to carry, or if the work interferes with either his regular school duties or his social duties, the primary aim and object of the contest is defeated.

Care should be exercised in conducting these contests not to over-emphasize the commercial side. The chief aim should be to call forth the pupil's best effort and to encourage sustained effort in whatever choice he makes. It should also be strongly emphasized that the exhibits of the contestants must be the result of their

own efforts. Absolute honesty must be demanded from every contestant.

(d) Contests which are professedly on a money-making basis should not be bolstered up by grants of free supplies or supplies furnished below market price. Business loans or credit can always be secured from the local banker or the Extension Department where necessary. In other contests a liberal policy of assistance should be adopted.

(e) In each local club there should be a prize of no monetary value, to be given to the member who receives the largest number of votes of his fellow-members as having exhibited throughout the year the most sportsmanlike, helpful, neighbourly, unselfish and courteous spirit.

(f) As regards meetings of members of the Boys' and Girls' clubs, it is believed that such gatherings would be beneficial if social, literary, and cultural interests were the chief features thereof.

(g) A policy of generous, financial support by the Extension Department would be of great benefit in the case of clubs now in the course of formation in districts where it is difficult to secure financial aid.

(h) The members of the Extension Staff available for work among the various clubs should, during the month of January in each year, communicate with the inspectors of the division to which they have been assigned in order that their work may be directed to the best advantage.

(i) Bound record books formed to contain records for a series of years, showing contests, entries and prizes won by individuals and teams of boys and girls should be provided and kept permanently in each school.

Co-operation with Extension Department. The inspectors are prepared to undertake the general supervision of the work of Boys' and Girls' clubs and to act in conjunction with the Extension Department in the formation of plans for the furtherance of the work. A committee of the inspectors will meet with a representative of the Extension Department at least once a year, after the fall conference of the inspectors, to decide on the plans for the following year. These plans if approved by the advisory board of education should be printed in a special bulletin, or as an appendix to the programme of studies.

SASKATCHEWAN

THE arrangement of work as between the Departments of Agriculture and of Education and the university is practically the same as that obtaining in British Columbia, and which is outlined in this series of articles on the next and the succeeding page.

ALBERTA

BY JAMES McCAIG, M.A., EDITOR OF AGRICULTURAL PUBLICATIONS

RESEARCH work pertains to the university except that in our provincial agricultural schools, which are set in between the university and the public schools, there is some research and experimental work carried on.

With regard to systematic agricultural instruction, we have a faculty of agriculture in the university and, besides this, a series of agricultural schools, at present three in number, which give five months' courses, extending over two years, to country boys and girls 16 years of age. The agricultural schools are administered by the Department of Agriculture. With regard to popular and short course instruction, this work is administered and organized wholly by the Department of Agriculture.

The university and Department of Agriculture co-operate to the fullest extent possible in all kinds of lecture and instruction work. Officials of the Department assist with university classes, and instructors from the university assist in the work of the Department.

A special text book to meet western conditions has been prepared for use in the public schools, of which the writer of this article is the author. The school-garden work is wholly in the hands of the Department of Education and is encouraged by special grants. The Department

of Education also co-operates with the Department of Agriculture in the work of the district agents, which up to the present has been largely taken up with organizing home gardens and conducting school fairs. This co-operation is effective, though it is not organized, or established, by regulation.

The Department of Education gives special courses in agriculture as well as other subjects to fit teachers for their work.

The teaching of agriculture by the Department of Education as secondary school work is limited to teaching and directing a course in the high schools, which is compulsory for those taking the teachers' course. It is supplemented by demonstration garden plots at the high schools, but the laboratory feature of the work cannot be said to be very well developed as yet.

BRITISH COLUMBIA

BY L. S. KLINCK, B.S.A., DEAN, COLLEGE OF AGRICULTURE

FOLLOWING a meeting of the representatives of the Department of Agriculture, the Department of Education, and the University of British Columbia, held at the request of the Honourable. the Minister of Education, on November 9th, 1917, to discuss questions affecting the general policies of the different branches represented, a second conference was held on November 13th to consider the practical effect of the application of the principles agreed upon at the previous conference. As a result of these conferences two general principles were decided upon, viz.:

(1) That all agricultural research, whether conducted at Point Grey, or at some other centre, or centres, in the province, be under the university authorities.

(2) That all courses of agricultural instruction exceeding three days' duration, in which particular emphasis is placed on the science underlying the principles taught, be conducted in future by the University rather than by the Department of Agriculture.

In addition to these principles the following matters affecting one or more of the Departments represented were agreed upon:—

(1) That the Department of Agriculture continue to assume responsibility for all activities at present conducted by it, as outlined in its tenth annual report, with the exception of short courses exceeding three days' duration, and all research work in agricultrue and in those sciences upon which agriculture is based.

(2) That researches now being conducted by the Department of Agriculture be continued until such time as the University is prepared to assume responsibility for investigation work at different centres in the province.

(3) That representatives of the University hold field meetings to discuss results of investigations obtained at centres in which researches are being conducted.

(4) That the Department of Agriculture conduct all illustration and demonstration field work.

(5) That the Department of Agriculture conduct all work having for its object increased agricultural production.

(6) That the Department of Agriculture continue to publish popular bulletins and circulars of instruction, whether prepared by officials of the Department or by members of the staff of the University.

(7) That representatives of the Department of Agriculture and of the University confer before undertaking any new work in which the application of the two guiding principles adopted is not perfectly clean.

(8) That the fullest measure of co-operation between the University and the Departments of Agriculture and of Education be continued, including the interchange of instructors whenever deemed advisab'e by those immediately responsible for the conduct of the work.

(9) That continuation classes in agriculture under the Department of Education be open to students of both sexes who have attained the age of fifteen years.

(10) That a tentative arrangement be arrived at between the Department of Agriculture and the Department of Education whereby the minimum age limit for membership in boys' and girls' clubs be fixed at eleven years for 1918 and at twelve years for 1919; also that the scope of the competition in these clubs be extended to include special projects for girls.

NOVA SCOTIA

AGRICULTURAL INSTRUCTION ACTIVITY

BY J. G. ARCHIBALD, B.S.A., DEPARTMENT OF CHEMISTRY

THE Department of Agriculture has recently held two unusually successful short courses, one at Guysborough during the week beginning January 27th, and the other at Arichat during the week beginning February 3rd. These were the first short courses ever held at the above-mentioned places, each of which is over 20 miles from the nearest railroad point. The average attendance during the Guysborough course was 100; the attendance for Arichat is not yet known.

At the larger centres, where short courses have been held before, the Department has this year been compelled to reduce and conduct what are known as "Rally Days"—one full day at each place. Two hours are devoted to live-stock judging, a similar period to seed judging and selection, and the balance to the discussion of special problems bearing on the 1918 food production campaign. Frequently arrangements are made for a sort of picnic during the day, the farmers bringing their lunches, and tea and coffee being supplied by the local organization. There is thus an opportunity during the intervening hours for the farmers to talk over matters in general with the instructors.

In response to most urgent requests from different parts of the country, the Department is holding the most extensive series of evening meetings ever conducted in Nova Scotia. The speakers are posted on the situation with regard to the supply of seed and fertilizer for the coming year and are making a special effort to get farmers to buy their supplies at once. They are also spending their time during the day in visiting business firms and in getting detailed information as to the supply that they have on hand of seeds and other agricultural materials. It is hoped that as a result, the Department will have very specific information as to possible supplies for next spring.

Three food production bulletins have recently been published and widely distributed. The first two of these were mentioned in last month's resumé; the third deals with the question of bigger implements for the farmer, and was written by Prof. J. M. Trueman of the Agricultural College.

ENTOMOLOGICAL DEPARTMENT

Prof. W. H. Brittain, head of the department of entomology, reports on "Potato Spraying Demonstrations and Experiments" as follows:—

Most of the work in potato spraying carried on by the Department in the summer of 1917 was in the nature of demonstrations, since the value of spraying in destroying insects and preventing blight has been long known. Owing to the very severe outbreak of potato blight that occurred last season, the results secured were very striking. In all the cases the crop produced on the sprayed plots was greatly increased. In some cases it was doubled. in others trebled, and in some the unsprayed potatoes were scarcely worth digging. The percentage of unmarketable potatoes was much greater on the unsprayed lots and the proportion that rotted in storage was a great deal higher than in the sprayed plots.

At Truro a number of experiments were carried on to determine whether arsenicals used in the ordinary strength have any fungicidal value; what effect the addition of poisons has upon the fungicidal value of the Bordeaux mixture, and whether the toxic value of the poisons was affected any

by using it in combination with the fungicide. From the results obtained, it could not be said that the various poisons affected, either favourably or otherwise, the action of the fungicide. There was some variation in results secured, but none that appeared to be attributable to this cause. It was not found that any of the poisons used in the ordinary strength have any noticeable fungicidal value, though it appears that some of them, when used double or treble the ordinary strength, have a marked fungicidal value. It was found, however, that the toxic value of all the poisons was less when used with Bordeaux than when used alone, the reduction varying with the different poisons and with the different dilutions. In other words, all the poisons were less effective when used with Bordeaux mixture than when used alone and greater amounts of poison were necessary to produce the same effect.

The toxic value of the different arsenicals was also tested, dilutions to give equivalent quantities of arsenic in each being employed. The results varied considerably with weather conditions. In fine weather calcium arsenate, weight for weight of arsenic oxide, proved most effective, but, if followed by heavy rains, arsenate of lead alone, arsenate of lead and Paris green combined, and arsenate of zinc were superior. Owing to the much lower cost of arsenate of lime in Nova Scotia, this arsenical would appear to be the best to use for next season.

TURNIP PLOT WORK

H. S. Cunningham, B.S.A., District Representative for Cape Breton Island, gives the following report on the introduction of turnip growing in that district by means of demonstration plots:

One feature of the District Representative work in Cape Breton has been the demonstration turnip plots. This work has been carried on for five seasons with very satisfactory results. This season some 16 plots were seeded in different parts of the island. These plots varied in size from one-half to one acre. The plots were all seeded to one variety, namely Sutton's Champion. This variety has given splendid results and has proven a good keeper. An effort is made to begin seeding about June 1st, and to have all plots seeded by June 20th, if possible. Thinning is commenced as soon as the third leaf is well developed.

The average yield per acre for the past season was 929 bushels per acre, the highest yearly average for the five-year period. The average yield per acre on all plots for the five-year period was 833 bushels, which is very creditable.

These plots have proven a great stimulus to root growing in Cape Breton Island. When this work was started, it was the exception rather than the rule to see turnips grown outside the garden plot; while now nearly every farmer has a good sized field. The farmers have come to realize the value of the turnip as a feed for stock, and, with the present high price of mill feeds, are planning to increase their acreage of this crop the coming season. Not only have these plots been of great value in this respect, but they have also served as a starting point for other work in the communities where they have been established.

NEW BRUNSWICK

FARMERS' CO-OPERATIVE CREAMERY COMPANY

BY W. R. REEK, B.S.A., SECRETARY FOR AGRICULTURE

MONCTON is a thriving railway and manufacturing centre. The counties of Albert, Westmoreland, and Kent have a large area of agricultural land and people interested in live stock, but without any modern or advantageous marketing system for dairy products. A large amount of butter has been made by the women on the farms. Moncton has had no permanent and definite supply of dairy products, except through outside channels. Here was a home market and the supplies near at hand, but organization was required in order that the producer and the consumer might meet without any intermediate exchanges.

A campaign to arouse public opinion was carried on last fall throughout the three counties, and at every meeting a committee was appointed to canvass for shares, and

two of that committee were to represent the district at a meeting to be held in Moncton at a later date. The prospectus called for a cream gathered creamery, operated by a company with an authorized capital of $25,000, of which $10,000 was to be paid up in $25 shares, but no man could hold more than 20 shares.

The organization meeting was held on December 27th. The company was formed with the following directors: Messrs. Trites, Fawcett and Melannson, to represent Westmoreland; Messrs. Ryan and Colpitts, for Albert, and Messrs. Breau and Melannson, to represent Kent county. At a later meeting Mr. Trites was elected President of the company. Messrs, Trites, Fawcett and Breau were appointed a committee to transact all business preparatory to the operation of the factory. A large brick building, centrally located, was purchased. A retail butter and buttermilk trade will be carried on, and, at a later date, undoubtedly other dairy products will be handled. A cold storage plant will be installed.

Mr. J. P. Simmons, of Dunstaffnage, P.E.I., has been engaged as manager, and will also be secretary-treasurer for the company.

The office of the District Representative will be in the creamery building. Thus the work of the provincial Department of Agriculture will be closely co-ordinated with that of those who have undertaken the management of the creamery. Much time and assistance have been and will be given by the Dominion Dairy Division and by the provincial Department of Agriculture.

ONTARIO

BUTTER GRADING IN 1917

BY JOHN H. SCOTT, OFFICIAL GRADER

FROM time to time, up to the early part of last year, Toronto butter dealers and others had made representation to the Ontario Government, suggesting that butter made at the creameries should be graded. Acting on this suggestion, at the last session of the legislature, $80,000 was included in the appropriations to purchase dairy products for grading purposes, and to meet the expenses in connection therewith. The butter was to be bought from the creameries and resold. By this method, the Government expected to almost entirely recuperate itself for the outlay. Following the adoption of this policy, the writer was appointed official grader. The Dairy Branch of the provincial Department of Agriculture rented accommodation from the city of Toronto at the municipal abattoir.

Having now been engaged in the work for practically a year, I am in a position to run over the ground that has been covered.

It had been found that 14-lb. boxes were the most suitable for shipping samples. These were furnished by the Department at cost price, and the express charges were paid by the Department. On arrival at the grading station, the samples were first placed in a cooler at a temperature of about 30 degrees and held over night or until scored, so that the samples should be under the same conditions exactly as far as temperature was concerned. After scoring, the samples were placed in the freezer at a temperature of from 5 to 10 degrees below zero and held there. They were held in storage according to agreement with the creameries, for at least one month, so that in case of an appeal against the score the sample would be available for rescoring. A grade certificate was mailed immediately after scoring to the creamery. The score card used is the standard usually used at On-

tario exhibitions, viz.: 45 points for flavour, 25 for body and texture, 15 for colour, 10 for salt, and 5 for finish.

The standard of grades used was 92 points and over, first grade; 87 points and under 92, second grade; 82 points and under 87, third grade, and under 82, off grade or culls. In scoring the butter, the basis was the grade to which the butter belonged commercially, not from an exhibition stand point. As there are 45 points given for flavour, defects in flavour were of the most importance, and the grade in which the butter was put was most often decided by the flavour.

From the creameries in the regular grading service 3,299 samples were graded; 82.16% were placed as 1st grade, or scoring over 92 points; 17.82% under 92, or second grade; and 28.15% scored 94 points and over.

	Scored 94 & over	92 to 94	Under 92
May	12%	65¾	22¼
June	29½	53	17½
July	34¾	48	17¼
August	18	54½	27¾
September	25	60	15
October	40	54½	5½
November	4½	72	23½

This table shows the month in which the sample arrived at the grading station, not the month in which it was made. Thus it appears that the greatest percentage of poor butter is shown in August. This is accounted for, by the fact that the last ten days of July were extremely hot, but most of the butter made in that period arrived at the grading station in August.

In looking over this table, the effect of the weather condition on the quality of the butter is very noticeable, October showing the best quality, when conditions were ideal as far as feed and weather were concerned.

The most common defects in flavour were "heated", "sour", and "yeastly" flavours, with "fishy" and "rancid" flavours developing in storage. Looseness and weak body were the most common defects in texture, with a great number of samples showing excessive free moisture. This does not mean that the butter contained more than the legal standard of 15% water, but very often shows the opposite by actual moisture test. Excessive free moisture is a serious defect in butter from a commercial standpoint. It not only makes a "sloppy" or "mushy" textured butter, but is the cause of great loss in shrinkage to the trade in storage, and in cutting out to the retail trade in prints, as the most of our butter is handled to-day. Proper incorporation of the moisture would prevent a great many of the complaints heard of short weight in butter when it reaches the dealer.

Next to the sense of taste the colour of butter is of importance to the consumer. Evenness of colour is required, and a large percentage of butter shows just a little freckle, or waviness, that leaves a bad impression, even though the flavour may be good. It would scarcely be wise to place a mottled or streaked butter in the first grade, no matter what good qualities it may otherwise possess. A great variation in the salting of butter was noticed, full points were allowed for salt unless the salt was gritty or undissolved. Each creamery claimed that they were salting for the requirements of the trade to which their butter goes.

The Department asked the creameries not in the grading service, to send in three samples made the last week of August, and three the last week in September, for the purpose of getting a general idea of the butter being produced throughout the province, and, also, for the purpose of making further investigations regarding salt and moisture content. Fifty creameries responded, sending in 259 samples. Of this lot 68% scored 92 points or over; only 6½% scored 94 or over, and 31% less than 92.

Taking the whole season's grading of regular creameries through the early fodder season, extremely hot summer weather, and late fall stable flavours, it was found that there were 14% more first grade, and 20% more scoring 94 points and over, than were secured from creameries that were not in the regular grading service, and that from butter made during ideal autumn weather.

THE POTATO EXTENSION SCHEME

BY JUSTUS MILLER, B.S.A., ASSISTANT COMMISSIONER OF AGRICULTURE

IN THE AGRICULTURAL GAZETTE for December, 1917, there was printed an account of the various steps which had been taken in our potato extension scheme up to the time a special committee sent a number of recommendations to the Minister of Agriculture regarding a definite policy, in this regard, for Ontario. The following is an account of how these recommendations have been ratified by the Minister of Agriculture and acted upon by officials of the Department:

STANDARDIZATION OF VARIETIES

The recommendation by the committee was adopted by the Prime Minister as it stood. The Ontario Department of Agriculture is especially recognizing and encouraging the Irish Cobbler as an early variety, with the Early Ohio as a special variety for market gardeners, and the Green Mountain as a late variety with such varieties as Carmen No. 1, Dooley, Rural New Yorker, etc., for those districts where these latter varieties have been grown generally and have been found most satisfactory. No legislation is to be attempted in this regard as the campaign must be largely educative. At any time a new variety may be propagated which will be superior to all other varieties and which would defeat the object of any legislation passed at the present time defining any one variety in a legal sense.

Certain important features of the educational campaign to be carried on in this regard are as follows: (1) Agricultural associations will be advised to recommend one of these recognized varieties for use in standing field crop competitions and to insist that the members taking part in the standing field crop competitions shall, in each locality, confine their efforts to some one variety. (2) Agricultural societies will still further be advised to offer substantial prizes at fairs and exhibitions for these recognized varieties with small prizes for a general a. o. v. class. (3) Members of the Junior Farmers' Improvement Association will be required to grow but one variety in one locality in acre profit competitions. (4) In the scheme of assisting farmers to secure Northern grown seed as herein after described, only these recognized varieties will be purchased and only one variety in any one locality.

SECURING NORTHERN GROWN SEED

The Ontario Department of Agriculture has decided, as a matter of definite policy, to encourage the planting of Northern grown seed in Old Ontario, especially the seed purchased in Northern Ontario. To this end 598 bags of the varieties mentioned have been bought in New Ontario, and 1011 bags in New Brunswick, a total of 1609 bags, all to be used for Departmental purposes as follows:—(1) Some 40 acres of potatoes are to be grown this year on farms owned by the Ontario Government in Northern Ontario. At the Fort William Farm a quantity will be grown sufficient to meet future requirements of the Ontario

Department of Agriculture. On the Burwash Industrial Farm a large area will be grown for distribution of first class foundation stock to Northern farmers, and on the New Liskeard and Monteith Farms, smaller areas will be grown for the same purpose. (2) A quantity of this seed will be used by District Representatives in practical field demonstration. These will be of the following nature: Each Representative will secure three lots of seed of the Irish Cobbler variety and of the Green Mountain variety. One lot will come from New Brunswick, one from Northern Ontario, one from Old Ontario. Each lot will be sufficient to plant a tenth of an acre. These will be grown side by side to demonstrate the value of Northern grown seed. (3) A thousand farmers will be supplied with small lots of seed by the Experimental Union to conduct this same demonstration on their own farms. (4) Some nine thousand school children of the province will be supplied with small lots of Northern grown seed in connection with school fairs.

The Department of Agriculture has also made arrangements to put Old Ontario farmers in touch with sellers in New Brunswick who can supply seed certified by the Dominion Government to be true to variety and reasonably free from disease. They will be encouraged to purchase in car-load lots only, as freight charges on smaller lots make the price high. The Department is ensuring that four car-lots of this seed be brought to four widely separated districts in Old Ontario, to act as a large field demonstration.

A car-lot of especially high class seed is to be distributed to growers in Northern Ontario as foundation stock. Owing to the heavy freight charges on this Northern shipment, and the desirability of establishing a seed industry in the North of large proportions, the Department is making arrangements to pay the freight on this car-lot.

Owing to the fact that Government inspectors have not been at work in Northern Ontario, it is impossible at the present time to secure much seed that can be guaranteed as to freedom from disease and varietal purity. Next fall, however, there will be a large quantity of seed available which can be certified, as New Brunswick seed is now certified.

GRADES AND GRADING

A committee to study grades and grading has been appointed. The personnel is as follows:—Chairman, Mr. F. C. Hart, Ontario Department of Agriculture; Mr. T. G. Raynor, Federal Seed Branch; Mr. G. W. Collins, Ontario Department of Agriculture; Mr. A. H. MacLennan, Ontario Agricultural College; Mr. S. C. Johnston, Ontario Department of Agriculture.

The purpose of this committee will be to study the grading question thoroughly as it affects the grower, the wholesaler, and the consumer. Present conditions of trade and market demands will be studied thoroughly. Having secured data from these sources, and from all other available sources, the committee will then decide whether or not a standard grade of potatoes is desirable for this province. If this is deemed advisable, the committee will advise the most desirable grade or grades, and will suggest the best ways by which they will become generally adopted.

POTATO SPECIALIST

The duties of the Potato Specialist are as follows:—To have charge of all potato extension work in the province, to co-ordinate the efforts of agencies at present working along these lines, to organize the whole improvement scheme in its broader phases, to prevent duplication of work in any form, to direct educational and publicity campaigns, and to supervise all literature con-

cerning any phase of the potato industry which may be published for distribution by the Ontario Government.

For the time being the Assistant Commissioner is to act as Potato Specialist, his work being largely that of organization. When the work is sufficiently developed to occupy all the time of one man, another appointment will be made.

ADVISORY POTATO COUNCIL

An Advisory Potato Council has been appointed as follows: Mr. C. F. Bailey, Assistant Deputy Minister of Agriculture for Ontario, (chairman); Dr. C. A. Zavitz, Professor Field Husbandry, Ontario Agricultural College; Mr. W. T. Macoun, Dominion Horticulturist; Mr. W. A. McCubbin, Pathologist, Entomological Branch, Dominion Department of Agriculture; Mr. J. E. Howitt, Professor of Botany, Ontario Agricultural College; Mr. F. C. Hart, Director Co-operation and Markets Branch, Ontario Department of Agriculture; Mr. S. C. Johnston, Vegetable Specialist, Ontario Department of Agriculture, and Mr. Justus Miller, Assistant Commissioner of Agriculture for Ontario, who will fill the dual position of acting potato specialist and secretary.

The duty of this council is to act in an advisory capacity with the Potato Specialist, and, with him, to define the policy of the province regarding potato extension work by mutual agreement. The committee will meet semi-annually, namely, on March 1st and October 1st. The chief object in view is a complete co-ordination of all Departments, Federal and Provincial, in the development of the potato industry and the promotion of harmony and efficiency in the work.

At the first meeting of the council all the features of extension work heretofore enumerated were ratified. Besides this, the following work was outlined for the coming season:

(*A*) *Experiments and Demonstrations.*—Many experiments, many not hitherto conducted, and others much enlarged, will be undertaken, together with those now under way. Sub-stations will be established at Fort William Industrial Farm and at Monteith Farm. So that complete co-ordination of effort may prevail, a committee has been formed of all who will have charge of various branches of this work. The personnel of this committee is as follows:—Chairman, Dr. C. A. Zavitz, Ontario Agricultural College; Mr. W. T. Macoun, Dominion Horticulturist, Central Experimental Farm; Mr. W. R. Leslie, B.S.A., Horticulturist, Fort William Industrial Farm; Mr. W. G. Nixon, B.S.A., Director, Monteith Farm; Mr. R. S. Duncan, B.S.A., Supervisor, District Representatives; Mr. Justus Miller, B.S.A., Acting Potato Specialist. A meeting has been called for February 15th, when a programme of experiments will be outlined.

(*B*) *Organization.*—An earnest effort will be made to form the nuclei of future co-operative societies in those districts where seed potatoes are bought this spring from Northern districts. In New Ontario this organization will take the form of growers' associations for the purpose of selling seed potatoes. In Old Ontario, the organization will take the form of associations for the purchase of Northern grown seed and the sale of table stock. In the initial stages no attempt was to be made to organize definite co-operative associations with fixed constitutions, by-laws, etc. The preliminary work is to encourage growers in those localities best adapted to potato growing to buy seed so that car-load lots may be sold in the fall. As the efficiency of these methods of production and selling become apparent definite organizations will be effected.

(*C*) *Educational Campaign.*—This will consist quite largely of practical field work. The demonstrations heretofore outlined, and the inspec-

tors who will travel from farm to farm, will have important results in this regard. Field meetings, somewhat similar to the drainage field meetings will be held at certain points, both in Old and New Ontario, either on the District Representatives' plots, or in fields that are being inspected. A special course in physiological diseases will be given by Professor Howitt, of the Ontario Agricultural College, to District Representatives and others who are interested, next summer. Prof. Howitt will also have charge of the inspection work of all crops grown by the Ontario Department of Agriculture on the various farms of the Ontario Government, and of field demonstrations under the jurisdiction of the Ontario Department of Agriculture. Schools having a course in agriculture will be used to the fullest extent.

Other propaganda, beside practical field work, will be as follows:—(1) Meetings will be held in those districts where the potatoes are sold at which experts will discuss fully the potato situation as affected by disease, source of seed supply, etc. Advertisements will be published in the regular way as part of a series being run now by the Ontario Department of Agriculture, explaining the Department's policy in this regard. A bulletin will be published in the near future treating as fully as is consistent with brevity, the influence of physiological disease on the potato crop, and the desirability of Northern grown seed.

(*D*) *Research.*—The following lines of research work were agreed upon by the Advisory Council:—

(1) The grading question.

(2) Economical production.

(3) To what extent can profitable production be increased in Ontario in relation to the market situation.

(4) What influence will the manufacture of potato by-products have upon the preceding question.

(5) The question of transportation.

PROFIT COMPETITIONS FOR 1918

VARIOUS changes have been made in the conditions of the Ontario profit competitions. The first is in the dairy profit, feeding hogs for profit, and acre profit competitions, which were previously restricted to young men under 30 years of age who had taken the course in agriculture conducted by the District Representatives, but which have now been thrown open to all young men under that age, excepting only winners in previous competitions. The choice of a two weeks' course, which constitutes the first prize in each case, formerly limited to live stock and seed judging at the Ontario Agricultural College, has been extended to take in poultry raising, horticulture, farm dairy, beekeeping, or farm powers.

THE DAIRY COMPETITION

In the dairy competition, the value of butter fat has been raised 20c a pound all round, and is now 50c a pound for the first three months, 53c a pound for the second three months, and 55c per pound for the last month.

FEEDING HOGS FOR PROFIT

In the feeding hogs for profit competition, in addition to the changes previously noted, the basis for the selection of winners has been changed so as to allow 25 points for type and finish, this being done with the bacon hog score card, and 25 points for the best kept records. Formerly, 50 points were given for type and finish and 50 points for the highest net profit per cwt. The latter remains as before. Another

change is that while entries are still said to close on July 1st, the condition is added, "and feeding period must be concluded by December 1st." Formerly, a condition read that each contestant must feed three hogs. Now it is provided that the pen of hogs must contain not less than four. Condition 6, which previously only provided for inspection of the hogs by the District Representative, now reads, "Contestants must notify the District Representative in advance when the hogs attain the age of six weeks, and at the time of entry the Representative will inspect the hogs and mark with ear tag, or in some equally suitable way." Condition 7, in addition to saying that hogs must be weaned at six weeks and fed and cared for by the contestant, now says that an accurate account must be kept of the kind and amount of food consumed every four weeks, in addition to the final feeding. It is also provided that credit will be given those who weigh their hogs at the end of that period, although the weighing is not compulsory. An entirely new provision is the following: "The contestant must notify the District Representative three days before the hogs are to be finally inspected and weighed, which must be done when they have reached a weight anywhere between 180 and 220 lb. One point will be deducted for each 5 lb. of fraction of 5 lb. under or over these weights. The District Representative, or some one appointed by him, will be present to certify to weights." The ninth condition, which is also new, provides that hogs may be finished any time within 28 weeks of age.

ACRE PROFIT COMPETITION

Condition 6 of the acre profit competition, which formerly said the crop should be decided by a vote of the competitors, now says, "but preference should be given the crop selected by the agricultural societies in the district, so that competitors may enter in the standing field crop competitions." Condition 7 has been changed so that instead of saying the competition must be confined to a field of one acre, now provides for a field of any size, but not less than one acre.

FARMERS' WEEK AT KEMPTVILLE AGRICULTURAL SCHOOL

BY W. J. BELL, B.S.A. PRINCIPAL

THE attendance at the Farmers' Week and Eastern Ontario Provincial Seed Fair held at the Kemptville Agricultural School, January 22 to 25, was far in excess of the anticipations of those in charge of these agricultural meetings, while the exhibits of grain, both in the Field Crop Competition, open, and C. S. G. A. sections, were of excellent quality.

THE INTER-COUNTY JUDGING COMPETITION

The Inter-County Live Stock Judging Competition was held on the first day of the course. The results were as follows:—

County	Dairy Cattle	Beef Cattle	Horses	Sheep	Swine	Total
1. Glengarry	478	386	447	434	432	2177
2. Dundas	420	388	439	388	381	2016
3. Lanark	440	350	481	310	313	1894
4. Peterborough	415	397	427	270	319	1828
5. Grenville	286	396	424	299	421	1826
6. Frontenac	499	263	401	334	251	1748
7. Carleton	449	320	368	233	339	1709

MORNING SESSIONS

The morning sessions, held in the I. O. O. F. Hall, considering the shortage of labour on the busy dairy farms of the eastern section of the province, were well attended, especially by members of the Junior Farmers' Improvement Association from adjoining counties. At these morning meetings such subjects were dealt with as "Feeding and Management of Dairy Cattle," introduced by Prof. A. Leitch, O.A.C., Guelph; "Seed Selection," by T. G. Raynor, Seed Branch, Ottawa; "Fruit Growing in Eastern Ontario," by Mr. W. T. Macoun, Dominion Horticulturist, Ottawa, and "Eradication of Weeds," by Prof. J. E. Howitt, O.A.C., Guelph. Judging by the interest taken in the discussion of these topics, those in attendance received considerable benefit.

AFTERNOON SESSION

Prominent live stock men discussed the judging of the different breeds of stock found in the district at the afternoon meetings, which were held in the Armouries, Kemptville, most of the stock used for demonstration work being obtained from the farm in connection with the Kemptville Agricultural School. The demonstrators at the meeting in the afternoon were, Prof. A. Leitch, O.A.C., Guelph; G. B. Rothwell, Assistant Dominion Animal Husbandman, Ottawa; J. P. Sackville, O.A.C., Guelph, and W. J. Bell, Principal of Kemptville Agricultural School. The attendance every afternoon was large.

EVENING SESSIONS

One of the features of the evening sessions was the showing of moving pictures of up-to-date agricultural operations and subjects, these pictures having been recently taken by the Moving Picture Bureau of the Ontario Government. In addition to these pictures, two addresses were given each evening by Mr. E. S. Archibald, Dominion Animal Husbandman, Ottawa; Prof. W. J. Squirrel, O.A.C., Guelph; Prof. A. Leitch, O.A.C., Guelph; Mr. W. J. Black, Commissioner under THE AGRICULTURAL INSTRUCTION ACT, Ottawa; Mr. F. C. Hart, Director Co-operation and Markets Branch, Toronto; Mr. J. Reed, Department of Agriculture, P.E.I.; Mr. S. C. Johnston, Moving Picture Bureau, Toronto, and Mr. J. H. Grisdale Director, Dominion Experimental Farms, Ottawa.

SEED FAIR SALE

At 10.00 a.m. on January 25, an auction sale of the seed exhibited at the Kemptville Seed Fair, was conducted. The bidding was spirited and the sale gave the farmers present an opportunity to purchase some very desirable seed grain. The management of the fair had printed for distribution in the province, a list of exhibitors, showing the variety and quantity of grain each had for sale as well as the price asked. It is believed this will be of assistance to the many prospective purchasers of choice seed grain.

NOTE.—The land purchase, the buildings and equipment of the Kemptville Agricultural School, and the services and expenses pertaining thereto, are financed under the provisions of THE AGRICULTURAL INSTRUCTION ACT.—EDITOR.

SHORT COURSES IN AGRICULTURE AND DOMESTIC SCIENCE

BY J. W. STARK, B.S.A., DISTRICT REPRESENTATIVE, PEEL COUNTY

THE annual short courses in agriculture and domestic science for this district held at Ebenezer, concluded with commencement exercises on the evening of February 1st when prizes were awarded for general proficiency, stock judging, public speaking, the keeping of notes and essays in domestic science. Mr. J. F. Nixon won the gold medal donated by Mr. W. Bert Roadhouse, Deputy Minister of Agri-

culture. During the four weeks of January, 30 young men met daily to receive agricultural instruction. For two weeks of this period, 45 young women met to study domestic science, food values and cooking, under a graduate of Macdonald Institute. At the conclusion of the course the boys organized themselves into the Ebenezer Junior Farmers' Improvement Association, and the girls into the Junior Institute. It will be the object of these two associations to co-operate in various lines of educational and patriotic work and to exercise their abilities in improving the social life of the district. The classes were taken on an excursion to Toronto on January 30th. In the morning the boys visited the stock yards and the girls the Technical School. In the afternoon the full class met at the Parliament Buildings, where they were addressed by Sir William Hearst, Premier and Minister of Agriculture.

SASKATCHEWAN

A NEW LIVE STOCK COMMISSIONER

THE resignation was recently announced of the Acting Live Stock Commissioner for the province of Saskatchewan, Mr. P. F. Bredt, on account of ill-health. Mr. Bredt had been acting since the enlistment in August, 1915, of Captain J. C. Smith, who died on active service in November, 1917. The position of Live Stock Commissioner has now been filled by the appointment of Professor A. M. Shaw, who has been connected with the Animal Husbandry Department of the Saskatchewan Agricultural College since November, 1913. He is a graduate of the Ontario Agricultural College, and from there became District Representative for Algoma. He was a member of the stock-judging team selected by Professor Day to represent Guelph at the Chicago International Live Stock Exposition. Subsequently, he was appointed assistant agricultural agent for the Great Northern Railway, his special work being to look after demonstration farms and the introduction of live stock along the railway lines through Dakota and Montana. In 1913, the late J. J. Hill, sent Professor Shaw to Europe to select Shorthorn and Ayrshire cattle, sheep, hogs, and horses for his farms in Minnesota.

To-day the world is bleeding to death in its efforts to conquer a false ideal of nationalism, but the only true nationalism, the only true internationalism, is a spirit of mutual sympathy and understanding among all the people—in other words, the spirit of unselfishness which is the essence of the thing we call co-operation. Until we can bring about the birth of that new spirit among the nations, until we can grow it in our own homes, our own communities, our own Dominion, as well cry out to the tides to cease their flowing, as well try to stop the stars in their course as bid wars to cease. Here is work for every individual woman of us, every group of organized women, work in the doing of which you may feel you are bringing perhaps a little nearer that time when there shall be a new heaven and a new earth.—*Mrs. Irene Parlby, President, United Farm Women of Alberta.*

ALBERTA

THE CO-OPERATIVE MARKETING OF POULTRY PRODUCTS

BY J. H. HARE, B.S.A., POULTRY MARKETING COMMISSIONER

THE Alberta Department of Agriculture has entered upon a movement to bring about the complete re-organization of the poultry industry in the province chiefly through improved marketing services. Under present conditions, it is hard to find efficiency of any sort, in any phase either of production or marketing. Production, which is approximately fifty eggs per hen per year, is less than one-half of what it should and might easily be, and what production there is, is unnecessarily seasonal; the great bulk of the eggs being produced in April, May and June, when prices are at their lowest level.

Also as a consequence of an evil and antiquated system of marketing in which the principle of non-recognition of quality is the worst feature, approximately fifty per cent of the eggs sent to market in the summer and fall months are No. 2's. No. 2's, according to the trade classification, constitute the fourth and lowest grade. As a consequence of this, there is an unnecessary loss or wastage in the season of approximately forty per cent of the food and money value of the product.

IMPORTANCE OF QUALITY

It is especially the question of the quality of the western product that is seriously in need of the earnest attention of both farmers and egg handlers in the West. It is made the more urgent because of the surplus now being produced in the western provinces, the future of the industry depending very largely upon the profitable disposition of that surplus. Western eggs, unfortunately, are not in strong demand in outside markets. Last summer in Chicago, a carload of western eggs was held up by the health authorities. On a later date, two carloads of western eggs in Montreal were found to be of such poor quality as to have a marked depressing effect upon the whole market. During the season of heavy holdings, western dealers at times have had the greatest difficulty in making sales, owing to their stocks containing an undue proportion of the lower grades. The following is the average grading, according to the Government Inspector's reports of 14 cars of western eggs, 1917 Spring and Summer Stock:—

Extras 13%, Ones 34%, Twos 44%, cracks, dirties and bad 9%.

British market reports repeatedly quote United States eggs several cents per dozen lower than Eastern Canadian eggs, yet the Dominion Live Stock Branch market report for December 11th makes this significant statement, that "Eastern buyers at present prices and quality express a preference for States eggs as compared with the western product."

POULTRY MARKETING COMMISSIONER'S BRANCH

These facts reveal a condition which is far from being healthy and satisfactory in the western poultry industry, and it was with a view to the organization of work that would aid in the correction of these conditions that the Alberta Department of Agriculture some time ago established the Poultry Marketing Commissioner's Branch.

The efforts of this Branch have

thus far been devoted to the organization and extension of the "Egg Marketing Service," which work is being carried on in close co-operation with the Alberta poultry representative of the Dominion Department of Agriculture.

THE EGG MARKETING SERVICE

The "Egg Marketing Service" has established a Candling Station in the Public Cold Storage warehouse in Calgary, and it is hoped to establish a similar station at Edmonton as soon as practicable. At this service station, shipments of eggs from farmers' associations are received, candled, graded and marketed, and the selling price, less operating charges, returned promptly to the shipping associations.

The objects of the "Egg Marketing Service" can be summarized as follows:—

(a) To provide the farmers of the province, including those in the outlying districts, with the best possible marketing facilities;

(b) To ensure the efficient candling and grading of the product.

(c) To make it possible for the individual farmer to receive a price in proportion to the actual quality of his product.

(d) To ascertain through the examination of the eggs received, what farmers are not following completely efficient methods, so as to be able intelligently to advise them and help them produce a high grade product exclusively.

(e) To stimulate to greater production of poultry and eggs for the benefit of the farmers themselves, as well as for war purposes, believing that this can be accomplished most effectively by providing the farmers with better marketing facilities, such as the Egg Marketing Service will supply; by assembling the farmers' eggs at the service stations and under Government inspection, grading them properly before selling; and by giving the farmer the actual returns his product brings when sold.

(f) To eliminate the tremendous unnecessary loss which the industry now sustains as a consequence of following the present inefficient system of marketing, and to develop an unexcelled reputation for Alberta eggs. Practical experience both in Europe and in Eastern Canada clearly indicates that this improvement can be brought about most effectively by the adoption of the co-operative system of selling and the establishment of the system of quality payment in making returns to the individual producers, both of which are provided for in the Egg Marketing Service.

It was late in the season of 1917 when the "Egg Marketing Service" commenced operations. Production was dwindling, and many points had no suplus to ship; but, before the conclusion of the season, marketing service was rendered to some twenty odd farmers' organizations throughout the province.

METHODS AND USERS

From the beginning, the principle of quality payment has been strictly adhered to. The eggs upon receipt are graded according to the Canadian standards and returns are made to the farmers on a basis of two grades, making the division during the greater part of the time between No. 1's and No. 2's.

After grading, the eggs are packed in clean, new light cases with new fillers and are offered to the trade for sale. All interested produce buyers are invited to make bids, and the eggs are sold to the highest bidder. In instances where buyers outside of the province quote no higher price than that quoted by local buyers, preference is given to local dealers.

In nearly all cases, shipping arrangements at the various country points have been made by special egg marketing committees, representing one or all of the local farmers' organizations. The organizations already using the egg-marketing service include U. F. A. local associations, farmers' co-operative stores, women's institutes, creameries, United Farm Women's associations, agricultural societies, and a few regularly formed poultry marketing associations.

PART III
Rural Science

THE VARIATION IN ELEMENTARY COURSES IN AGRICULTURE

BY JAMES McCAIG, M.A., EDITOR OF PUBLICATIONS, ALBERTA

IF we were to take an inventory of the condition of agricultural education in the Dominion at the present time, we would doubtless take satisfaction from finding a rather wholesome condition in public sentiment with respect to increasing and improving our educational services in behalf of agriculture to the fullest extent possible within right limits. We should also find working in our educational services in behalf of agriculture an increasing number of active and enthusiastic men in both popular and systematic work. We should likewise find that the interest of the public and the energy of educational men had found expression in explicit and formal provision in educational institutions for the effective promotion of the science, art, and business of agriculture. In all of the provinces of the Dominion, agriculture has now been given rank with the other great professions in higher institutions of learning. At the other end of the scale, the elementary schools of the Dominion all have incorporated in their courses of studies considerable bodies of work with an agricultural basis, variously called nature study, rural science, elementary science or agriculture. We likewise have secondary school agriculture rather variously represented in educational effort.

There would appear to be an advantage in a discussion of the right functioning and proper province of the different grades of teaching institutions in dealing with the subject of agriculture. An examination of courses in the different provinces shows wide variation in content and general purpose, or use. Having accepted and established the subject, it would appear to be the next necessary point in progress to more carefully define by either expansion or limitation the appropriate scope of work for the various grades of schools. It is impossible in the first place to get away from the need of having a code or organized body of work. Human progress is constituted of the putting of each generation in possession of the attainments of previous generations in the form of organized knowledge, in the acquisition of which the pupil has a consciousness of increased and progressive power. This is subject in the case of a dynamic unsettled science like agriculture to the need of working close to current development. In this view it is pertinent to ask the framers of courses of study in the elementary schools whether their work is thought to be satisfied by a camouflage of nature study, by explicit vocational teaching of children, by an assembling of beginnings in pure elementary science, by school gardening dominantly, or by organized elementary agriculture.

To give concrete quality to the discussion the practice in Alberta is to pass from a nature study basis to

educational agriculture in grades seven and eight. Agriculture is of concrete interest and embodies the elementary sciences in a way to give cohesion and interest above what may be secured in attempts at pure science teaching. The introduction of agriculture into the schools is a broad social measure which gives reflection of our dominant interest, but is not intended to be a vocational service. The variations in the race are too great and obvious to give warrant to any scheme to make farmers of all country boys. Compulsory attendance till the end of the fourteenth year is enforced, which gives opportunity to enrich the school experience of the Alberta boy with material of some breadth and substance. There appears to be a tendency in Alberta to rather extend the function of the common school well along into the life of the boy, i.e., for two or three years past childhood.

Agriculture is taught in a laboratory way. In this view emphasis is given to the following matters:

1. Field work by both teacher and pupils for the study of soils and plants.
2. Experimental work done, both within and without the school-room.
3. The study of the authorized text-book; and of books, magazines and bulletins treating topics similar to those under consideration.
4. The application of the knowledge gained to school and home gardening and to farming operations.

The work done by the Department of Education and the work of the Department of Agriculture are complementary. The District Agents of the Department of Agriculture direct the home gardens and school fairs. The school has its institutional garden. Live stock work is not a part of formal teaching in the schools, but is an important part of the school fair work. The soil and the plant are the characteristic interests of the schools as the materials are everywhere.

MANITOBA

CONSOLIDATION OF SCHOOLS AND AGRICULTURAL EDUCATION

BY S. E. LANG, INSPECTOR OF SECONDARY SCHOOLS

THE Editor of THE AGRICULTURAL GAZETTE has asked for a brief statement showing the extent to which consolidated schools in Manitoba are officered, equipped, and conducted to meet the demands of agricultural education.

There are in the province some 70 consolidated schools employing 229 teachers. Over 3,400 pupils, 300 of whom are of high school grade, are transported to these schools in conveyances provided at public expense, over $160,000 having been spent in 1917 on the item of transportation alone. Thirteen of these schools do not undertake anything beyond the elementary programme; 44 employ one teacher in high school work, and the remainder more than one.

Many of these schools are modern, up-to-date buildings, that have been erected with a view to future possibilities as well as present needs. From the standpoint of agriculture the size of the site is important. One school has 17 acres of land, two have ten, one has nine, one has eight, two have seven, six have six, thirteen have five, fourteen have four, five have three, fourteen have two, and the remainder one acre. What has been done at such centres as Stonewall, Teulon, and Roblin, in the way of playgrounds, individual gardens, experimental plots, and

school fields, can no doubt be done elsewhere. Material equipment, in the way of manual training and other tools and implements for illustrative work in an agricultural course, does not require to be very extensive or very expensive.

Hitherto the supply of teachers required to take charge of agricultural departments in local schools of secondary grade has been equal to the demand for such instruction. The consolidated schools should prove very effective instruments in disseminating information of an elementary yet very practical character concerning agriculture over a considerable area through the medium of boys' and girls' clubs and fairs. The Director of the Extension Service states that there will be fully 200 clubs operating in 1918 with an aggregate membership of 20,000. The system is organized in such a way that the teacher is able to keep in close touch with the club competitions. The school is thus the centre for the dissemination of information upon agriculture, and the home garden and farm the laboratory where the knowledge is applied. In five centres, four of them being consolidated schools, secondary as well as elementary instruction in agriculture was provided for several years. In two cases owing to the enlistment of the instructors the work was discontinued, but will doubtless be resumed later on.

It is generally agreed among educators and others who have the nation's interests at heart that the schools of the country shall continue during the war with as little interruption as possible. At the same time it is felt that the schools shall do all they can to aid in meeting conditions which have grown out of the war. Inasmuch as some of the greatest problems are concerned with increasing the production of food and with conservation in its use, there is a special interest at this time in the teaching of agriculture and home economics. Now, as never before, the nation is appreciating the value of these subjects in the school curriculum. With most educators it is no longer a question of why these subjects should be taught, but as to how they may be taught most effectively.—*H. P. Barrows, Specialist in Agricultural Education, in States Relation Service, Doc. 73, United States Department of Agriculture.*

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications and Notes

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VOCATIONAL TRAINING IN AGRICULTURE

THE MEANS ADOPTED IN THE UNITED STATES COMPARED WITH THE OBJECTS AIMED AT BY THE AGRICULTURAL INSTRUCTION ACT IN CANADA

PREPARED BY THE STAFF OF THE COMMISSIONER OF AGRICULTURAL INSTRUCTION

IN February, 1917, an Act to Promote Vocational Education was passed by the United States Congress. The measure is commonly known as the Smith-Hughes Act. The Act referred to provides a comprehensive scheme for rendering financial assistance to the states in support of vocational education in the fields of agriculture, home economics, trade, and industry.

Under the Smith-Lever Act, Congress made provision to financially assist, in 1914 and thereafter, extension work in agriculture and home economics through the state agricultural colleges. The Act provided that the work was to consist of instruction and practical demonstrations for the benefit of the farming community generally.

THE SMITH-HUGHES ACT

The moneys appropriated under the Smith-Hughes Act are to be expended in furnishing the education necessary to train for useful employment in agriculture, trade and industry, and in home economics. The training furnished is not to be of college grade, nor in any sense academic, but is to apply to the common, wage-earning employments. The training may be given (1) to boys and girls who desire to prepare for a selected vocation, and (2) to boys and girls and others who seek greater efficiency and wage-earning capacity in the occupation or trade in which they are already engaged.

It is not proposed that the Federal Government shall undertake the organization and immediate direction of vocational training in the states. The purpose of the measure is to enable the State authorities, in co-operation with the Federal authorities, and with the assistance of Federal moneys, to work out and apply a successful scheme of vocational education, and to set up a proper standard of efficiency in connection therewith.

THE CANADIAN ACT

In Canada, THE AGRICULTURAL INSTRUCTION ACT is intended to assist in the fields covered by the Smith-Lever and the Smith-Hughes Acts. On the one hand, it assists the provinces to meet the cost of carrying instruction to the man on the farm and to the woman in the farm home; on the other hand, it places at the disposal of the provinces

funds that may be used to promote the teaching of agriculture in the common schools and in schools of less than college grade, designed for the purpose of providing vocational education for the young men and women from the farms. Schools of the latter class were allotted the following amounts under THE AGRICULTURAL INSTRUCTION ACT in 1917:

Ontario: Kemptville Agricultural School	$50,000.00
Alberta: Three Schools of Agriculture	37,000.00
New Brunswick: Two schools of Agriculture (work in abeyance)	4,000.00
	$91,000.00

For the teaching of agriculture and domestic science in public, high and normal schools, and for the training of teachers to give instruction in those subject, the following allotments were made under THE AGRICULTURAL INSTRUCTION ACT in 1917:

Ontario	$30,000.00
Quebec	20,000.00
Saskatchewan	25,000.00
British Columbia	20,000.00
Nova Scotia	10,000.00
New Brunswick	9,785.80
Prince Edward Island	10,500.00
	$125,285.80

LIBERALITY OF THE CANADIAN ACT

While there is a marked similarity of purpose between the United States and Canadian Acts, the application of the funds is much more restricted in the former than in the latter case. The money set aside by Congress under the Smith-Hughes Act for use by the states may be employed only for the salaries of teachers and supervisors, for the salaries of teachers in-training, and for the maintenance of teacher-training. The Act stipulates that the moneys shall not be applied, directly or indirectly, to the purchase, erection, preservation, or repair of any building or buildings or equipment, or for the purchase or rental of lands, or for the support of any religious or privately owned school or college. THE AGRICULTURAL INSTRUCTION ACT contains no limitations of this nature. Thus we find that in the current agreement with the province of Ontario provision is made, in connection with the Agricultural School at Kemptville, for "capital expenditure, including land purchase, buildings, and equipment, and for services and expenses pertaining thereto."

HOW U.S. MONEY IS EXPENDED

The principles upon which Federal moneys are distributed under the Smith-Hughes Act are thus stated. The money is designed:—

(1) To stimulate the States to undertake a new and needed form of service—that of vocational education—which the national government believes necessary to the public welfare.

(2) To equalize the inequalities of burden among the States in carrying on this service.

(3) To secure for the national government a reasonable degree of participation in the carrying on of this work in which the national government is so deeply concerned.

(4) To establish standards of efficiency in vocational education in so far as it is aided by federal funds.

The total Federal grant increases from $1,860,000 in 1917-18 to $7,367,000 in 1925-26. The appropriation for teachers and supervisors in agriculture increases from $548,000 in 1917-18 to a maximum of $3,027,000 in 1925-26. The appropriation for teachers in trade, home economics, and industry increases from $566,000 in 1917-18 to $3,050,000 in 1925-26; and the appropriation for teacher-training from $546,000 in 1917-18 to $1,090,000, the maximum, in 1920-21. The maximums, when reached, are to continue indefinitely.

The acceptance of the grant is optional on the part of the states, and carries with it specific obligations. Every Federal dollar furnished must be matched by an equal amount appropriated for the same purpose by the state, the local community, or both, in which the Federal money is to be spent.

METHODS OF OPERATION

The machinery established by the Act is devised to secure effective co-operation in promoting vocational education. The law provides for the appointment by the President of a representative Federal Board for Vocational Education. The members of this Board are the Secretary of Agriculture, the Secretary of Commerce, the Secretary of Labour, and the Commissioner of Education, together with three citizens who represent, respectively, the manufacturing and commercial, the agricultural, and the labour interests. To provide agencies representing the states, the act requires that state boards of no less than three members shall be created by legislative enactment. Each state board is to work in co-operation with the Federal Board in carrying out the provision of the Act.

REQUIREMENTS FROM THE STATES

Each state board is required to submit annually to the Federal board a plan outlining the methods by which it proposes to conduct its activities. These plans shall show (1) the kinds of vocational education for which it is proposed that the appropriation shall be used; (2) the kinds of schools and equipment; (3) the courses of study; (4) the methods of instruction; (5) the qualifications of teachers, supervisors, and directors; (6) plans for teacher-training; (7) plans for the supervision of agricultural education, including practice in agriculture either on a farm provided by the school or other farm, for at least six months per year. It shall also be shown that the education is under public control, and that the object is to fit for useful employment. State boards are also required to report annually on the work performed, and to submit a statement of receipts and expenditures.

On the examination and acceptance of the plans by the Federal board, the payment of the grant is authorized. By this means the two boards are brought together on common ground, and standards of vocational education are established meeting the approbation of both bodies. While the right to establish such standards rests with the state boards, the standards themselves must have the approval of the Federal Board. A state is entitled to receive Federal aid only when it has conformed to the Act and has had its plan approved. No money belongs to any state, nor to any community, as of right. Communities and institutions are entitled to the money only as they show themselves able and ready to meet the requirements of the state board.

THE STAFF

The staff, appointed by the Federal board, consists of a director, who is the executive officer, four assistant directors—one for agriculture, one for industrial education, one for home economics, and one for research—and the regional and other agents. The agent for home economics, however, remains at Washington. The Federal agents are, in general, to act as administrative representatives of the Federal board in the field, to gather information as to the methods adopted by the several state boards for the administration of the Act, and to inspect the work of the state boards in so far as it has to do with the requirements of the law, and the decisions and policies of the Federal board, and with the approved plan of conducting the work.

With regard to the supervision of the work within the states, the Federal board holds that trained teachers and trained supervisors are indispensable in effective vocational education. Only in this way can schools get the help they should have at the time they need it most—when the work of the state is beginning. Furthermore, in this way only can state boards be certain that schools are complying with the terms of the agreement. If the schools of

a state do not live up to the agreement, the funds may be withheld.

The Act contemplates that the Federal board shall make studies and investigations for the help of the states. To that end it will issue, from time to time, bulletins, circulars and announcements giving the results of studies carried on in its research department.

HYDRO-ELECTRIC POWER ON THE FARM

BY J. W. PURCELL, ASSISTANT ENGINEER, HYDRO-ELECTRIC POWER COMMISSION OF THE PROVINCE OF ONTARIO

IN these days of labour scarcity and high wages, everything possible should be done to place farm production on an efficient and scientific basis. The employment of power machinery has worked, and is working, a revolution in farm methods, and the farm home itself is to-day being equipped in many parts of Ontario with labour-saving appliance and conveniences similar to those found in city homes, including systems of hot and cold running water, electrically driven washing-machines, vacuum cleaners, churns, cream separators, electric irons and electric lighting.

In 1912 the Hydro-Electric Power Commission, appreciating the advantages that would accrue to the province of Ontario if it were possible to apply hydro-electric power to farm work instead of gas and steam power, then being used, made a number of demonstrations beginning in August of that year at the Canadian National Exhibition, Toronto, and continuing at fall fairs and exhibitions throughout the western part of the province at the request of fair boards and municipalities.

THRESHING AND SILO FILLING

In addition to this, two demonstration outfits, consisting of 25 H.P. motors, the necessary transformers, cable, control apparatus and metres were equipped and put into service. With these outfits the cost of doing the heavier work, such as threshing, silo-filling, sawing wood,

SPECIAL FARM HOUSE SCENE
Showing iron, washing machine, table, stove and chandelier operated by hydro power

chopping grain, etc., has been obtained, and the figures in the following tables are very convincing as to the desirability of electric power for this work. In the tables, the electric power has been charged at 5 cents per K. W. H., and service at $3 per month, this being the average rate which farmers in different sections of the country are working under:

THRESHING

Table No. 1—Wheat.

Township.	Farm No.	Condition of grain.	Time at place in days.	Time running—time of delays deducted.	Total in bush.	Total kw-hr.	Bush. per hour.	Bush. per kw.-hr.	Kw. hr. per Bush	Average demand in h.p.	Electric Cost. Con. Charge	Serv. Charge	Total	Per Bush.	Separator	Notes
W. Oxford.....	1	Good	¾	4H-16M	265	87	62.2	3.04	.32	27.2	4.35	.07	4.42	.0670	Sawyer-Massey Peerless.	Straw not cut.
W. Oxford.....	2	Good.	1¼	5H-5M	476	92.5	93.3	5.15	.194	24.3	4.63	.12	4.75	.0100	McCloskey.	Straw not cut.

Table No. 2—Oats.

W. Oxford.....	1	Fair, buttough	1¾	11H-15M.	1,179	165	104.8	7.14	.140	19.6	8.25	.17	8.42	.007?	Sawyer-Massey Peerless.	Straw not cut.
Dereham.....	1	Wet & tough.	1½	8H-20M	1,190	141	143	7.50	.103	22.2	7.05	.15	7.20	.0056	" "	Straw not cut.
W. Oxford.....	3	Fair	1½	7H-35M	1,450	198	191	7.80	.136	24.8	9.90	.15	10.05	.0069	McCloskey.	Straw not cut.
N. Oxford.....	1	Fair	2	6H-52M	1,140	203	162	5.36	.178	24.5	10.15	.20	10.35	.0091	Geo. White & Sons.	Straw cut.
W. Oxford.....	2	Good, but tough	2¾	13H-35M	2,180	325.5	165	6.69	.150	24.4	16.28	.27	16.55	.0076	McCloskey.	Straw not cut.

Table No. 3—Hungarian Oats

N. Norwich.....	1	.....	2	5H-45M.	397	93.	69	4.27	.235	22.8	4.65	.20	4.85	.1022	.....	Straw not cut.

SILO FILLING

Table No. 4

Township	Farm No.	Size of Silo ft.	Capacity in cu. ft.	Amount cut and elevated—tons.	Time at place in days	Time running, time of delays deducted	Total Kw-hr.	Tons per hr.	Kw-hr. per ton.	Pounds per Kw-hr	Average hemanded H. P.	Electric Cost. Con. Ch.	Ser. Ch.	Total	Per ton.	Name of Cutting Box.	R. P. M.	Notes
N. Oxford....	2	14 x 40	6157.6	125	2	10H-15M	197	12.4	1.57	1,268	25.5	9.85	.20	10.05	.085	Blizzard No. 3.	944	Very green.
W. Oxford.....	2	16 x 45	9047.7	152½ *	2½	16H-14M	275	9.51	1.75	1,109	22.	13.75	.25	14.00	.092	C. Wilkinson.	1000	Fair weather.
W. Oxford.....	1	33 x 29 x 13½ †	12917.5	270	2½	18H-35M	367	14.5	1.36	1,471	24.5	18.35	.25	18.60	.069	Blizzard No. 3.	944	Silo inside barn trouble with belt.
Dereham.....	1	15 x 40	7068.4	175	3½	20H-3M	336	8.75	1.92	1,041	22.4	16.80	.35	17.15	.098	Blizzard No. 3.	944	Rainy weather.
Dereham.....	2	16 x 40	8042.4	189	2	20H-15M	392	8.4	2.35	939	19.6	19.60	.20	19.80	.105	Blizzard No. 3.	944	
W. Oxford.....	3	14 x 35	5388.	108	2	11H-05M	215	9.73	1.90	1,004	25.9	10.75	.20	10.95	.102	Blizzard No. 3.	944	
N. Norwich....	1	14 x 40	6157.6	154	2	12H-45M	183	7.5	1.17	1,683	21.5	9.15	.20	9.35	.068	Blizzard No. 3.		
N. Norwich....	2	16 x 37	7439.6	146	1	7H-15M	129	20.1	1.13	2,262	23.7	6.45	.10	6.55	.045	Wilkinson.	790	Rainy weather, silo not filled.
S. Norwich..	1	14 x 40	6157.6	154	2	11H-15M	136	12.7	1.13	2,264	16.2	6.80	.20	7.00	.045	Wilkinson.	790	Another silo partly filled.

*Weight of silage taken at 30 to 50 lb. per cu. ft., according to condition.
†Silos all round except in one case above referred to as oblong.

‡ Filled 32 ft.
† Filled 37½ ft.

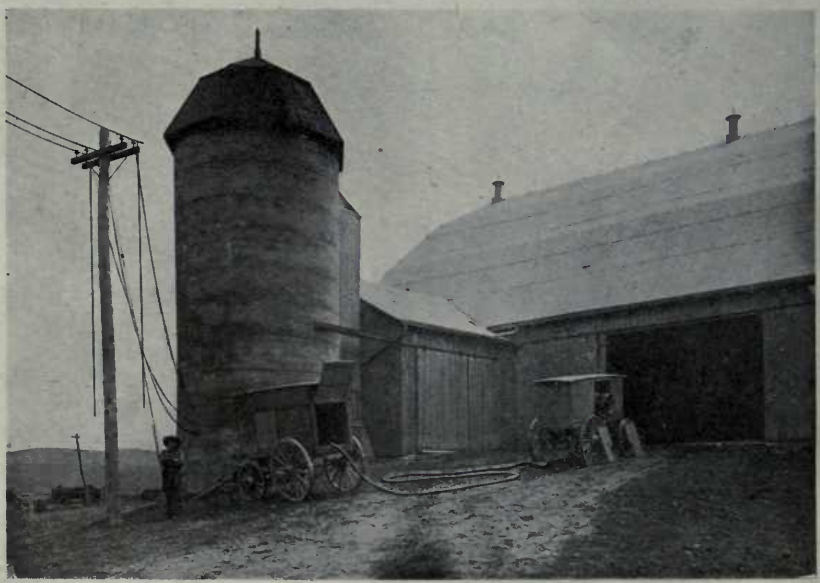
VALUE AND ADVANTAGES

The advantages of electric power over other power at present in use are quite apparent to the farmer in most districts. The question with him is how he can apply the power so as to receive full value for the money expended.

In order to make a fair comparison between the cost of electric drive and other methods, it is necessary to take into consideration the saving of time effected, whether it is in work that is done by the farmer or his help, or whether it is borrowed help which he has to pay back under the system in vogue of exchanging labour during periods of silo-filling and threshing.

The advantages of electric power for use in silo-filling are evident when it is remembered that the value of silage depends to a large extent on its being cut and put in at the right time. When the farmer has to depend on steam power, he often has to wait so long for the outfit to come

GENERAL VIEW OF FARM SERVED WITH HYDRO POWER, SHOWING FARM SERVICE TRANSFORMERS—SERVICE TO BARN AND HOUSE.



VIEW OF SYNDICATE OUTFIT SHOWING MOTOR AND TRANSFORMER WAGONS. ONE TRANSFORMER IS CONNECTED TO THE LINE AND SUPPLIES CURRENT TO THE MOTOR AT SUITABLE VOLTAGE

around that the quality of the silage is very seriously affected.

NUMBER OF SERVICES

At the present time the number of farm services to rural communities and suburban district in Ontario probably reach a total of nearly five thousand. The counties in which progress has been the greatest are South Oxford, Waterloo, Kent, Ontario, Peel, Welland, Lincoln, Wentworth, Norfolk, Middlesex, and Elgin.

wanting hydro-power to petition the township council for an estimate. The council transmits this petition to the Hydro-Electric Power Commission with a resolution asking that such an estimate be prepared. As soon as the estimate is approved by the Commission, it is sent to the council, who within thirty days call a meeting of the petitioners and submit the estimate. If they so desire, the petitioners then enter into a contract with the municipality for hydro-power, and the municipality

SYNDICATE OUTFIT—TRANSFORMER WAGON—USED BY MEN IN WATERLOO TOWNSHIP

Rural districts necessarily move more slowly than do populous centres, but the policy of the Commisssion is the same in supplying power to farms and rural municipalities as it is in the case of cities, towns, and villages, that is, "Service at Cost."

HOW SERVICE IS SECURED

If a district is willing to bear the cost, the Power Commission Act provides that service shall be given. The regular procedure is for a group

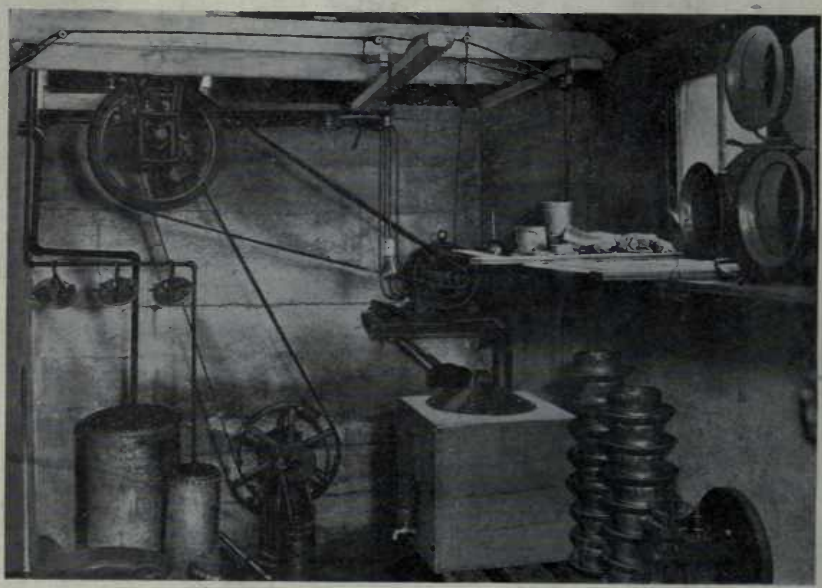
in its turn enters into an agreement with the Commission for power for the petitioners. The Commission then build the lines to the farmer's gate and the township provides the transformers and metres. Construction is not recommended by the Commission unless there are at least three consumers per mile, the revenue from this number being required to take care of the annual fixed charges on the cost of construction, which includes interest at 6 per cent, depreciation

at 5 per cent, sinking fund on a thirty year basis, and maintenance and operation.

THE CHARGES

The rates upon which the consumers are billed are made up of two parts, namely, service charge and consumption charge. The service charge depends upon the number of consumers per mile. It is $3 per month for three consumers per mile; $2.50 per month for four consumers per mile; $2.00 per month for five consumers per mile, etc. The consumption charge depends upon the amount of power used. This is measured by metre and is so much per K.W.H., depending upon the cost of power in the district.

The cost of wiring farm buildings varies considerably in different districts, depending on the contractor who does the work and the cost of labour. The average cost of wiring barns in the Waterloo district, from a total of eight places of 100 to 150 acres, during the past season was $110. The cost of house wiring is much less than this.



AN UP-TO-DATE DAIRY, WHERE THE MILKING MACHINE, WATER HEATER, ETC., ARE OPERATED BY HYDRO POWER

TABLE OF COST TO THE FARMER

The actual cost to the farmer for power, both for domestic uses and power purposes, is illustrated by the following table covering six farms in Waterloo Township in 1915:—

WATERLOO TOWNSHIP SYNDICATE

Users of Power for Domestic and Power Purposes for 1915.

Farm No.	Kilowatt Hours												Rate—Service charge $30. Power 4c. per K.W. Discount 10% for prompt payment from power only				
	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total	Domestic	Power	Service Charge	Total
1	48	35	38	33	21	17	20	30	33	38	59	47	409	$14.72	$43.96	$31.66	$90.34
2	48	31	23	23	29	55	17	19	25	36	51	54	411	14.80	56.52	30.00	101.32
3	39	49	33	18	10	10	13	12	19	23	36	33	295	10.62	54.68	30.00	99.30
4	31	27	21	23	14	15	16	15	20	38	56	43	319	10.48	29.84	31.66	71.98
5	31	26	23	18	12	12	10	15	21	23	35	27	253	9.11	29.16	30.00	68.27
6	45	17	13	12	6	6	7	13	15	16	7	25	182	6.55	31.57	30.00	68.12
7	On Town System				..	..	..	..	..	..	..	..	..	.....	13.57	9.00	22.57
													1869	$66.28	$259.30	$19 .32	$521.90

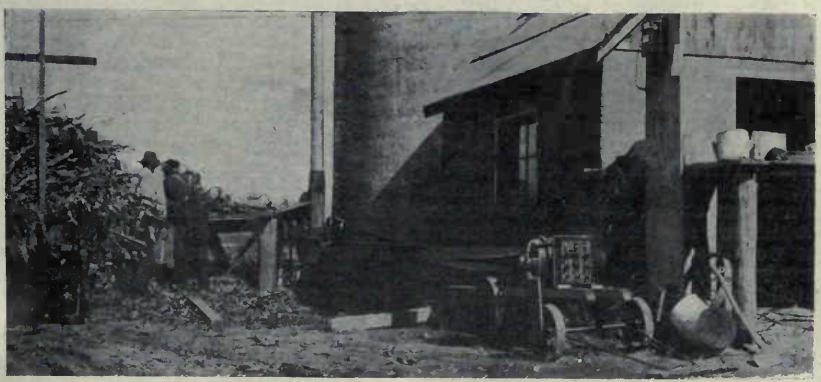
Power Used by 20 H. P. Syndicate Outfit.

1	73	..	..	34	..	..	..	283	....	153	30	648	1221	$43.96	No record of detail work done.
2	58	..	42	26	59	32	12	131	192	185	745	88	1570	56.52	
3	67	..	51	42	10	19	..	89	289	228	267	457	1519	54.68	
4	76	..	71	..	..	..	26	107	134	....	363	52	829	29.84	
5	65	..	..	49	20	..	..	51	245	....	312	68	810	29.16	
6	..	..	..	..	..	..	..	..	193	114	21	549	877	31.57	
7	..	..	..	..	..	..	..	260	....	117	....	....	377	13.57	
													7203		
													9072		

NOTE.—Nos. 1 and 4 now pay an extra service charge of $5.00 per year from September 1st to December 30th.

Average cost per kilowatt hour, including Service Charge:—

No. 1	5.542	cents	
No. 2	5.114	cents	
No. 3	5.48	"	
No. 4	6.27	"	
No. 5	6.42	cents	
No. 6	6.528	"	
No. 7	6.00	"	



SILO FILLING WITH 5 H.P. OUTFIT

EXAMPLES OF WORK PERFORMED

The following work was performed on the farms enumerated:—

Farms

No. 1 —Silo Filling—A 12 x 42 ft. silo was filled to depth of 40 ft. settled.
—Threshing—2,000 bushels mixed grain; 800 bushels wheat; 300 bushels barley.
—Sawed—15 cords (stone length) wood.
—Chopped—2,000 bushels grain.

No. 2 —Silo Filling—A 14 x 39 ft. silo was filled to a depth of 30 ft. settled.
—Threshing—1,120 bushels wheat; 1,150 bushels mixed grain; 450 bushels barley; 1,000 bushels oats.
—Sawed—12 to 15 cords (stove length) wood.
—Chopped—2,400 bushels of grain.

No. 3 —Silo Filling—A 12 x 40 ft. silo was filled and settled and refilled.
—Threshing—900 bushels wheat; 1,800 bushels oats; 1,500 bushels mixed grain: 500 bushels barley.

—Sawed—12 cords (stove length) wood.
—Chopped—3,000 bushels grain in the year.

No. 4 —Silo Filling—two silos were filled—one 10 x 10, and one 8 x 10 x 22 ft.
—Threshing—300 bushels wheat; 1,600 bushels oats.
Sawed—No record.
—Chopped—1,000 bushels grain in the year.

No. 5 —Silo Filling—A 11 x 30 ft. silo was filled and settled.
—Threshing—325 bushels wheat; 1,550 bushels oats and mixed grain.
—Sawed—16 cords (stove length) wood.
—Chopped—1,100 bushels of grain in the year.

No. 6 —Silo Filling—a 14 x 40 ft. silo was filled, 24 ft. settled.
—Threshing—700 bushels wheat; 2,000 bushels mixed grain; 300 bushels barley.
—Sawed—10 cords (stove length) wood.
Chopped—½ day—about 300 bushels —has windmill chopper.

BABY BEEF CONTESTS FOR BOYS AND GIRLS

BOYS and girls baby beef contests inaugurated in the state of Iowa have added stimulus to baby beef production in that state, and have added a useful factor in the education of the young people. The contest was first organized in 1914. It is open to boys and girls between the ages of ten and eighteen years. It is supervised by the Iowa Beef Producers' Association. The object of the contest is to induce as many boys and girls as possible to take a steer or heifer and feed it for a stipulated period. This accomplished, the contestants feed to get the greatest gain at the least expense. Each contestant must feed, groom, break and show his, or her, entry, and must feed with the idea of having a finished product at the end of the feeding period that has quality, smoothness and bloom, and which will place well in the show-ring. The entire responsibility rests with each contestant.

Co-operating with the state organizations are numerous county and district fairs which are contributing to the success of the work by liberal premiums to contestants in their respective districts. Then there follows the state show at Des Moines, when the calves are all assembled to be judged for quality. That is always the big event, and the show in 1917 would have done credit to many state fairs. Seventeen hundred and fifteen dollars was paid out in prizes, and a free trip to the International was awarded to county winners.

THE RECORDS

Two hundred and ninety-two entered the contest and two hundred and fifty finished. The records of these contestants are very interesting. The contest was based on a ten-months' feeding period, November 1st, 1916, to September 1st, 1917. Calves entered were dropped between January 1st and September 1st, 1916, and pure-bred calves intended for breeding purposes were barred. The final results were based on amount of gain, economy of gain, and records and reports kept by the contestants. The calves of the 250 members completing the project were on an average feeding period of 294 days, starting with a total initial weight of 106,988 pounds, and finishing with a final weight of 238,289 pounds. The total gain was 131,301 pounds, or an average initial weight of 401 pounds, and a final weight of 892 pounds, making an average gain of 492 pounds.

In figuring the cost of production, standard prices of feeds were sent to all members to be used in making out their reports. The total cost of feeds was $15,292 28, or an average cost of $32.08. Figuring the calves at $13.00 a hundred at the close of the contest and $8.00 at the beginning, gives a total value of $33,360.46. The net profit of all members was $9,509.14, or an average profit per member of $35.72.

THE INFLUENCE EFFECTED

The educational value, with the increased interest of the contest, has brought about a wonderful influence in the kind and quality of calves entered. Each year finds a larger percentage of high-grade and pure-bred calves entered. More care is taken in the selection of the calf. Special attention is given to securing a good member who is willing to pay what the calf is worth. Special care is taken in choosing a ration keeping in consideration the cost of feeds, individuality of amount and home conditions. Boys that never before took into consideration feed values are now giving this special study. Not only are they learning to feed with excellent results, but are learning to fit their calves for exhibition. Boys that enter the contest with the one aim to win the prize soon learn that there are other things besides prizes that are well worth getting, namely, the educational value and experience. The boy that has taken hold of the club work with a vim and determination begins to take a new interest in live stock production.

ASSOCIATIONS AND SOCIETIES

LIVE STOCK BREEDERS' WEEK IN TORONTO

THE annual meetings of the live stock breeding associations in affiliation with the National Live Stock Records Board of Canada were held in Toronto from February 4th to 8th. As promised by the tables of records and transfers and membership rolls published in the February number of THE AGRICULTURAL GAZETTE, a general tale was told of advancement and prosperity. Many important questions came up for discussion, the majority of which have either already been dealt with in THE GAZETTE or are referred to in the necessarily curtailed summaries that follow. It will be observed that both the Canadian Clydesdale Horse Association and the Dominion Shorthorn Association have arranged for reciprocity in registrations with the United States Associations. The proposed international live stock show in Hamilton and the suggestion that a national organization should be found to take charge of such matters as were of common concern to all the breeding interests of the country, each received attention, and in the majority of instances both were referred to the various executives to be dealt with. The scarcity of labour and the feed questions and the suppression of hog cholera came up for consideration, Federal Government chiefs being present to explain what was being done. With the sheep men, the vital question was the co-operative selling of wool, a matter that has been largely dealt with in THE GAZETTE and action regarding which is recorded on another page. A number of Ontario breeders' associations met in annual session during the same week at the same place.

RECORD ASSOCIATIONS

CLYDESDALE HORSE ASSOCIATION OF CANADA

A tone of optimism marked the annual meeting of the Clydesdale Horse Association of Canada. The director's report, after referring to the depletion of horses in Europe in consequence of the war, predicted that for years following the settlement of peace there would be a demand for well-bred horses. Available statistics showed that the horse population of Canada had increased 400,000 since 1915. In Ontario, however, there had been a decrease of 10,000. Clydesdales had shown an advance, both in quality and number at most of the shows. The financial statement of the Association displayed continual improvement, the receipts having been $15,418.28 in 1917 against $12,475.02 in 1916. Allowing for $5,754.70 paid for war bonds, the expenditure had been $10,198.84, which included $4,050 paid in grants to exhibitors and $500 subscribed to the Canadian Red Cross fund. The balance at the end of the year, including the $6,000 worth of war bonds was $14,106.34. In addition to the money grants, 54 gold medals were distributed among local shows and 22 grand championship medals were given. During the year a settlement of an outstanding difficulty had been made with the American Clydesdale Association. In the past the only Clydesdales eligible for entry for breeding purposes from Canada to the United States were imported purebreds, or those tracing to imported registered stock on both sides. Now all animals recorded in the Canadian Stud Book can be entered and recorded in the American Stud Book. An arrangement has also been made with the executors of the estate of the late Captain G. L. Watson of British Columbia that the trophy given by him for the best Canadian-bred Clydesdale stallion shall be open for competition annually in perpetuity and shall be known as the Watson Shield. Grants for 1918 were made of $500 to the Red Cross fund, $300 to the Y.M.C.A., war expenses and $6.850 to exhibitors. Wm. Graham, Claremont, Ont.; Jas. A. Torrance, Markham, Ont., and J. W. Wheaton, Toronto; were respectively re-elected president, vice-president and secretary-treasurer. The vice-presidents for provinces were all re-elected excepting that Wm. Grant was elected for Saskatchewan in place of Alexander Mutch and S. A. Logan, Amherst, N.S., was elected for the Maritime Provinces under the new arrangement which combines the three. The representatives on the Canadian National Live Stock Record Board are Wm. Graham, Claremont, Ont.; John Boag, Queensville, Ont.; Robert Ness, Howick, Que.; Wm. Smith, M.P., Columbus, Ont.; Peter Christie, Manchester, Ont.; Fred Richardson, Columbus, Ont.

CANADIAN SHIRE HORSE ASSOCIATION

Officers elected: president, Amos Agar, Nashville, Ont.; vice-president, James Bovaird, Brampton, Ont.; secretary treasurer, G. de W. Green, Toronto; representatives on Canadian National Live Stock Records Board, Jas. Bovaird, Brampton, and Jno. Gardhouse, Weston, Ont.

CANADIAN PERCHERON HORSE BREEDERS' ASSOCIATION

Officers elected: President, W. B. Thorne, Aldersyde, Alta.; vice-president, E. A. Davenport, Acme, Alta.; secretary, W. H. Willson, Calgary, Alta.: representatives on National Live Stock Records

Board; Geo. Lane, Calgary; R. C. Upper, Calgary; W. B. Thorne, Aldersyde, Alta.

CANADIAN HACKNEY HORSE SOCIETY

The secretary of the Canadian Hackney Horse Society at the annual meeting reported a demand for good representatives of the breed. There is a membership of 165 and a balance on hand of $282.30. The officers elected were: President, Robert Graham, Toronto, vice-president, Dr. E. Watson, Hudson Heights, Que.; secretary-treasurer, H. M. Robinson, Toronto; representatives on the Canadian National Live Stock Record Board: Robert Graham, Toronto; Dr. E. Watson, Hudson Heights, Que.

CANADIAN THOROUGHBRED HORSE SOCIETY

Officers elected: president, Lieut. Col. Wm. Hendrie, Hamilton; vice-presidents, J. J. Dixon and A. E. Dyment; secretary-treasurer, T. J. Macabe, Toronto; representatives on Canadian National Live Stock Records Board, T. J. Macabe and T. A. Crow, Toronto.

CANADIAN STANDARD-BRED HORSE SOCIETY

At the annual meeting of the Canadian Standard-bred Horse Society, the treasurer reported that the receipts up to December 31, 1917, were $4,155.21, while the expenditures for the year were $1,193.60. With outstanding accounts, the cash on hand was reported to be $3,671.59. It was decided to devote $150 to the Allies Relief Fund. The officers elected were: Hon. President, W. J. Cowan, Cannington, Ont.; president, Geo. S. McCaul, St. Thomas, Ont.; vice-president, Sam McBride, Toronto, secretary, John W. Brant, Ottawa; representatives on Canadian National Live Stock Records Board, Harford Ashley, Foxboro, Ont., and T. H. Hassard, Markham, Ont

CANADIAN PONY SOCIETY

Officers elected: Honourary President, W. J. Langton, Toronto, Ont.; president, J. M. Gardhouse, Weston, Ont.; vice-president, Dr. E. Watson, Hudson Heights, Que.; representatives on National Live Stock Record Board: J. M. Gardhouse, Weston, Ont.; H. M. Robinson, Toronto; secretary, G. deW. Green, Toronto.

CANADIAN FRENCH COACH BREEDERS' ASSOCIATION

Officers elected: President, G. E. Goddard, Cochrane, Alta.; vice-president, W. B. Thorne, Aldersyde, Alta.; second vice-president, L. J. Schroeder, Midnapore, Alta.; secretary, E. L. Richardson, Calgary, Alta.; representatives on the Canadian National Live Stock Records Board, G. E. Goddard, Cochrane, Alta., and W. B. Thorne, Aldersyde, Alta.

FRENCH CANADIAN HORSE BREEDERS' ASSOCIATION

Officers elected: Hon. president, Jos Deland, L'Acadie; president, Victor Sylvestre, St. Hyacinthe; vice-president, Louis Thouin, Repentigny; secretary-treasurer, J. A. Couture, Quebec; representatives on the Canadian Live Stock Records Board, Victor Sylvestre, St. Hyacinthe, and J. A. Couture, Quebec.

THE DOMINION SHORTHORN BREEDERS' ASSOCIATION

At the annual meeting of the Dominion Shorthorn Breeders' Association held in Toronto, on February 6, a resolution was passed providing for reciprocity and registration between the United States and Canada. It is now possible for an American buyer to purchase a shorthorn of Canadian ancestry and have the registration transferred to an American registry for the customary United States fee of $1.25. Shorthorns registered in the United States can now also be registered in Canada for the fee of $1. The financial report showed the association to have $35,000 invested in war loan bonds, that the total assets were $58,590.73, that the liabilities were only $8,000, that the total income last year was $34,000, that nearly one-half of this was invested in victory loan bonds and that, in addition, the association divided $1,000 between the Patriotic and Red Cross funds in 1917 and that in 1918, $1500 will be divided between the Patriotic, Red Cross and Y.M.C.A. funds. The membership of the association was shown to be 2,872, the registrations 16,863, the receipts from registrations in 1917, $27,-181.75, and the receipts from memberships $5,422. The executive was authorized to expend not more than $6,000 in publicity work. The following officers were elected: President, W. A. Dryden, Brooklin; first vice-president, J. F. Mitchell. Burlington; second vice-president, J. G. Barron, Carberry, Man.; secretary-treasurer, Professor G. E. Day, Guelph, Ont.; representatives on Canadian National Live Stock Records Board, W. A. Dryden, Brooklin, Ont.; Robt. Miller, Stouffville, Ont.; J. A. Watt, Elora, Ont.; J. F. Mitchell, Burlington, Ont.; Hon. W. C. Sutherland, Galt, Ont.; Harry Smith, Hay, Ont., and Peter White, K.C., Pembroke, Ont.

CANADIAN HEREFORD BREEDERS' ASSOCIATION

The Canadian Hereford Breeders' Association reported an increase in business of about 90%. Especially in the West was there a marked increase in popularity of the breed. The association decided to distribute $3,000 as prize money between the different fairs and to subscribe $100 to the Canadian Red Cross fund. The fol-

lowing officers were elected: President, W. H. Hunter Orangeville; vice-president, L. O. Clifford, Oshawa; secretary, H. D. Smith, Ancaster, Ont.; representatives to Canadian National Live Stock Records Board, W. H. Hunter, and H. D. Smith.

CANADIAN AYRSHIRE BREEDERS' ASSOCIATION

In his report at the annual meeting held in Toronto on February 8th of the Canadian Ayrshire Breeders' Association, the secretary stated that the membership was now 1521, an increase of 166 over 1917. Of the provinces, Quebec has the greatest number of members, viz., 753; Ontario coming next with 430. The financial report showed the expenditures for the year to have been $13,746, while the receipts were $12,107. It was explained that $1,660 of the expenditures belonged to the previous year. Mr. C. F. Bailey, Deputy Minister of Agriculture, announced that a demonstration Ayrshire herd was being established at New Liskeard. A resolution was passed restricting the record of performance test to 300 days with an extension to 390 days in which the cow under test must produce her calf. After voting $200 to the Allies Relief Fund, the following officers were elected: President, L. J. Tarte, Montreal; vice-president, A. S. Turner, Ryckman's Corners; secretary, W. F Stephen, Huntingdon, Que.; representatives on National Live Stock Record Board: W. W. Ballantyne, Stratford, Ont.; John McKee, Norwich, Ont., Wm. Hunter, Grimsby, Ont., W. F. Stephen, Huntingdon, Que.

HOLSTEIN BREEDERS' ASSOCIATION

At the annual meeting of the Canadian Holstein Breeders' Association, it was reported that the registrations during 1917 totalled 12,019, being an increase of 1000 over the previous year. The transfers totalled 10,656. The membership of the association was increased by 382. Certificates were issued for 760 tests under R. O. M. rules and 206 qualified in the record of performance. The balance on hand was reported to be $2,080.24, with assets of $24,680.24 above all liabilities. One thousand dollars was voted to be used as prizes in R. O. P. tests. A committee was appointed to deal with the complaint that some breeders were in the habit of having animals transferred to them for show purposes only. The idea of an International Live-Stock Show was approved and a representative appointed to confer with other breeders relative thereto. Both the 300 day test and the 365 day test were approved for R. O. P. work. The officers elected were: President, S. F. Tolmie, Victoria, B.C.; first vice-president, Neil Sangster, Ormestown, Que.; second vice-president, G. A. Brethen, Norwood, Ont.; secretary, W. A. Clemons, St. George, Ont.

CANADIAN JERSEY CATTLE CLUB

Officers elected: President, D. O. Bull, Brampton, Ont.; first vice-president, F. Lea Alexander, Coaticook, Que.; second vice-president, Gordon Duncan, Todmorden; secretary-treasurer, B. A. Bull, Brampton; representatives on the Canadian National Live Stock Records Board, B. A. Bull, Brampton, and R. J. Fleming, Toronto.

CANADIAN BROWN SWISS ASSOCIATION

Officers elected: Honourary President, Arthur Galey, Massawippi, Que.; president, C. E. Standish, Ayer's Cliff, Que.; first vice-president, W. A. Jolley, Waterloo, Que.; second vice-president, Ralph Ballagh, Guelph, Ont.; representatives on National Live Stock Records Board, J. Keffer, Preston, Ont.; Benjamin Bowman, New Hamburg, Ont.; secretary-treasurer, Ralph H. Libby, Stanstead, Que.

FRENCH CANADIAN CATTLE BREEDERS' ASSOCIATION

Officers elected: President, Arsene Denis St. Norbert, Que.; vice-president, Louis Thouin, Repentigny; secretary-treasurer, J. A. Couture, Quebec; representatives on the Canadian Live Stock Records Board, Hon. Sydney Fisher, Knowlton; Hon. N. Garneau, Quebec.

CANADIAN SHEEP BREEDERS' ASSOCIATION

At the annual meeting of the Canadian Sheep Breeders' Association, held in Toronto, February 6, resolutions were passed, allowing free transfers within sixty days, fifty cents to be charged for transfers made between 60 and 120 days, and voting $200 to the Empire Relief Fund. The officers elected were: President, W. A. Dryden, Brooklin, Ont.; vice-president, Jas. Bryson, Brysonville, Que.; secretary-treasurer, R. W. Wade, Toronto; representatives on Canadian National Live Stock Record Board: Jas. Bryson, Brysonville, Que., Jas. Snell, Clinton, Ont., Lt.-Col. Robt. McEwen, London, Ont.

CANADIAN SWINE BREEDERS' ASSOCIATION

At the annual meeting of the Canadian Swine Breeders' Association held in Toronto on February 4th, Dr. Torrance, Veterinary Director General for Canada, stated that in five years twenty-five million hogs had been lost in the United States, as a result of hog cholera. In Canada, the greatest losses occurred in 1914 and 1915, when there were 34,779 and 34,470 respectively, or a trifle over one per cent of the hog population of the Dominion. Considerable discussion took place on the question of feed. The federal Live Stock Commissioner explained what his Department was doing towards improvement of the situation in this respect. The financial report showed that the receipts from regis-

trations totalled $9,647.52, and from memberships $2,840. The officers elected were: President, G. H. Hutton, Lacombe, Alta.; vice-president, F. Byrne, Charlesbourg, Que.; secretary-treasurer, R. W. Wade, Toronto; representatives on Canadian National Live Stock Record Board: J. D. Brien, Ridgetown, Ont.; J. E. Brethour, Burford, Ont.; John I. Flatt, Hamilton; H. German, St. George.

CANADIAN KENNEL CLUB

Officers elected: Honourary President, John G. Kent, Toronto; president, Joseph Russell, M.P.P., Toronto; first vice-president, T. E. Milburn, Toronto; second vice-president, W. M. Coats, Vancouver, B.C.; representatives on National Live Stock Record Board; Joseph Russell, M.P.P., T. E. Milburn, and Peter Herd, Toronto; secretary, J. E. Dowling, Toronto.

LIVE STOCK ASSOCIATIONS

ONTARIO HORSE BREEDERS' ASSOCIATION

Officers elected: president, Wm. Smith, M.P.; vice-president, John A. Boag; secretary, R. W. Wade, Toronto.

CANADIAN TROTTING ASSOCIATION

At the annual meeting of the Canadian Trotting Association, the secretary-treasurer reported a balance of $561.36 on hand. A committee was appointed to endeavour to bring the Western Fairs Association under the rules of the Canadian Trotting Association. The officers elected were: President, O. B. Sheppard, Toronto; vice-president, Geo. McCaul, St. Thomas, Ont.; secretary-treasurer, W. A. McCullough, Toronto.

ONTARIO CATTLE BREEDERS' ASSOCIATION

At the annual meeting of the Dominion Cattle Breeders' Association, it was decided that the organization should henceforth be known as the Ontario Cattle Breeders' Association. A resolution was passed appointing a committee to interview the Provincial Minister of Agriculture with a view to securing the elimination of the scrub bull. John Gardhouse was elected president and R. W. Wade, secretary.

ONTARIO SHEEP BREEDERS' ASSOCIATION

At the annual meeting of the Ontario Sheep Breeders' Association, the question of amended legislation regarding the higher taxation of dogs was left to the executive to deal with. The officers elected were: President, Jas. Douglas, Caledonia; vice-president, J. D. Brien, Ridgetown; secretary-treasurer, R. W. Wade, Toronto.

ONTARIO SWINE BREEDERS' ASSOCIATION

Officers elected: President, John Flatt, Hamilton; first vice-president, Wm. Jones, Mount Elgin; secretary, R.W. Wade, Toronto.

ONTARIO BERKSHIRE SOCIETY

Officers elected: President, Frank Tisdale; first vice-president, H. A. Dolson; secretary, R. W. Wade, Toronto.

ONTARIO YORKSHIRE CLUB

Officers elected: President, J. C. Stuart, Osgoode Station; vice-president, R. Garbutt, Belleville; secretary-treasurer, R. W. Wade, Toronto.

EASTERN LIVE STOCK UNION

In Toronto on February 8th, the organization of the Eastern Live Stock Union was completed with the election of the following officers: President, Wm. Smith, M.P., Columbus, Ont.; first vice-president, John Gardhouse, Weston, Ont.; second vice-president, R. R. Ness, Howick, Que.; third vice-president, W. R. Reek, Fredericton, N.B.; secretary-treasurer, R. W. Wade, Toronto.

CANADIAN BEE-KEEPER'S ASSOCIATION

Officers elected: President, R. A. Fletcher, first vice-president, Geo. Morrison; second vice-president, J. K. Martin; secretary, P. Temple; assistant secretary, C. V. Clubb.

SEED SUPPLIED BY THE CANADIAN SEED GROWERS' ASSOCIATION

Following is an approximate estimate of the quantity of registered seed catalogued for sale by members of the Canadian Seed Growers' Association in the six years ending with 1916:—

1911	16,631
1912	16,373
1913	66,008
1914	40,963
1915	78,304
1916	59,217

Not only were many thousand bushels of seed distributed which were not advertised in the catalogues, but large quantities of seed grown from registered and improved seed have been disseminated in many districts. As an instance of this, it might be mentioned that a large percentage of white oats now grown in Prince Edward Island originated with members of the association.

CANADIAN CO-OPERATIVE WOOL GROWERS' LIMITED

A conference of wool growers from every province in Canada, which, with its committee and formation meetings covered three days, namely, February 5, 6, and 7, was held in the Dominion Government wool warehouse, Toronto, and the Canadian Co-Operative Wool Growers Limited, organized. Following a prolonged discussion presided over by Mr. F. N. Savoie, of Quebec, and during which Mr. T. R. Arkell, chief of the Sheep and Goat Division, Ottawa, and in charge of the wool warehouse, made full statements regarding the sales of last year and relative to the existing situation (see THE AGRICULTURAL GAZETTE, Vol. IV, pages 23, 265, 313, 864 to 873, and Vol. V, page 141), it was decided to form the association on a co-operative basis with a capital of $200,000 divided into 20,000 shares of $10 each.

THE BY-LAWS

An appointed committee submitted a draft of by-laws which was considered by the conference and ultimately adopted to provide: That subscriptions for stock can be taken from any eligible person; that the minimum subscription shall be one share, on which 20 per cent shall be paid on allotment; that no call shall exceed 20 per cent and that three months shall elapse between calls; that shares can be summarily forfeited on which a call remains unpaid for six months; that the directors can refuse applications for stock and must sanction transfers; that the head office shall be in Toronto; that each province having one or more shareholders shall be entitled to delegates at annual or special general meetings, but that such delegates shall not exceed 30 in number, the directors to give notice when calling the meeting of the number of delegates each province is entitled to; that transportation of delegates shall be paid and $5 a day allowed as living expenses when actually employed in the service of the company; that meetings shall be held in each province for the election of delegates; that the annual meeting shall be held in Toronto in January or February according to the decision of the directors; that special general meetings shall be held whenever the directors consider desirable, or on petition to the president of 10 per cent of the shareholders; that 45 days' notice of meetings shall be given; that ten delegate shareholders shall constitute a quorum; that a shareholder shall have but one vote; that shares cannot be jointly owned; that the board shall consist of 15 directors, each province having at least one director, and no province more than three directors; that every shareholder having one share shall be eligible to the directorate; that the board shall choose their own officers; that five directors shall be a quorum; that meetings of the board can be held on five days' notice; that the president may decide the place of meeting of the board; that a commission of investigation may be appointed by the delegate shareholders at any special or general meeting; that the directors can borrow money on the credit of the company or issue bonds or debentures for no less sum than $100; that the directors can pay a commission of 5 per cent for the sale of shares; that business shall be conducted so as to provide 6 per cent payment on the paid up capital and to provide a reserve fund not exceeding 1 per cent on the year's sales. Other by-laws refer to the duties of the officers.

RESOLUTIONS

Resolutions were passed by the conference offering the wool output to the Government at last year's price if required for war purposes; instructing the directors to advise the authorities in Australia and New Zealand that Canadian wool was not shipped to the United States for gain, but because 75 per cent of it could not profitably be used in Canada; expressing appreciation of assistance given by the Live Stock Branch of the Federal Department of Agriculture in the grading and marketing of wool and praying that such assistance be continued. It was decided to ask the Dominion Government to appoint a commission of three to take charge of the wool growers' interests, the commission to be composed of the president of the Canadian Co-operative Wool Growers' Limited, and one each from the East and the West to be recommended by the directors of the Association.

THE DIRECTORATE

Following are the names of the first directorate appointed under the by-laws of the Association:

British Columbia: George C. Haynes, Kamloops, B.C.; Alberta: J. W. Renton, Calgary; Levi Harker, Magrath; Saskatchewan: J. H. Follett, Duval; J. D. Wilson, Maple Creek; Manitoba: George Gordon, Oak Lake; Ontario: Col. Robert McEwen, London; W. A. Dryden, Brooklin; Geo. L. Telfer, Paris; Quebec: T. A. McClary, Lennoxville; J. R. McDowell, Shawville; M. St. Marie, Hoe's River; New Brunswick: Angus M. Avard, Sackville; Nova Scotia: Stanley Logan, Amherst; Prince Edward Island: Wm. McGregor, Central Lot 16.

On the close of the conference the directors met and elected Lieut.-Col. Robert McEwen, London, Ont., president; Captain J. D. Wilson, Maple Creek, Sask., first vice-president; Stanley Logan, Amherst, N.S., second vice-president, and F. E. O'Brien, Toronto, secretary. By consent of the Dominion Minister of Agriculture, Mr. T. Reg. Arkell, Chief of the Sheep and Goat Division, will give his services as manager of the association for the first year.

NOVA SCOTIA FARMERS' ASSOCIATION

The annual meeting of the Nova Scotia Farmers' Association was held at Truro on January 22 to 24. Addresses were delivered on stallion enrolment, spraying, the fertilizer situation, greater production, the protection of sheep against dogs, and other topics. Resolutions were adopted urging more stringent legislation with respect to dogs; legislation requiring potatoes to be graded similar to the United States law; urging the provincial Government to increase the annual grant to $20,000; opposing the adoption of the daylight-saving scheme as recommended for cities and towns; favouring the nationalization of the railroads of Canada; that The Agricultural Act of the province be so amended as to deprive agricultural societies of their share of the grant as a penalty for changing from one breed to another without consulting the Department of Agriculture; that the Food Controller be memorialized to prohibit mills from withholding available mill feeds; that the Highway Board appoint efficient patrol men to effect minor repairs as required; that the federal Government be asked to give cars of feed precedence over all other freight except munitions and other war materials; that the Nova Scotia Farmers' Association accept representatives from co-operative associations on the basis of one representative for one hundred members or less and one representative for membership over that number. The following officers were elected: President, Samuel Freeman, Amherst; 1st vice-president, D. R. Nicholson, Coxheath; 2nd vice-president, Walter Churchill, Yarmouth; secretary, C. R. B. Bryan, Truro.

THE HOLSTEIN RECORD

The Holstein cow, Zarilda Clothilde 3rd DeKol, owned by Colony Farm, the property of the Government of British Columbia, has completed an official world's record for milk and butter produced in one year. She commenced her record at six years, ten months, and twelve days of age, and at the completion of the year was giving about forty pounds of milk per day. Following is her record as supplied by Mr. W. A. Clemons, Secretary of the Holstein-Friesian Association of Canada:—

COLONY FARM CHAMPION HOLSTEIN, ZARILDA CLOTHILDE 3RD DE KOL

Days	Milk lb.	Butter lb.	Days	Milk lb.	Butter lb.
7	831.3	31.12	180	18572.4	638.48
30	3331.7	122.25	210	21031.2	725.32
60	6718.0	233.96	240	23260.0	806.11
90	9940.5	338.62	270	25292.7	878.43
120	13009.8	442.28	300	27277.7	950.28
150	15900.7	544.58	330	28902.9	1010.42
			365	30467.0	1071.34

ONTARIO CORN GROWERS' ASSOCIATION—STANDARDS FOR CORN

THE Ontario Corn Growers' Association on the recommendation of the committee selected for the purpose has adopted the following standards for varieties of corn suitable for cultivation. for ensilage and seed corn purposes, in the province of Ontario:

DENTS

Wisconsin No. 7

Ear—Length, 8½ inches to 9½ inches. Circumference, 7 inches to 7½ inches.
Kernel—Colour, creamy white. Indentation, well dented. Rows, 16-20.
Butt—Moderately rounded.
Tip—Well covered. Fairly full.
Cob—Colour, glistening white.

Bailey

Ear—Length, 7¾ inches to 8½ inches. Circumference, 6¾ inches to 7¼ inches.
Kernel—Colour, yellow cap with reddish tinge lower. Indentation, nicely dented.
Rows—16-18.
Butt—Moderately rounded.
Tip—Full, well covered.
Cob—Colour, dark red.

White Cap Yellow Dent

Ear—Length, 7¾ inches to 8½ inches. Circumference, 6⅜ inches to 6⅞ inches.
Kernel—Colour, cap white, remainder yellow. Indentation, fairly rough.
Rows—14-16.
Butt—Moderately rounded.
Tip—Well covered, slightly tapering.
Cob—Colour, red or white.

Golden Glow

Ear—Length, 8¼ inches to 9¼ inches. Circumference, 6½ inches to 7 inches.
Kernel—Colour, deep yellow. Indentation, medium.
Rows—16-18.
Butt—Moderately rounded.
Tip—Slightly tapering.
Cob—Colour, cherry red.

FLINTS

Longfellow

Ear—Length, 10½ inches to 11½ inches. Circumference, 4½ inches to 5 inches.
Kernel—Colour, deep golden yellow. Indentation, none.
Rows—Eight.
Butt—No larger than ½ distance up ear.
Tip—Slightly tapering and well covered.
Cob—Colour, pure white.

Salzer's North Dakota

Ear—Length, 10½ inches to 11½ inches. Circumference, 5 inches to 5½ inches.
Kernel—Colour, pearly white. Indentation, none.
Rows—Eight.
Butt—No larger than one-third distance up ear.
Tip—Slightly tapering and well covered.
Cob—Colour, pure white.

Compton's Early

Ear—Length, 12 inches to 13 inches. Circumference, 5½ inches to 6 inches.
Kernel—Colour, deep golden yellow. Indentation none.
Rows—Twelve.
Butt—No larger than one-third distance up ear.
Tip—Well covered.
Cob—Colour, pure white.

After holding a successful three days' show, viz., on February 12, 13 and 14, at Chatham, Ont., the Ontario Corn Growers' Association elected the following officers: President, L. L. Gregory, Kent Bridge; first vice-president, Walter Anderson, Amherstburg; second vice-president, Stuart Macdonald, Port Lambton; treasurer, J. H. Coatsworth, Kingsville; secretary, P. L. Fancher, Chatham.

CENTRAL CANADA VETERINARY ASSOCIATION

The annual meeting of the Central Canada Veterinary Association was held in Ottawa on February 7th. The following officers were elected: Honorary president, Dr. F. Torrance, Veterinary Director General; president, Dr. Geo. Hilton, Chief Veterinary Inspector, Department of Agriculture, Ottawa; secretary-treasurer, Dr. A. B. Wickware, Ottawa.

ONTARIO MILK AND CREAM PRODUCERS' ASSOCIATION

An organization known as the Ontario Milk and Cream Producers' Association has been formed with the following officers: President, E. H. Stonehouse, Weston, Ont.; secretary-treasurer, Manning W. Doherty, Malton, Ont.; executive committee, G. J. Cook, Beachville, Ont.; P. J. Griffin, Freeman, Ont.; H. D. Rice, Welland, Ont.; S. Young, Guelph, Ont.; J. B. Long, Hintonburg, Ont.; T. Shearer, Listowel, Ont.; Andrew Cornish, Wilton Grove, Ont.

The objects of the association are to improve conditions under which milk is produced, to improve marketing methods and to standardize milk and cream as sold as such.

THE ONTARIO PLOUGHMEN'S ASSOCIATION

At its annual meeting held in Toronto on February 4th, the Ontario Ploughmen's Association decided that this year's provincial ploughing match should be held at Ottawa on October 16, 17 and 18. The officers elected were: President, W. C. Barrie, Galt; first vice-president, W. H. Garbutt; treasurer, T. A. Patterson, Agincourt; directors, R. B. Faith, W. R. Grey and T. H. Lennox, all of Ottawa; secretary and managing director, J. Lockie Wilson, Toronto.

THE MONTH'S MEETINGS

March
5-9—Manitoba Winter Fair, Brandon.
5 — " Annual Bull Sale "
7 — " Sale of Sows "in pig" "
13—Spring Cattle Sale, Regina, Sask.
14—Spring Horse Sale, " "
March
26-29—Spring Horse Show and Bull Sale, Calgary, Alta.
April
2-6—Spring Horse Show, Edmonton, Alta

THE MANITOBA DAIRY ASSOCIATION

The 32nd annual convention of the Manitoba Dairy Association was held at Winnipeg, January 31st and February 1st. The Interprovincial Butter Show was held at the same time. The convention was especially largely attended and the butter exhibits attracted a great deal of attention. A noteworthy feature was the attendance of many visitors from other provinces.

Mr. Geo. H. Barr, Chief of the Dairy Division of the Dairy and Cold Storage Branch, Ottawa, gave an address on the keeping of herd records. Regarding the butter industry throughout Canada, he said that the quantity made in 1917 compared with that made in 1916, is as follows: Ontario about 5 per cent less, New Brunswick 13 per cent less, Saskatchewan 2 per cent less, Prince Edward and British Columbia about the same quantity, while Manitoba and Nova Scotia show an increase of 13 per cent.

"The Grading of Cream for Butter Making", was dealt with by Mr. C. Marker, Dairy Commissioner for Alberta. The pasteurization of cream was advocated by several creamery representatives and a resolution was passed recommending that grade certificates be issued on butter made from properly pasteurized cream only, and that a special score card be issued to the creameries on butter made from raw or improperly pasteurized cream, the card to state that the score does not indicate the quality of the butter beyond date of manufacture.

Another resolution endorsed the policy advocated by Mr. Geo. H. Barr, relative to the keeping of herd records and cow testing, and further recommending aggressive action in this direction.

A DOMINION-WIDE ASSOCIATION

A third resolution was one favouring a Dominion-wide dairy association, and, at the close of the convention, a meeting of representatives of dairy industries from the three prairie provinces was held, and a resolution unanimously adopted to appoint two members from each of the provinces and from British Columbia, to state the objects and to draft by-laws and a constitution for an organization consolidating Canadian dairy interests, such by-laws and constitution to conform with the ideas of the dairy commissioners and associations in Eastern and Western Canada. The appointees made at this meeting in accordance with the resolution were as follows:

Manitoba: L. A. Gibson, dairy Commissioner; A. McKay, J. Carruthers, Winnipeg.

Saskatchewan: F. M. Logan, Dairy Commissioner; W. A. Wilson, Regina; O. W. Andreason, Humboldt.

Alberta: C. Marker, Dairy Commissioner; J. B. Thompson, Edmonton; J. W. Carlyle, Calgary.

A permanent secretary is to be appointed who will be able to devote all his time and energy towards the organization of the new association. The above-mentioned delegates will ask for the appointment of similar delegates from the eastern provinces. A conference will next be held and the new organization, it is expected, be brought into being.

THE OFFICERS

The following officers of the Manitoba Dairy Association were elected: President, Alex. McKay, Winnipeg; first vice-president, S. Code, Dauphin; second vice-president, C. Tully, Reaburn; secretary, L. A. Gibson, Provincial Dairy Commissioner, Winnipeg.

SASKATCHEWAN AGRICULTURAL SOCIETIES

The annual convention of the Agricultural Societies of Saskatchewan was held at Saskatoon on January 8th to 12th. During the year three new societies were organized, bringing the total up to 121. The societies held 13 spring stallion shows, 50 ploughing matches, 2 good farm competitions, 133 exhibitions, 23 standing crop competitions, 52 seed fairs, 17 poultry shows, 60 short courses. The total membership for the province amounts to 17,934. The minimum age for members has been reduced from 18 years to 12 years. Mr. E. S. Greenway, B.S.A., was appointed Director.

SASKATCHEWAN POULTRY BREEDERS' ASSOCIATION

At a meeting of poultry breeders of Saskatchewan, held at Moose Jaw on February 8th, to reorganize the Saskatchewan Poultry Breeders' Association, an entirely new constitution was adopted, giving voting power on certain questions to individual representatives from each affiliated association. A resolution was passed asking the Minister of Agriculture for the province to call a meeting of representatives of every association, with a view of bringing together the two factions that at present exist. Resolutions were also passed asking the Provincial Government to purchase 2000 coops with drinking cups to be placed at the disposal of poultry shows; asking the Department of Agriculture to inaugurate an egg-laying contest; asking the Provincial Government to induce the Department of Education to include a course of study in poultry breeding in the curriculum of both normal and public schools; requesting the Provincial Government to make grants to the different poultry associations to be distributed in prizes at poultry exhibitions, and deciding to petition for the placing of incubators and poultry equipment on the customs free list

UNITED FARM WOMEN OF ALBERTA

At the annual conference of the United Farm Women of Alberta held in Calgary from January 22nd to 25th, Miss Jean Reid, Alix, Alta., was elected honourary president; Mrs. Walter Parlby, Alix, president; Mrs. J. H. Ross, Duhamel, vice-president; Mrs. Leona Barrett, Calgary, secretary.

ALBERTA PROVINCIAL POULTRY ASSOCIATION

The annual meeting of the Alberta Provincial Poultry Association was held at Calgary on December 12th. After debating the question of moving the Provincial Poultry Show from time to time, it was decided that it should be held at Calgary during the next five years. It was decided to publish a directory of poultry breeders in the province. The following officers were elected: President, C. M. Baker, Calgary; first vice-president, A. E. Humphrey, Lethbridge; second vice-president, W. A. Moore, Medicine Hat; secretary-treasurer, P. J. Timms, Calgary.

PRINCE EDWARD ISLAND EGG AND POULTRY ASSOCIATION

THE reports presented at the fourth annual meeting of the Prince Edward Island Egg and Poultry Association held at Charlottetown, January 13, 14 and 15, proved exceptionally satisfactory. The receipts for 1917, according to the report of the secretary, totalled 939,654 dozens, exceeding those of 1916 by 127,059 dozens. The average price per dozen last year was 7.21 cents higher than in 1916. The average price per dozen in 1916 was $25.35 and $32.56 in 1917. The association shows a net gain in membership of 329. A new act of incorporation went into force during the year. All circles are now corporate bodies and all the members are registered under the Act. The advantages of the recently introduced system is seen in the fact that while in 1916, 288 members were reported as not in good standing, last year only nine were so reported. The new regulation provides for a capital fund to be distributed annually on a pro rata basis among the members. The first payment on this account was made on December 17th and amounted to $18,498.32.

A poultry improvement scheme has been adopted and as a result, an importation of funds derived under THE AGRICULTURAL INSTRUCTION ACT. An importation of utility breeding stock is being distributed among the farmers of the Island. The importation was selected from among the best flocks of Eastern Canada. The secretary's report also referred appreciatively to the assistance rendered by the Dominion Live Stock Branch, the Provincial Department of Agriculture, and the federal Experimental Station. Among the resolutions adopted were one appointing a committee to select a shorter name for the association, and another approving the revision of the association's charter in order to add selling and handling seed grains and other farm products to the activities of the association. The following officers were elected: President, Rev. P. P. Arsenault, Mount Carmel; first vice-president, Edward Bulpitt, Cardigan; second vice-president, J. B. Millman, Long River; third vice-president, Albert Schurman, Central Bedeque; secretary-treasurer, W. J. Kerr, B.S.A., Charlottetown.

NEW PUBLICATIONS

THE DOMINION DEPARTMENT OF AGRICULTURE

The Agricultural Instruction Act. A 36-page bulletin has been published giving in brief summary form details of the uses to which the funds granted under THE AGRICULTURAL INSTRUCTION ACT have been put in the different provinces since the enactment of the measure. The work done under the Agricultural Aid Act, passed in 1912, is briefly referred to. Relative to THE AGRICULTURAL INSTRUCTION ACT, full particulars covering the four years extending from 1913 to 1917, during which $3,400,000 has been divided between the nine provinces, are specifically set forth. The bulletin opens with a summary of the work designed to be performed under the Act, and from thence proceeds to deal in concise form with the different objects to which the funds have been applied by all the provinces. A cursory view of the bulletin will show that there is not one line of agriculture to which some portion of the funds has not been put.

THE DIVISION OF CHEMISTRY

Fertilizer Economy in War-Time. Special Circular, No. 14, of the Division of Chemistry, is a four-page leaflet bearing the foregoing heading. It contains well put, and tersely put, advice from B. Leslie Emslie, F.C.S., Supervisor of Investigational Work with Fertilizers, on the use, value, and constituents of commercial fertilizers.

THE PROVINCIAL DEPARTMENTS OF AGRICULTURE

NOVA SCOTIA

Food Production Bulletins.—Three bulletins having for their object the encouragement of increased food products have been issued by the Nova Scotia Department of Agriculture. The first of these bulletins is on "Seed Growing in Nova Scotia" and has for its authors, Professor M. Cumming, Secretary for Agriculture, and Mr. S. J. Moore, Dominion Seed Inspector. The second is on "Bean Growing", and was written by Professor P. J. Shaw, Horticulturist at the College of Agriculture, Truro, and contains an appendix on "Cooking Beans", by Miss Jennie A. Fraser, Superintendent of Women's Institutes for the Province. The third has for its subject, "Greater Labour Efficiency on the Farms of Nova Scotia, by using bigger implements", Professor J. M. Trueman of the Agricultural College being the author. In this bulletin, the announcement is made by the Secretary for Agriculture that his Department will pay 25% of the cost of two furrow ploughs bought in the Province of Nova Scotia between the present and the first day of May next.

QUEBEC

The Report of the Minister of Agriculture for the year ending June 30th 1917, recently issued, is a plentifully illustrated volume of 228 pages. It contains reports of all the demonstrations and activities of the various branches of the Department for the year.

The Breeders' Guide of the Province of Quebec, 1918, is a 36-page bulletin, printed in both French and English. It contains, besides classified lists of all the breeders in the province with the number of animals owned by each of them, a blank register of mating form, an appeal for greater production, and information on common topics.

Pure Maple Sugar and Syrup.—The proceedings at the 5th annual meeting of the Pure Maple Sugar and Syrup Co-operative Agricultural Association held at Victoriaville, Que., January 23 and 24, 1917, has been issued in book form in both French and English. It contains a full list of the members and gives many interesting details of the industry.

How to Increase the Production of Pork, by Jos. Pasquet, Professor of Zootechny, Ste. Anne's Agricultural School. This is bulletin No. 51 of the Department of Agriculture and is an appeal to farmers to produce more hogs. It points out the reasons for doing so and supplies details in connection with the work.

ONTARIO

Co-operative Wool Sales, An appendix to the annual report of the Live Stock Branch for 1917 of Ontario, gives full statistical reports of co-operative wool sales according to counties. It also contains full descriptions of the requirements in the different breeds of sheep and much information regarding housing and feeding.

MANITOBA

Numbers 20 and 21 of the Extension Bulletins issued in the Manitoba Farmers' Library series by the provincial agricultural college, deals respectively with "Cheese-Making on the Farm" and "Better Farm Houses". The former is by I. Villeneuve, Inspector of Cheese-Making, and the latter by L. J. Smith, B.S., Professor of Agricultural Engineering. Each makes a bulletin of twenty pages and is plentifully illustrated with photo pictures and diagrams.

SASKATCHEWAN

Department of Agriculture.—The 12th annual report for the twelve months ending April 30, 1917, makes a book of 320 pages, and covers all the activities of the Department, with plentiful statistics and portraits of former officers of the department who have made the supreme sacrifice in the war.

MISCELLANEOUS

The Clydesdale Stud Book of Canada, Volume 25, has just been issued covering the registrations of Clydesdale stallions from 17,420 to 18,572, and of mares from 35,690 to 37,743. The minutes of the thirtieth annual meeting, lists of awards at exhibitions, the constitution and rules of entry, and much other relative details are given. A portrait of the late John Bright, Live Stock Commissioner, forms a frontispiece.

High School Boys' and Girls' Work in Food Production in 1917 is the subject of Circular No. 8, of the Organization of Resources Committee for the Province of Ontario. It consists of 20 pages, and, besides an appeal for further effort, and a brief review of last year's work, contains the four essays that won the provincial prizes on "How can the Ontario High School Boy by Working on a Farm this Summer help Himself, the Farmer, the Empire". A list of winners of prizes in every district is given by counties.

Canadian National Live Stock Records. The thirteenth annual report of the Record Committee to the Record Board and Record Associations, with the kindred facts that usually accompany its publication, makes a book of 86 pages. It contains lists of officers of all the affiliated breeders' societies, with the financial statement to December 31st, 1917, of each society. New features are tables of the pure-bred animals owned in each of the three Prairie Provinces showing a marvellous increase in the last six years, and a couple of pages of information regarding the importation and transportation of pure-breds. The customs, quarantine and health of animals regulations for both Canada and the United States are also given.

A little book of 32 pages published by Wm. Briggs, Toronto, under the title of "A Career of Eminent Service in Education and Agriculture", gives a sketch of the life of James Mills, M.A., LL.D., now in his 78th year, and for a quarter of a century President of the Ontario Agricultural College. The Doctor's life is briefly traced from the time when he was the eldest of ten children, and worked on his father's farm in the county of Simcoe, and at the age of twenty lost his right arm in a threshing machine. A year later he entered the local public school and received his first lesson in English grammar.

NOTES

The State of Minnesota has 3,000 farmers' co-operative enterprises, 450 of which are live stock shipping associations.

Mr. F. A. Dixon, M.A., a Nova Scotia school inspector, recommends the formation of pupils' production clubs under such names as corn clubs, canning clubs and pig clubs, such as are operated in parts of Canada and the United States.

Fully fifty per cent of the members of the Boys' and Girls' Club at Dauphin, Man., are foreigners, either by birth or descent. The Secretary is a Ruthenian. A Polish boy brought his pigs sixteen miles to the annual school fair.

In the inspectoral district covering the county of Carleton and parts of Victoria and York, New Brunswick, Arbour Day was observed in 1916 in one hundred and twenty-nine districts. One hundred and fifty-seven trees and sixty-two shrubs and two hundred and forty-four flower beds were planted.

Amos O'Blenes, M.A., School Inspector, Moncton, N.B., in his report to the Superintendent of Education states that all new school sites chosen during 1916 consisted of an acre of land, and that several old sites have been enlarged to this area. The enlarged area is to provide space for school gardens.

Professor M. C. Herner, of the Manitoba Agricultural College, during the latter part of January, conducted a short course on poultry raising before the students of the Saskatchewan Agricultural College at Saskatoon. He also addressed the Saskatoon Poultry Association and set forth a series of rules for back-yard poultry raising.

A Farmers' Co-operative Association has been organized in Dundas county, Ontario, under the direction of Mr. E. P. Bradt, District Representative. The association has adopted the individual note system for securing credit, each member signing a promissory note for twenty-five dollars, which is held at the bank as security.

Mr. W. T. Ritch, an Australian wool specialist engaged by the wool growers of the United States, delivered a series of lectures between February 11th to 18th at various places in Alberta. Three lectures were given on each occasion, the first on "Classification of Wool", the second on "Production of Wool", and the third on "Preparation and Marketing of Wool".

The Dundas district Holstein Breeders' Club have decided to purchase a bull on the co-operative plan. It was estimated at a meeting of the club that the bull would cost between $10,000 and $15,000. It was decided that shares should be put at $100 each, each share entitling a man to breed his cow at a club rate service of $20. No breeder was to be allowed to breed more than 10 cows. The service fee to non-members was to be $200. Four members at the meeting offered the club enough to make up more than one-half of the $15,000. All fees collected will be placed to the credit of the club, and utilized to pay for the bull.

At a gathering of the Welland County Board of Agriculture a resolution was passed appreciating the efforts of the Provincial Department of Agriculture to induce the farmers of Ontario to increase the production of pork, and promising aid to the younger farmers of the county by offering to advance two-thirds of the value of any pure-bred breeding sow that any boy or girl might purchase for the express purpose of breeding, the purchaser to agree to pay to the Treasurer of the Board of Agriculture of the County of Welland on or before January 1st, 1919, the whole of the sum advanced, with 3% interest. The offer was to be open until March 1st.

Mr. J. W. Stark, District Representative for Peel county, reports that in connection with the "Keep a Pig" contest, that he started in the Peel rural schools, seventy-five extra sows have been promised. Regarding the short course, which was held from January 8th to February 1st at Ebenezer, Mr. Stark writes: "In my experience with short course students, I have yet to meet or to hear of a young man who was sorry he took four weeks off to be a member of the agricultural class, but I have had dozens of men come to me and say, 'I would give almost anything to have known beforehand how much that course would have really done for me, and to have again that opportunity to attend that I let slip by.'"

Mr. R. H. Clemens, District Representative for Wellington county, put a couple of readers in the local papers at Arthur, where he has his headquarters, and from them twenty-seven young farmers between the ages of 15 and 23 were induced to give in their entries for the short course conducted by Mr. Clemens. There are 13 local papers in Wellington county, and a reader is sent to each of these newspapers every week. These deal as nearly as possible with current agricultural matters. For instance, says, Mr. Clemens, "When the hog campaign was going strong, we wrote on the production of more pork. When school fairs were being conducted, we wrote articles on school fairs." In short, he tried to make the contributions seasonable.

The Port Arthur Garden Club by its vacant lot activities last year raised products to the value of $26,527.50. These included 6,600 bags of potatoes sold at $1.50 a bag; 1,100 bags turnips at $1.00 a bag: 1,100 bags of carrots at $1.50 a bag; 1,500 bags of beets at $1.50 a bag; 49,500 pounds of cabbage at 3c. a lb.; 5,400 lbs. onions at 5c. a lb.; 1,100 bushels of peas at $1.50 a bushel; 550 bushels of beans at $2.00 a bushel; 5,500 cucumbers at 3c. each; 11,000 heads of cauliflower at 10c. a head; 27,500 bunches of celery at 5c. a bunch; 11,000 bunches of parsley at 5c. a bunch; 550 bushels of tomatoes at $1.25 a bushel; 5,000 doz. bunches of lettuce at 30c. a dozen; 250 marrows at 20c. a piece; 200 squash at 20c. a piece; 3,000 doz. bunches of radishes at 30c. a dozen.

A table in the report of the board of the Canadian National Live Stock Records for the year 1917 furnishes statistics of the number of pure-bred animals in the three Prairie Provinces at the end of 1916. It also gives the totals of each breed in 1911, in which year there were 13,074 pure bred horses against 25,213 in 1916; 25,876 cattle compared with 49,115 in 1916; 3,290 sheep, compared with 11 396 in 1916, and 13.006 swine against 32,043 in the latter year. Clydesdales show an increase in the five years of 6,851 and Percherons of 2,003. In cattle, Aberdeen Angus show an increase of 1,881; Ayrshires of 1,109; Herefords of 3,611; Holsteins of 4,358; Jerseys of 555, and Shorthorns of 10,473. In sheep, Lincolns show an increase of 630; Oxfords of 2,153; and Shropshires of 2,445. In swine, Duroc Jerseys show an increase from 257 in 1911 to 7,068 in 1916; Berkshires from 4,684 to 13,152: Poland China from 453 to 2,135, and Tamworth from 568 to 1,163. Yorkshires were nearly stationary, totalling 6,140 in 1911 and 6,406 in 1916.

INDEX TO PERIODICAL LITERATURE

The Canadian Countryman, Toronto, Jan. 26, 1918.

The Good Layer is Usually a Hustler, Professor W. R. Graham, Poultry Department, Ontario Agricultural College, Guelph, page 100.

Feb. 2—Possibilities for Canadian Sheep Raising—Greatest Increase from Flocks on Mixed Farms, T. Reg. Arkell, Chief, Sheep and Goat Division, Ottawa, page 130.

Can Pear Blight be Controlled? L. Caesar, Ontario Provincial Entomologist, page 131.

Succulent Feeds for Beef and Dairy Cattle, E. S. Archibald, Dominion Animal Husbandman, Ottawa, page 132.

Feb. 9—Capital—What it Means in Co-operation, F. C. Hart, Director, Co-operation and Markets Branch, Toronto, page 163.

The Agricultural Journal, Victoria, B.C., January, 1918.

Increased Production of Hogs for 1918 G. H. Hutton, president, Canadian Swine Breeders' Association, page 218.

A Means Whereby Depleted Soil may be Brought into a High State of Cultivation, G. E. Parham, Superintendent, Experimental Station, Invermere, B.C. page 220.

Electrification of Milk, Electrified Milk will Preserve Human Life, T. A. F. Wiancko, Provincial Dairy Instructor, page 223.

The Canadian Thresherman & Farmer, Winnipeg, Man., Jan., 1918.

Modern House Plan, Professor L. J. Smith, Department of Agricultural Engineering, Manitoba Agricultural College, Winnipeg, Plan "E", page 31.

Farm & Ranch Review, Calgary, Alta., Jan. 21, 1918.

Sheep in Alberta in 1917, Jas. McCaig, Department of Agriculture, Edmonton. page 55.

Feb. 5—Farm Flocks in War Time, M. C. Herner, Professor of Poultry Husbandry, Manitoba Agricultural College, page 135.

Farm & Dairy and Rural Home, Peterboro, Ont., Jan. 24, 1918.

Some Practical Suggestions on the Production of Spring Wheat—Selection of Seed and Dates of Seeding, by Dr. C. A. Zavitz at theExperimental Union Convention, page 61.

Suggestions on the Production of Butter and Cheese in 1918, H. H. Dean, Ontario Agricultural College, Guelph, page 59.

Jan. 31—Making the Most of the Labour at Hand, J. H. Grisdale, Director, Dominion Experimental Farms, page 81.

Feb. 7—War Time Poultry Problems, Professor W. R. Graham, Ontario Agricultural College, page 102.

Grain Growers' Guide, Winnipeg, Man., Jan. 23, 1918.

Live Stock Trade in 1917, D. M. Johnson, Representative of the Dominion Department of Agriculture in the Union Stockyards, Winnipeg, page 9.

The Farm Shelter Belt, Norman M. Ross, Chief of Tree Planting Division, Indian Head, Sask., page 237.

The Maritime Farmer, Sussex, N.B., Jan. 22, 1918.

Common Ailments & Diseases of Dairy Cattle, F. Torrance, Veterinary Director General, page 221.

Feb. 5—Apple Spraying, G. E. Sanders, Field Officer in charge Dominion Entomological Laboratory, Annapolis Royal, N.S., page 249.

The Monetary Times, Toronto, Feb. 8, 1918.

How Canada will take Production Census, R. H. Coats, Dominion Statistician and Controller of Census, page 5.

Nor-West Farmer, Winnipeg, Man., Feb. 5, 1918.

Why a Price Cannot be Fixed for Hogs, W. F. Stevens, Live Stock Commissioner for Alberta, page 144.

Farmers' Advocate, Winnipeg, Man., Feb. 6, 1918.

Work Done and Work to Do, L. A. Gibson, Dairy Commissioner for Manitoba, page 185.

PART V

The International Institute of Agriculture

T. K. Doherty, LL.B., Commissioner

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty International Institute Commissioner, Department of Agriculture, West Block, Ottawa

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

791—**Studies on the Digestibility of some Vegetable and Animal Fats.**—LANGWORTHY, C. F., and HOLMES, A. D., in *United States Department of Agriculture, Bulletins* Nos. 505 and 507, each 19 pp. Washington, D.C., Feb. 13 and March 24, 1917.

In these experiments the trials of vegetable and animal fats were conducted with the same methods, so that the results are directly comparable. A basal ration (supplying a minimum of fat) composed of wheat biscuits, oranges, sugar, and tea or coffee, was supplemented by a blanc mange or corn starch pudding, in which were incorporated the fats under investigation.

As regards the vegetable fats, the authors conclude that olive, cottonseed, peanut, cocoanut, and sesame oils are very completely and readily available to the body, and may be satisfactorily used for food purposes. The animal fats investigated were also well assimilated, and shown to be satisfactory sources of food, butter fat being particularly valuable.

CROPS AND CULTIVATION

795—**The Influence of Soil Conditions on the Decomposition of Organic Matter in the Soil.**—RUSSELL, E. J., and APPLEYARD, A. (Rothamsted Experimental Station), in *The Journal of Agricultural Science*, Vol. VIII., Part 3, pp. 385-417. Cambridge, June, 1917.

796—**Irrigation in Various States and Colonies.**—BORGHESANI, G. A. R., *Commissione Reale par studi e proposte relative ad opere d'irrigazione, seconda Relazione presentata al Parlamento del Presidente Onorevole Girolamo Giusso, Senatore*, Part 3, pp. I.-VII. Bergamo, 1916. (2 pp. in Institute Bulletin.)

This monograph is a study on irrigation in various countries, especially in arid and semi-arid districts.

In conclusion, the following principles for the irrigation of arid zones in general are given:—

1. The utilization of superficial, sub-soil, and deep waters by all the means in the power of modern technology.

2. Technical State assistance in the utilization of the various water reserves suitable for irrigation.

3. Financial State aid for irrigation work if private capital cannot find immediate interest.

4. An appropriate distribution of the reserve waters suitable for domestic, agricultural and industrial uses, so that its use for the last purpose shall not be detrimental to the other two more important ones.

5. Technical assistance given to those engaged in irrigation farming, so that they may make the most economical use of the water at their disposal.

6. The institution of homesteads for those engaged in irrigation farming, as this is the only method which will allow the maximum economical utilization of the water.

7. The recongition, with the requisite support, of all irrigation works and enterprises which have been declared by competent technical bodies to be of public utility.

An appendix gives a bibliography of 643 works.

797—**The Fixation of Nitrogen in Faeces.**—RICHARDS, E. H., (Rothamsted Experimental Station), in *The Journal of Agricultural Science*, Vol. VIII, Part 3, pp. 299-311. Cambridge, June, 1917.

799—**The Solubility of Calcium Phosphates in Citric Acid.**—RAMSAY, A. A. (Chemical Laboratory, Department of Agriculture, Sydney, N.S.W.), in *The Journal of Agricultural Science*, Vol. VIII., Part 3, pp. 277-298. Cambridge, June, 1917.

800—**The Resistance of Wheat to Cold in Relation to its Sugar Content; Investigation carried out in Sweden.**—AKERMAN A., and JOHANSSON, H., in *Sveriges Utsadeforenings Tidskrift*, Year 27, Pt. 2, pp. 77-83. Molmoe, 1917. (2 pp. in Institute Bulletin.)

During the last 10 years it has been proved that the resistance of plants to low temperatures is due, in part at least, to the presence of sugars (saccharose, glucose, mannite, etc.) in the cell sap. With regard to the Gramineae, GASSNER and GRIMMER have observed that the water extract of autumn cereal seedlings gives a much stronger reaction with Fehling's solution than the water extract of spring cereals treated with the same reagent.

The experiments described were undertaken to determine whether the various degrees of resistance to cold of the principal Swedish wheats really are due to a more or less strong concentration of the sugars in solution. Three series of experiments were made, of which the analytical results are given in the article in the Institute Bulletin.

801—**Temperature and Life Duration of Seeds; Experiments made in the United States.**—GROVES, JAMES FREDERICK (Contribution from the Hull Botanical Laboratory 226), in *The Botanical Gazette*, Volume LXIII, No. 3, pp. 169-189. Chicago, Illinois, March, 1917. (2 pp. in Institute Bulletin.)

In the appendix there is a bibliography giving 33 publications mentioned in the text of the article.

A study of the effect of high temperatures (from 50° to 100° C.) upon the life duration of seeds of wheat (Turkey-red variety) with a somewhat low moisture content (9%—12%—17.5%).

802—**The Influence of Light on the Germination of the Seeds of the Different Varieties of Nicotiana Tabacum.**—HONING, J. A., in *Bulletin van het Deli Proefstation*, No. 7, pp. 1-14. Medan, December, 1916.

803—**The Influence of Mineral Matter on the Germination of Peas.**—MAQUENNE, L., and DEMOUSSY, E., in *Comptes rendus des Séances de l'Académie des Sciences*, Vol. 165, No. 2, pp. 45-51. Paris, July 9, 1917. (2 pp. in Institute Bulletin.)

805—**The Fertilization of Gramineae and Leguminosae in Relation to Selection.**—FRANDSEN, N. H., in *Zeitschrift fur Pflanzenzuchtung*, Vol. V., Pt. 1, pp. 1-30. Berlin, March, 1917. (2 pp. in Institute Bulletin.)

806—**Selection of Spring Wheat in Sweden.**—NILSSON-EHLE, H., in *Sveriges Utsadeforenings Tidskrift*, Year 28, Pt. 2, pp. 51-76. Malmoe, 1917. (3 pp. in Institute Bulletin.)

Until recent years it was thought that there existed a negative correlation between earliness and yield, the one diminishing as the other increased. Results obtained lately with winter wheats show that these two characters develop, and are transmitted, independently of each other, at least up to a certain point.

In the northern climates, especially in Scandinavia, it is important to have wheats which combine the two characters, "earliness" and "productivity." The selection and hybridisation experiments carried out at the Svalof Station (Sweden) and at its branches, aimed at creating types of spring wheat which should be both very early and very productive. In the article in the Institute Bulletin, the results of experiments from 1911 to 1917 are given. One variety, "Svalofs Extra Kolben," has been found highly valuable from every point of view.

807—**Hybridization Tests between Spelt and Wheat in Holland.**—GMELIN, H. MAYER, in *Cultura*, Year 29, No. 345, pp. 140-158. Wageningen, May, 1917. (3 pp. in Institute Bulletin.)

808—**Experiments in Hybridizing Wheat and Rye in the United States.**—I. LEIGHTY, C. E., Carman's Wheat-Rye Hybrids, in *The Journal of Heredity*, Vol. VII, No. 9, pp. 420-427. Washington, September, 1916.—II. MCFADDEN, EDGARD A., Wheat-Rye Hybrids, *Ibid.*, Vol. VIII, No. 7, pp. 335-336. Washington, July, 1917. (2 pp. in Institute Bulletin.)

810—**Experiments with Small Grains (Wheat, Barley, and Oats) Under Irri-**

gation in Idaho, United States.—WELCH, J. S., in *University of Idaho Agricultural Experiment Station, Gooding Sub-Station, Bulletin* 93, 24 pp. Moscow, Idaho, January, 1917.

In 1909, the Office of Irrigation Investigations of the United States Department of Agriculture and the Idaho Experiment Station established the Gooding Sub-Station for experimental work in the irrigation of farm crops. The Station is a tract of 40 acres located 2 miles south of the town of Gooding on the great Snake river plains at an elevation of approximately 3,600 feet. The Bulletin analysed is based upon the results of experiments conducted at this Station during the years 1909 to 1916 inclusive. The writer gives the following summary:—

The small grain crops are of great importance on the irrigated farms of Idaho.

Wheat.—Of all the spring varieties, the soft white ones are best adapted for growth under irrigation. Dicklow is the leading variety grown under irrigation at this time. For average irrigation conditions, the durum wheats are not recommended.

In the irrigation of spring wheat, water can be used most efficiently in the early stages of the plants' development. If but one irrigation can be given, it should be applied just before the first jointing stage of growth. If water is withheld till the grain reaches the soft dough stage, it is of no value to the crop. The most satisfactory results were obtained at the Gooding Sub-Station by the application of one irrigation just before the first jointing stage and another between the first jointing and the blooming stage. In the growth of spring wheat, it is not advisable to apply a total of more than one and one-fourth acre-feet of water per acre.

Winter wheats can be grown to advantage on irrigated lands; perhaps to best advantage in those sections where irrigation water is not plentiful. On the station farm the best varieties have proved to be "Jones Fife" and "Turkey Red." In the irrigation of winter wheat, one irrigation of slightly less than three-fourths of an acre-foot of water per acre, given just before heading was found to be sufficient.

Barley. Of the six-rowed type Trebi, Beldi, and Sandrel were the varieties which gave the highest crops under irrigation. The best varieties of the two-rowed type were "Bohemian" and "Horn." Eureka was the best of the hulless type.

For irrigating spring barleys, about 1½ acre-feet of water should be applied per acre. Under normal irrigation winter varieties of barley are not nearly as productive as the spring-sown ones. Winter barley should be irrigated just before the appearance of the ears, and only about ½ acre-foot of water applied per acre.

Oats.—A large number of the varieties of oats are very productive. The best from this point of view are Swedish Select, with 96.6 bushels of grain per acre and 1.63 tons of straw per acre, and Wisconsin Pedigree No. 1, with 96.5 bushels of grain and 1.69 tons of straw per acre. Oats do not require more than 1¾ acre-feet of water per acre.

Tables are given in the article in the Institute Bulletin showing the performance records of irrigated wheats and barleys.

812—Shallu, a Variety of Sorghum, in the Great Plains, United States.—ROTHGEB, BENTON E., in *Farmer's Bulletin* 827, *United States Department of Agriculture*, 8 pp., 5 fig. Washington, D.C., June 1917.

813—Experiments with Irrigated Legume Crops and Grass Pastures.—WELCH, J. S., I. Experiments with Legume Crops under Irrigation, in *University of Idaho Agricultural Experiment Station, Gooding Sub-Station Bulletin* No. 94, 14 pp. Moscow, Idaho, January, 1917; II. The Management of Irrigated Grass Pastures, *Ibid., Bulletin* No. 95, 17 pp., Moscow, Idaho, January, 1917.

I. The legume crops are among the most important for the irrigated lands of Southern Idaho. The principal leguminous plants grown are: lucerne and clovers, upon which an extensive and growing live stock industry is based; clover seed, peas and beans (field peas are used in pork production). The use of all these crops in upbuilding and maintaining the fertility of the soil of this region has become one of the first principles of agricultural practice in the State. The work which has been conducted at the Gooding Sub-Station with the legume crops has consisted of the testing and comparison of varieties, experiments upon various phases of irrigation practice, and the seeding and cultural management of the most important of these crops. In the irrigation experiments, all water, both on-flow and run-off was carefully measured, all waste water being deducted from the amount supplied.

LUCERNE. *Varieties.*—During the season of 1910, 11 varieties of lucerne were grown. Very irregular stands were secured, and therefore no data were obtained on the relative yields of the different varieties. The "common" lucerne, which is by far the most extensively grown in Idaho, usually consists of several varieties or strains.

Seeding.—Under ordinary conditions, it was found by experiments that the best results came from sowing 12 pounds per acre. Heavier seedings produced thicker stands, while the seedlings were shorter and less coarse, and came into bloom on an average 3 days later than those grown from the lighter seedings. Only 2 cuttings were

taken; a better quality of hay was produced by the 12, 16 and 20 pound seedings than by the 4 and 8 pound seedings. Under ordinary conditions, with a properly prepared seed bed and a sufficient moisture supply, it is waste of seed to use more than 12 pounds per acre. The best results were secured by sowing lucerne with a drill.

Irrigation.—During the seasons of 1910 and 1912, experiments were made with a view of comparing the relative value of the corrugation and the flooding methods for the early irrigation of lucerne. On the plots that were irrigated by the corrugation method the furrows were 30 inches apart. The sowing was done on relatively dry soil and irrigated afterwards. Observations made on this test indicate clearly the superiority of the corrugation method of starting lucerne, as it prevents soil-baking, but later it shows little advantage over the flooding method. On sandy soils and steeper slopes, however, the former system may still be valuable to prevent washing, and to aid in an even distribution of the irrigation water.

The results of this work show that comparatively deep irrigations should be used for lucerne. Under conditions similar to those prevailing at Gooding, the lucerne should receive from ½ to ¾ acre-feet per acre in order to secure 3 crops of hay per season. This amount of water can be applied best in 7 or 8 irrigations. More water than the quantity indicated may produce a little more hay, but the increased yield will not justify the extra expense involved.

Seed production.—In general, much less water is required to produce lucerne seed than lucerne hay. The best results are obtained by light frequent applications of water, because they tend to maintain a uniform soil moisture content. The best crop was obtained from rows 35 in. apart.

CLOVERS.—Common red clover is the kind most grown. As regards irrigation, the same system is adopted for clover hay production as for lucerne hay. When grown for seed it is advisable to clip the first growth late in May and afterwards to apply light irrigations. Red clover is an especially valuable crop for use in building up the fertility of new lands.

Alsike and white clover are particularly valuable in pasture mixtures. When grown for seed, the first growth should be allowed to mature the seed crop.

PEAS.—The conditions prevailing in South Idaho favour the production of field peas; the best varieties are: Amraoti, Blue Prussian, Kaiser, and Bangalia. The seeds should be sown at the rate of 90 to 100 pounds per acre. Early sowing is advisable. Under normal conditions, two irrigations give the best results. When mixed with oats, they make a satisfactory hay crop. They are extensively and profitably used in economical pork production in Idaho.

VETCHES.—*Vicia villosa*, or hairy vetch, is the most productive of the vetches. When grown with oats, it produces a heavy yield of excellent hay. The second growth can be used profitably as a green manure.

FIELD BEANS.—Of all the varieties tried, White Navy is the most satisfactory. Horse beans are valuable as a "hogging off" crop, but for this purpose they are not the equal of field peas.

The climatic conditions which prevail over many irrigated sections of south Idaho do not favour the production of soy beans and cow peas (*Vigna Catjang* or *Vigna sinensis*).

II.—During the last few years the interest in irrigated grass pastures has much increased in southern Idaho, where the conditions are well adapted to grass production. Of all the different grasses tested at the Gooding Experiment Station, the best varieties are: Orchard grass (*Dactylis glomerata*), Smooth Brome grass (*Bromus secalinus*), Kentucky blus grass (*Poa pratensis*). Meadow Fescue (*Festuca pratensis*), and Timothy. Mixtures give better results than any variety sown alone. Different conditions require different mixtures.

A total of 20 to 24 lb. per acre is sown. Grasses can be sown at any time from early spring to the latter part of July; autumn sowing is not advisable. Broadcasting the different varieties separately is the most satisfactory method of sowing. Sowing should be done on well prepared land, and the seed covered lightly. Under average conditions, a nurse crop should not be used. From planting, until the grass comes up, the seed bed must be kept moist. The corrugation method is the best for the first season's irrigation; afterwards, flooding is very satisfactory. Established pastures should be irrigated about every 12 days, the amount of water applied at the Gooding Sub-Station being about 2.25 acre-feet per season. Pastures can be grazed lightly the latter part of the first season. Grazing tests have shown that one acre of good grass will properly maintain two good dairy cows, or three beef steers, without any extra feed, from the end of April to the latter part of September. On an average, the steers gained in weight 732 pounds of beef per acre in one pasture season.

With regard to sheep, it was found that about seven or eight large ewes of the mutton breeds, with their lambs, can be properly maintained on one acre of irrigated pasture. It is advisable to divide the pasture into two or three parts.

814—**Wild White Clover (Trifolium repens) for Artificial Grass Land; Trials in Different Parts of the United Kingdom.** —*The Journal of the Board of Agriculture,*

Vol. XXIV, No. 4, pp. 424-428. London, July, 1917. (2 pp. in Institute Bulletin.)

815—**The Cultivation of Flax for Fibre in Canada.**—ADAMS, J., in *Dominion of Canada, Department of Agriculture, Dominion Experimental Farms, Division of Botany, Bulletin* No. 28, 23 pp. Ottawa, 1916.

821—**Effect of Sulphuric Acid Sprays on Sugar Beet: Experiments carried out at the Sugar Industry Experiment Station, Prague (Bohemia)**—ANDRLIK, K., in *Zeitschrift fur Zuckerindustrie in Bohmen*, Year 41, Pt. 10, pp. 685-688. Prague, July, 1917.

823—**The Effect of Some Alkaline Salts Upon the Fire-holding Capacity of Tobacco.**—KRAYBILL, HENRY R. (Contributions from the Hull Botanical Laboratory), in *The Botanical Gazette*, Vol. LXIV., No. 1, pp. 42-56. Chicago, Illinois, July, 1917. (2 pp. in Institute Bulletin.)

824—**Variety Tests of Vegetables Carried Out at the Maryland Agricultural Experiment Station, United States.**—WHITE, T. H., in *Maryland Agricultural Experiment Station Bulletin* No. 204, pp. 231-262. College Park, March, 1917. (3 pp. in Institute Bulletin.)

825—**Plum-Growing at the Maryland Agricultural Experiment Station .**—HOLMES, F. S., *The Maryland Agricultural Experiment Station Bulletin* No. 207, pp. 295-326. College Park, May, 1917. (2 pp. in Institue Bulletin).

826—**The Pine Trees of the Rocky Mountain Region.**—SUDWORTH, G. B. (Dendrologist), in *United States Department of griculture Bulletin* No. 460 (Contribution from the Forest Service, Professional Paper), pp. 1-46. Washington, D.C., May 26, 1917.

LIVE STOCK AND BREEDING

828—**Poisoning of Cattle by Ragwort (Senecio Jacobaea L.) in England.**—*The Journal of the Board of Agriculture*, Vol. XXIV, No. 4, pp. 433-436. London, July, 1917.

This note has been prepared by the Chief Veterinary Officer of the Board of Agriculture.

In South Africa, Canada, and New Zealand, much attention has been given to the subject of cattle poisoning by certain species of ragwort. Until the actual cause was discovered, the cases were attributed to a disease which was known under different names (Pictou, Winton, and Molteno disease). It is not generally recognized that the common British ragwort (*Senecio Jacobaea* L.) is poisonous to cattle. This probably arises from the fact that poisoning under natural conditions is a slow process, the action of the poison being cumulative. The actively poisonous agent in the plant seems to be one or more alkaloids which it contains.

In a case recently studied in the Laboratory of the Board of Agriculture, the first symptoms of the poisoning appeared in a herd of cattle 44 days after they had begun to eat dry forage containing much ragwort. The time elapsing between the first appearance of definite symtoms and death varied from a few days up to a month. Some of the animals did not show definite symptoms until twelve days or more after the feeding with ragwort had been discontinued.

The animals suffering from poisoning show signs of nervous disturbance; in some there may be diarrhœa, but usually there is marked constipation. The principal lesions found are inflammation of the mucous membrane of the bowel; small hæmorrhages are present under the above-mentioned membrane and in the pericardium; in acute cases, the liver becomes altered.

There is no cure for the disease, and prevention resolves itself into removing the ragwort from the forage, or eradicating it from the pastures. The latter may be done (1) by pulling up the plant where circumstances permit; (2) by cutting the plants in the flowering season, that is to say, late in July or early in August, if the operation can only be done once; the cut portions of the weed must be gathered up at once and burnt; (3) the ragwort may be cut early in July and again six weeks later: in which case there is no need to gather up the cut portions; (4) by grazing infested land with sheep in the winter and early spring.

There is reason to believe that ragwort is most poisonous during the flowering season, from June to early August. The question of whether flowering ragwort is poisonous to sheep is now being investigated at the Board's Laboratory. Having regard to the experience acquired in practice of grazing sheep on ragwort pastures during the winter and early months of the year, it would seem reasonable to assume that the practice is not attended by bad results. This is, however, still an open question.

830—**Experiments in Controlling Ecto-parasites on Poultry in the United States.** (1).—BISHOPP, F. C., and WOOD, H. P., In *Farmer's Bulletin* 801, *United States Department of Agriculture*, 26 pp. Washington, May, 1917. (2 pp. in Institute Bulletin.)

831—**Experiments to Find a Basal Ration for the Most Economical Feeding of Dairy Cattle under Northwestern Conditions in the United States.**—ELLINGTON, E. V., in *University of Idaho Agricultural Experiment Station, Annual Report Bulletin* No. 92, pp. 16-18. Moscow, Idaho, December, 1916.

The experiments undertaken by the Department of Dairy Husbandry of the Idaho Experiment Station to establish a basal ration for dairy cattle under northwestern conditions have been completed.

It has been found that the following ration can be adapted to the high-producing cow or the low-producing cow, and, moreover, may be adapted to animals of different weights: *Alfalfa hay, one part; corn silage, four parts, grain (consisting of barley, four parts; bran, two parts, linseed oil meal, 1 part), one part.*

To show how closely this ration conforms to the standards established by Armsby, the following data are given:—

900-lb. Cow, Giving 20 lbs. Milk, Testing 4 per cent	Digestible protein	Energy value (calories)
For maintenance	0.46	5.70
To produce 20 lbs. milk	1.00	6.00
	1.46	11.70
Alfalfa hay 7 lbs., silage 28 lbs., and grain 7 lbs., gives ... lbs.	1.45	11.98
900-lb. Cow, Giving 40 lbs. Milk, Testing 4 per cent.		
For maintenance and milk production	2.46	17.70
Alfalfa Hay 10 lbs., silage 40 lbs., grain 10 lbs., gives ... lbs.	2.48	17.98
1500-lb. Cow, Giving 20 lbs. Milk, Testing 4 per cent.		
For maintenance and milk production	1.65	13.90
Alfalfa hay, 8 lbs., silage 32 lbs., grain 8 lbs., gives ... lbs.	1.89	13.69
1500-lb. Cow, Giving 40 lbs. Milk, Testing 4 per cent..		
For maintenance and milk production	2.65	19.90
Alfalfa hay 11 lbs., silage 44 lbs., grain 11 lbs., gives ... lbs.	2.60	18.84

These rations correspond very closely to the rough rule followed by many dairymen, in feeding one pound of grain daily for every pound of butter fat that the animal produces weekly. The complete set of data secured by these experiments will be published in a "Dairy Farm Management" Bulletin of the Idaho Experiment Station.

(1) See also Bulletin of Foreign Agricultural Intelligence, April 1916, No. 1313.

832—**The Mechanical Milker in Dairy-Herd Management in Idaho.**—ELLINGTON, E. V., in *University of Idaho Agricultural Experiment Station, Annual Report Bulletin*, No. 92, pp. 16-18. Moscow, Idaho, December, 1916.

The Department of Dairy Husbandry of the Idaho Experiment Station has continued during the past year the dairy herd management investigations. A considerable portion of the time was spent with the milking machine installed for use on the College herd. Data were compiled to show the economy of milk production and the effect on the health of the herd. Attention is being given to the control of the bacterial content of the milk. It is observed that there was no decrease in production during the first eight months in the lactation period of the individual cows as compared with similar preceding lactation periods of the same cows. It was also observed that with the same amount of labour necessary for handling the University herd when milking by hand, the herd could be milked three times a day, with a resulting average increase in milk flow of 22%. This procedure is probably not practical for the farmer who is milking cows as a side line, but for the man who devotes his entire time to dairying, and who is supplying milk for city markets or cheese factories, this is an important factor in the management of the dairy herd. The effect of the mechanical milker on hard-milking cows is worthy of note. Very frequently cows that are capable of high production are not given the attention they deserve because of difficulty experienced in drawing the milk. It has been noted in the case of one pure-bred Holstein cow in the University herd, Philidea Young De Kol, that with the mechanical milker in 1916, during eight months 11,795 pounds of milk containing 360 pounds of butter fat were produced. In 1915, during a similar period with hand milking, 8001.5 pounds of milk with a fat content of 274 pounds were produced, and during 1914, for a similar period with hand milking, 8,500 pounds of milk, with a fat content of 336 pounds were produced. Machine milking with this class of cattle seems to increase the length of the lactation period, as the average hand milker has a tendency to dry up the cow that he finds difficult to milk.

Close inspection has given each individual animal by the Department of Veterinary Medicine to determine the effect of mechanical milking on the udders. So far no ill effects have been noticed.

Special precautions were taken to keep the machine in perfect repair at all times. The results obtained so far, however, do not warrant an unqualified endorsement of the mechanical milker.

The observations should extend over two consecutive lactation periods.

833—**A Study of Leading Breeds of Sheep with Special Reference to Production Factors in Idaho.**—IDDINGS, E. J., and HICKMAN, C. W., in *University of Idaho Agricultural Experiment Station, Annual Report, Bulletin* No. 92, pp. 4-8. Moscow, Idaho, December, 1916.

834—**Lamb Feeding Experiments (1) in Nebraska.**—GRAMLICH, H. J., in *The University of Nebraska, Bulletin of the Agricultural Experiment Station,* No. 153, pp. 1-26. Lincoln, Neb., October, 1916.

Sheep and Pig Breeding in the Argentine Republic at the Present Day.—MARTINOLE, G., Director of the Zootechnical Institute, University of Buenos Aires, in *International Review of the Science and Practice of Agriculture*, Year VIII, No. 9, pp. 1205-1213. Rome, September, 1917.

Sheep Breeding.—There were 67,211,700 sheep in Argentina in 1908, according to the census of that year, and in 1914 the number was 81,485,100. The native sheep of Argentina, called "pampa" and "criolla,' are descended from animals brought out by the Spaniards. When wool increased in value early in the 19th century, breeders began to improve the native sheep by crossing with Merinos. But when the frozen meat industry started, early maturing mutton breeds, such as Lincolns, were used in crossing. At present, the breeds most in favour are the Lincoln and Romney Marsh.

The article in the Insitute Bulletin contains several tables giving details of the export of mutton and wool. In the period 1911-15, 480,000 live sheep and 12,217,901 frozen sheep were exported. The number of sheep slaughtered in 1914 for home consumption and exportation was 4,519,350. In 1914, 117,270 tons of wool were exported.

Pig Breeding.—Until recent years very little pig breeding was done in Argentina. Lately, great success has been achieved with the Berkshire and Poland China breeds. The exportation of frozen pork is now becoming very important.

835—**Economical Pig Feeding; Experiments made in the United Kingdom.**—*The Journal of the Board of Agriculture*, Vol. XXIV, No. 4, pp. 436-439. London, July, 1917.

836—**Pork Production Experiments on Field Peas in Idaho.**—IDDINGS, E. J., and HICKMANN, C. W., in *University of Idaho Agricultural Experiment Station, Annual Report, Bulletin* No. 92, pp. 6-8. Moscow, Idaho, December, 1916.

(1) See also Agricultural Gazette, September, 1917, No. 65.

837—**Feeding Experiments to Determine the Relative Efficiency of Vegetable and Animal Protein for Egg Production.**—PREN, MOORE, in *University of Idaho Agricultural Experiment Station, Annual Report Bulletin* No. 92, pp. 28-30. Moscow, Idaho, December, 1916.

The realtive value of vegetable and animal protein in the ration of laying hens is a subject that is the cause of much discussion among poultry men. Some experimental work has been done, but the question is still an open one. As a means of securing further information, the following experiment was planned and started on November 1, 1915, by the Department of Poultry Husbandry of the Idaho Experiment Station.

Four pens of twenty-five fowls each were fed with the following rations:—

PEN I

Grain	Mash
10 parts peas,	3 parts bran,
14 parts wheat	3 parts shorts,
6 parts corn,	1 part corn meal,
	1 part wheat meal,
	1 part pea meal,
	6 parts oil meal,
	1 per cent charcoal.

Nutritive ratio 1: 4.2.

PEN II

Grain	Mash
6 parts corn	2 parts bran,
10 parts wheat,	1 part shorts,
	1 part corn meal,
	1 part wheat meal,
	3 parts beef scrap,
	1 per cent charcoal.

Nutritive ratio 1: 4.2.

PEN III

1 part peas,	1 part bran,
5 parts corn,	1 part shorts,
10 parts wheat,	1 part corn meal,
	1 part wheat meal,
	1 part pea meal,
	3 parts oil meal,
	1 per cent charcoal.

Nutritive ratio: 1: 5.5.

PEN IV

6 parts corn,	2 parts bran,
10 parts wheat,	2½ parts shorts,
	1 part corn meal,
	1 part wheat meal,
	1½ parts beef scrap,
	1 per cent charcoal.

Nutritive ratio. 1: 5.5.

The grain was fed in deep litter at the rate of eight quarts a day per one hundred hens, and the mash in open hoppers. The rations were supplemented with green food, grit, shell and bone. In the calculation of nutritive ratios, Idaho analytical data on wheat, bran, and shorts have been used. All other analytical data and digestion co-efficients have been taken from Henry's Feeds and Feeding. The fowls were all trap-nested, and the number and weight of each were recorded. Moreover, the fowls were weighed at the beginning of the experiment on May 1 and again on October 31, 1916, and individual weights recorded. The results of the first year are summarized

in the following table giving the weights of eggs.

Pen	Per cent under 2 oz.	Per cent 2 oz.	Per cent over 2 oz.
I	46.5	52.7	.08
II	15.2	72.7	12.0
III	41.9	56.3	1.8
IV	17.5	79.7	2.9

Pen No II. produced 55.8 per cent more eggs than pen No. I., 51.1 per cent more eggs than Pen No. III, and 35.2 per cent more eggs than pen No. IV.

The condition of health and gain in flesh show about the same percentage as that of egg production and weight of eggs. The difference in production between pens I and III and pens II and IV indicates that animal protein is essential for heavy egg production. In the ration of pen No. II. the beef scrap constitutes 37.5 per cent of the mash; in thet of pen No. IV. it constitutes 18.75 per cent of the mash. The fact that pen No. II produced 35.2 per cent more eggs than pen No. IV suggested the advisability of increasing the pen by one whose mash would contain an intermediate percentage (28%) of beef scrap. This experiment with white Leghorn pullets is planned to extend over a period at least three years.

838—**Goose Raising in the United States.**—LAMON, H. M., and LEE, A. R., in *U. S. Department of Agriculture, Farmer's Bulletin* No. 767, pp. 1-6. Washington, D.C., February, 1917.

839—**On the Factors Governing the Sex of the Eggs of the Honey-Bee.**—MORGENTHALER, OTTO, in *Bulletin de la Société romande d'Apiculture*, Year 14, No. 2, pp. 35-39. Lausanne, 1917.

FARM ENGINEERING

840—**The Benedetti Double Brabant Motor Plough.**—DESSAISAIX, R., in *Journal d'Agriculture pratique*, Year 81, No. 8, p. 145, fig. 2. Paris, April 19, 1917.

841—**Mechanical Methods of Cultivation of Vineyards.**—RINGLEMAN, MAX, in *Bulletin de la Société d'Encouragement pour l'Industrie Nationale*, Vol 127, No. 3, pp. 599-602. Paris, May-June, 1917. 2 pp. in Institute Bulletin.)

842—**Apparatus to Prevent Spontaneous Combustion in Hay Stacks.**—FORDI, ERNST, in *Deutsche Landwirtschaftliche Presse*, Year 44, No. 49, p. 388. Berlin, June 20, 1917. (2 pp. in Institute Bulletin.)

843—**Making Milk Bottles of Paper.**—I. *Scientific American*, Vol. XCVI, No. 11, p. 275, 3 figs. New York, March 17, 1917.—II. *Les Inventions Illustrées*, No. 6, pp. 8-9. Paris, June, 1917.

Doctors and health experts in the United States condemn the glass milk bottle as a pernicious germ-carrier. They are demanding that destructible bottles be used for the distribution of milk for the home, so that they cannot be returned to the dairy to be refilled and sent out another time laden, perhaps, with germs picked up during previous use. Pennsylvania was the first state to proscribe the glass bottle as being a continual menace to the public health.

Some dairies of the progressive type had already begun to employ destructible bottles made of light cardboard coated with paraffin. Milk can be kept in a fresh condition in these paper bottles many hours longer than in the glass bottles, being both air and light tight.

A machine has been invented capable of manufacturing paper milk bottles at the rate of 5000 an hour. It is 90 feet long, and costs over 15,000 dollars. Wood pulp is the raw material employed. The process does not require exclusively high-priced paper pulp; any fibrous wood is said to work equally well. One ton of pulp will produce 60,000 bottles. Owing to the low cost of manufacture, the new paper bottle is said to be cheaper in the long run than the common glass bottles in use at the present time. Only three men are required to work the machine, and from beginning to end the milk bottle is handled only by steel fingers, so that the apparatus meets all sanitary requirements.

The process of manufacture is simple. A steel core is dipped into a tank of raw pulp, and, by means of four clamps, the pulp is pressed round the core into a seamless bottle. During this operation the bottle revolves three times, the clamps pressing at every third of a turn.

The bottle next passes through a powerful drier and over a stencil which prints on it the name of the milk dealer, the capacity of the bottle, etc. It is then removed from the core by a steel hand, and deposited to a belt conveyor which crimps on the bottom and the top. The bottle is then given a paraffin bath that renders it impervious to liquid or acid, and is automatically packed in dust-proof cartons for delivery to the dealer.

The operation is continuous, and it takes about 8 minutes to convert the raw pulp into the completed bottle.

845—**Equipment for Farm Sheep Raising.** —MACWHORTER, V. O., in *United States Department of Agriculture Farmers' Bulletin*, No. 810, 27 pp. Washington, D.C., June, 1917.

The object of this publication is to furnish a practical guide for equipping farms for sheep raising. Owing to the wide differences in climatic conditions it is not possible to suggest a particular type of building for all parts of the United States.

The above bulletin contains numerous plans of buildings, some showing combinations to contain horses, cattle, sheep, etc., others intended for sheep only; at the same time, scope is left for private initiative to choose the building which is best suited to the particular conditions of the farm in question. Equipment for raising sheep is not expensive. In mild latitudes little housing is required, and the main need is for fencing and for pastures of sufficient number and size to allow frequent changing of flocks to fresh ground to insure health. For enclosing sheep pastures and lots, a fence that will exclude dogs should be used. The dog-proof fence should be 57 inches high, the posts 7½ feet long, set 2½ feet in the ground. Close to the ground should be set a tightly stretched barb wire, next to which is a 36 inch woven-wire fence with 4-inch mesh, and above this three strands of barbed wire. Portable hurdles are illustrated and described.

When winters are longer and more severe, buildings and sheds are necessary to furnish protection from storms, though no special provisions are needed for warmth. Dryness, good ventilation and freedom from draught are the first requisites of buildings for sheep.

Convenience in feeding and shepherding must also be held in mind in locating and planning such buildings or sheds. Abundance of light is necessary for the health of the sheep.

One square foot of window for each 20 square feet of floor space is necessary. Small flocks can be cared for in sections of barns having stabling or feed storage for other stock, but with a flock, of say, 100 ewes, separate buildings are desirable. The interior arrangements of these buildings should be such as to require a minimum of labour and the least possible moving of the ewes in doing the feeding and caring for them during the lambing season. Ample yard space that is dry and sheltered should be available adjacent to the main barn or shed.

Level and well drained clay-surfaced floors are satisfactory and economical. Concrete floors for alleys and feed rooms are necessary, but it will seldom be called for in the pens.

Instructions are given for the construction of feed racks, wooden grain troughs, etc.; some fixed, and others with moveable parts or completely portable, and the same with automatic feeding arrangements. The descriptions are accompanied by very clear drawings giving all necessary dimensions.

A list is appended to the bulletin containing references to all the publications of the U.S. Department of Agriculture relating to sheep raising.

AGRICULTURAL INDUSTRIES

849—**Production of Sugar in the United States and Foreign Countries.**—ELLIOT, PERRY, in *U.S. Department of Agriculture Bulletin* No. 473, pp. 70. Washington, D.C., February 12, 1917.

The data presented in this bulletin cover the period from September 1, 1903, when the Brussels Convention came into effect, to the close of the season 1912-1913. The world's production of sugar from beet from cane, the production of the United States, and that of 37 other states and colonies', (1) are examined successively.

I. WORLD'S PRODUCTION.—During the last 20 years the total production of beet and cane sugar throughout the world has nearly doubled, increasing from 11,000,000 tons' in 1893-94 to 20,000,000 tons in 1912-13. The averages of these two periods show an increase of 34% for beet sugar and 40% for cane sugar. The increase in yield of sugar per ton of beets varies from 8 lb. (0.4%) in France to 40 lb. (2%) in Belgium. The number of beet sugar factories has decreased since 1903 in all countries except Russia and the United States. This decrease is due to the increased capacity of those factories which are still working, and to the improvement of the methods employed. The annual output per factory during the 10 years ending 1912-13 was greatest in Hungary, with 17,610 tons, as against 5,312 tons for Austria, and 6,615 for the Empire. For the other countries, this output reached 7,585 tons for the Netherlands, 7,474 for the United States, 6,170 for Germany, 4,947 for Russia, 3,054 for France, and

(1) Hawaii, Porto Rico, Philippine Islands, Cuba, British West Indies, Mexico, Canada, Costa Rica, British Honduras, Argentina, Brazil, Peru, British Guiana, Paraguay, United Kingdom, Germany, Austria, Hungary, Russia, France, Italy, Belgium, Netherlands, Spain, Denmark, Sweden, Roumania, Switzerland, British India, Java, Mauritius, Japan, Formosa, Straits Settlements, Fiji Islands, Australia, Egypt and Natal.

2,765 for Belgium. The total world area over which beet is grown exceeds 6,000,000 acres, with an average production of 1 ton of sugar per acre of beets. As the average yield of sugar per acre of cane is slightly higher than for beets, it may be assumed that about an equal area of cane is harvested, which would give a total of 12,000,000 acres devoted to sugar growing throughout the world. The yield of beet sugar per acre has varied in the different countries from 1,800 to 3,900 lb., while the cane sugar produced per acre varies from 2,000 to more than 9,000 lbs. At Hawaii and Java, the yield per acre of cane sugar is about 40 tons, as against 20 tons for other countries. During the decade 1903-4 to 1912-13, 78.9% of the world's sugar was produced by 11 countries in the following proportions: 14.5% by British India, 13.6% by Germany, 10.3% by Cuba, 8% each by Austria-Hungary, Java, and Russia, 4.7% each by the United States and France, 3% by Hawaii, and 1.5% each by Belgium and the Netherlands. During this period, Germany produced 28.4% of the beet sugar, Austria-Hungary 18.2%, Russia 17.4%, France 9.9%, and the United States 7.3%. British India produced 27.9% of the cane sugar, Cuba 19.7%, Java 15.6%, Hawaii 5.8%, and the United States 3.9%.

The annual exports of sugar during this period were 1,626,000 tons from Cuba, 1,342,000 from Java, 920,000 from Germany, 755,000 from Austria-Hungary, and 482,000 from Hawaii.

The United States imported 2,743,000 tons as compared with 1,843,000 for the United Kingdom, 147,000 for France, 83,000 for the Netherlands, 35,000 for Argentina, and 13,000 for Germany.

The consumption per head was 112.96 lb. in Australia, 85 in the United Kingdom, 77.6 in the United States, 60.6 in Cuba, 38 in Germany, 30.6 in France, 28.1 in Belgium, 26 in Austria-Hungary, 16.7 in British India, and 14.4 in Russia.

II. UNITED STATES' PRODUCTION.—(1) *Beet Sugar.* The 1909 census shows the beet sugar industry to be localized in three groups of states.

Group I.—Arizona, California, Oregon, and Washington.

Group II.—Colorado, Idaho, Kansas, Montana, Nebraska, and Utah.

Group III.—Illinois, Iowa, Michigan, Minnesota, New York, Ohio, and Wisconsin,

Three states in each of these groups (California, Colorado, and Michigan), together produced ¾ of the total sugar beets on an area which, in California, rose from 41,242 acres in 1899 to 83,000 in 1909, from 40,247 acres to 112,232 in Michigan, and from 1,094 acres to 121,698 in Colorado during the same decade. The total area devoted to sugar beets during the five years 1901-1905 was 228,000 acres, during 1906-1910 it was 374,000, and during 1911-1915, 543,000 acres. The yield of beets per acre increased from 7.2 tons in 1899 to 10.7 tons in 1915.

The production of beets thus rose from 794,658 tons in 1899-1900 to 6,462.000 in 1915-16, representing, in this last year, a value of $36,919,000; the average price rose from $4.19 to $5.67 per ton. The value of beets produced per acre rose from $30.16 in 1899 to $54.60 in 1909. In 1909 this value was exceeded by four other crops only: hops, tobacco, sugar cane, and sweet potatoes.

In California, the harvest begins at the end of July and, in the north and central states, at the beginning of October. The average length of the season is 90 days.

The number of factories increased from 30 in 1899 to 73 in 1912, but decreased in 1914 to 60, rising to 67 in 1915. The majority of the factories have a daily slicing capacity of from 350 to 750 tons of beet. Several factories have a daily capacity of 1.000 tons of beets, one a capacity of 2,000, and one a capacity of 4,000 tons. This last factory produces from 400 to 500 tons of sugar daily.

In 1899 the factories planted, on their own land, 17.2% of the area under beets; this figure sank to 11.4% in 1909. In that year, the beets grown in the Pacific Coast group of states had an average sugar content of 18%; those of the Rocky Mountains, 15.1%; and those of the Great Lakes, 16.6%. The capital invested in the beet sugar industry was $20,141,719 in 1899, rising to $129,628,938 in 1909. The quantity of beets used was 794,658 tons in 1899 and 3,965,356 tons in 1909; the sugar produced during these years passed from 81,729 to 501,682 tons, and its value increased from $7,222,581 to $45,937,629.

The annual average production of sugar for the ten years ending 1912-13 was 448,346 tons as against 77,202 tons for the ten years ending 1902-03, an increase of 480.7%.

The fuel (mostly coal) used in 1909 by these factories amounted to 575,731 tons, plus 554,174 barrels of liquid fuel. The total value of the fuel used, including rent of power, was $1,899,468.

(2) *Cane Sugar.*—In 1909, cane sugar was grown in twelve states over an area which increased from 386,986 acres in 1899 to 476,849 in 1909; in 1899, 72%; and in 1909, 69% of this area was in Louisiana. The area under cane in 1909 exceeded the area under beets by 112,765, but the production, of beet sugar exceeded that of cane by 167,543 tons.

During the last five years the production of beet sugar has been approximately double that of cane. In 1909, cane was grown on

(1) The ton used in this article is the short ton of 2,000 lbs.

278,233 farms and beet on 35,682. In Louisiana, two crops of cane are grown from one planting, thus the ploughing and planting of cane occurs only every other year on the same piece of ground. Planting begins in September and ends about the first of March. The crop grown from this planting is called "plant cane," that produced from the preceding year's stubble is called "stubble" or "ratoon" cane, and is inferior to the plant cane.

The average yield per acre of cane increased from 10.9 tons in 1899 to 13.1 tons in 1909, and the average value per ton, $4.89 in 1899, sank to $4.23 in 1909, the value per acre for these two years being $53.08 and $55.40 respectively. Of the total area, 5,276,016 acres, under cultivation in Louisiana in 1909, 30.2% was under maize, 18.1% under cotton, and 6.2% under cane. Of the total value of the crops, 23% was derived from cane, 21.3% from maize, and 22.4% from cotton. Texas produces a small amount of cane sugar, but the cane grown in the other ten states is mostly used for syrup.

Of the 214 cane sugar factories working in 1909, all but ten were in Louisiana; of these, 22 produced syrup only. The average production of cane sugar per factory in 1909 was 1702 tons, as against 8,650 tons per beet sugar factory. In this year, the power of the 214 cane sugar factories was 122,189 horse power, that of 68 beet sugar factories was 57,202.

In 1909, the capital invested in the cane sugar factories was $38,000,000, the expenses $26,000,000, and the value of the products $31,000,000; these figures were $130,000,000, $37,000,000, and $48,000,000 respectively for the beet sugar factories.

There were also, in 1909, 19 sugar refineries in the United States engaged in refining both home-grown and imported cane sugar. They were distributed as follows:—

Louisiana and New York, 5 each; California, Massachusetts, New Jersey, and Pennsylvania, 2 each; Texas, 1. The refineries turned out products valued at $249,000,000. The production of sugar per ton of cane was 152 lb. in 1914 and 135 lb. in 1915.

Whereas the production of beet sugar gradually increased to 862,800 tons in 1915-16, that of cane sugar, after an average production of 350,000 tons for the ten years 1901 to 1911, decreased rapidly to 137,500 tons in 1915-16.

The production of beet sugar was 6 times greater in 1915-16 than that of cane sugar, which it exceeded in the United States for the first time in 1906-07.

(3) *Maple Sugar.*—The United States and Canada are the only countries for which statistics relating to the production of maple sugar are available. The territory of the United States devoted to this industry is in the north-east, and extends from the Atlantic coast to Missouri, and from the Canadian border to North Carolina and Tennessee. The first census taken in 1849, gave the production of maple sugar as 34,253,436 lbs. Since then the production of maple sugar has decreased by more than one-half, while that of syrup has trebled. In 1899, 11,928,770 lbs. of sugar and 2,056,611 gallons of syrup were produced; in 1909, these figures were 14,060,206 lb. and 4,160,418 gallons respectively. Estimating the quantity of sugar in one gallon of syrup to be 8 lb., there was, in 1909, a total production of 46,900,000 lb, of sugar.

There were, in 1909, 87,537 farms making maple sugar or syrup, that is, more than 1% of all the farms in the United States. The number of trees tapped in 1909 was 18,899,533, of which 5,586,000 were in Vermont, 4,949,000 in New York, 3,170,828 in Ohio, and 1,298,000 in Pennsylvania. The value of the sugar and syrup produced in 1909 was $5,177,509, compared with $2,636,711 in 1899, an increase of 96.4%. The average value per farm was $59 in 1909 and $42 in 1899.

IMPORTS AND EXPORTS OF SUGAR IN THE UNITED STATES.—The imports of sugar into the United States are practically all raw. They increased from 1,000,000 tons in 1883 to 2,000,000 tons in 1902, and 3,000,000 tons in 1914. Non contiguous possessions supplied 1,000,000 tons in 1914.

The sugar exports, mostly refined, are sent to the United Kingdom, Central American States, and the West Indies. In 1915, the exports amounted to 275,000, and, for the 12 months ending June 30, 1916, they were 815,076 tons.

The increased production in the United States and its possessions has caused a decrease in imports from abroad; during the last ten years, 1903-1913, this decrease was 46%, as compared with 79% in the preceding decade.

851—**Breadmaking Trials in France by the War Administration.**—BALLAND, in *Comptes Rendus de l'Academie des Sciences*, Vol. 64, No. 19, pp. 712-714. Paris, May 7, 917.

Since early in 1915, the War Administration has been examining measures with the object of finding substitutes for wheat flour for the preparation of army bread.

Their efforts have been directed to barley, maize, rice, manioc, and ground-nut flours. Chestnuts and potatoes have been disregarded, as every trial since Parmentier has shown that these products are useless for breadmaking.

The following is a summary of the trials effected in the furnace of the Laboratory of the Invalides with the assistance of M. Hennequin. The bread was made according to the rules in use in the military bakehouses.

Barley.—The experiments with 5-10-15-20-25-30% of barley flour were very favourable The flavour of the barley is only apparent where it forms more than 10% of the bread. The crumb keeps fresh over a long period.

Maize.—Yellow maize flour: above 5% the crumb acquires a yellow tinge; at 10% the colour is more pronounced, and the specific flavour of the maize becomes evident. Form 15 to 20% the bread works well, but requires more care. The crumb is closer.

Rice.—From 5 to 15%, the results are satisfactory. From 15 to 20%, working becomes more difficult; the crumb is more compact and easily crumbles.

Manioc.—With 5-10-15-20% of flour from Madagascar the work is easier than with rice. The flavour of the bread is not affected.

Ground-nut.—The flour prepared at Marseilles, from cakes whence the oil has been expressed, has a disagreeable leguminous flavour, and was, therefore, slightly roasted before being used. At 5% the flavour of the bread is hardly affected; at 10% a taste of rye; up to 15% bread-making presents no difficulty, but above 10% the dough is blackish and very close, like that of rye bread.

Barley and maize; barley and rice; barley and ground-nut.—The trials with a 15% proportion of these products mixed in equal parts, gave a very acceptable product. The barley attenuates the flavour of the maize, and especially that of ground-nut.

To sum up, the incorporation with wheat flour of barley, rye, maize, rice, and manioc flours may, in cases of necessity, be recommended up to a proportion of 10 to 15%. Barley flour should have the preference.

The bread making is favoured by the use of young yeasts obtained only with fine wheat flour. This is exactly what was recommended by Mège-Mouriès in order to obtain semi-white bread from grey flours.

The dough, just before it is put into the oven, contains 46 to 49% of water; the same proportion is found in the crumb twelve hours after the loaves have been removed from the oven. In the crust and in whole loaves the water content was the same as in ordinary army breads.

All these breads keep for the same period of time as army bread.

The nutritive value, according to the following analyses, appears to be intermediate between those for rye and wheaten breads.—

	Water	Nitrogenous matter	Fats	Starch and Fibre	Ash
1*.....	12.75%	9.10%	1.95%	74.95%	1.25%
2.....	12.50	8.95	4.05	73.18	1.32
3.....	12.86	9.45	0.20	77.07	0.42
4.....	12.60	1.96	0.44	84.20	0.80
5.....	5.40	48.56	0.62	40.02	5.40
6.....	29.05	9.47	0.14	59.88	1.46 (1)
7.....	24.68	7.06	0.20	66.24	1.82 (2)

(1) Of which 0.71 of sodium chloride.
(2) Of which 0.63 of sodium chloride.
*1) Barley flour (bolting 66%).—2) Yellow maize flour (bolting 90%).—3) Chinese rice flour (bolting 95%).—4) Manioc flour received from Madagascar.—5) Ground-nut flour prepared at Marseilles.—6) French army bread (exclusively from wheat flour).—7) Russian army bread (with rye and caraway).

855—**The Manufacture of Essential Oils in the United States.**—*The Tea and Coffee Trade Journal*, Vol. XXXII., No. 6, p. 520. New York, June, 1917.

856—**The Sanitary Control of Tomato Canning Factories.**—HOWARD, BURTON J., and STEPHENSON, C. H., in *United States Department of Agriculture Bulletin*, No. 569, 29 pp., II Plates. Washington, June 25, 1917.

857—**"Grape Honey."**—MARTINOTTI, F. (R. Stazione enologica, Asti), in *Giornale vinicolo*, Year 43, No. 31, p. 362. Casale Monferrato, August 5, 1917.

The author describes a method, discovered by Monti for the preparation of a new product called "grape honey."

The grape must is subjected to two successive treatments; (1) freezing; (2) concentration. The freezing removes the excess of acid, the impurities, and about ¼ of the water. Concentration, under greatly reduced pressure and at low temperature, removes the desired quantity of water either for the preparation of the syrup, or for that of the "honey," a crystallized product with the appearance of honey and the food and therapeutic value of grape juice.

By the Monti method, the must obtained from pressing the grapes and the liquid obtained from the skins are used. By mixing these two liquids, either before or after the freezing, a product is obtained which Monti calls "integral," because it contains all the products of grape juice.

859—**The Sterilization of Liquids in Thin Streams by Heat.**—STASSANO, HENRI, in *Comple Rendus des Séances de l'Académie des Sciences*, Vol. 165, No. 1, pp. 41-43. Paris, July 2, 1917.

In this method, on which a short note was previously presented to the Académie des Sciences (Vol. 160, Year 1915, pp. 820-822), the liquid passes, under uniform pres-

sure of a compressed, inert gas-nitrogen, through a heating apparatus formed by two super-posed rectangular metal sheets; these are held apart by a paper frame 0.1 mm. thick, which limits the perimeter of the receiver.

Long experience with this method has shown that it gives the following advantages over the usual sterilization methods:—

(1) The liquid may be raised as quickly and as regularly as possible to the desired temperature.

(2) The liquid may be cooled as soon as it has reached the requisite temperature by passing it immediately from the heating apparatus to a cooling apparatus under the same stream of nitrogen. The detrimental effect of heat is thus stopped as soon as its purpose is fulfilled. Neither this last advantage of rapid cooling, nor that of raising the temperature almost instantaneously, can be obtained in a closed vessel.

(3) A large volume of liquid may be dealt with. Sterilization in a closed vessel is always limited by the size of the water-bath or the auto-clave. In the small apparatus (27 cm. x 17 cm.) used by the author, more than 100 litres of physiological solution and 30 to 40 litres of bacterial emulsion may easily be sterilized in one hour without exceeding a pressure of 2 kg. or unduly raising the temperature.

By comparing the results obtained by this method with those obtained by sterilization in closed vessels, it is very clearly seen that the duration of heating is the principal factor in the changes caused by heat in living beings and their albuminoid organic substances. The degree of heat within certain limits, of course, plays only a secondary part.

After giving several examples of the sterilization of cultures, the author states that cow's milk, sterilized at 126° to 128° C. (259° to 262.4° F.) by this method, has neither the colour nor characteristic boiled taste of milk sterilized in bottles in the autoclave at a temperature below 115° (239° F.). A still more remarkable fact is that milk, sterilized in thin streams, even when raised to a temperature of 135° (275° F.), is much less affected by heat where the action of rennet is concerned than milk which has been boiled for a few minutes. Indeed, this milk, whose colour and natural taste show no trace of the test to which it has been put, coagulates with rennet almost as rapidly as fresh milk, and forms a thick coagulum, from which exudes very slightly a perfectly transparent serum, as is the case with fresh milk. The same milk, heated to 100° (212° F.) over the water-bath, gives a slower and less compact coagulum, showing streaks resembling precipitates; the abundant serum is greenish. It is well known that milk sterilized in the autoclave is no longer coagulated by rennet.

The results obtained from the author's many experiments on heating in thin streams are further confirmed by the following fact:—

Milk heated to 75°C (167° F.) for five minutes over the water-bath, that is to say, before the whole mass has reached this temperature, no longer gives the oxidizing and reducing diastase reaction. The same milk heated in the author's apparatus, even to a temperature of 80° (176° F.), still reacts very distinctly to the reagents showing the presence of these enzymes. Only in the case of peroxidase is the reaction somewhat weaker.

860—**Paying for Milk in Cheesemaking.**—TROY, H. C. (New York State College of Agriculture), in *Hoard's Dairyman*, Vol. LIII., No. 15, pp. 647-649. Fort Atkinson, Wisc., May 4, 1917.

The methods of paying for milk which the larger milk purchasing companies of the United States have put into practice are due to the ordinary variations that occur in the composition of the milk from different herds and the effect of these variations on its economic value.

The percentage of fat and solids not fat found by the chemical analyses, during the past fifteen years, in the milk of 1228 herds, made up of the various breeds and types of cows found in western New York, are as follows:—

TABLE I

Number of herds	Percentage of fat	Average Percentage of Solids not Fat
241	3.5 and under	8.243
376	3.51 to 4.0	8.572
331	4.01 to 4.5.	8.677
178	4.51 to 5.0	8.858
102	5.01 and over	9.077
1228		

This shows there is an increase in the average percentage of solids not fat for any large number of samples as the precentage of fat increases. The increase, however, for the solids not fat is not at an exactly even rate, nor is it so great as the increase for the fat.

Allowing due consideration for the variations in ratio that will be found in single samples, the assumption is made that, as the percentage of fat increases, there would be an increase in the solids not fat and in the food value similar to that shown in the following table II.:—

TABLE II.—*Comparative Value of a Quart of Milk of Different Compositions.*

Fat	% Solids Not Fat	Energy Units	Cents per quart (1)
3.0	8.3	604.10	4.0
3.5	8.5	665.46	4.4
4.0	8.7	726.82	4.8
4.5	8.9	788.18	5.2
6.0	9.1	849.54	5.6
5.5	9.3	910.90	6.0.
6.0	9.5	972.26	6.4

(1) Value is based on a price of 4 cents quart of milk with 3 % fat.

Relation of Composition to Cheese Yield.—The Babcock test affords a practical means by which the factory may determine the percentage of fat in milk, but the tests for casein are more difficult to make, and, while some of them work fairly well, none have come into general use.

The percentage of casein, like the percentage of solids not fat in either rich or poor milk, may vary within quite wide limits, but the amount present in rich milk will average somewhat higher. While the richer milk contains a larger quantity of casein per hundredweight, the amount present in proportion to each pound of fat is greater in milk having the low fat content.

As a basis for work in determining a fair method of paying for milk that is to be made into cheese, a standard may be adopted with which suggested methods may be compared. For the present, it may be assumed that any method is fair that will give the same returns to each producer that he would secure were his milk made into cheese separately. Van Slyke has shown that when 100 lb. weight of pure milk is made into cheese, the yields may vary according to the percentage of fat as shown in table III.:—

TABLE III.—*Yield of Cheese from Milk of Different Tests.*

Fat %	Lb. of cheese per 100 lbs. milk		Cents per lb.	Returns for 100 lb. milk	Difference in cents per 100 lb. of milk	Gain or Loss over Flat Rate of $2.12 per 100 lb. for all milk.
3.0	8.30	X	20	$1.66	0.00	$ — .46
3.5	9.45	X	20	1.89	0.23	— .23
4.0	10.60	X	20	2.12	0.46	.00
4.5	11.75	X	20	2.34	0.68	+ .23
5.0	12.90	X	20	2.58	0.92	+ .46

Returns by the Fat Percentage Basis.—If the five 100-pound lots of milk of table III were made into cheese, 53 lb. would be produced, bringing $10.60 when sold at 20 cents a pound. The milk contained 20 pounds of fat, and, if the money were distributed on the fat percentage basis, each pound fat would be credited with 53 cents. The difference between the returns by the Fat Basis and the returns when such milk is made up separately is shown in table IV.:—

TABLE IV.—*A Comparison of the Returns by the Fat Percentage Basis with the Returns when such Milk is made into Cheese Separately.*

Fat %				Returns by Fat Basis	Returns when Made up separately	Difference
3.0	X	53	=	$1.590	$1.66	$ — .070
3.5	X	53	=	1.855	1.89	— .035
4.0	X	53	=	2.120	2.12	.000
4.5	X	53	=	2.385	2.34	+ .035
5.0	X	53	=	2.650	2.58	+ .070

On the fat percentage basis the richer milk receives a larger share of the proceeds than it would were it made up alone, and the poorer milk receives a proportionally less amount. But the error is small compared with that which occurs when the money is distributed according to the number of pounds of milk delivered.

The price of 20 cents a pound for all the cheese is another point to be considered. The energy unit values per pound of cheese from each of the five different samples of milk containing different percentages of fat are shown in table V.:—

TABLE V.—*Energy Value of Cheese Made from Milk of Different Tests.*

Fat %	Energy Units per lb. of cheese	Difference in Energy Units per lb. of cheese	Lbs. of Cheese per 100 lb. milk	Extra Energy Units due to composition of cheese	Value of Extra Energy Units cents
3.0	1870	—	8.3	—	—
3.5	1890	20	9.45	189.0	2.02
4.5	1918	48	11.75	563.5	6.02
5.0	1932	63	12.90	812.7	8.69

(1) In calculating these values each cheese is given the same percentage of moisture.

The richer milk produces cheese containing a higher fat content and lower casein content than is found in cheese from poor milk.

The extra fat not only makes up for the lower percentage of casein, but also supplies the extra energy units contained in cheese from the richer milk. If allowance is made for this difference in food value, and a price of 20 cents a pound is placed on the cheese from the milk containing 4% fat, the values shown in table VI are obtained.

TABLE VI.—*Value of Cheese when Energy Values are Added.*

Fat %	Pounds Cheese	Cents per pound	Value of Cheese per 100 lb. milk	Value on Fat Percentage Basis	Difference
3.0	8.30	19.644	$1.630	$1.590	—$0.040
3.5	9.45	19.786	1.869	1.855	—0.014
4.0	10.60	20.000	2.120	2.120	0.000
4.5	11.75	20.156	2.366	2.385	+0.019
5.0	12.90	20.317	2.620	2.650	+0.030

The last column in table VI shows the difference in values by the fat percentage basis compared with a method which gives credit to the yield and food values of the cheese from each grade of milk. The milk containing the lower percentages of fat would receive a few cents less per hundred than an absolutely correct method would give, while the richer grades of milk would receive a few cents more than is due.

In the fat percentage basis method the extra fat of the richer milk, moreover, assists in producing the better flavour, aroma, texture, and palatability of the cheese having a high fat content, and may more than make up for any apparent discrimination against milk of lower fat content, when, in cheesemaking, milk is bought on the fat percentage basis.

861—**The Use of Selected Ferments in Cheesemaking.**—GORINI, C., in *Rendiconti del Reale Instituto Lombardo di Scienze e Lettere*, Series II., Vol. L., Pt. 7-8, pp. 302-310. Milan, 1917.

862—**The Desiccation of Meat Resulting from Freezing and Cold Storage.**—FREIMAN, K., in *Cold Storage Industry*, pp. 339-357. Moscow, November-December, 1916; summary in *Bulletin Mensuel de l'Association Internationale du Froid, Bulletin Bibliographique*, Year 8, Vol. 8, No. 1, pp. 8-10. Paris, January March. 1917. (2 pp. in Institute Bulletin.)

863—**The Refrigeration of Fruit.**—SMITH, EDWIN and CREELMAN, J. M., in *Department of Agriculture, Dairy and Cold Storage Series, Bulletin* No. 51, pp. 2-16. Ottawa, February, 1917.

PLANT DISEASES

865—**Decree of the Italian Minister of Agriculture Suspending the Importation of Certain Plants or Portions of Plants into the Kingdom.**—*Gazzetta uficiale del Regno d'Italia*, Year 1917, No. 203, pp. 3749-3750. Rome, August, 28, 1917.

Owing to the importance, during wartime, of not interfering with the importation of food-stuffs or with any of the raw material intended for industrial purposes, and in view of the necessity of preventing the introduction, along with certain products, of parasites or pests dangerous to crops within the realm, the Italian Minister of Agriculture has issued, under date of July 12, 1917, the following decree which entered into force on August 29:—

Sole article.—Article 9 of the ministerial decree of April 25, 1917, is modified as follows:

The importation of the following plants or portions of same is suspended:

(*a*) Cuttings and rooted cuttings of European and American vines from France, Spain, United States of America and Canada; the existing anti-phylloxera regulations remaining in force;

(*b*) Live chestnut seedlings from the United States of America.

Fresh fruit of any kind whatever from the following countries: Canada, U.S.A., Chili, Hawaii, Japan, China, Australia, are allowed to be imported under the condition of their being inspected by the delegate for Phytopathology, who must declare the total absence of parasites.

The same regulation applies to citrus fruits and to potato tubers of whatever origin.

872—**Grain Mildew (Sclerospora macrospora) in the Government of Podolia, Russia.**—GARBOWSKI, L., in *Bulletin trimestriel de la Société Mycologique de France*, Vol. XXXIII, Parts 1-2, p. 33. Paris, 1917.

874—**Bacterium Phaseoli, Injurious to Field Beans in Michigan, United States.**—MUNCIE, J. H., in *Science*, New Series, Vol. XLVI, No. 1178, pp. 88-89. Lancaster, Pa., 1917.

875—**Xylaria sp., the Cause of Root Rot in Apple Trees in North Carolina, United States (1).**—WOLF, FREDERICK A., and CROMWELL, RICHARD O., in *Journal of Agricultural Research*, Vol. IX., No. 8, pp. 269-276. Washington, D.C., 1917.

INJURIOUS INSECTS

880—**The Use of Nicotine Sulphate as a Spray.**—MOORE, WILLIAM and GRAHAM, SAMUEL, A., in *Journal of Agricultural Research*, Vol. X., No. 1, pp. 47-50. Washington, D.C., 1917.

The attention of the writers was directed recently to two cases of nicotine poisoning observed at Minnesota (United States), and resulting from the use of greenhouse lettuce. The plants had been sprayed with a commercial tobacco extract containing 40 per cent of nicotine sulphate.

The wirters found from their experiments that, while nicotine is volatile, nicotine sulphate is non-volatile. The alkalis contained in hard water and soap set free the nicotine contained in nicotine-sulphate sprays. In order to obtain the maximum efficiency of tobacco extracts containing nicotine sulphates, they should be rendered alkaline before using. Commercial tobacco extracts containing nicotine sulphate should not be used in the greenhouse, at least not on plants which are later to be used as food. Tobacco extracts, or tobacco papers containing free nicotine, may be safely used in the greenhouse on plants such as lettuce, without danger to the consumer. Food plants, such as lettuce, sprayed with tobacco extracts, should not be cut for the market until the day after spraying. If the temperature of the house is low, a longer period should be given to allow the nicotine to evaporate completely from the leaves.

882—**Life History of Plutella Maculipennis, the Diamond-Back Moth.**—MARSH, H. D., in *The Journal of Agricultural Research*, Vol. 10, No. 1, pp. 1-9. Washington, D.C., July 2, 1917.

AGRICULTURAL ECONOMICS

ORGANIZATION OF FARMERS' MUTUAL FIRE INSURANCE COMPANIES IN THE UNITED STATES

Mutual fire insurance companies in the United States have made very rapid progress. In some States of the Middle West, fully three-fourths of all the insurable farm property are now insured by the farmers' own companies. Companies of this kind are found in every State except Florida, Mississippi, Louisiana, New Mexico, Arizona, and Nevada.

The article in the Institute Economic Bulletin of October, 1917, describes a typical mutual fire insurance company, susceptible of modification to suit the legislation in particular States, and practising methods which in some points are an improvement on those now in use. The subject is discussed under the following heads: Organization and Administration of the Companies; Insurance Transacting; Essential Provisions of the Model By-laws of a Farmers' Mutual Fire Insurance Company. The last-mentioned section discusses property that may be insured, special inspection of property, limits to the amount of insurance, sale of property and transfer of policy, fees and assessments, and classification.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the October number of the International Review of Agricultural Economics. Persons interested in any of the articles in this list may obtain the original bulletin on application to the Institute Branch, so long as the supply for distribution is not exhausted.

AGRICULTURAL STATISTICS

CROP CONDITIONS IN ENGLAND AND WALES, JANUARY 1st, 1918

The Crop Reporters of the Board, in reporting on the crops and agricultural conditions on the 1st January, generally state that December proved, on the whole, very favourable for field work, being generally dry with light frosts until towards the latter half of the month, when frost and snow caused some delays, which were most severely felt in the south east. Good progress was accordingly made everywhere, and in the chief corn-growing districts of the east work is at least as forward as usual, if not more so. Nearly four-fifths of the area intended for wheat have already been sown, whereas at the same time last year only some two-thirds of the wheat area had been got in; and the total area actually under wheat at the end of 1917 was fully 15 per cent greater than a year ago. The young crop everywhere looks promising, although that sown late has received some check from the frosts. Of other autumn-sown crops the area under barley and oats is about the same as at this time last year, that under rye a little greater, and the bean area smaller. All these autumn crops are generally satisfactory. Seeds are, in practically all districts with the exception of the eastern counties, where they are rather patchy, a strong and healthy plant.

NUMBERS OF LIVE STOCK IN THE UNITED STATES

Live stock in the United States on January 1st was valued at $8,263,524,000, the Department of Agriculture, announces. That was an increase of $1,527,912,000 over a year ago and the highest on record.

The combined number of all live stock on the farms January 1st was 187,104,000 head, or 6,393,000 more than a year ago, and the largest since 1901, when the total was 192,285,000 and the high mark for farm animals was made.

Numbers of live stock for the last three years are given in the following table:—

	1918	1917	1916
Horses	21,563,000	21,210,000	21,159,000
Mules	4,824,000	4,723,000	4,593,000
Cows	23,284,000	22,894,000	21,008,000
Cattle	43,546,000	41,368,000	39,812,000
Sheep	48,900,000	48,483,000	48,625,000
Swine	71,374,000	67,503,000	67,766,000

BROOMHALL'S FOREIGN CROP CABLE, FEB. 13, 1918

Russia.—Crops are well protected by snow. The general outlook is not favourable, as acreage is smaller than normal and economic conditions are not satisfactory. Railway facilities are inadequate, therefore movement of all cereals are light. Port stocks small.

Balkan States.—Plenty of snow is reported, with weather generally favourable to new crops. Food shortage in parts pronounced. The outlook for corn is favourable.

Italy.—Snow has fallen over a wide area and crop prospects have improved. The outlook is for a moderate yield. Native supplies are scanty and foreign arrivals moderate. Mills operating slowly. Admixture quantities small. Further economy in usage is announced.

Spain.—General fall of snow and rain is reported and the recent drouth has been broken. Heavy frost is reported, but crop protected. Native supplies liberal and foreign arrivals continue, therefore stocks are well maintained.

North Africa.—The drought has been effectively relieved and agricultural outlook greatly improved. Supplies of wheat and corn liberal and exportation continues.

France.—Snow covers the entire agricultural area. Official reports confirm a generally favourable outlook for new crop. Seeding will be extended when frost disappears. Threshing has been on a liberal scale, but bad roads and snow have prevented any noticeable increase at the mills. Foreign arrivals are increasing. The demand for oats continues unabated.

United Kingdom.—Official and unofficial reports are unanimous in the reports of favourable outlook for new wheat. Acreage large and growth of early seedlings good. Native offers moderate. Foreign arrivals increasing.

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DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

The Agricultural Gazette

of Canada

EDITOR: J. B. SPENCER, B.S.A.

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PART V

THE INTERNATIONAL INSTITUTE OF AGRICULTURE

The Agricultural Gazette

OF CANADA

VOL. V APRIL, 1918 No. 4

The AGRICULTURAL GAZETTE of Canada is published monthly, in English and in French, by the Dominion Department of Agriculture. It is not intended for general circulation. A limited number of copies, however, are available to subscribers at $1.00 per annum, or 10 cents per copy.

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VACANT-LOT AND BACK-YARD GARDENING

AFTER careful calculation it has been estimated that between $20,000,000 and $30,000,000 worth of food was raised on vacant lots and back-yard gardens in Canada last year. In the United States a more exhaustive calculation has been made. Mr. Charles Lathrop Pack, President of the National Emergency Food Garden Commission, estimates that 3,000,000 war gardeners in the Republic, last year on 1,150,000 acres of land, produced food crops valued at $350,000,000, and that the women of the United States put up 500,000,000 quarts of fruit and vegetables. This year the indications are that in both countries the production in the aggregate will bulk a great deal larger. Not only do the reports published in Part IV in this number of THE GAZETTE warrant such an expectation in Canada, but the action of the Canada Food Board in taking energetic measures to further the movement cannot fail to prove a gratifying impetus. The Board proposes to elaborate the work where already established and to assist in organizing committees in new fields. The policy of the Board is to work in co-operation with provincial and local cultivation movements. It is using the press extensively and is helping with practical counsel and advice, and by making known the pressing needs of the situation.

Although the reports in THE GAZETTE are altogether from the cities of Canada, the work is not confined to those centres, for there are few towns which are not doing good work in this direction. There is, indeed, what may be termed a national uprising towards greater production. Practically every horticultural society, rotary club, board of trade, and innumerable other business and social organizations, as well as the municipal corporations, are interesting themselves, and the women are foremost in the movement.

Apart from the national service of thus liberating great quantities of food for overseas use, there are many benefits that must follow the actual taking up of vacant-lot and back-yard gardening. The blessing of intimate association with the soil in replenishing the larders that might otherwise be empty; the forming of a habit of thrift and independence, and the diversion, in many cases from idleness and unproductive effort, will all tend to unlift humanity as would no other enterprise.

LIVE STOCK REGULATIONS IN STOCK YARDS

HIS Excellency the Governor General in Council, on the recommendation of the Minister of Agriculture, and pursuant to the advice of The Canada Food Board, has been pleased, under and by virtue of the powers conferred by the War Measures Act, 1914, or otherwise vested in the Governor in Council, to make the following Regulations under date of March 7th:—

REGULATIONS

1. (*a*) The feeding in stock-yards of any kind of live stock within eight hours immediately preceding slaughter is prohibited.

(*b*) No wheat of any grade shall be used for feeding live stock in a stock-yard.

(*c*) No barley above grade No. 3, and no oats above grade extra No. 1 feed, shall be used for feeding live stock in a stock-yard.

(*d*) The waste in a stock-yard of any grain or any feed made in whole or in part from any grain product, due to carelessness of handling or feeding, or to overfeeding, is hereby prohibited.

(*e*) A copy of this regulation, and of regulation 4, shall be posted up in every stock-yard in each place, where feed is issued or sold.

2. No person shall sell or purchase any wheat fit for milling purposes for the feeding of poultry:

Provided, however, that where wheat has been grown together with other grain, and the wheat cannot be separated for milling purposes without undue cost, such mixture, provided it does not contain more than twenty-five per centum of wheat, may be sold or purchased for the feeding of poultry.

3. No person shall, without a written permit from the Canada Food Board, use any wheat, barley, oats, rye, Indian corn, buckwheat or peas for the purpose of feeding or decoying migratory wild fowl.

4. Any person violating any of the provisions of these regulations, or obstructing or impeding any officer or person enforcing or carrying out any of the provisions of these regulations, is guilty of an offence, and shall be liable on summary conviction before a Police Magistrate, or two Justices of the Peace, to a penalty not exceeding two hundred dollars, and not less than twenty-five dollars; or to imprisonment for a period not exceeding three months; or to both fine and imprisonment.

5. Where the proceedings in any case in which a fine is imposed under the authority of these regulations are instituted at the instance of any municipality, or by any officer of a municipality, the fine shall be paid to the treasurer of such municipality, to be disposed of as the municipality may from time to time direct. And where such proceedings are instituted at the instance of or by, any provincial officer, such fine shall be paid to the provincial treasurer, to be disposed of as such treasurer may from time to time direct.

REGULATIONS REGARDING SEED CORN

HIS Excellency the Governor General in Council, on the recommendation of the Minister of Agriculture, and under the powers conferred by the provisions of the War Measures Act, 1914, was pleased on February 28, 1918, to make the following regulations:

1. (*a*) No person, firm or corporation shall until, on or after July 1st, 1918, remove or transport any Flint or Dent Corn capable of being used for seed purposes from within the district comprising the counties touching or bordering, on any of the waters of River St. Clair, Lake St. Clair, River Detroit, or Lake Erie, to any place outside of said district.

(*b*) No person, firm or corporation until, on or after July first, 1918, shall remove or transport from the counties of Lambton, Essex, Kent and Elgin, any Flint or Dent Corn capable of being used for seed purposes, without first having obtained a written permit in duplicate from the District Representative of the Department of Agriculture for Ontario resident in the county, or resident in the county nearest to that in which such seed corn is held, one copy of which permit is to be attached to the package containing said seed corn and the other to be retained by the shipper thereof.

2. Seed merchants within the Provinces of Ontario and Quebec shall not sell, or contract for the sale of, or ship, or deliver, or consign, to any common carrier or any person or deliver or cause to be shipped, either directly or indirectly, until after the 15th day of April, 1918, any of the varieties of Flint Corn, or any of the

following varieties of Dent Corn, viz.:—Wisconsin No. 7, White Cap Yellow Dent, Bailey and Golden Glow, except for delivery in any of the counties of the Province of Ontario touching the waters of the River St. Clair, Lake St. Clair, River Detroit, or Lake Erie.

3. Any person violating the provisions of these regulations shall be guilty of an offence and shall be liable on summary conviction to a fine not exceeding fifty dollars, or to imprisonment for a term not exceeding one month, or to both fine and imprisonment.

FEDERAL ASSISTANCE FOR GREATER PRODUCTION

AT a conference of the premiers of all the provinces held in Ottawa, 15 and 16 February, with members of the Canada Food Board, it was decided that the best policy to follow in order to secure better production of cereals and meats was to leave the matter as largely as possible to each of the different provinces. The Canada Food Board undertook to give the need for the greatest possible production all the publicity within its power. At the same time the Government, through the Honourable the Minister of Agriculture, promised to consider in what way assistance could best be rendered to each province. Ultimately, as announced by the Premier in the House of Commons on March 19, it was decided by Order in Council to make the following cash assistance to the different provinces: Ontario $60,000; Quebec, $60,000; Nova Scotia, $30,000; New Brunswick, $25,000; Prince Edward Island, $5,000; British Columbia, $15,000; Manitoba, $25,000; Saskatchewan, $35,000, and Alberta, $25,000.

Dr. J. W. Robertson, Chairman of the land section of the Commission of Conservation, has been representing the Canada Food Board in consultation with the governments of the Maritime provinces and Ontario and Quebec, and the Honourable C. A. Dunning, Treasurer for Saskatchewan, the Food Board in the same manner with the Western provinces.

Outlining the policy of the provinces it can be stated that Ontario aims to secure organization down to county and municipal committees, particularly to assist in labour supply and distribution, and to bring home directly to the individual farmer the need of the greatest possible effort; Quebec aims to supply similar organization and to produce enough wheat to feed herself and to greatly increase meat animals. Nova Scotia and New Brunswick have the same objective. Also in each of these provinces, the desire is to produce enough coarse grains to meet their own individual requirements for animal feed.

In Western Canada, Alberta has been divided into sixteen districts, each district under the supervision of a greater production agent. The agents so appointed will come under central supervision. The objects are to insure supplies of seed, to find out help that is necessary, to secure tenants for unoccupied land, and to arrange definitely with farmers for the breaking of new areas of their holdings for 1919 crops. Saskatchewan and Manitoba have similar aims, and, along with Alberta, are taking steps to secure all available labour from towns and cities that could be of use on the farms. A Provincial Labour Bureau has been established and public meetings are being held in each province.

As stated in THE AGRICULTURAL GAZETTE for March, the Dominion Government has further assisted in the work, through the Canada Food Board, by the purchase of one thousand Ford tractors, which will be distributed during April and May.

PART I

Dominion Department of Agriculture

THE DOMINION EXPERIMENTAL FARMS

AGRICULTURAL EXHIBITS AT FAIRS

AT the annual convention of the Ontario Fairs Association, two officials of the Dominion Experimental Farms made recommendations to fair boards with a view to increasing the educational value of the autumn fairs. The recommendations are equally applicable to corresponding fairs in other provinces.

DISPLAY OF FARM PRODUCTS.

BY W. A. LANG, CHIEF OF THE DIVISION OF EXTENSION AND PUBLICITY

The agricultural fair is a great educator and has contributed much towards better cultural methods, better seed selection, and the improvement of stock. Every effort, therefore, should be put forth to improve such fairs, both from an educational and a commercial standpoint. There are exhibits for purely educational purposes, there are exhibits featuring natural products and resources for publicity purposes, there are exhibits for advertising purposes only, and there are exhibits for competition. Being usually the best of their kind, or class, the exhibits might all be said to be educational and, in a general sense, of interest and value to the visiting public. I place educational exhibits first, partly because it is the class of exhibits that appeals to me the most, and, partly, because they do not always receive that attention that they deserve.

ATTRACTIVENESS A NECESSITY

Just what will especially interest and satisfy the general public at agricultural fairs is quite a problem. The question is not only how much information the exhibits will convey, but also how much of it will find its way home. It must be remembered that fair day, or fair week, is holiday time for the farmer and his family, and that in a considerable number of cases it is their only holiday time of the year. It is, therefore, important that exhibits be made attractive as well as instructive. Consequently, too much care and thought can hardly be expended on their preparation. The lesson to be learned from an exhibit will not lose any of its force by being presented in such a way that the visitor does not recognize that he is being taught.

In planning an educational exhibit we should not forget or undervalue the display feature. A colour scheme

should be adopted and followed, it always being borne in mind that the average farmer visitor has little time to study printed information. Show him results, show him the profitable way, and his attention and interest will be secured.

Exhibits of natural resources and products, whether of a township, county, province, or nation, are usually put up for publicity purposes, with a view to invite settlement, to secure capital, or in the hopes of developing or extending markets. This class of exhibits is usually undertaken by a county or provincial organization strong enough financially to install it in such a manner as will be in keeping with the importance of the object sought. In exhibits of this nature, quality and excellence of arrangement must have first attention. It is an indisputable fact that an attractive, well-arranged display will appeal to a greater number of people, even if the materials featured are not quite up to standard, than a poorly arranged exhibit of higher quality articles.

EXHIBITS FOR ADVERTISING

Probably the most attractive displays at the average fair are those put up by manufacturing and mercantile firms for advertising purposes. The merchant of to-day realizes the value of the window dresser, and this class of exhibit can very well be left in the capable hands of those interested and responsible for them.

It is in the arrangement of exhibits of dairy products, fruits and vegetables, grain, domestic manufactures, and ladies' work, where much improvement can be made, because these classes are usually in charge of individual directors, who should not only be willing to devote some considerable time and thought to their arrangement, but should have sufficient appropriations placed at their disposal to enable them to furnish attractive and convenient accommodation for their display. In a wooded country like Ontario, where lumber is reasonably cheap and colouring plentiful, it seems too bad to see the splendid products of the farm, the orchard, and the garden laid out on rough, unpainted and uncovered boards. A little white enamel paint and white oilcloth will greatly add to the attractiveness of the display of dairy products, etc. Some green cloth for the tables and shelving for the fruit exhibits, with trays, plates or baskets of uniform size and colour, will prove pleasing to the eye. Uniform containers of wood or glass for the grain display are very much more interesting and attractive than the usual assortment of bags of all sizes, colours, and age. Vegetables should have the same consideration as fruit, and, if properly staged, would make as fine a display.

In the staging of all exhibits, one prime requisite should always be kept in mind, the provision of ample aisle space for the public. No passage should be less than 8 feet, while 10 feet is preferable. It is better to cramp an exhibit than make it impossible for the visitor to stop and examine it.

THE POULTRY EXHIBITS

BY F. C. ELFORD, DOMINION POULTRY HUSBANDMAN

The preparation that careful poultry exhibitors give to their birds is largely lost if suitable preparation is not made for the exhibits on the part of the fair board. In fact, the arrangements made by the fair board have much more to do with the continued success of the exhibits than the preparations made even by the exhibitors themselves.

ACCOMMODATION

No doubt the accommodation at the average fair is improving, but there is need for more advancement in this direction. Where the shady side of a fence or the back of the pavilion is the only accommodation provided, the poultry exhibits are not likely to be ever very large or attractive. A suitable building should be provided, and there should be above everything else plenty of light. There ought to be wire coops provided by the association, and the ideal method is to stage them in single tiers with good wide aisles between. The old system of using exhibitors' coops and placing them on tables or on top of each other beside the wall, is not satisfactory, nor does it do justice to the exhibit, the judge or the visitor.

THE DIRECTOR

A good live director in charge of the poultry work will arrange for the receiving of all birds and the cooping of them according to varieties, and will know where they are cooped so that he can assist the judge in his work.

PRIZE LISTS

If ever there was a time when the poultry prize lists needed revision, it is at present. As a rule, the majority of the prizes are awarded to classes that are called "fancy," that is they are not utility birds in any way. This is no time for any fair to countenance encouragement to any class of stock that will not produce, and no patriotic fair board can conscientiously continue to offer the bulk of the prizes for birds the chief production of which is feathers. More than ever the utility end of the show must be emphasized.

UTILITY CLASSES

All birds belonging to what might be called the utility classes, that is birds that can be recommended to the ordinary man as good producers in either eggs or flesh, should receive emphasis. Better prizes should be given to all such classes. Prizes for breeding pens ought to be increased, and a sales class introduced. In the sales class, birds that are for sale should be entered, and information on the coop as to the prize and facts in reference to the breeding be given. The sale of these birds should be made through the director in charge, or the secretary of the fair.

To encourage beginners, it might be well to have a beginners' class, where only those who have never exhibited before would be allowed to exhibit. In order to stimulate an interest and to substitute something for the fancy classes which might be eliminated, a laying contest should receive careful consideration. Laying contests have been carried on at two of our Canadian winter fairs, and have proven very attractive. They might be of practical benefit to some of our later fall fairs, though during the earlier fairs they are not so easy to conduct. Where it can be conducted, however, a laying contest will prove the main attraction in the poultry exhibit, as it is of such a utilitarian nature it should be tried out where possible.

EDUCATIONAL FEATURES

More features of an educational nature should be introduced. Local poultry supply firms might be given more encouragement to demonstrate incubators and other poultry appliances designed for the saving of labour and increasing the egg yield. Government educational exhibits and demonstrations could in many cases be secured. Demonstrations as to how best to kill and pluck, select the layers, caponize, build poultry houses, etc., could be introduced with very little expense and would be much appreciated. In some cases even moving pictures might be considered, from which much instruction could be imparted.

The re-organization of poultry exhibits is not only advisable, but is essential if we are to respond to the appeal to produce, and again to produce, to eliminate waste of all kinds which includes the loafer in the poultry house.

THE DIVISION OF BOTANY

THE WHITE PINE BLISTER RUST SITUATION

BY W. A. McCUBBIN, M.A., ST. CATHARINES, FIELD LABORATORY OF PLANT PATHOLOGY

BOTH Canada and the United States have made special efforts during the summer of 1917 to discover the exact spread of the Blister Rust on the continent, with a view to enabling a definite and permanent policy to be adopted towards this serious disease. From reports recently published from all the states and provinces involved it is found that the disease is very widely distributed in the eastern part of the continent. It has been found generally on currants from New York and Ontario eastward, and one or two infections occur in Wisconsin and Minnesota. West of the Mississippi no trace of the disease has yet been discovered.

In Ontario diseased pines have been found in but few places, but the currant stage is very widespread. From the results of scouting, and by securing information through the public schools, it has been found that the currant rust is present in 38 counties out of the 43 in the province, and that in these counties it occurs in 120 townships out of a total of 455. Roughly speaking, the greatest amount of the disease is present in a circle of about 60 miles radius with Toronto as its centre, with another generally infected area in the Ottawa-Montreal district. In Quebec, out of the 30 counties examined 8 are known to be diseased, and it is probable that the rust is much more widely distributed than somewhat the limited survey has shown.

The general continental situation was thoroughly discussed at a conference in Pittsburg towards the end of 1917, and the consensus of opinion among the pathologists present was that, as far as the eastern section of the continent was concerned, the disease was here to stay. It is hoped that the slightly infested states in the Middle West can be cleaned up, and that the disease may be still prevented from passing into the Rocky Mountain region, where there are pine areas of considerable importance.

In the east our problem is now concerned with the question of whether we can grow pines even if the disease is present. There is considerable ground for hope that this can be done by keeping wild and cultivated currants and gooseberries cut down for some little distance around the pines. It is planned to conduct experimental work which will determine the feasibility and the cost of this method of dealing with the disease.

THE DAIRY AND COLD STORAGE BRANCH

A NEW PLAN FOR COW TESTING AND A RESUME OF PAST WORK

BY CHARLES F. WHITLEY, IN CHARGE OF DAIRY RECORDS

A change of plan for cow-testing work has been decided upon and will take effect on May 1st next. On that date the Dairy Record Centres will cease to exist, and the position of Dairy Recorder will be abolished. In place of such organization, the Dairy Branch of the Department of Agriculture will enlist the services of cheesemakers, buttermakers, and other persons possessing the necessary qualifications to test samples of milk, paying sufficient to make it worth the while of anyone to give some attention to the work. The average yield of milk per cow has increased fully 30 per cent in recent years, but it is felt that there is still plenty of room for improvement. By the new plan it is hoped to reach many milk producers who have not up to the present been keeping records. At the same time upwards of thirty men of practical experience and ability will be released for other tasks. In view of the adoption of this revised system it will be interesting to take a glance back and to note in some detail the progress that has been made in a work of supreme importance to the dairy industry.

EARLY STAGES OF COW TESTING

In the year 1904, the Minister of Agriculture announced that the Dairy Division would undertake to test for one year the milk of individual cows belonging to farmers in the neighbourhood of Cowansville, Que., free of cost to the owners. The object of the work was to secure data for the farmers of Canada showing the difference in productiveness of the individual cows in herds under the same management, with a view of indicating the possibilities of increasing the profits from milk production by paying more attention to the selection, care, and feeding of dairy cows.

Samples of milk from 66 farmers were received and tested. The highest number received in any one month was in July, the number of samples than received being 1120. Three farmers continued to weigh and sample for twelve months.

In the first herd of 25 cows, the average yield for the twelve months was 3,306 lb. milk, 131.9 lb. fat, the value, with fat at 18 cents per pound, being $23.74; the cost of feed (calculated very closely) was $25.48. The second herd of 14 cows had an average of 4,949 lb. milk, 189.9 lb. fat; value $34.19; feed cost $24.01; profit per cow $10.18. The third herd, 19 cows, had an average of 5,994 lb. milk, 275.3 lb. fat; value at 18 cents, $49.56; feed cost $30.18; profit per cow, $19.38.

In order to make the work more widely known the plan in 1905 was to carry on tests for thirty days in seven different localities. In 1906 eighteen cow-testing associations were organized, the first one in January at Cowansville, Que. During that year there were 266 members enrolled owning 3,005 cows, with a total of 17,125 separate records kept during the twelve months. The associations were all organized on the simple basis of the members providing their own equipment of scales and bottles, the Dairy Division doing the testing free of charge by paying makers at the local cheese factory and

creamery. Similar methods have been followed up to the present.

ESTABLISHMENT OF DAIRY RECORD CENTRES

A new feature was added in 1911, when six dairy record centres were established. Representatives of the Department, termed dairy recorders, were then appointed to stay on the ground continuously for the whole year and encourage the keeping of dairy records. Herd record books were prepared and, in most cases, kept by the recorder for the dairy farmer; in them the yield of milk and fat of each cow, together with the cost of her feed, could be conveniently entered each month.

The recorders collected dairy statistics in their centres, some of which are tabulated below. By 1913 there were twenty-two dairy record centres, and from 1914 to 1917 inclusive, there were thirty-five. The following table shows their distribution by provinces:

TABLE NO. 1, SHOWING THE NUMBER OF DAIRY RECORD CENTRES IN OPERATION, AND THE TOTAL NUMBER OF MONTHLY RECORDS OF COWS RECEIVED EACH YEAR

PROVINCE	1911		1912		1913		1914		1915		1916		1917	
	Dairy Record Centres	Monthly Records	Dairy Record Centres	Monthly Records	Dairy Record Centres	Monthly Records	Dairy Record Centres	Monthly Records	Dairy Record Centres	Monthly Records	Dairy Record Centres	Monthly Records	Dairy Record Centres	Monthly Records
Ontario	3	11,881	9	32,494	11	39,548	15	51,552	15	75,444	15	95,134	15	80,832
Quebec	2	7,905	4	13,2€2	6	18,409	10	31,064	10	44,550	9	46,617	9	50,781
New Brunswick	....	.....	....	.....	2	2,722	5	10,106	5	17,701	6	21,521	6	11,258
Nova Scotia	....	.....	....	.....	2	6,659	2	7,209	2	13,733	2	12,999	2	24,077
P.E. Island	1	3,655	1	2,629	1	1,822	2	4,579	2	7,938	2	6,991	2	8,816
Saskatchewan	....	.....	....	.....	....	.....	1	1,272	1	2,584	1	2,313	1	2,715
Total	6	23,441	14	48,385	22	69,160	35	105,782	35	161,950	35	185,575	35	178,479

MEMBERS, COWS, AND RECORDS

Table No. 2, showing the total number of members each year, with the total number of cows being tested, and the total number of monthly records received during the year, including cow testing associations and dairy record centres:

YEAR	TABLE NO. 2	No. of Members	No. of Cows	Total Monthly Records
1906		266	3,005	17,125
1907		789	7,324	41,257
1908		751	7,243	43,518
1909		893	10,028	53,883
1910		1143	11,853	72,423
1911		1255	12,242	70,196
1912		1418	16,076	86,543
1913		1686	15,946	88,530
1914		2109	17 777	126,527
1915		2743	23,009	183,560
1916		3383	29,409	212 854
1917		3421	29,240	205,156

HERDS AND AVERAGE YIELDS

Table No. 3, showing the number of herds and the number of cows recorded for the full period of lactation in 1916, by provinces, with the average yield of milk and fat:

PROVINCE TABLE NO. 3	No. of Herds	No. of Cows	Milk, Lb.	Average Yield Test Per Cent	Fat, Lb.
Ontario	838	8,677	6,061	3.50	212.3
Quebec	1,008	6,639	4,856	3.87	188.0
Maritime	1,040	3,672	4,926	4.01	197.7
Saskatchewan	52	208	4,718	3.73	176.2
Totals and averages	2,938	19,196	5,140	3.77	200.7

The average test of 3.77 per cent of fat is calculated on a total production of about one hundred and four million pounds of milk, the result of 212,854 individual Babcock tests.

The yields are typical of each year from 1908 to 1916. So many new men and so many new herds with young cows have been added each year that the general tendency has been to keep the average yields about the same.

PERCENTAGE OF FAT PER MONTH

Table No. 4 gives the average percentage of fat by months and provinces:—

TABLE NO. 4, PER CENTAGE OF FAT PER MONTH

MONTHS, 1914	ONT.		QUE.		N.B.		N.S.		P.E.I.		SASK.			
	No. of Cows	Per Cent Fat	No. of Cows	Per Cent Fat	No. of Cows	Per Cent Fat	No. of Cows	Per Cent Fat	No. of Cows	Per Cent Fat	No. of Cows	Per Cent Fat	Total Cows	Average Fat
January	1,110	3.6	481	4.2	326	4.4	326	4.4	88	3.8	.....	.....	2,331	4.0
February	1,021	3.6	473	3.7	302	4.2	329	4.3	88	3.8	.....	.....	2,213	3.8
March	1,609	3.4	616	3.8	340	4.1	344	4.2	114	3.7	52	3.5	3,075	3.7
April	3,555	3.4	1615	3.6	396	3.9	640	4.1	134	3.6	72	3.6	6,412	3.5
May	6,150	3.3	3601	3.6	936	3.8	926	3.9	255	3.6	129	3.6	11,997	3.4
June	7,452	3.3	5070	3.7	1355	3.9	1389	4.0	507	3.5	175	3.7	15,948	3.5
July	7,522	3.3	5896	3.7	1465	3.9	1618	4.0	666	3.7	175	3.7	17,342	3.6
August	7,408	3.4	5555	3.9	1536	4.0	1469	4.0	801	3.6	169	3.9	16,928	3.7
September	7,012	3.6	5351	4.1	1349	4.2	1243	4.2	768	3.5	178	4.1	15,901	3.8
October	6,417	3.8	4535	4.3	1051	4.3	930	4.2	688	3.9	140	4.1	13,761	4.0
November	4,948	3.9	3337	4.5	730	4.5	766	4.4	568	4.1	125	4.1	10,474	4.1
December	3,035	3.9	2039	4.6	493	4.3	655	4.3	396	4.1	124	4.1	6,742	4.2

CONTRASTS IN TYPICAL HERDS

Table No. 5, showing contrasts in production in six typical herds.

TABLE NO. 5	YIELD OF THE BEST COW IN EACH HERD				YIELD OF THE POOREST COW IN EACH HERD			
Herd No.	Age	Milk, Lb.	Test, Per Cent	Fat Lb.	Age	Milk, Lb.	Test, Per Cent	Fat, Lb
1	8	4220	3.7	156	12	2945	3.6	106
2	8	3690	3.9	145	4	2540	4.2	106
3	12	5105	3.6	184	10	3005	4.5	137
4	9	5065	3.7	186	5	3820	3.8	146
5	8	4570	4.3	197	5	3165	4.2	134
6	6	6015	3.5	210	7	4796	3.5	167

The average yield of all the cows in these six herds was 4.024 lb. milk, 3.8 test, 154.5 lb. fat. The difference in yield between the poorest and best cows as shown above runs as high as 2,100 lb. milk and 63 lb. fat.

VALUE OF PURE-BRED SIRES

Table No. 6 shows the value of a pure-bred dairy sire. Contrast made at Farmer's Union, Ont., dairy record centre:—

TABLE NO. 6	No. of Herds	No. of Cows	Total Lb. Milk	Average Lb. Milk Per Cow
Group 1, pure-bred sire	7	83	655,801	7,901
Group 2, grade sire	7	84	395,873	4,712
Difference in favour of pure-bred sire	.....	.....	259,928	3,189

This table indicates:—

1 Even with one cow less, the first group of 83 cows, where the herds were headed by a pure-bred sire, gave 259,928 pounds of milk more than he second group.

2. The difference in production per cow was 3,189 pounds of milk, which, if divided, amongst the seven owners meant a total of $2,646.87 or $378.12 additional money for each man.

INCREASES IN YIELDS AND HERD IMPROVEMENT

The tables presented herewith help, in a measure, to duplicate the trend of increased production. In several districts where cow testing has been practiced for two or three years, names could be given of twenty-five or thirty dairymen who have made considerable increases in the yield; some of them of over two thousand pounds of milk per cow

Dairymen have received new ideas; many are now aiming, for instance, at nine or ten thousand pounds of milk per cow. A large number of farmers are keeping private records on forms supplied by the Dairy Branch, copies of which are not returned to the Department. Hence it is believed that the cow-testing movement has had a much greater influence on milk production than can be tabulated in figures at the present moment. It is probably a conservative estimate that the average yield per cow for Canada is now thirty per cent greater than when cow-testing work was originated. But that is by no means the whole of the story: better cows have taught dairymen that better conditions pay. Accordingly, numerous cow stables have been renovated, improved methods of cultivation and feeding have been instituted, more pure-bred stock introduced; so that wherever cow testing has been in practice intelligently, many farms have been vastly improved. Such values cannot adequately be shown by cold figures.

As a time has arrived when the supply of feeding cattle at Winnipeg is barely sufficient to meet local demands, the Live Stock Branch of the Department of Agriculture announces the suspension until further notice of the Special Stocker and Feeder policy, adopted in the fall of 1917, under which a fifty percent freight rebate was allowed on carlot shipments of cattle purchased at the Winnipeg Stock Yards and shipped from there to country points in Eastern Canada for feeding purposes.

THE ENTOMOLOGICAL BRANCH

SOME LADYBIRD BEETLES DESTRUCTIVE TO PLANT LICE

BY WILLIAM A. ROSS, DOMINION ENTOMOLOGICAL LABORATORY VINELAND STATION, ONTARIO

THE study of the life-histories and habits of aphids has brought to light many intensely interesting natural phenomena such as polymorphism, the alternation of sexual and parthenogenetic generations (heterogeny) and the habit of alternating food plants. But possibly the greatest marvel it has revealed to us is the astounding fecundity of these small, fragile insects. Buckton, in commenting on this, states that, if all the progeny of a single rose aphis were to live, they would at the end of 300 days be equal in weight to the population of China sevenfold. Gillette estimates that the descendants of one plant louse passing through ten generations of fifty each, would be, if all survived, approximately two quadrillions. "If they were all martialled 150,000 abreast, in close enough order so that each could place its antennæ upon the louse in front, they would make a procession long enough to reach round the world." Fortunately for us, Nature does not permit these great powers of multiplication to have full play. From early spring to the close of the season aphids are beset and held in check by hosts of enemies, amongst which are numbered ladybird beetles and their larvæ, syrphid larvæ, hymenopterous parasites, aphis lions, *Aphidoletes* larvæ, *Leucopis* maggots, predacious capsids and tree crickets.

In this paper, we shall confine our attention to one group of aphid-eating or aphidivorous insects, namely, the ladybird beetles.

FIG. 1—LARVA OF LADYBIRD BEETLE, ENLARGED ABOUT THREE TIMES
(Original)

FIG. 2.—LADY BIRD BEETLE, *ADALIA BIPUNCTATA*, ENLARGED ABOUT FIVE TIMES
(Original)

THE LADYBIRD BEETLES

The ladybird beetles, or "ladybugs," are easily recognized by their oval, hemispherical shape, their three-jointed tarsi and their conspicuous colouring. Most of them are red or

yellow with black markings or black with red markings. Their eggs, oval in shape and yellow in colour, are laid in clusters on foliage and bark. Their larvæ are the voracious, alligator-like grubs commonly found on plants infested with aphids.

During the past four years we have collected over twenty-five species of ladybird beetles in the Niagara district. Out of that number, eight species, viz.: *Adalia bipunctata, Coccinella* 9-*notata, C.* 5-*notata, C. trifasciata, Hippodamia* 13-*punctata, H. convergens, Megilla maculata* and *Anatis* 15-*punctata,* are of great importance in the control of plant lice.

THE TWO-SPOTTED LADYBIRD
(*Adalia bipunctata*)

Broadly oval. Head black, with two yellow spots between eyes. Thorax black, with yellow lateral margins. Wing-covers red, with a black spot near the centre of each. Under surface of body black. Length 1/8 in. to 1/5 in.

This species is apparently the most common ladybird beetle in the Niagara district. According to our observations, it is the most important insect enemy of the apple aphids, *A. malifoliæ, A. pomi* and *A. avenæ,* and of the cherry aphis, *Myzus cerasi.* It attacks a host of other aphids, amongst which the following might be mentioned: corn aphis, pea aphis, bean aphis, plum aphids, birch aphids, privet louse, viburnum aphis (*Aphis viburnicola*), rose aphis, and oak aphids.

This ladybird beetle occurs so commonly on aphis-infested plants that the damage wrought by the aphids is frequently credited to it. Some people even go so far as to accuse the innocent ladybird of giving birth to the plant lice. Others —careful housewives—finding it hibernating within their houses, mistake it for the notorious "buffalo moth," and treat it accordingly.

Breeding experiments.—In experiments with eight over-wintering couples, Mr. W. P. Shorey, my assistant, obtained the following data:—

The egg-laying capacity per female ranged from 13 eggs to 468 eggs, with an average of 149 eggs. The period of incubation varied according to the temperature from 4 to 13 days, the average being about 7.5 days. The average length of larval life was 22 days, the maximum and minimum being respectively 31 and 18 days. The average duration of the pupal stage was 6.8 days, the maximum 12 days and the minimum 5 days.

Feeding experiments.—In the insectary experiments with this species, adult beetles devoured from 70 to 100 aphids daily.* During a period of eight days, two individuals consumed no less than 1434 plant lice.

THE FIVE-SPOTTED LADYBIRD
(*Coccinella* 5-*notata*)

Hemispherical. Head black, with two yellow spots between the eyes. Thorax black, with front half of lateral margins yellow. Wing-covers red, with a black basal cross band and two black dashes on each elytron. Legs and undersurface black. Length ¼ in. to ⅜ in.

This species is common in the Niagara district. We have recorded it as being of importance in the control of the green apple aphis, rosy aphis, oat aphis, bean aphis, corn aphis, cherry aphis, melon aphis, viburnum aphis, pea aphis, and the privet louse.

Breeding experiments.—The average egg production of ten individuals in confinement was 147 eggs, the maximum being 254 eggs. The period of incubation ranged from 3 to 19 days, with an average of 7.9 days. The average length of larval life was 27.3 days, the maximum 29 days, the minimum 24 days. The duration of the pupal stage varied

* All the plant lice used in the feeding tests were immature.

from 2 to 5 days, with an average of 4.1 days.

Feeding experiments.—Adult beetles destroyed from 137 to 165 aphids daily. During a period of 4 days, two individuals devoured 1180 plant lice.

THE NINE-SPOTTED LADYBIRD
(*Coccinella 9-notata*)

Hemispherical. Head black, with a broad yellow band between the eyes. Thorax black, with front margin and half of the lateral margins yellow. Wing-covers red or yellow, with four black spots on each wing-cover, and a common one on the inner margin near the base. Legs and under surface black. Length ¼ in. to ⅜ in.

This is another very common species. In 1916, it was the most prevalent ladybird in apple orchards infested with aphids. We have recorded it as feeding on the following: apple aphids, cherry aphis, pea aphis melon aphis, bean aphis, spiræa aphis, corn aphis, rose aphis, evening primrose aphis.

Breeding experiments.—Four females in confinement produced an average of 123 eggs per individual. The period of incubation was from 4 to 11 days, the average being 8.4 days. The length of larval life was about 24 days. In the case of the only individual which reached the adult stage, the duration of pupal life was 4 days.

Feeding experiments.—In 6 days' time two adult beetles consumed 1429 aphids, or in other words, from 94 to 146 aphids per day per adult.

THE THREE-BANDED LADYBIRD
(*Coccinella trifasciata*)

Broadly oval. Head black, with two yellow spots between the eyes. Thorax black, with front margins and anterior half of lateral margins yellowish. Wing-covers red or yellow, with three black transverse bands, the median and posterior bands interrupted in the middle. Legs and under surface black. Length 3/16 in. to ¼ in.

While sweeping grass and clover during June and July, we have taken large numbers of this species. In abundance, it probably ranks with or next to *Adalia bipunctata*. We have found it feeding on the following economic species: apple aphids, cherry aphis, privet louse, corn aphis, bean aphis, melon aphis, viburnum aphis, spiræa aphis, cabbage aphis, and pea aphis.

Breeding experiments.—In our experiments with this species, very few eggs were laid by confined adults. The maximum egg production noted by us was 92 eggs per female. The period of incubation varied from 3 to 12 days, with an average of 8.1 days. The average length of larval life was 23 days, the maximum 28 days, the minimum 17 days. The average duration of pupal life was 6 days, the maximum 8 days, the minimum 4 days.

THE THIRTEEN-SPOTTED LADYBIRD
(*Hippodamia 13-punctata*)

Oblong, oval. Head black, with yellow mouth parts. Thorax black, with anterior and lateral margins yellow and with a black dot within each lateral margin. Wing-covers red or yellow, each with six black spots and one common spot at the base. Length 3/16 in. to ¼ in.

This species has been observed attacking the cabbage aphis, bean aphis, corn aphis, melon aphis, cherry aphis, and the apple aphids. It is, of more importance in the control of vegetable plant lice than of tree-infesting species.

Feeding experiments.—One adult devoured from 64 to 108 aphids daily for a period of 3 days.

THE CONVERGENT LADYBIRD
(*Hippodamia convergens*)

Oblong, oval. Head black, with yellow between the eyes. Thorax black, with anterior and lateral

margins yellow and two oblique yellow bars. Wing-covers red, each with 6 black dots. Length ¼ in. to ⅓ in.

This species is apparently very subject to fluctuations in the province of Ontario. Some years it is rare, e.g., 1914, 1915, and 1917, and other seasons it is very abundant, e.g., 1916. It is very voracious and energetic in habits. Our food records for this species are apple aphids, corn aphis, cabbage aphis, pea aphis, and birch aphis.

Feeding experiments.—The feeding records for this species are given herewith in tabular form:—

APHID	Sex of Beetle	Feeding Period	Total No. Aphids Eaten	No. Min.	Devoured Max.	Daily Average
A. maidis.....	Female	6 days	553	88	110	92.2
A. maidis.....	Male	6 "	551	82	98	92
A. pomi.....	Female	8 "	775	73	146	97
A. pomi.....	Male	8 "	711	56	144	89
A. brassicae.....	Female	7 "	495	59	93	71
A. brassicae.....	Male	7 "	464	53	89	66.3

THE SPOTTED LADYBIRD
(*Megilla maculata*)

Head black, with a red median stripe. Thorax red, with two large black spots. Wing-covers red, each with four black spots and two common ones on the inner margins. Legs and under surface black. Length about ¼ in.

This species is very commonly found on grasses and herbaceous plants, but is seldom taken on trees. This past season Mr. Shorey observed thousands of adults, pupæ, and larvæ amongst some hay which was being carted into a local farm barn. The adult beetle is apparently very fond of the pollen of dandelions.

Our food records for *Megilla maculata* are: cabbage aphis, melon aphis, pea aphis, corn aphis, spiræa aphis, birch aphis, cherry aphis, and apple plant lice.

Feeding experiments.—During a period of 5 days, two beetles destroyed 463 aphids, or in other words, from 21 to 73 aphids per day per adult.

THE FIFTEEN SPOTTED LADYBIRD
(*Anatis* 15-*punctata*)

Very broadly oval. Head black, with two yellow spots between the eyes. Thorax black, with anterior margin, broad lateral margins, and two spots on the posterior margin yellow and with a black spot on each lateral margin. Wing-covers vary from yellowish to dark brown, with eight spots on each. In dark specimens, the spots are almost invisible. Under surface black, with yellowish or reddish brown margins. Legs, femora black; tibiae and tarsi, yellowish brown. Length ⅜ in.

This, our largest ladybird beetle, is not at all common in the Niagara district. We have taken it most frequently on trees infested with black cherry aphis. At various times we have found it attacking apple aphids (particularly *A. malifoliæ*) and birch aphids.

THE HOUSE SPARROW AND THE BROWN RAT IN THE PRAIRIE PROVINCES OF CANADA

BY NORMAN CRIDDLE, DOMINION ENTOMOLOGICAL LABORATORY, TREESBANK, MAN.

THE House Sparrow (*Passer domestica*) and the Brown Rat (*Epimys norvegicus*), like the obnoxious house fly, are both largely dependent upon mankind for their spread and perpetuation in North America. The house sparrow was purposely introduced with the idea, it is said, of destroying the Spanworm (*Ennomos subsignarius*) which it apparently succeeded in doing, at, however, great cost in other directions. In Canada, it was introduced on sentimental grounds by people who had no idea of the consequences.

The brown rat, like the house mouse, was introduced into America accidently. It is a common inhabitant of ships and, therefore, its appearance on this continent, in any case, was only a matter of time.

From the original places of introduction on the eastern side of the country these animals have since made their way over most of the continent. The house sparrow being a strong, vigorous flier followed the settler very closely, and is now met with in almost every settled district. So closely in fact do these birds follow human settlers that, according to Mr. J. B. Wallis, of Winnipeg, they were actually present at latitude 56.23 with the construction gangs who were building the Hudson Bay Railway in 1917.

The brown rat, owing to its mode of travel, has been somewhat slower in making its way northward, but it is now found over a wide range of territory and in Manitoba has probably invaded the whole area south of the Canadian Pacific Railway main ine, besides having crossed it in various places. There is no doubt whatever that these rodents make regular migratory movements over the country and that during these periods rivers are no serious obstacles to their travels. The writer has personally followed their tracks on one occasion, for a distance of three miles, made in a single night, and there is little doubt that they travel far greater distances during the hours of darkness.

As was mentioned above, both the house sparrow and the brown rat are dependent upon mankind for their spread and perpetuation. This is true apart from their actual introduction into the country and becomes more so as we pass to colder latitudes such as is met with in the prairie provinces.

It is well known that the house sparrow is closely associated with the haunts of man. They are essentially birds of barns and out-buildings, preferring to nest within such structures and only when this is not convenient do they resort to the trees close at hand. In winter time they are still more dependent upon buildings and when these do not afford additional warmth such as is supplied by the presence of live stock, the birds are obliged to seek winter quarters elsewhere. Thus we have regular, periodic migrations towards the cities and villages in autumn and back to the farms again in spring time. There appears to be also a well-marked movement southward in autumn and northward in spring. These movements are primarily due to the necessity of securing shelter and warmth in winter time especially during the colder periods, when the birds are not able to survive outside. Food is also an important consideration as it cannot be procured in sufficient quantities under normal conditions outside. With reference to cold, observation shows that a temperature of 25 degrees F. below zero causes sluggishness and consequently inactivity. This results in a loss of food which very soon produces death. Without the

warmth supplied by animals or by some artificial means the birds perish very quickly at a temperature of 35 degrees F. below zero, and in Manitoba a single night at a temperature of 40 degrees below zero has been known to destroy an entire flock which was deprived of the warmth supplied by two pigs. All who have observed house sparrows must be able to bring to mind similar occurrences, and the writer has noted dead sparrows in the streets of Ottawa which had evidently succumbed to the low temperature occurring at that time. Thus we see that some form of heat, other than that supplied by mere shelter is necessary to enable house sparrows to survive our cold winter nights and that they are, therefore, dependent upon our assistance, however unwilling it is supplied, to enable them to perpetuate their kind.

Brown rats are also closely associated with mankind. Like the house sparrow they wander far afield in summer time and are found among stooks or stacks of grain, straw piles, as well as in burrows in potato patches, etc. As winter approaches, however, they leave the more exposed places to gather around the farm buildings, and later, as the weather becomes more severe, all outbuildings and those without animals, or artificial heat, are abandoned. Doubtless many of these animals die of exposure while attempting to locate warmer quarters as their numbers have decreased considerably by spring time. As rats, however, have only invaded Manitoba very recently, more evidence is necessary before definite information is available.

The enormous toll taken from the community by rats, and to a lesser extent by house sparrows, makes it desirable that every possible means of destroying them should be utilized. Poisoned baits, traps, guns, and, to a far lesser extent, cats are all useful for this purpose. The first two if used with ordinary precautions and skill will do much to keep these pests within reasonable bounds Weasels, are, also, of much value as destroyers of both rats and mice, and, being able to follow along their runways, soon drive them away or exterminate them. Such facts are well known to all who have made a study of the question and it is not my purpose to enlarge upon them here.

From the evidence presented above it will be seen that another method, especially effective in the case of sparrows, is available. This is nothing more than to entice or drive these birds out of their shelters in the day time during a cold spell and block up the entrance by which they can make their way back. Or if convenient the live stock can be withdrawn from a sparrow-inhabiting building and the doors left open for a night or two. Both methods should prove effective in ridding a farm of the house sparrow pest.

With reference to rats the problem is more difficult but the fact that these rodents congregate in the warmer buildings during winter will enable us to concentrate our attention to those places until such time as concrete foundations can be substituted for those so commonly in use at present.

IMPORTATION OF PINE-APPLES AND BANANAS FROM THE HAWAIIAN ISLANDS

BY an Order in Council passed on February 11, 1918, subsection (*b*) of section 7, which reads as follows:—

The importation into Canada of the following is prohibited:

(*b*) All non-canned fruits, plants or portions of plants or vegetable matter from the Hawaiian Islands.

has been amended to read:—

(*b*) All non-canned fruits, plants or portions of plants or vegetable matter from the Hawaiian Islands, except pineapples (*Ananassa sativa*) and bananas (*Misa spp.*), which may be imported provided they have been inspected by the United States Department of Agriculture, certified free from infestation by the Mediterranean fruit fly, and that the boxes, crates, bales or other containers shall be marked with the name and address of the consignor and the name and address of the consignee and shall bear the original or a duplicate copy of the certificate of inspection.

Importers are advised by the Dominion Entomologist to instruct their shippers fully with regard to the requirements governing the importation of pineapples and bananas from the Hawaiian Islands. The importation of all other fresh fruits, plants, etc., is prohibited.

THE HEALTH OF ANIMALS BRANCH

SWINE FEEDING REGULATIONS

IN view of the interest being generally manifested in the cities and towns of Canada in hog-raising, as recommended by the Food Controller, it would appear appropriate at this time to direct attention in THE AGRICULTURAL GAZETTE to the regulations of the Department with respect to the feeding of garbage. In Section 88¾ of the Contagious Diseases Act this provision is made:

> The feeding of swine upon garbage or swill, either raw or cooked, obtained elsewhere than on the premises where fed, is prohibited, unless special permission in writing is first obtained from the Veterinary Director General.

Raw garbage sometimes contains fragments of uncooked pork which may readily carry the infection of hog cholera to hogs which eat it. Licenses to feed garbage are issued free of charge to parties who apply to the Veterinary Director General, and who provide the necessary appliances for cooking garbage, and will undertake to do so.

For violation of the regulation as here set forth, three men were prosecuted at Edmonton, Alta., during the month of February, that is for feeding garbage to hogs without the necessary license being obtained from the Veterinary Director General. Previous to prosecution these people had been duly warned on more than one occasion by officers of the Health of Animals Branch, but they persisted in their action. Their course was so clearly an infraction of Section 88¾ of the Animal Contagious Diseases Act that proceedings were taken and the men, being found guilty, two of them were each fined $30 and costs and the third $20 and costs.

VIOLATIONS OF THE MEAT AND CANNED FOODS ACT

ON March 11th, the Health of Animals Branch instituted prosecutions in Montreal for violations of the Meat and Canned Foods Act. In one case a merchant was fined $100 and costs for offering for export meats that had not been inspected according to the provisions of the Act, and, in another case, a company was fined $25 and costs for putting to illegal use the inspection legend. In the latter instance, Government labels were used a second time contrary to the law, which especially provides for the destruction of the label containing the legend after it has once been used. Section 3 of the Meat and Canned Foods Act requires every animal slaughtered and all carcasses, portions, or products thereof, intended for food purposes shall be inspected and dealt with according to the regulations.

THE SEED BRANCH

SEED CORN FOR CANADIAN GROWERS

BY GEORGE H. CLARK, B.S.A., SEED COMMISSIONER

IN the March number of THE AGRICULTURAL GAZETTE there was shown the action that was being taken by the Dominion and Provincial Governments to insure to the farmers of Canada an adequate supply of seed of the cereal grains and vegetable seeds for this year, and of the latter for the year following. It can now be stated that an ample supply of seed corn may be expected from the United States to Canada for planting for fodder purposes. A committee of the Canadian wholesale seed trade has assumed full war-time responsibility for the importation of seed corn suitable for ensilage in quantity to meet requirements.

The season in the United States, as in Canada last year, was unfavourable to the ripening of corn, with the result that there is a grave deficiency in the supplies of seed corn of the earlier maturing sorts, such as are usually grown in the central and northern states and Canada. Indeed it is realized that not more than seventy-two per cent of the normal acreage of corn lands in the states north of Kansas, Missouri, Tennessee, and Virginia can be planted with the sorts usually grown in those areas.

A survey of the seed corn situation by the United States authorities has brought out the fact that the supply of seed of the late southern varieties is not plentiful, considering the demand for ensilage corn throughout the northern areas of the United States, and also of Canada. In this matter, as in all others concerning the food situation, the United States authorities desire that the needs of Canada should receive the same consideration as those of the people of the republic. The Seed Stock Committee at Washington have, therefore, arranged with the United States War Trade board so that the supply of seed corn available in the United States will be placed at the disposal of Canadian ensilage growers. They have, therefore, agreed to release, under license, an amount up to five hundred thousand bushels, on condition that all of the orders from Canada would issue from one central governmental organization. Arrangements have, therefore, been made under authority from the Minister of Agriculture with the War Trade board of the United States, whereby all Canadian orders for seed corn will be confirmed by the Canadian Government Seed Purchasing commission.

In conference with representative wholesale seedsmen in Toronto, February 22nd, it was arranged that a committee of the wholesale seed trade will co-operate with the Seed Purchasing commission. This committee undertakes to provide that there will be no shortage of ensilage seed corn for Canada. The committee consists of: A. C. Hogg, of Hogg & Lytle, Limited, Toronto, Convenor; E. F. Crossland of Steele Briggs Seed Company, Toronto; John Rennie of Wm. Rennie Co., Ltd., Toronto; Walter Bruce of J. A. Bruce & Co., of Hamilton; W. McWilliams of Wm. Ewing Co., Limited, Montreal; J. O. Duke, Ruthven, Ont.

It was agreed by the seedsmen that the net profits on seed corn imported under the order of the Seed Purchasing commission, shall not exceed 5 per cent on carload lots and 7½

per cent on less than carload lots in wholesale quantities. The price of the corn is not fixed, and will depend upon the condition of the market when orders are placed.

An order for 100,000 bushels has already been placed by the Seed Purchasing commission with a St. Louis firm. Seed corn ordered from this company by Canadian dealers will come forward under the commission's order, but Canadian seedsmen will have to accept corn grown within the prescribed area. Orders placed with other firms who can deliver corn from this area, may be filled if they are confirmed by the Seed Purchasing commission. Orders for seed corn of varieties not grown in or south of Kansas, Missouri, Tennessee, and Virginia, or from dealers who cannot deliver from this area, will not be filled. For convenience in operating with the Seed Trade committee the work of the Seed Purchasing commission in connection with the seed corn will be handled through the Toronto offices of this Branch, Mr. W. J. Lennox 28 Front St. East.

SEED TESTED IN FEBRUARY

BY E. D. EDDY, B.S.A., CHIEF SEED INSPECTOR

DURING February 2,307 samples were received for test at the Ottawa Seed Laboratory, an increase of 258 over the number received in February, 1917. The number of samples received for germination test in February, 1918, was 1,267 compared with 426 in the same month last year. This increase is largely made up by samples of wheat, oats, barley, corn, peas, beans and field root seeds. The following table indicates the germination test results with some of the principal kinds of seeds reported during February.

	Wheat	Oats	Barley	Corn	Peas	Beans	Mangels and Beets
Number of samples reported	88	325	79	436	40	31	36
Average per cent germination	94	81	93	40	86	70	68
Number germinating up to standard for good seed	59	128	49	95	25	9	4
Number germinating below two-thirds of standard for good seed	1	36	1	293	4	8	14

From the above it will be noted that the average germination of corn samples was very low. Many of the samples received were practically dead. There is also need for precaution in using western grown oats for seed. Quite a large proportion of the bean samples were weak in vitality.

The number of samples received for purity test in February, 1918, was 1,196, about 500 less than a year ago. On account of the light crop and general scarcity of clover seed, fewer samples have been submitted for test. The following indicates the grading of the clover and timothy samples during February: Timothy: total, 361; No. 1, 45; No. 2, 126; No. 3, 91; rejected, 99. Red Clover: total, 405; No. 1, 101; No. 2, 127; No. 3, 119; rejected, 58. Alsike: total, 170; No. 1, 36; No. 2, 54; No. 3, 38; rejected, 41. Alfalfa: total, 25; No. 1, 10; No. 2, 11; No. 3, 4. Mixtures: total, 54; No. 1, 1; No. 2, 21; No. 3, 15; rejected, 17.

At the Calgary Seed Laboratory 7,145 samples were received for test from September 1st to February 28th. Of these 2,951 were received in February and 2,503 in January.

PART II
Provincial Departments of Agriculture

RECENT AGRICULTURAL LEGISLATION

QUEBEC

AT the recent session of the Quebec provincial legislature the following amendments to existing legislation affecting agriculture were passed:—

1. Under Bill No 19, the European Rust of currants and the White Pine Blister Rust were added to the list of injurious pests, enumerated in Article 2041-1 R. S. Q., and authority was given to the Lieutenant-Governor in Council to extend the application of the section to other destructive insects and plant diseases.

2. (a) Under Bill No. 48, agricultural associations are authorized to make the members' fee $2.00, instead of $1.00, as heretofore, by resolution passed at any general, annual, or special meeting.

(b) The object of the second amendment to the law of agricultural associations is to enable 25 members to apply to the Minister relative to the decision of the County Council as to matters affecting exhibitions when they are not satisfied with such decision.

(c) The third amendment refers to the payment of services rendered.

(d) The fourth amendment changes the date of the annual meeting from the second Monday of January to the third Wednesday.

(e) Under the fifth amendment, local municipalities not including more than five practising farmers, are not allowed to appoint a member to the board of directors of the association. The object of this amendment is to prevent small towns from obtaining control of agricultural associations.

3. Bill No. 49, concerning agricultural clubs, changes the date of the annual meetings to the second Tuesday in January instead of the second Wednesday.

4. Bill No. 50 amends the law of agricultural co-operative associations and:

(a) Provides that all shares, while remaining at $10.00 as in the past, shall be payable in five annual instalments of $2.00, instead of ten instalments of $1.00, and authorizes the association to decide by regulation that the shares shall be payable in less than five instalments, and to fix the amount of each.

(b) Another amendment to the law of co-operative associations embodied in article 6 authorizes co-operative associations to pay a maximum dividend of 8 per cent instead of 6 per cent.

APPROPRIATIONS FOR AGRICULTURE

The appropriations for the fiscal years of 1917-1918 and 1918-1919, ending June 30th, are as follows:—

	1917-18	1918-19
Civil Government	46,500.00	50,850.00
Agricultural Societies	100,000.00	120,000.00
Farmers' Clubs, encouragement of agriculture in general, including subsidy to the South Shore Railway Co., land clearing competitions, lectures on agriculture, etc	100,000.00	255,000.00
Agricultural and Horticultural Society of Montreal	500.00	500.00
Pomological and Fruit Growing Society	500.00	500.00
Horticultural Society, Quebec	500.00	.....
Council of Agriculture	3,000.00	3,000.00
Agricultural Schools	30,000.00	40,000.00
Veterinary Instruction	5,500.00	6,000.00
Housekeeping Schools (Ecoles ménagères)	10,000.00	21,000.00
Dairy Association of the Province	2,000.00	2,000.00
Dairy School of St. Hyacinthe and making of the farm	10,000.00	15,000.00
Dairy industry and inspection of factories	87,000.00	127,000.00
Horticulture	5,000.00	6,000.00
Official Laboratory of the Province	2,000.00	4,000.00
Lectures on Agriculture	9,000.00	.....
Journal of Agriculture	27,000.00	27,000.00
Aviculture	3,000.00	6,000.00
Provincial Agricultural Merit	3,500.00	6,000.00
Arbor Day	100.00	.....
Exhibitions	30,000.00	34,000.00
Totals	$475,100.00	$723,850.00

SASKATCHEWAN

A NUMBER of Acts were passed at the recent session of the Provincial Legislature referring to agricultural matters. These were, however, mainly measures amending Acts previously in force. The Municipalities Seed Grain Act revises and consolidates the old Act, one of the new provisions being that in case the sum required for seed grain does not exceed $2,000.00, the money can be raised under the authority of resolution of the council, instead of being referred to the ratepayers. The latter course is necessary when it is desired to exceed that amount. It is especially pointed out that councils should only make use of the Act after every effort has been exhausted by the farmers to secure the necessary grain in the seeding seasons.

STALLION ENROLMENT

The Horse Breeders' Act has been changed so that every stallion in the province must be enrolled, and so that no stallion over thirty months old taken into Saskatchewan can be offered for sale without enrolment. Every stallion must also undergo examination. Until this is done, no certificate will be issued for service. The certificate will be issued by the stallion board on recommendation of the examiners. For pure-breds, there will be three classes of certificates—the first for horses true to type, of good conformation, and thoroughly sound; the second for horses up to standard in every other way, but inferior in conformation, and the third for horses having some unsoundness not of a hereditary nature, but due to accident. All grade horses must be sound and of good conformation. Provision is made for the issue of the certificates to all horses which have previously been examined, and permits are to be issued to others until such time as the examination can be made. Municipalities retain the right to state whether they will allow grade stallions to travel within their boundaries, and if it is considered that there is a sufficient number of pure-bred stal-

lions in the municipality, upon petition to the Minister of Agriculture, a municipality may be incorporated as an "approved stallion district" in which no grade horses will be permitted to render service. There is no positive provision preventing the keeping of an unenrolled stallion, but, in such a case, there must be no route bill or breeding cards printed or posted, no advertisement issued, or any charge made for service. The schedule of fees is as follows: For a certificate of enrolment, $5; for duplicate, $1; for transfer of certificate, $1; for annual renewal of certificate, $1; for examination, $5. The Act came into force on the first day of February this year.

LIVE STOCK PURCHASE AND SALE

The Live Stock Purchase and Sale Act has been amended by striking out the section which made it necessary for a purchaser under the Act to be either a patron of one of the co-operative creameries operated by the Department of Agriculture, or to be a member of one of the societies or associations organized for the purposes of this Act or for live stock improvement.

The Act incorporating the Saskatchewan Co-operative Creameries, Limited, is amended by prohibiting any incorporated company hereafter organized with similar objects, from using the word "Saskatchewan" as any part of its name. The schedule to the Act is amended by increasing the sixteen companies originally constituting the ama'gamation to nineteen.

AGRICULTURAL SOCIETIES

The Agricultural Societies Act is amended by making provision for the formation under the Act of boys and girls' clubs and farmers' clubs that may encourage manual and domestic training among the young and promote the formation of school gardens, gopher, and weed clubs. The age of persons entitled to sign an application for the organization of an agricultural society is changed from eighteen years to twelve years. Persons may become life members of agricultural societies on a payment of $15 to the funds, and if fifty or more such life members are secured, a Government grant will be made equal to one-half the amount collected for life membership. Several changes have been made in regard to the grants. The membership grant is fixed at 25c per member for societies having a membership of one hundred to one hundred and fifty, and 50c per member for societies numbering from one hundred and fifty to two hundred members. To earn this grant, a society must be represented at the annual agricultural societies' convention. A grant will be paid of half the cash prizes paid in connection with exhibits, competitions, any kind of agricultural shows, seed fairs, etc. If a society chartered prior to November 1, 1917, has been in existence less than five years, a grant will be made on the basis of two-thirds of the prizes paid in connection with the exhibitions and competitions until the end of five years from the date of its organization. A grant up to one-half the disbursements incurred in providing speakers, not exceeding $25, will be paid to societies holding at least five meetings for the dissemination of agricultural knowledge. The total amount of the grants, exclusive of the life membership grant, must not under the Act in any year exceed $750, except in cities and towns with three thousand population, when the grants may amount to, but must not exceed, $2,000.

FARM LOANS

The Saskatchewan Farm Loans Act has been amended by the addition of a clause providing that the Provincial Treasurer can raise by way of loan the sum of ten million dollars instead of five million, as before, for the purposes of the Act. This last amendment makes it possi-

ble for the Provincial Treasurer to advance a sum up to the total amount of the mortgage before the mortgage is deposited with him. It will now be feasible to seize any favourable opportunity to sell enough securities so that there may always be sufficient money on hand to meet required advances.

WILD LANDS TAX ACT

The Wild Lands Tax Act is largely new in its provisions. It provides for taxation at one per cent of the assessed value on the wild lands in each municipality. The lands to be subject to the tax are described as:—

All the land of an owner in the municipality when it does not exceed 320 acres in extent and when less than one-quarter of its area is under cultivation upon the first day of August of the year in which the assessment is made, unless the owner actually resides on the and, or resides on a farm of at least eighty acres in area situate within a distance of nine miles therefrom in a direct line; or resides upon a farm of that area and so situate, owned solely and occupied by his or her father, mother, son, daughter, brother, sister, husband, or wife; provided that if the individual owner is absent on active service in the wars of the Empire, he shall for the purpose of this section be deemed to be in actual residence. All the land of the owner in the municipality when it exceeds 320 acres, but does not exceed 640 acres in extent, and when less than one quarter of its area is under cultivation upon the first day of August of the year in which the assessment is made. All the land of an owner in the municipality when it exceeds 640 acres in extent and when less than one-half of its area is under cultivation upon the first day of August of the year in which the assessment is made.

"Cultivated," or "under cultivation," means improved for any agricultural purpose, such as cropped, ploughed, summerfallowed, or used as garden land; and cultivated land includes hay lands from which the hay is cut annually and lands actually used for pasture and surrounded by a fence consisting of not less than two strands of barbed wire attached to substantial posts not more than twenty feet apart.

Under the previous law secretary-treasurers of municipalities were allowed to charge a small commission for collecting the tax. Under the new Act, the municipality is to receive five per cent of the tax collected, but this goes to the municipality instead of to the secretary.

All crown land and land held by, or in trust, for the use of a tribe of Indians, and land held for the public use of a municipality, and the land of any person not more than forty acres in extent, are exempt from taxation. Wild land valued at $20 an acre has to pay an annual tax of $32 per quarter section, in addition to municipal taxes, the supplementary revenue tax, and patriotic tax.

APPROPRIATIONS FOR AGRICULTURE

Following are the appropriations for the years ending April 30th, 1918 and 1919:—

	1917-18	1918-19
Civil Government	$ 35,830.00	$ 35,130.00
Assistance to General Agricultural Interests	67,600.00	63,000.00
Assistance to Live Stock Industry	50 200.00	50,000.00
Assistance to Dairy and Poultry Industry	18,100.45	15 200.00
Publicity and Statistical Work	23,600.00	18,000.00
Weed Control, Seed Inspection, and Exhibitions	10,900.00	11,300.00
Bureau of Labour	11,100.00	11,700.00
Game Protection and Museum	14 700.00	14 160.00
Miscellaneous Services	2,100.00	500.00
Totals	$234,130.45	$218,990.00

SHORT COURSES IN AGRICULTURE

QUEBEC

MACDONALD COLLEGE

A SERIES of short courses was held at Macdonald College in the months of January and February. These were devoted to the subjects of household science, horticulture, animal and cereal husbandry, poultry, and suburban gardening. With the exception of the suburban gardening course, which was held at McGill University, Montreal, the courses were held at Macdonald College. The instructors mainly consisted of the members of Macdonald College, but federal officers, including Messrs. H. S. Arkell, Live Stock Commissioner; F. C. Elford, Dominion Poultry Husbandman; and W. A. Brown, Chief of the Poultry Division of the Live Stock Branch, also afforded assistance, as well as Mr. P. E. Aird, president of the Montreal Poultry Association. The household science course, which extended from January 22nd to 26th, included cookery, dressmaking, and nutrition. Forty-four pupils attended. The horticultural course, which was held from February 5th to 8th, included studies and demonstrations in vegetables and fruit growing. The class consisted of fifty-five students. The animal husbandry and cereal husbandry courses ran concurrently from February 12th to 15th. Seventy-six students attended this course. The poultry course began on February 19th and ended on the 22nd. It embraced incubation breeding, rearing, and marketing, and one lecture on fruit culture. Fifty-six students were in attendance.

The suburban gardening course, held at McGill University, was designed to assist beginners who had access to pieces of land to produce the utmost of food crops upon it. The attendance was 240.

ONTARIO

ON FARM POWER

A short course on farm power was held at the Ontario Agricultural College during the last two weeks of January. One hundred and fifty students took the course. Eleven makes of farm tractors were used to demonstrate tractor operation. The forenoons were given principally to lectures from charts, and the afternoons to studies of the machines, these including taking down, assembling, and running. The course included the study not only of tractors, but other of farm machines operated by gasoline, by kerosene, and by electricity.

MANITOBA

BY W. R. ROBERTS, B.S.A., DISTRICT REPRESENTATIVE, BINSCARTH

THE popularity of gas engines was enhanced materially in the district of Russell when the short course fortnight came to the town.

One farmer, a successful old timer, expressed his appreciation, when he said, that "it was the very best thing that could come to the district." His reasons were based on the practicability of such a course for farmers.

The instruction in live stock was very ably given by J. R. Bell, B.S.A., District Representative, Portage la Prairie. Lecture periods were given in the mornings and practical periods in live stock judging in the afternoon.

The farmer students, though of long experience with stock, found it rather embarassing to give reasons for their placings, without knowing a systematic outline to follow in doing so. Much progress was made before the end of the course. Horse judging created an interest that will stay. The desire is for more of this class of education. This branch of the school alone was worth while.

In gas engineering, lectures were given in the mornings and shop practice in the afternoons, by Messrs. Smythe and Allin.

The normal farm boy loves an engine. The popularity of gas engine work was much in evidence in the shop, where several stationary engines and tractors were used.

The weather was very cold to work the tractors, but, nothing daunted, these interested students were anxious to know all that could be learned during the limited time at their disposal.

Scarcity of labour makes it imperative to know how to operate labour-saving machinery efficiently. The patriotism of the farmer will not languish, if devices will help to keep up production.

Interesting work was also done with grain and poultry under the direction of H. E. Walker, B.S.A., and J. E. Bergey, B.S.A., respectively.

This short course is one of the nineteen held throughout the province during the winter months.

The Department of Agriculture through these courses comes in direct contact with the people it represents.

The contact is a happy one, in that it establishes confidence in the service which the Department seeks to give.

The promotion of agriculture depends largely upon the development of uniform and economical methods of farming, which these courses uphold.

WAR-TIME POULTRY RATIONS

SASKATCHEWAN

BY R. K. BAKER, B.A., PROFESSOR OF POULTRY HUSBANDRY, UNIVERSITY OF SASKATCHEWAN

OWING to the difficulties of obtaining corn or Government standard screenings, which our poultrymen would like to use as substitutes for wheat, we have suggested to them modifications of some of the standard rations. The following is a fair example:—

Scratch Feed:—Shrunken wheat, 30 lb., barley, 30 lb.

Dry Mash:—Bran, 8 lb.; shorts, 10 lb.; crushed oats, 16 lb.; meat scrap, 6 to 8 lb.

This is supposed to be fed in the proportion of six pounds scratch feed to four pounds dry mash. Where sour milk or butter milk are available these may take the place of meat scrap. In addition to the above the poultry would require vegetable feeds as well as grit and oyster shells and granulated bone.

ALBERTA

BY A. W. FOLEY, POULTRY SUPERINTENDENT

AT the provincial poultry plant the rations used correspond fairly closely with those recommended by the Eastern States agricultural colleges. Modifications have been made on account of difficulty in securing some of the grains. I have never been able to secure a substitute for wheat that proved entirely satisfactory. This is also the experience of leading members of the poultry associations in this province. Elevator screenings are not available, and if they were our poultry men do not care much for them. In our egg-laying competition we used the following rations:

DRY MASH

	Lb.
Bran	25
Shorts	25
Oat Chop	25
Alfalfa Meal	12½
Bone	5
Charcoal	1
Barley Chop	12½

This mixture is constantly before the birds in self-feeding hoppers. Beef scrap, oyster shell and grit are also kept before the birds in hoppers.

WET MASH

A wet mash consisting of the dry mash ration to which boiling water and 15 lb. of beef scrap is added and shorts to partially dry the mash is fed three times a week in the evening.

GRAIN RATIONS

A light feed of whole oats is given each morning in the litter. During the winter a light feed of wheat, oats, or barley and, occasionally, a little corn is given at noon to insure exercise. Whole wheat is fed in the evening, when no mash is given.

GREEN FOOD

Throughout the winter months alfalfa and sprouted oats are given as green feed. During the summer months sufficient green feed is produced in the runs.

NOVA SCOTIA

AGRICULTURAL INSTRUCTION ACTIVITIES

BY J. S. ARCHIBALD, B.S.A., DEPARTMENT OF CHEMISTRY, AGRICULTURAL COLLEGE

EXTENSION WORK IN GUYSBORO COUNTY

IN past years Guysboro has been looked upon more as a fishing and lumbering county than as an agricultural one. Now, however, a change is in evidence and it is steadily rising to a position of importance in the farming industry. In May of 1916, Mr. A. B. MacDonald, a graduate of the Nova Scotia Agricultural College, was appointed Agricultural Representative for the county, and it is gratifying to know that he reports improvement in all lines of farming. At the time of his appointment pioneer work had to be done in getting the farmers to realize the value of improved seed grain, increased cultivation, better breeding and such like. To-day there are many calls from the county for high-priced bulls, registered seed, improved farm machinery and other requisites of improved agriculture.

Under Mr. MacDonald's direction the county held its first short course in January of this year. The course continued for three days and judging from the average attendance, which was over 100, it would seem that the farmers are interested in better farming and are anxious to do more than in the past. Five members of the staff of the Agricultural College at Truro were present and conducted the classes in seed judging; judging of horse, dairy and beef cattle; soil cultivation; potato spraying, and the use of fertilizers.

Ever since starting work in the county, Mr. MacDonald has devoted considerable attention to getting the school children interested in work on the farm. School gardens were worked in many places last year, lectures in the school room have been given, and as Mr. MacDonald puts it himself, "I never lose an opportunity of calling at the country schools, even if I have only time to explain to the children one single idea of farming."

One good result of the work he has done among the school children has been the organization of the boys of Guysboro town into a poultry club known as the Chedabucto poultry club. On the last two days of the short course the club held a poultry show. Being the first one held in the county it proved more successful than was anticipated. Over two hundred exhibits were brought in, and the quality was by no means poor. This club is making arrangements to get the rural school children interested in the keeping of pure-bred poultry and in housing and caring for them in a better manner.

HANDLING BARN-YARD MANURE

Prof. J. M. Trueman, of the Animal Husbandry department at the College of Agriculture, has carried on during the past year some experiments on different methods of handling barn-yard manure. The results are rather interesting, and, while Prof. Trueman does not consider them as at all final, they are given for what they are worth. His report is as follows:

In order to gain some little data as to whether or not it is wise to spread manure on frozen ground covered with snow, an acre of the cornfield was divided into halves, and one half covered while in the above condition in February, and the ther half left until spring. In order to give each piece the same amount and kind of manure, one load was spread on the piece selected to

be covered in the winter, and the next load was placed in a pile on the other half acre. This was continued until ten loads had been spread and ten loads put in the pile. After the pile of manure had thawed out in May and the ground had also thawed the manure in the pile was spread.

The corn when cut showed rather the heaviest yield from the half acre on which the manure was spread in the winter. This was fairly level land with no chance for any great amount of washing to take place, The yield obtained was as follows:

Golden Glow corn cut green for silage—

Manure spread in winter...	13,492 lb.
Manure spread in spring....	11,603 "
Gain from winter spreading.	1,889 "

It would appear that there was considerable gain from winter spreading in this case. At any rate it is safe to say that spreading on the frozen ground did not cause any loss in the fertility contained in the manure. The soil on the two halves was of equal fertility as far as could be determined, and they had both received the same treatment for the past five years at least.

QUEBEC

HOMEMAKERS' CLUBS' CAMPAIGN

BY FREDERICA MACFARLANE, HOMEMAKERS' CLUBS DEMONSTRATOR

THE Quebec Homemakers' clubs, true to their motto "For Home and Country," are planning to do their part in the production and conserving of food. By reason of the fact that these clubs are organized in country towns and rural districts, and also on account of the nature of their studies and the instruction given them by their demonstrators during the past three years, they are well qualified to help in this most necessary and urgent duty.

The success of the plan will depend largely upon the organizing ability of the Homemakers and the patriotism of the vicinities in which they work.

The plan is as follows:—

1. That each club immediately organize, under the leadership of one or more members, all the girls in that community.

2. That a canvass be made of every woman in that community to join with the club in this new movement.

The girls' organizations in conjunction with the clubs hope to help in some of the following ways:

1. By growing more vegetables, especially potatoes, beans, peas, etc., and by canning all the perishable vegetables not needed at once for food, while they are yet fresh and tender. The necessary equipment and supervision for this work to be arranged by each club to suit the needs of its community.

2. By raising those seeds for their own use of which there may be a shortage next year.

3. By picking and canning all fruit both wild and cultivated which might otherwise go to waste.

4. By raising more chickens to take the place of beef, and canning the surplus product.

5. By each housekeeper producing and preserving at least her own supply of eggs for the year.

6. By getting out the sap buckets and increasing the supply of maple sugar, and urging the use of substitutes for cane and beet sugar in candy making.

7. By making the soap for laundry purposes out of bones and the fats not used for food.

8. By doing all in their power to encourage any movement along the line of production and conservation; such as School Fair projects, "Keep a pig" and "Grow more wheat."

ONTARIO

SHEEP AND CATTLE RANCHING IN ONTARIO

BY C. F. BAILEY, B.S.A., ASSISTANT DEPUTY MINISTER OF AGRICULTURE

DURING the past summer the Ontario Government had a survey made of the waste lands of Ontario with a view to getting some idea of their value for sheep and cattle ranching. From the report received we find that there are millions of acres of this land, a large part of which would seem to be suitable for ranching purposes. At the present time there are upwards of 40 ranches varying in acreage from 600 to 85,000 acres. The majority of them, however, are not carrying very much stock and are somewhat handicapped for the lack of capital. There are, however, a number being conducted on a fairly large scale and with apparent success.

Before any great amount of capital is likely to become interested in the ranching business more definite information as to the cost of operating, building equipment, methods and costs of land clearing, methods of feeding and caring for stock, marketing problems, etc., will have to be solved. With this in mind plans are under way to establish a combination cattle and sheep ranch. Ten thousand acres of land, where average conditions exist, will be selected for this purpose. This ranch will be run on practical lines and accurate accounts will be kept of all the operations, so that facts and figures will be made available to anyone who may be interested in ranching.

Close observation will also be made of the ranches that already exist, so that we may learn at first hand of the conditions, and assist ranch owners in solving their problems. It is hoped through this plan to do much to foster the ranching industry in Ontario, and to put ranching on a more permanent and profitable basis.

VINELAND EXPERIMENT STATION

A valuable part of the work of the Horticultural Station at Vineland is to test out various new varieties put on the market by nursery men and others, and to secure for testing promising seedlings or bud sports, which quite often occur throughout fruit growing districts. The station has prepared lists of new, or noteworthy, varieties not at present grown in the test block, and invites fruit growers and nursery men anywhere in the province to send names of fruits which, in their opinion, should be tested. Correspondents are asked to supply also information concerning such seedlings and such new varieties as they possess.

JUNIOR FARMERS' IMPROVEMENT ASSOCIATIONS

BY R. S DUNCAN, B.S.A., DISTRICT REPRESENTATIVE SUPERVISOR

DURING the past few years the District Representatives of the Ontario Department of Agriculture have been conducting a 4 to 6 weeks' course in agriculture in their respective counties for farmers' sons ranging in age from 16 to 30 years. The attendance ranged from 15 to 70 with an average of 25 to 35. It was felt that there should be some

organization by which these young farmers, who were the rising hope of the agricultural community, might be held together in order that the new ideas which they received, the new methods learned, and the inspiration and enthusiasm which had been created would not fall on barren ground and remain dormant.

In 1914 the first Junior Farmers' Improvement Association was organized at the close of the special courses in agriculture. At the beginning of 1918 there were 82 such organizations with a total membership of 1,521.

THE OBJECT

Briefly stated, the object of the association is to create a deeper, more permanent and more intelligent interest in all that pertains to agriculture in its broadest sense. The movement is progressing very rapidly, and I am firmly convinced is now one of the most important features of District Representative work.

Membership Button

The advantages of organizing the boys in the agricultural classes are obvious. Much more effective work can be undertaken and the active organization has proven to be the means of keeping the young men interested in better agriculture.

The organization is usually called by the name of the place where the class is held. The boys are encouraged to hold regular meetings, which, however, are usually dispensed with during the summer months.

The Junior Farmers' Improvement Association has a four-fold object in view—educational, social, research and investigational, and financial. The meetings during the winter months partake of the nature of addresses, debates, mock parliaments, literature and music. During the summer, the Junior Farmer's Improvement Association in the district usually hold a picnic and conduct an automobile tour through certain districts.

TO CONDUCT COMPETITIONS

In addition to the educational meetings the Junior Farmers' Improvement Association members take part in conducting the various competitions, such as acre profit, feeding hogs for profit, baby beef, and dairy profit, which are carried on through the District Representatives.

In several instances some of the members have been loaned a set of milk scales for a year on condition that they will keep accurate records of milk produced and feed consumed in connection with their dairy cows. At the conclusion of the test the young man gives the results of his experience to the other members of the association at one of the regular meetings. Invariably this young man purchases a set of milk scales and continues recording weights to weed out the unprofitable cows.

Another feature worthy of mention is the conducting of live stock judging competitions at fall fairs for junior farmers. In addition to this we have the inter-county live stock judging competitions conducted at the Guelph and Ottawa winter fairs, which create a great deal of rivalry amongst the boys, to say nothing of their educational value.

THE OFFICERS

At the time of the Canadian National Exhibition held in Toronto last September, steps were taken to organize a Provincial Junior Farmers' Improvement Association. Unfortunately the meeting was not well advertised, and, as a consequence, only a few were in attendance. The officers elected at that meeting were as follows:—

President, R. H. Crosby, Markham, York County; vice-president, Cuthbert Howell, Brant county; sec.-treasurer, J. A. Snider, Downsview, York county; executive, W. W. Lord, Campbellcroft, Durham county, Wm. Peart, Haldimand county.

THE CONSTITUTION

A constitution has been drafted, which will be submitted to the local branches and to another meeting, when it is hoped there will be more Junior Farmers' Improvement Associations represented.

Very effective work can be accomplished through the Junior Farmers' Improvement Association, and the movement should be fostered and receive every encouragement.

The following is the constitution:

CONSTITUTION OF THE.....JUNIOR FARMERS' IMPROVEMENT ASSOCIATION

1. This association shall be known as the Junior Farmers' Improvement Association.

2. The object of the association shall be to create a deeper and more permanent interest in the agricultural life of the district;

(a) By the dissemination of agricultural learning among its members leading to improved farm methods;

(b) By conducting competitions, such as the acre profit competition, in the production of field crops;

(c) By conducting competitions, such as the feeding of hogs for profit, dairy profit and baby beef competitions, in the production of live stock;

(d) By arranging for live stock judging competitions at the local fall fairs;

(e) By conducting simple experiments on the farm in cow testing, commercial fertilizers, spraying, pruning and thinning, underdrainage, apiculture, poultry, etc.

(f) By the introduction of better varieties of farm crops.

3. The officers of the association shall consist of a president, vice-president, secretary-treasurer, a committee of management and two auditors.

4. The association year shall commence the first day of March of each year.

5. The association shall hold at least two meetings each year, and, if possible, monthly meetings. The meetings shall be held at or near the place where the course in agriculture was conducted.

6. The membership of the association shall be limited to those who attended the course in agriculture arranged by the local Department of Agriculture.

7. Any *bona fide* farmer under 30 years of age may become an associate member of the association.

8. Each member shall be notified in writing of all meetings of the association at least five days previous.

9. Ten members of the association shall constitute a quorum for the transaction of business.

10. An annual membership fee of twenty-five cents shall be levied.

11. The constitution of the association may be amended by a majority vote at any regular meetings.

THE CHAMPION JUNIOR JUDGING TEAM

THE championship judging teams of four Junior Farmers at the Ontario Winter Fair, held at Guelph in December and at the Eastern Ontario competition held at Kemptville Agricultural School toward the end of January, met at the Toronto Stockyards on February 14th and 15th to decide which team was the better judge of beef cattle, dairy cattle, horses, sheep, and swine. The Western Ontario team, trained by J. C. Steckley, B.S.A., District Representative in York county, won over the G engarry team trained by D. E. MacRae, B.S.A., District Representative, by one hundred and eighty-nine points. Messrs. W. J. Bell, B.S.A., Kemptville Agricultural School, and J. P. Sackville, B.S.A., Ontario Agricultural College, were the judges.

THE MOTION PICTURE IN AGRICULTURE

BY S. C. JOHNSTON, B.S.A., DIRECTOR, MOTION PICTURE BUREAU

REALIZING the possibility of the motion picture in the realm of education, the Ontario Government in 1917 organized a Motion Picture Bureau in the Department of the Provincial Treasurer. The work entrusted to the Bureau was to prepare films suitable for the dissemination of information of practical value to the general public, and to establish a library of all Government films to be distributed as required by the various Departments.

While a large number of films have been prepared for the various Departments of the Government, this article is intended to briefly describe the work done for the Department of Agriculture and the plan of film distribution to be followed out.

EDUCATIONAL PROGRESS

Agricultural education, as well as all other forms, has, during the past few years, undergone many rapid changes, and it is becoming generally recognized that the methods which prevailed 10, or even 5, years ago, are not the acme of success to-day. It is still true that much good can be done through the spoken word, but it is also realized that the eye plays an important part in present-day education. Books, addresses and slides interest, and, in a great many cases, whet the imagination, so that people become anxious for more explicit information and to see things as they really are. The motion picture fills this need in that it enables people to see things as they are, and makes impressions on the mind that are lasting and that accomplish much good.

There remains no doubt whatever that the motion picture has completely won over the great public—the many millions who are constantly seeking fresh fields of diversion and amusement. In the past, the motion picture has been largely a form of town and city entertainment, but of late it is becoming, largely through the efforts of producers and theatres, a live factor in the educational life of these people. It is the belief of the Government that the pictures, depicting life, the efforts and experiences at home, and in other parts of the world, and the fun and humour depicted therein, should be made available to the people of the country and rural hamlets. Motion pictures are being used to supplement the work of schools, colleges, churches, hospitals, etc., and more or less in agriculture.

PRACTICAL PICTURES

In view of the ever-increasing educational value of the motion picture, the Bureau has prepared for the Department of Agriculture during the past 8 months, some 45 educational motion picture films. These have been made with a view to extend agricultural education by showing the most up-to-date method of general farm work. It is a recognized fact that many in the province have neither the time, nor the opportunity, to visit the Agricultural College, and the Bureau has made a number of films under the direction of several members of the staff of the College, and thus hopes to bring the College in closer touch with the general farming communities. It can be readily understood that it is difficult for all wool-growers in the province to understand how their wool was handled in 1917 at Guelph. The film "Ontario Wool" shows how the wool was graded, stored, weighed, and made ready for shipment. The farmer will readily "see" how his wool was handled, and will be in a better position to prepare for further co-operative selling of wool.

It is not always possible to secure the best type of animal for short course work during the winter months. The films on the conformation of the dairy cow; the heavy draft horse, and the conformation of a beef animal, have been so arranged that where it is not convenient to demonstrate on a live animal the screen may be utilized for bringing to the attention of the audience the important features sought for in live stock. The following is a list of the films prepared and available for general use throughout the province:

Potato Growing.
Forcing Lettuce in the Greenhouse.
Greenhouse Tomatoes.
Pruning Apple Trees of Various Ages.
The Wintering of Bees.
Box packing of Apples.
Marketing the Peach Crop—Niagara District.
The Marketing of Live Stock.
Rearing Chickens.
Incubation.
Killing and Dressing Poultry.
The Conformation of a Holstein Dairy Cow.
The Conformation of a Beef Animal.
The Heavy Draft Horse.
The Parts of a Bee Hive.
Handling Bees.
The Home Canning of Vegetables.
Onion Growing in Ontario.
Celery Culture.
Forcing Rhubarb.
The Parts of a Plant.
The Rural School Fair.
The Market Types of Beef.
The Testing of Milk for Butter Fat.
Judging Competition C.N.E., 1917.
The Blue Cross Ambulance.
Ontario Wool.
The Back Yard Garden.
Back Yard Garden Methods.
Back Yard Garden Appliances.
The Sediment Test of Milk.
The Acidity Test of Milk.
The Curd Test.
Ontario Creamery Butter.
The Community Canning Centre.
The O.A.C. No. 72 Oat.
Treatment of Grain for Smut.
Growing Mangle Seed.
Farm Drainage.
The Provincial Ploughing Match.

In addition to the foregoing, several films of agricultural methods and progress in Northern Ontario are available.

DISTRIBUTION

The District Representatives of the Department, of whom there are 45 in the province, have each been supplied with a portable, safe, motion picture machine and storage battery, so that motion pictures may be shown in any part of their respective counties, whether electric power is available or not. It is hoped, by making at least 3 copies of each film, to institute a regular scheme of distribution, which will supply each Representative with 2 or 3 educational films per week. As a supplement to these he will also be provided with reels of comedy, drama, travellogue, etc., so that he can entertain as well as instruct. Already the majority of the Representatives have been supplied with a number of these films, which, in all cases, have been used at short courses and special meetings to good advantage. It can be seen that though the District Representative office is the chief source of distribution, it is but one of many. Others include the county boards of agriculture, association conventions, special meetings, exhibitions, winter fairs, and women's institutes. In connection with the last mentioned organization a three weeks' series of meetings has been arranged in East Simcoe. At each of these meetings, many of which will be held in the smaller villages of the district, motion pictures will be shown, thus bringing to the people of this county a new form of education, entertainment and interest. Other series of meetings similar to the foregoing, are under contemplation and may cover many parts of the province in the near future.

In addition many thousands of farmers and visitors to the Toronto, Ottawa, London and other large fairs, as well as the Guelph winter fair, were given an opportunity of seeing pictures dealing with the dairy cow; the care, shipment and co-operative sale of wool, forest protection in Northern Ontario, etc.

Through the motion picture it is hoped to disseminate reliable information on agricultural subjects of vital interest to the farmers of the province in an interesting, satisfactory manner. The advantage of the motion picture method is that the hand of the demonstrator on the subject matter contained in the picture is easily seen by every person present, and not confined to the few within hearing or seeing distance of the speaker or demonstrator. These and many other advantages are being seized upon by the Department in its effort to give efficient information and instruction to the mass of Ontario farmers.

SASKATCHEWAN

CULTIVATION AND USES OF FLAX

BY W. E. H. STOKES, EDITOR "PUBLIC SERVICE MONTHLY"

A NEW linen, or imitation lined, has been produced from ordinary flax grown on farms in Saskatchewan for seed purposes. Some fifty articles made from this new material have been on exhibition at the Parliament Buildings, Regina, and comprise:—

Yarns drawn and spun up to 4,500 feet to the pound ready for weaving into heavy sacking, burlaps, or heavy towelling;

Commercial twines, heavy qualities with glazed surfaces and fine qualities with waxed surfaces, having a wholesale value ranging from 50c to 83c per pound.;

Binder twines of a soft even surface being three ply spun and giving 750 feet and 900 feet to the pound, with a breaking strain at 60 and 50 pounds respectively, not varying more than 2½ pounds either way.

Tests of this binder twine in the field gave 99 per cent of well bound sheaves, a better result than when sisal twine was used with the same binder.

The preparation and treatment of raw flax fibre is simple and cheap, and can be carried on under cover at all seasons of the year. The treatment gives a spinning value of 4,500 feet to the pound with the permanent qualities of linen, and is immune from the activities of gophers, mice, or crickets.

The acreage under cultivation in the three Prairie Provinces to flax in 1917 was: in Saskatchewan 700,000, in Alberta 230,000, and in Manitoba 63,000 acres, or about 1,000,000 acres in all, which produces on an average 1¼ tons of straw to the acre, a total amount of 1,250,000 tons. The result shown from the manufacture of unretted fibre was that at least 270 pounds of the unfinished article, either yarns or twines, can be made from one ton of straw. Saskatchewan uses about 23,000,000 lb. of twine per annum; there is, therefore, sufficient raw material grown in the province to furnish binder twine to ten provinces having an equal demand.

Western Canada cannot produce linen at a profit. The short season, early and late frosts, dry climate, high winds, and lack of suitable water, with the high cost of labour, make it impossible to produce linen on a paying basis. Machinery has been invented for taking the fibre from the straw without retting.

Early in 1917 there was an association formed under the name of the Flax Fibre Development Association, with headquarters in Regina, with the object of developing the use of flax fibre as distinguished from linen, and its utilization in the manufacture of the coarser commodities. Those forming the association had

previously been engaged in the flax industry, in improving fibre machinery, or in chemical research for the purpose of simplifying the procedure of treating raw flax. Their laboratory experiments having been successfully completed, the Saskatchewan Government, through the Department of Agriculture, gave financial aid in having experiments carried out on a larger scale, and very satisfactory results were obtained.

The following are the results of the test made of the articles manufactured from the chemically retted flax fibre:—

SOFT TWINES

SIZE	Average Breaking Strain	Fine Finished Twine, Size	Average Breaking Strain
ft. to lb.	lb.	ft. to lb.	lb.
1st, 750	60	1st, 800	60
2nd, 787	42	2nd, 800	40
3rd, 1050	37	3rd, 1050	7
4th, 1125	45	4th, 1500	29

HARD TWINES

1st, 350 ft. to pound, average breaking strain, 123 lb
2nd, 400 ft. to pound, average breaking strain, 112 lb.

ROAD DRAG COMPETITION

THE Department of Highways of the Government of Saskatchewan has for several years been conducting a Road Drag competition throughout the province. This year a modification of the rules that have obtained is being made. The competition is open not only to the councils of organized rural municipalities, but also to duly affiliated automobile clubs and duly organized good road associations in Saskatchewan. Entries will be grouped together in such a manner as to form districts with from ten to twelve competitors each.

THE RULES

Dragging will start officially June next and will end on September 30. Only one entry will be allowed from each municipality, Automobile Club and Good Roads association. The entry of Automobile Club or Good Roads association must be accompanied by the approval of the municipality in which the road entered is located.

The road to be entered must be at least two and no more than six miles long.

Entries will be received up to and including June 1 and no entry wil be considered if it is mailed later than June 1.

Any road which was entered in one of the former competitions will not be accepted for entry this year.

Roads entered in the competition must be continuous grade. New roads to be built this year will not be accepted for entry. Roads graded in former years may be regraded and will then be eligible for entry, but such regrading must be finished prior to June 1.

Every competitor is to put a sign on each end of the road bearing the following legend: "This road is entered in this year's road-dragging competition. (The department of highways will supply, free of charge, to such competitors as apply for same, the necessary signs printed on heavy cotton.)

The competing roads must be kept clear of weeds and all manner of growth from ditch to ditch, very shor grass growing between grade and ditch excepted.

Returns on forms to be furnished by the department of highways must be made regularly every month, and not later than on the date printed at the bottom of the form. They must be filled in complete by both operator and secretary. If returns are withheld until the end of the competition and then sent in a bunch, or if no returns at all are sent, the competitor who in such manner disregards this rule will be disqualified thereby.

THE PRIZES

The prizes to be awarded in each district will be as follows: First prize, $150; second prize, $125; third prize, $100; fourth prize, $75; fifth prize, $50.

The roads of the first-prize winners in all districts will be inspected again after the regular prizes have been awarded, and of these roads the one that is adjudged best will receive a grand prize of $250, the second best a grand prize of $150, and the third best a grand prize of $100.

All the above prizes will be paid in the following proportion: 75 per cent to the competitor winning a prize, and the remaining 25 per cent to the winning operator. This applies to both regular and grand prizes.

The competitive roads will be inspected from time to time during the season, and the condition of the road at the time of entering, the character of the soil, the amount of traffic and other general conditions affecting it, and the state of the road during the season and when the competition closes, will be taken into consideration in awarding the prizes.

The judging will be done by points and the awards of the prizes will be made by disinterested judges appointed by the Department, the decision of the judges being final.

Roads will be judged along the following lines: Beginning of season—1, condition of road before dragging starts; 2, nature and formation of soil; 3, length of road. During season—4, improvement on road in (a) crown, (b) hardness, (c) smoothness; 5, condition of ditches; 6, freedom from weeds; 7, amount of traffic; 8, general appearance. End of season—9, value of returns.

No withdrawal of a road will be accepted after June 1, 1918.

ACTIVITIES OF THE DEPARTMENT OF AGRICULTURE

BOYS' AND GIRLS' CLUB WORK ORGANIZED

MR. J. G. Raynor, B.S.A., formerly District Representative of the Department of Agriculture at North Battleford, has been appointed Assistant Director of Extension and will have full charge of the boys' and girls' club work. It is proposed in the next few months to visit every society, to meet the directors and discuss the advisability and possibility of reaching every boy and girl who is not linked up with some organization whose object is to supplement the work of education.

CO-OPERATIVE MARKETING

A series of meetings have been held throughout the province with a view to stimulate the co-operative shipping of live stock, and the greater production of hogs. As a result of these meetings and from reports received by the registrar of co-operative associations it is shown that there has been a marked increase in the amount of stock marketed co-operatively during 1917. Twenty-five associations report having marketed 444 cars of stock during the year. During the previous year twenty-three associations marketed a total of 241 cars. Reports from these associations would indicate a saving of from one-half to as high as one and a half cents per lb. having been made on shipments marketed co-operatively instead of through drovers and buyers.

LIVE STOCK PURCHASING AGENT

Mr. J. H. Ross, a graduate of the Saskatchewan College of Agriculture, has been appointed Live Stock Purchasing Agent. Mr. Ross thus becomes the chief assistant of Professor A. M. Shaw, recently appointed Live Stock Commissioner.

BRITISH COLUMBIA

CONSERVATION OF HEIFER CALVES AND SOWS

THE Department of Agriculture of British Columbia has issued an appeal to the secretaries of farmers' institutes and other farmers for the raising of heifer calves. Farmers having heifer calves, from good producing cows, that they are not able to raise, are asked to notify the Live Stock Commissioner; and those desiring to purchase stock of this class are invited to advise this official of their wants. It is expected that many useful animals will thus be conserved.

With a view to increasing the number of brood sows kept by the farmers, an exchange column is being opened in the monthly Agricultural Journal, which is sent to all members of Institutes. In this column there will be published the addresses of those who have breeding sows for sale and of those who desire to purchase animals of this class. The secretaries of Farmers' Institutes are urged to bring this matter to the attention of their members.

WHALE FERTILIZER

The Department of Agriculture has purchased for distribution in the province fifty tons of whale fertilizer. It is manufactured from whale meat and blood, the oil having been extracted. Analysis shows it to contain 12.4 per cent of nitrogen. It is being sold to farmers and farmers' organizations at approximately $72 per ton, which includes transportation.

No effort that has to do with the winning of this war is insignificant or unimportant. No community, no individual, has the right to say that what it, what he or she, can do is of no account. Every extra ear of corn, every additional hog or steer, every day's work on a farm by a man or boy who would otherwise be working or playing in some way not connected with the war, counts in the mighty total of the general effort.—*W. Almon Wolfe.*

PART III

Junior Agriculture

DEMONSTRATIONS, COMPETITIONS AND CLASS-ROOM STUDIES IN RURAL LIFE FOR BOYS AND GIRLS.

SCHOOL PUPILS FOR FARM WORK

The Canada Food Board has taken the lead in organizing boys between the ages of 15 and 19 for farm work. Under the caption of "Soldiers of the Soil," the Board has called for the enlistment of 25,000 boys between these ages. Enrolment commenced on March 17th and from that date to the 23rd was known as "Enrolment Week." In towns of under 10,000 population, high school teachers and bank managers acted as enrolment officers, while in larger centres high school teachers, Y.M.C.A. secretaries, together with officers of the Boy Scouts and other boy organizations, enrolled the recruits. Arrangements have been made by the Departments of Education in the several provinces, as detailed below, so that the boys who enlist for this work will not lose their school standing. Every boy between 13 and 19 who gives three months of satisfactory service on the farm will be given a bronze National Honour Badge. In addition he will be paid regular wages, based upon the amount of work which he is capable of doing. The Departments of Agriculture in the various provinces will provide machinery for placing the boys on the farms.

PRINCE EDWARD ISLAND

BY H. H. SHAW, ACTING SUPERINTENDENT OF EDUCATION

LAST year the Prince of Wales College and Normal School, which is really the only high school in the province, continued its classes during the Easter holidays and discontinued the work on May 10th, instead of May 31st. This year the same plan will probably be followed. The rural schools were allowed to substitute spring and fall, instead of midsummer, holidays to enable the farmers to take advantage of the assistance of the children at those times. The same option will likely be granted this year.

NOVA SCOTIA

THE Department of Education of Nova Scotia is doing everything it can to back up the efforts of the Department of Agriculture to increase production. Much literature has been circulated showing the needs, and, in order to make it possible for the school children to join the army of food producers, the following regulations passed by the Council of Public Instruction in 1917 are to continue in force during the present year:—

Ordered that pupils certified by the teacher to be standing well in their grades about the first of May who carry out the programme of the National Service Commission and the Provincial Department of Agriculture by being regularly and effectively employed in helping in farm work for four or more weeks between May 1st and the closing of the school term, may (provided during the rest of the term they

are in regular attendance and doing good class work) have their certified days of such employment if sent to the teacher before the last day of the school term in June, entered in the school register and the school return as days of school attendance, and as such draw their legal proportion of the Municipal school fund.

All such pupils with their days of work thus acknowledged as the equivalent of public school attendance, shall be reported by the teacher through the Inspector to the Education Department which will issue a National Service Certificate to such pupils that will be accepted as a pass certificate into the next highest grade in the school and that will exempt the holder at the provincial examination from the fee of $1.00 for not passing the regular terminal examination of the said grade.

The said National Service certificate will be accepted by the Education Department as an ordinary pass certificate of the high school grade thus passed in the case of applicants for a Teacher's License, provided there appears to have been no breach of good faith on the part of the teacher or employer of candidate.

To further encourage the good work a sort of catechism has been prepared and published in *The Journal of Education* of the province, in which computation is invited of the quantity of material and amount of money that would be saved by doing certain things and the service that is rendered by canning, drying and preservation of fruit and vegetables when in season.

ONTARIO

THE boys and girls in the schools of Ontario in 1917 made a good response to the war-time appeals for increased food production. Many assisted in home gardening as a new activity. Many had gardens of their own for the first time. Scores of schools directed the school-gardening work in the direction of war-time needs. The pupils in their rural schools cultivated war plots in the school fair competitions that were directed all over the province by the District Representatives. Groups of high school girls grew beans and potatoes in community plots. Others worked on fruit farms. Boy Scouts exercised team play in potato growing enterprises. Some assisted in caring for gardens at homes where the men were overseas or had been put out of action. Many raised poultry. A few raised pigs. Thousands assisted on farms.

BOYS AND GIRLS ON THE FARM

In 1916 the Department of Education issued regulations granting examination exemptions to boys for service on the farms. This enabled many to work on the farms from seeding to harvest. In all, 2,717 certificates were granted on proof of the performance of the required service. Of this number 1,166 were given to boys in the public schools and 1,551 to boys attending the high schools. These numbers represent only those who applied for standing. There are no records for the large numbers who withdrew from the schools and who did not request certification.

For the season of 1917, the regulations were extended to allow girls as well as boys to work on the farms. Owing to the scarcity of help in cheese and butter factories, work in these was accepted for exemption on examination also.

For 1918 the same encouragement is extended to pupils who give three months' continuous service on farms. In view of the scarcity of farm help, and of the world food shortage, even larger numbers are expected to go out to help in greater food production.

TRADES AND LABOUR HELP

The Trades and Labour Branch of the Department of Public Works, organized late in 1916, took an active

part in this work during the past year. Professors from the university, who had been brought up in the country, were sent to the high schools to explain the great need of help on the farms and to urge boys and girls to enlist for this service. Literature was distributed. Pupils were registered and sent out to farmers who applied to the provincial employment bureaux. The offices of the District Representatives of the Department of Agriculture were organized as county employment bureaux and hundreds of boys placed through them on farms not too far distant from the boys' homes.

In recognition of the service rendered, bronze badges were distributed to all deserving applicants. Over 1,300 badges were awarded to girls, and over 7,000 badges to boys. To win the badges girls were required to have worked three weeks; the boys' badge was given for three months' work on a farm.

GOOD WORK BY Y.M.C.A FIELD SECRETARIES

The supervision of the boys was undertaken by the National Council of the Young Men's Christian Association. The province was divided into five districts and Messrs. Kingerley, Sidenius, Watson, Poole and Geddes, assisted by Mr. Barnes for part of the time, placed in charge. These gentlemen were all experienced as Y.M.C.A. boys' secretaries and were thoroughly in sympathy with the boys in their new experiences.

Working under the direction of the Trades and Labour Branch, and in conjunction with high school principals and District Representatives, visits were made to the boys at their work on the farms. Each field secretary was provided with an automobile and thus was enabled to cover his territory thoroughly. Lonely boys were looked up, discouraged boys were heartened, difficulties were adjusted. Group meetings of the boys were arranged. Camp fires with "stunts" and "sing-songs" were organized. Meetings were held to interest local farmers and townspeople in the "boy-movement." Ministers were enlisted to take a practical interest in the strange boys in their districts. Addresses were given in the churches on Sunday or at mid-week meetings. No more valuable work on behalf of our boys has ever been done.

MANITOBA

BY R. FLETCHER, B.A., DEPUTY MINISTER OF EDUCATION

THE advisory Board at a special meeting on January 31st, 1918, adopted a regulation whereby pupils in Grade VIII, whose services may be required on the farms this spring, may receive their promotion at Easter on the recommendation of their teachers that they have attended fairly regularly since August last and have covered the course satisfactorily. These pupils will be required to furnish certificates from their employers between June 15th and July 1st, certifying that they were engaged in farm work during the spring.

We are arranging to hold special examinations during the last week of March for pupils in Grade IX, or in Grade X, who wish to assist in farm operations this spring. This will furnish an opportunity to those students who have attended fairly regularly and covered the work to secure their standing and thus have a clear field when they return to school after mid-summer. It will prevent the granting of standing to those pupils who entered the schools late last fall and who would expect to

be recommended for promotion at Easter if last year's regulations were applied.

Last year we arranged for an examination for Grade XI students in December to provide for those pupils of that grade who might be at work during the spring, but the number taking advantage of this was so very small that we have decided to conduct only the usual Grade XI examinations this year. We cannot grant exemptions in this grade, as the students go from it to the university or the normal schools.

SASKATCHEWAN

THE Minister of Education for Saskatchewan has decided that students in actual attendance at a high school or collegiate institute, or at schools doing high school work, and whose services are required for urgent farm operations may, on application to the Deputy Minister, and on the recommendation of the principal or teacher, be permitted to proceed to the work of the next higher form without examination, conditionally: that they have been in regular attendance for at least six months immediately prior to the time of such employment; that their work has been satisfactorily reported upon by their principal or teacher, and that they enter upon their employment not later than June 1 this year. Students complying with these regulations can also be granted cards of admission to the provincial normal school on conforming with the other conditions of admission required by the Department.

THE REGULATIONS

Following are the regulations *in extenso* adopted by the Department of Education.:—

1. All students who are needed to assist in seeding operations shall apply to the teacher, or principal, who shall satisfy himself that the application is made in good faith and in response to a request from a farmer for assistance.

2. The teacher, or principal, shall forward to the Deputy Minister immediately after the pupil engages for employment on the farm the following information —

(a) The name of the student whose application was granted; the name and address of the farmer by whom he is to be employed; and the exact location of the farm.

(b) His confidential report to the Department on the attendance and progress of the pupil throughout the school year.

Grade VIII.

3. Pupils who have been preparing for Grade VIII diplomas, and whose attendance and progress throughout the year as reported upon by the teacher, or principal, have been satisfactory, shall be permitted to proceed with the work of the First Year (Junior Form, Part I) as prescribed for high schools, without examination.

Teachers' Examinations and Normal Entrance.

4. Pupils who have been attending a high school or collegiate institute or schools doing high school work, and whose attendance and progress throughout the year as reported upon by the teacher, or principal, have been satisfactory, shall be permitted to proceed with the work of the next higher form without examination, or to enter the Normal School for professional training provided they are otherwise qualified in accordance with the regulations of the Department.

5. Every applicant for promotion or for admission to the Normal School, shall submit to the Deputy Minister of Education immediately at the close of his engagement, a Certificate of Employment from the farmer or farmers by whom he was employed. This certificate shall specify the dates upon which his term of employment began and ended. The location of the farm and post office address of the farmer shall be clearly indicated.

ALBERTA

BY J. T. ROSS, DEPUTY MINISTER OF EDUCATION

FOLLOWING are the regulations adopted by the Department of Education applying to the employment of pupils of the schools on farms:

1. Any student classified in Grade XI or Grade XII who has been in regular attendance until March 31st, 1918, at any school conducted in accordance with The School Ordinance and Regulations in that behalf, who produces certificates or other evidence satisfactory to the Minister of Education that he has been regularly employed in farming operations for at least five weeks during the months of April and May, 1918, and who at the regular Departmental Examinations at midsummer, 1918, obtains twenty-five per cent on each subject or part thereof and forty per cent of the total marks assigned, shall receive such diploma as he would have obtained had be passed such examination on the usual basis, provided that the confidential report required from the Principal shall certify that in his opinion the candidate would have been prepared to pass the examination had he continued in regular attendance until the end of the term.

2. Any student classified in Grade IX or Grade X who has been in regular attendance until March 31st, 1918, at any school conducted in accordance with the school ordinance and regulations in that behalf, who produces certificates or other evidence satisfactory to the Minister of Education, that he has been regularly employed in farming operations for at least five weeks during the months of April and May, 1918, and also a certificate from the principal certifying that he has done satisfactory work up to that date, and would, in his opinion, be prepared to pass the regular Departmental examination were he to continue in regular attendance until the end of the term, shall receive such diploma as he would have obtained had he passed such Departmental examination on the usual basis, or, on the recommendation of the principal, may be allowed to proceed to a higher grade with the condition that he be required to satisfy the Department with respect to one or more subjects which may not be represented in the prescribed course for such higher grade.

3. Any Grade VIII pupil who has been in regular attendance between October, 1917, and the 31st of March, 1918, at any school conducted in accordance with the school ordinance and regulations in that behalf, who produces certificates or other evidence satisfactory to the Minister of Education that he has been regularly employed in farming operations for at least five weeks during the months of April and May, 1918, and who at the regular Departmental examination at midsummer 1918, obtains twenty-five per cent (25%) on each subject and forty per cent of the total number of marks assigned, shall receive a Grade VIII diploma provided that the confidential statement required from the principal shall contain in addition to the information required by the regulations a certificate to the effect that in his opinion the candidate would have been prepared to pass the public school leaving examination on the regular basis had he continued in regular attendance until the end of the term.

THE VARIATION IN ELEMENTARY COURSES IN AGRICULTURE

NOVA SCOTIA

BY L. A. DEWOLFE, B.A., DIRECTOR, RURAL SCIENCE SCHOOLS

MR. McCaig's article, given in the March GAZETTE, is good; and doubtless suits conditions in Alberta. In Nova Scotia we are differently situated.

The more progressive of our people have gone west to make the western country, while the conservative ones have remained in the East. Consequently his "wholesome condition in public sentiment" is not evident here. Moreover, our teachers are practically all young women. In the West there are men enough to assume leadership. In Nova Scotia most of the men still in the teaching profession are past middle age, and still adhere to the classical notion.

Nature study and elementary science are good things if properly handled. Would you, however, expect a girl to teach mathematics if she had had, say, one or two lessons in interest or simple equations without having had even addition and substraction? That is what we have in agriculture. A student has caught snatches of a few lectures on plant growth or soil cultivation, and then starts out to teach it without even knowing oats from wheat, cauliflower from shepherd's purse, or sand from clay. Hence our agricultural teaching soon brings itself into ill-repute. If we could get our good teachers back from the West, we could do better work.

Our course of study is very good theoretically. It reads well on paper. The practice, however, falls far short of the theory. The teacher excuses herself on the ground that "Nature study and agriculture were never taught in this school before", and, of course, the ratepayers are satisfied with the course as it was when they were children.

Parental influence is somewhat negative until a child wins a prize at a county exhibition, then interest awakens. The school exhibition, therefore, seems to be the connecting link between the school and the home. For that reason we urge it wherever we can.

We get samples of pure science teaching in our high schools. With the right teacher it is all right, but, with the average teacher, it helps drive the pupil from school. Simple applied science or vocational teaching is more attractive.

In Nova Scotia, we advocate lessons on minerals in mining regions, lessons on fisheries in fishing villages, lessons on gardening everywhere, for in all communities there is room for the back-yard garden. The garden work, the sewing, the canning, and cooking all point towards the exhibition, where the parents learn really what children can do. The school lessons correlated with these activities they never see. But school work is not considered an important thing anyway. Possibly this sounds pessimistic. It is not. Though what I say is true generally, there are notable exceptions. Here and there we have a teacher who is a leader. Here and there a clergyman assumes the community leadership in all worthy activities. In such communities, the people slowly fall into line. The fact remains, however, that the average teacher will not assume leadership. She does what she is expected to do and no more. If she can make the children sit quiet all day she is a good teacher, whether she teaches them anything or not.

Give us good live teachers and we need not worry about the course of study. It will adapt itself to the community.

QUEBEC

MACDONALD COLLEGE

BY SINCLAIR LAIRD, DEAN OF THE SCHOOL FOR TEACHERS

IN the Protestant schools of Quebec, 93% of the children are in the elementary schools, and half of these children are in rural schools. The question of agricultural instruction, therefore, has a vital relation to the future lives of half of the Protestant children. This has been recognized by the Council of Public Instruction, and a strong course in nature study has been authorized on a seasonal basis for the first eight grades. This course includes two lessons a week throughout the whole year for every one of these classes, and a syllabus has been extensively drawn up for the guidance of teachers.

In addition to these lessons, which are more or less general in their nature, and deal with birds, flowers, plants, weeds, the soil, the weather, etc., there is a distinctively agricultural course in Grades 6 and 7, the present authorized book being Hatch and Haselwood's 'Elementary Agriculture," together with Calfee's "Rural Arithmetic," which is for the use of the teacher.

The Council of Public Instruction also has under discussion the question of advanced agriculture for high school grades. It has not yet been decided whether it will be made one of the science options for the school-leaving certificate, although there is a feeling in some quarters that it ought to be, because so many children afterwards take up farming, or proceed to an agricultural college for advanced work.

Macdonald College has taken the important step of declaring that one of the requirements for matriculation into the Faculty of Agriculture, shall be the passing of an examination in nature study and elementary agriculture. For those who do not have an opportunity of passing this in the school-leaving examinations, special supplementary tests will be held at the college on entrance. This is an important feature, as it exercises pressure from above on the studies of the school candidates who will proceed to higher agricultural education.

School gardens are rapid y spreading in many of the counties of the province. There are no fewer than 846 school gardens cultivated by 21,217 children. But these are almost all in connection with Catholic schools. There are few school gardens now successfully conducted in connection with the Protestant schools. Many of those attempted have been abandoned because of the difficulty of caring for them during the summer months.

It should be remembered that the rural Protestant population is scattered and the schools have small enrolments. In addition, some of the more isolated sections are unable to secure trained teachers through their inability to pay for them, although the number of teachers without diplomas is being rapidly reduced, there being 80 fewer than in the previous year.

HOME AND SCHOOL GARDENING

Home gardens, however, have been very successful. Two demonstrators connected with Macdonald College spend their whole time in directing this work, and in organizing school fairs. Several visits are made to each school. The work is explained, the seeds and other materials are distributed, the gardens are inspected, and the school fairs are judged. These projects and school fairs have caught the interest of pupils, parents, and school trustees. More successful work of an agricultural nature has resulted from this scheme than from the previous school gardens.

In my opinion, agricultural instruction will make most progress in the Protestant schools of Quebec by improved attention to the present outline of work, more extensive nature study in the lower grades, better teaching of agriculture in grades 6 and 7, further extension of the work of the two rural demonstrators employed by Macdonald College, and greater encouragement in the school fairs. I firmly believe that the gardening at school under our conditions should be confined to the beautifying of school grounds and their maintenance in good condition. This would mean the planting of trees, shrubs, and flowers, and the keeping of window boxes. If the province should insist on allowing science options in agriculture as well as in physics, chemistry, and botany for high schools, this would still further strengthen the agricultural tendency among children of more mature years, and the work would undoubtedly be more successful.

At present the teachers in training receive a wider course in nature study and agriculture than is necessary to conduct the work prescribed in schools. This policy is adopted in order to prepare them for additional work whenever it is demanded. For the last few years, a summer session for nature study and agriculture has been held at Macdonald College for the benefit of those who did not have the advantage of the extensive course which is now being given as a regular part of the training course.

In short, nature study and agriculture are encouraged. Pupils get credit for these subjects in written and oral examinations. The difficulty of making the work practical is overcome partly by home projects and school fairs instead of school gardens.

ONTARIO

BY J. B. DANDENO, Ph.D., INSPECTOR OF ELEMENTARY AGRICULTURAL CLASSES

I have read with interest the contribution by Mr. McCaig concerning a co-operation among the provinces respecting a standard course of study in agriculture for both primary and secondary schools in Canada. In the main, I agree with Mr. McCaig's viewpoint as set forth in this article; and, I might add, that there is no important difference between the scheme now laid down in Ontario, and that in use in Alberta, especially so far as the course of study is planned.

With respect to methods of management of agricultural classes as indicated in the numerical summary given by Mr. McCaig, I may say that with the exception of No. 3 this practice is the same in Ontario as it is in Alberta. With respect to No. 3, I wish to say that we do not study text-books in Ontario; nor do we recommend the use of them. The work will be successful in our schools only so long as it is practical, dealing with *things* and not with *books*. However, by way of reference, extensive use is made of books, bulletins and periodicals.

Mr. McCaig is doubtless correct in saying that in some provinces the work is largely a sort of nature study given under the heading of 'rural science." In Ontario we avoid the use of the term "rural science," because it is misleading and erroneous. There is no such thing as "rural science," any more than there is "urban" or "city science," and no good purpose will be served by preserving the term which seems to have arisen in the Maritime Provinces, where agriculture and nature study are so interlocked that some general term seems to be required to cover the two.

In Ontario, agriculture and nature study are two distinct subjects, the former carried on throughout the eight grades, and the latter through the 7th and 8th; the former is obligatory, the latter optional.

The kernel of Mr. McCaig's article lies in the following paragraph:

> In this view it is pertinent to ask the framers of courses of study in the elementary schools whether their work is thought to be satisfied by a camouflage of nature study, by explicit vocational teaching of children, by an assembling of beginnings of pure elementary science, by school gardening dominantly, or by organized elementary agriculture.

For the Ontario schools it is easy to answer the question implied. As has already been stated, recognition is given only to organized elementary agriculture, begun when the pupil enters the 7th grade, and carried on in connection with school gardens or home gardens, and other projects, through the 8th grade. The school fairs are under the charge of the District Representatives of the Department of Agriculture, in co-operation

with the public school inspectors. The District Representatives assist in directing the home projects and, to a certain extent also, the school gardens.

The high school course of study is also distinctly agricultural, being neither sugar-coated elementary science, nor camouflaged nature study. The course of study is outlined in circular 13 (1) and is framed to cover, for the first part, two years, and, for the second part, two years in advance of this.

For primary schools the course of study and regulations respecting this course are found in Circular 13, 1917, which may be had on application to the Department of Education, Toronto.

MANITOBA

BY S. G. LANG, INSPECTOR SECONDARY SCHOOLS

MR. McCAIG'S article on the teaching of agriculture is a timely one. He inquires into the services rendered by the various agencies of education in the field of agriculture. There are several types of school and several distinguishable branches and methods of instruction. There is also some divergence of opinion as to the place and purpose of these schools and courses. A few of the elements and features of agricultural teaching are indicated in the following questions:

Are there any subjects of study which possess a general educational value, and at the same time have a bias towards agriculture as a vocation?

At what stage should direct vocational instruction begin?

Is it impossible to infuse vocational instruction with elements of broad cultural value?

What are the methods best suited to agricultural instruction in elementary and secondary schools?

Should secondary school agriculture be taught in separate and independent agricultural high schools, or as a regular branch of instruction in the ordinary high school?

Answers to these questions should furnish a fairly comprehensive view of the aims and methods of agricultural teaching within any given system, and the following may be taken as a brief statement of the experience in this province:—

Nature study has done much, no doubt, in forming habits of observation and an enquiring attitude in the field of natural phenomena, and while the general educational value of that form of discipline is very high indeed, it ought to prove of special advantage to the prospective agriculturist. Of the more systematic and ambitious work of elementary science as pursued in the last year of the elementary school, and the first of the high school, much the same may be said. The course has a general educational value of its own, and may incidentally give a certain vocational bias according to the character of the illustrative work in the laboratory.

INFLUENCE OF THE BOYS' AND GIRLS' CLUBS

The contests and fairs in connection with boys' and girls' clubs are concerned with agriculture and homemaking, and members may enter at the age of ten. Of course the educational value of a club contest in the case of a child of ten is to be found chiefly in the play element. But the boys' and girls' club movement promises to exercise a strong influence upon the school and home activities of young people. The inspectors here recognize the danger of too early specialization and over-absorp-

tion in one branch of study to the detriment of the rest, and the desire to limit strictly the number of contests which children, particularly young children, should be permitted to enter. Moreover, while recognizing to the full the value of the boys' and girls' clubs, and the great practical results of the movement, they express the belief that the educational possibilities of the work are not limited to individualistic and vocational elements alone. During the elementary school age, especially, the general educational bearings of this form of instruction in agriculture and homemaking should be regarded as of chief importance, and in the later years of school life the socializing and liberalizing value of agriculture should not be completely overshadowed by the vocational. The experience with book courses in elementary agriculture is not any more encouraging here than elsewhere. But the school and home gardens of Manitoba have come into their own, and along with this there are organized some 150 boys' and girls' clubs with over 15,000 members. As the local or branch clubs are formed, with the school as a centre and the teacher as guide, philosopher, and friend, it is clear that you have here an effective combination. Nature study, elementary science, agriculture, can be directed and studied in the school garden and the school library. The agricultural laboratory of the country school is in the school and home garden, and the motive of the practical work is in the contests of the boys' and girls' clubs.

SECONDARY AGRICULTURE

As to secondary agriculture, the plan followed here was to encourage the establishment of agricultural courses under competent teachers in existing high schools rather than independent high schools. It was thought better not to segregate the student of agriculture at that stage, but to find a place for him in our present educational structure, giving agriculture a place co-ordinate with other high school disciplines. Five such agricultural departments were established within the province, but two of these have been closed on account of the enlistment of the teachers in charge. The remaining three afford satisfactory evidence of the value and future prospects of this type of work.

SASKATCHEWAN

BY A. W. COCKS, B.Sc., DIRECTOR OF SCHOOL AGRICULTURE

I HAVE read Mr. McCaig's article which has reference to the subject of agricultural instruction in the elementary schools. The practice in this province is very similar to that in Alberta, namely, that we endeavour to pass from the nature study basis in the lower grades to school gardening and educational agriculture in Grades VII and VIII. We do not attempt to make it a vocational subject in the elementary school, but regard it of value from the educational point of view, because it enables the school to relate its activities to those of the community.

The great difficulty is to obtain a sufficient supply of well-qualified teachers for the work. The majority of our teachers are young girls fresh from a short course in the normal school, which fol owed two or three years of high school work, during which time little preparation for the teaching of nature study or agriculture in elementary schools was made.

The secondary schoo', to my mind, is the most important factor, both from the point of view of giving

instruction in the science of agriculture to the boys and girls who intend to live on the farm, and from the point of view of the future teacher in the rural schools. We need some kind of rural high school which will have a strong department in agriculture and domestic science and will be associated with all the rural schools in the neighbourhood. The principal of such a school, with his assistants in agriculture and household science, would be able to supervise the work of these young teachers in the rural schools, and wou d also be able to train the high school students for the special work of teaching in the rural schools. I sincerely hope that, as a result of the recent survey made in this province by Dr. Foght, some such change as this will be made in our school system, for I believe it will then be possible to make instruction in agriculture in both the elementary and secondary schools much more efficient, but that without this alteration it is almost impossible to obtain anything better than the present rather unsatisfactory and more or less inefficient work.

POULTRY PROJECT SCHOOL WORK

NEW BRUNSWICK

BY R. P. STEEVES, M.A., DIRECTOR ELEMENTARY AGRICULTURAL EDUCATION

WE propose to organize clubs in the schools at centres where supervision can be had conveniently and where teachers can give to them the time necessary to insure good returns to the pupils in education and profit.

Following are regulations under which we plan to conduct the work:

1. Clubs are to contain not less than s x pupils between the ages of 10 and 18 years.

2 Pupils before enrolling must obtain their parent's consent in writing.

3. Each pupil agrees to make careful records of work (on forms supplied), to read literature in connection with the project, to write a composition in the fall on "My Poultry Project," and to hand same to the teacher of the school in which the pupil is enrolled, not later than October 31st next.

4. This Division offers to each pupil who becomes a member of a club, a setting of pure-bred eggs on the condition that for each such setting, one bird (a cockerel) be handed over to this Department in the fall.

5. Each pupil agrees to exhibit stock from this project work at a school fair, if one is held in the fall, at a place convenient.

6. The composition to be written must contain the history of the work as obtained from the records which accompany it, and also statement of project expenses.

7. The enrolment cards and parent's approvals, properly filled out, are to be collected by the teacher and mailed to this office when the application for eggs is made.

8. Two or three sparsely settled districts where the schools are small and conveniently situated may form a union club, if the teachers of the schools desire, and the school officers are willing.

9. Time and expense will be saved by having pupils hand in their records, reports, etc., to the teacher, who will O.K. them and transmit information to this Division.

10. The teacher of every school n which a club is formed is to have supervision of the work being done by the pupils, and see that the greatest efficiency and success are attained.

SASKATCHEWAN

BY W. E. H. STOKES, EDITOR "PUBLIC SERVICE MONTHLY"

THE Saskatchewan Extension Department has issued the following suggestions for poultry work by school children:

1. Only one breed of fowls should be allowed on any farm or town property. If fowls of any special breed are being kept at the child's home, only eggs of that breed should be supplied. If more than one child in a family wishes to raise poultry, each should be given eggs of the same breed.

2. Eggs supplied for school competitions should be from flocks which have been rated up, or at least inspected, by qualified poultry-men.

3. Where flocks of pure-bred utility fowls are being kept in, or near, a competition district, such flocks after inspection should be the source from which settings are supplied in that district.

4. Breeds used in school work should be limited to Plymouth Rock, Wyandottes, Rhode Island Reds, with the possible addition of Orpingtons, in a district where this breed is popular, and good stock obtainable. (Preference should be given to solid-coloured birds and the parti-coloured varieties avoided where possible.)

5. Children should be required to pay for eggs, either in cash or produce or work.

6. Bulletins or leaflets should be given each child which will give explicit directions for every line of work he or she may have to undertake, *e.g.* How to set a hen; care for her during incubation period; testing eggs; care of young chicks, etc. If possible some lessons in school should also cover this ground.

7. Children should elect representatives to an executive which will, at least in part, plan the competitions, and the attractions for their district fair.

8. Each child should agree to keep records of the hatch, feeds and quantities etc., and to show, as required at the fairs, preferably all the chicks reared from the setting.

9 The judge, after making his awards should handle birds for each child to point out the strong or weak features. He should also let the owner know how much each bird is worth. In some places children not knowing values have been persuaded to sell the whole brood at 50c. each, to some unscrupulous adult.

ONTARIO

FUND FOR AGRICULTURAL INSTRUCTION EQUIPMENT

AT Sault Ste. Marie, Ontario, the District Representative is co-operating with the School Inspector with a view of having each school that participates in the annual school fair plant about one-third of a bushel of potatoes and care for them. The trustee boards are asked to provide the seed. It is purposed that the crop shall be sold, and the proceeds used for the purchasing of equipment for giving agricultural instruction in the school.

INCREASED FOOD PRODUCTION THROUGH THE SCHOOLS

THE Department of Education of Ontario is urging the teachers in the public and high schools of the province to give every encouragement in the direction of increasing the food supplies by means of school plots, home gardens, and the hatching and rearing of improved poultry. Last year it was estimated that food crops valued at $55,000 were raised as a result of the effort put forth by the agricul-

tural classes of these schools. Last year the aim was to grow potatoes, beans, and other vegetables, and to raise poultry from selected eggs. The only modification proposed for 1918 is to increase the amount in every way possible. Each teacher is asked to direct the pupils, as a business proposition, to calculate, from market prices available in the neighbourhood, the total food value produced by the pupils, and to report the result to the Department at the end of the season, in order to show the result achieved.

By an arrangement with the Poultry Department of the Ontario Agricultural College, Guelph, eggs for hatching can be supplied in a limited quantity for May delivery at $6.00 a hundred in 100-egg lots to pupils of schools in which classes in agriculture are maintained. The eggs are from an improved Barred Rock bred-to-lay strain, and the introduction of this breed into the rural districts is likely to prove of lasting benefit to the whole country. About 40,000 eggs were distributed under a similar arrangement in 1917.

SCHOOL GARDENS, S.S. No. 2, GLANFORD, WENTWORTH COUNTY; TEACHER, MR. E. C. BOUCK

In a circular sent out by Mr. J. B. Dandeno, Inspector of Elementary Agricultural Classes, it is suggested that part of the cost (say one-half) be borne by the school board, and part by the pupils, thus placing the cost to the pupil at so reasonable a figure that the project may be within reach of all.

MANITOBA

SCHOOL FAIRS AND BOYS' AND GIRLS' CLUBS

BY GEORGE HUNTER, INSPECTOR DIVISION NO. 5

BOYS' and girls' clubs and fairs promise to become a great forward movement in education. Practically every school in six municipalities included in this inspectoral division is organized for this work. The old idea was that education makes a man accomplished. The new idea is that it makes him useful. The idea has come to stay. We generally find that the pupils who take part in these competitions excel in their general school work. The training given the pupils in their general school work in preparation for these fairs cannot fail to have an important bearing upon the future. They have been trained to observe more closely, to recognize good and bad qualities in their products. They have learned to meet and solve problems. They have learned something as to the cost of production and the keeping of simple accounts. They have learned to read agricultural literature bearing upon their work and personal initiative has been strongly developed. The competitive spirit judiciously engendered stimulates them in the endeavour to excel, and careful habits are formed that have an abiding effect on improved citizenship.

PLANTING MATERIAL FOR SCHOOL GROUNDS

PROVISION is made by the Department of Education of the Provinces of Manitoba and Saskatchewan for the supplying of trees and other planting material for school grounds. The Manitoba Department of Education is prepared to distribute a limited quantity of trees, shrubs, and herbaceous perennials to the schools in the province which have grounds in a condition for planting. The planting material has been raised on the grounds of the Brandon normal school in connection with the instruction in gardening and forestry. It will be supplied free, but school districts will be required to pay the transportation expenses.

In the province of Saskatchewan, since 1915, the Department of Education has each year supplied trees to nearly one hundred school districts. Most of the trees are obtained from the Dominion Forestry Station, Indian Head, while the shrubs are supplied by the Provincial Nurseries, Regina. School trustees and other officials wishing to obtain supplies of this material are required to make application at least nine months before the material is needed. The trees and shrubs are then supplied only on the following conditions:—

(1) The ground must be summer-fallowed in the year previous to planting.

(2) The ground most have been broken prior to the year in which it is summer-fallowed.

(3) The proposed belts should be at least twenty-five yards from any permanent buildings unless exceptional conditions exist.

(4) The necessary information respecting the preparation of the ground as requested by the directors must be supplied before November 1 in the year previous to planting.

SASKATCHEWAN

GIRLS' CAMP AT THE UNIVERSITY

A CAMP for farm girls of Saskatchewan will be held at the College of Agriculture, University of Saskatchewan, Saskatoon, from June 17 to 21, 1918. This camp will be limited to 200 girls between the ages of 16 and 20 years. Agricultural societies are authorized to send two girls each, but no acceptance will be made after applications shall have been received from the first 100 societies. Last year about 60 girls accepted the opportunity of attending the camp at the college, and the results are regarded as most encouraging to the girls, to the authorities of the University, and to the Department of Agriculture. This year, as last, the Department of Agriculture has agreed to assist in the matter of refunds of railway fares.

A MUNICIPAL AGRICULTURAL SCHOOL

BY A. KENNEDY, INSPECTOR OF SCHOOLS

REFERRING back to my article in the January number of THE AGRICULTURAL GAZETTE suggesting the establishment of a municipal agricultural school, I would like to enlarge upon the views there set forth, and to enter upon details of the proposition as they present themselves to me.

Statistics of the attendance at the public schools seem to inply that hardly more than 6 per cent of the pupils advance any further. This would appear to be due in large part to the fact that only a small percentage of the youths find opportunity for satisfying their ambitions in the secondary schools. A considerable portion of the difficulty in connection with the public school problems appears to lie in the fact that comparatively few of the public school children, or their parents, find sufficient attraction beyond grade eight in the opportunity for their development.

The university has been able to gather together, in harmony, upon one campus, colleges of various types, so that there would appear to be no good reason why two or more types of secondary schools should not flourish side by side. The high schools and collegiate institutes have ample work to do at present, in preparing the youths for the normal schools and colleges of the university; in many respects they could not and would not meet the requirements of many of the youths with ambitions along other lines.

ADVANTAGES THAT WOULD ACCRUE

The rural municipa ity has been found most convenient for administrative purposes in the work of the municipal councils and the municipal agricultural societies. In view of the value of such democratic governmental institutions, a municipal agricultural school might well be one of the first variations from the h gh school among the secondary schools. A quarter section of land at or near the municipal centre would be a sufficient site for the practical demonstrations, and would also provide a very considerable portion of the revenue required for the operation of the school. The erection of the

necessary buildings would provide practical material for manual training purposes, while the solution of the living problems would furnish ample material for the household science classes. Such a school would be within reach of the homes of the youths, so that parents would not hesitate to send the boys and girls for a considerable portion of the week; much valuable help to both parents and youths would result from the opportunity to assist with the farm-work during the seeding and harvest seasons. The special interest of each student, as well as his particular capacity in executive matter, would find opportunities in the operation of the farm, in work, study, and play.

THE BUILDINGS

In the erection of the buildings I would advise following the plan of the university rather than that of the secondary school building, according to a pre-arranged plan, as necessity required, rather than starting with a complete building and a heavy debenture indebtedness The complete plan might well include provision for municipal offices, for the municipal council, an auditorium for municipal gatherings, gymnasium, etc. The agricultural society might also be accommodated on the grounds and in the buildings at the time of their annual fair, thus saving much in outlay for grounds and buildings which are used only one or two days in the year.

THE PLAN OF MANAGEMENT

The Municipal Rural Education Association, as now being organized and established, will find great opportunity for useful work. An elected executive of seven men and women, with an appointed secretary-treasurer, could manage practically all the educational activities, including school exhibitions, boys' and girls' club contests, as well as acting as a board of trustees for the Municipal Agricultural School. There are infinite possibilities in the propaganda of such an association. Not the least of these would be the indirect inspiration given to the work of the public schools within the municipality.

THE SECRETARY-TREASURER

The office of the secretary-treasurer of the Municipal Rural Education Association holds wonderful possibilities in respect to public service. A well-trained teacher, with agricultural training, could fill this office best, acting as an assistant to the inspector of schools, especially in respect to household science, manual training, school gardens, and organized play. He would be the executive in matters connected with the school exhibitions held at the municipal centre; he could encourage and guide the club contests, in which boys and girls up to 18 years of age would participate, and could act as judge in the three or more judgings required during the year. In addition, he might well organize and direct short courses, especially during the winter; might act as secretary-treasurer of the agricultural society, and even, if required, as municipal truant officer. In his visits to the farms throughout the municipality, he would find many opportunities of assisting the farmers, and would thus prove a useful agricultural secretary. Such an office could command a salary up to $1,500, with $500 for expenses. If this amount were levied by the municipal council it would amount to only $125 per school district, or thereabouts. The assistance afforded and encouragement given, not only to the boys and girls in the public schools, but also to the youths in attendance at the municipal agricultural school, and also those at home on the farm or in the village, would amply justify the expenditure.

Instances are quite common of "homesteaders" who began ten years ago with only the quarter section,

and very little capital, and who today possess well-cultivated farms, with beautiful homes; they have been able to make a comfortable living and to educate their children. An executive of seven should then be able to finance the Municipal Agricultural School, without appreciably increasing the tax rate.

THE PRINCIPAL

An interested, energetic, well-trained principal, and his equally interested, energetic, well-trained wife, could direct the work of the farm, and the farm home, as well as directing the reading and study during the evening hours. The study and class hours would be governed by the activities of the varying seasons. A reading-room, well stocked with current journals and magazines, and a library provided with suitable books, would supply most of the students' needs, and would also serve as the foundation for a municipal library. I would advocate no examinations save for those who wish to enter the Agricultural College or similar institutions.

THE LOCATION

A tract of some twenty acres, either a portion of the quarter section or a separate plot in or near the municipal centre, would serve as municipal athletic grounds, as well as providing accommodation for the annual fair of the agricultural society. This point has already appealed strongly to the people of Cymri R. M. 56, the board of directors having recently purchased a site of twenty-two acres in Midale for the purposes of the agricultural society as well as providing for the future needs of the R. E. A. of R. M. 36. The executive of this municipal association has already considered the matter of permitting the boys and girls to experiment in the planting of trees, shrubs, and perennials around this plot; even the erection of the buildings might be left to the boys from 14 to 18 as a beginning in manual training.

STANDING OF THE SCHOOL

In so far as the College of Agriculture is concerned, I believe the organization of such municipal agricultural schools would not only assist greatly in promoting the work of such college, but would be the means of affording greater support to the provincial institution, both in interest and in students. Just as we have three steps—public school, secondary (high) school, and university (arts)—so we would have three steps—public school (with school gardens), municipal agricultural school, and college of agriculture. The municipal agricultural school should then be related to the college of agriculture in a manner similar to that in which the high school is related to the university faculty of arts.

OBJECTIONS

Certain objections will naturally be offered against the proposed municipal agricultural school, and perhaps these should be noted and met. I cannot, after consideration, feel the force of the argument *re* the "isolation of those intending to be farmers." We have isolation in all phases of education, including the elementary schools, urban and rural, as well as in the secondary, including technical schools. Even in the colleges we find isolation, without objection. Provided the municipal agricultural school filled a community need efficiently, the isolation would not be felt more than it is today in the case of the rural school.

As to certain objections noted on the basis of conclusions drawn from certain surveys, I feel that the facts warrant the conclusion that those intending to be farmers should have fuller opportunity for a proper secondary education. The high school system has failed to attract, or to provide for, these youths, while

providing for the youth desiring to enter almost any other line of life-work.

ADVANCEMENT NEEDED

Further, conditions have changed, and are still changing rapidly, so that the equipment of the youth of to-day must be vastly different from that of the youth of a decade ago. While I admit the necessity, for many reasons, for the improvement of the elementary schools in rural communities, I feel that the facts of to-day demand that the State provide more adequately and fully for the youth wishing to keep abreast of the times in agricultural lines. Economic conditions demand a more intelligent citizenship and a more efficient type of artizan.

SUPPLIES OF SEED FOR SCHOOL GARDENS

FOR the past two years teachers and pupils in the province of Saskatchewan have been able to obtain from the provincial Department of Agriculture seeds of vegetables, flowers, cereals, etc., for their school garden work. This year the Department of Education is supplying these seeds at a price of there cents per packet. The vegetable seeds are chiefly for garden crops, although mangel wurzel is also included. The flower seeds are all of annual varieties. The cereals include Red Fife and Marquis wheat, Banner oats, O.A.C. No. 21 barley, and Premost flax. Clover seeds include Red and Mammoth clover and alsike. The grass seeds include timothy, Western rye, Red Top, Kentucky Blue and Canadian Blue. The seeds of Manitoba Maple and White Ash are also supplied at the same price.

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications and Notes

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THE QUESTION OF A NATIONAL FLOWER

SINCE the movement was set on foot to bring about the selection and official recognition of a national flower for Canada, as outlined in THE AGRICULTURAL GAZETTE for January, many letters have been received favourable to the idea, and a few raising the question whether or not there is need of an emblem in addition to the maple leaf. At a meeting of the central committee, consisting of Mr. W. T. Macoun, Dominion Horticulturist; M . F. E. Buck, landscape specialist of the Experimental Farms; Dr. M. O. Malte, Dominion Agrostologist; Miss Faith Fyles, Botanist, Experimental Farm; Mr. J. M. Macoun, Botanist, Department of Mines; Mr. George Simpson, President of the Ottawa Horticultural Society, and Mr. J. B. Spencer, Editor of THE AGRICULTURAL GAZETTE, this aspect was discussed. It was then pointed out that both the maple leaf and the beaver are emblematic of Canada, and will always remain so, both being used in national devices. It is, therefore, concluded by the central committee that it is not a question of substituting a flower for the maple leaf, since the maple is the typical Canadian tree, as the oak is of Britain and the American elm of the United States. The object in view is to select a flower which will be typical of the Dominion of Canada, if one can be decided upon that will represent most parts of the Dominion.

The reasons given in the previous article for advocating the choice of a national flower may be supplemented in a subsequent number of THE GAZETTE; in the meantime, many of the letters sent in by correspondents will be of interest to its readers.

The committee had brought to their attention the fact that during the past fourteen years the majority of the states of the American Union have selected state flowers, and that the question of a national flower for the United States is now before the senate. Last June a joint motion was introduced into congress by Mr. J. H. Stevens to adopt the Mountain Laurel (*Kalmia latifolia*) as the national flower of the United States.

It is felt by the committee that, in view of the fact that Canadian flowers will be required for planting on soldiers' graves, the present is quite an opportune time to select a national flower. The authorities at Kew have already obtained seed from the Experimental Farm, and have raised several varieties of maples to plant on the avenues running through the burial grounds which are under the direction of the War Graves Commission.

The committee also considered the question of provincial flowers, but it was felt that the first thing to do was to find out the sentiment and feeling toward a national flower, and, if one is adopted, it is expected that the provinces will follow and choose provincial floral emblems.

IDEALS TO BE KEPT IN MIND

BY L. A. DEWOLFE, B.A., DIRECTOR OF RURAL SCIENCE SCHOOLS, NOVA SCOTIA

The article on page 86 of the January issue of THE AGRICULTURAL GAZETTE, relative to a national flower for Canada, is timely. The six flowers named by the association are all attractive and interesting. I feel like taking exception to some of them because they do not grow wild throughout Canada. Of those named, probably the perennial aster is the one most generally distributed.

To my mind the national flower should be one that will stand transplanting; it should have a long season of blooming; thrive on a variety of soils; be good for cut flowers; and be a native species. Possibly no flower possesses all these qualities; but these ideals are worth keeping in mind in the selection

Though I have very little to offer in favour of the following flowers I suggest that they might be considered Lupine, Clover, Violet, Wild Rose, Lambkill (Kalmia), Mallow, Lily, Great Willow Herb.

Notice, I have not said what species of these flowers should be chosen. Discussion will bring out the virtues of any of these that may be worth adopting. I mention them because some species of each genus has established itself in, or is native to Canada.

WHY A FLOWER FOR CANADA ?

BY A. H. MACKAY, B.A., LL.D., CHIEF SUPERINTENDENT OF EDUCATION, NOVA SCOTIA

In reference to the proposal made on page 86 of the January number of THE AGRICULTURAL GAZETTE, why a flower for Canada? The Dominion has a tree—the maple; the provinces—flowers. Nova Scotia has its *Epigæa*, New Brunswick its *Linnæa*, etc.

If we are to have a flower for the Dominion, we must get trees also for each province to be symmetrical. But that will require a rather large arboreal, as well as flora, pantheon for us to worship in—where we cannot see our flowers for the trees.

No flower can be appropriated for Canada —not even the humble, graceful, beautiful iris, the only possible one in the list of suggestions.

THE PAINTED TRILLIUM

BY BROTHER M. LEOPOLD, OKA AGRICULTURAL INSTITUTE, LA TRAPPE, QUE.

After giving some thought to the subject of a national flower for Canada, this is what I beg to submit to you on behalf of the Oka Agricultural staff of professors:

It seems that a national flower should be found in all parts of Canada, and in Canada alone, or at least on the American continent, and should not be a cultivated plant alone.

Among the beautiful wild flowers of Canada, I would place in the first instance the

1. Painted trillium (*Trillium erythrocarpum*). Trille à fruit rouge, also called in English "smiling wake robin."

Except for three or four species native to the Himalayas and Japan, the trilliums, or wake-robins, belong to North America. Few choicer flowers adorn our woods and forests. They are odd plants, with the whorl of three leaves and the single large flower. Sometimes the flower is stalked, sometimes it is not.

The painted trillium is the most delicate of them all. The dark green leaves set off to great advantage the white or pale pink petals, exquisitely pencilled with deep wine colour. It is a shy plant, confining itself to cold, moist woods and bogs. The flowers open in May around our country.

2 The flags are not natives of Canada alone, as in Europe there are so many beautiful kinds, and they grow in such abundance that it would be strange if they would not attract lovers of nature.

> Blue flags, yellow flags, flags all freckled.
> Which will you take? Yellow, blue, speckled?
> Take which you will, speckled, blue, yellow.
> Each in its way has not its fellow.
> —*Christina Rosetti.*

Anemone *Canadensis*, Anemone *de Pennsylvanie* Anemon is another quaint little white flower found all over Canada, but I would prefer to it the trilliums or the columbines.

THE COLUMBINE COMBINES FAVOURABLE FEATURES

BY V. W. JACKSON, PROFESSOR OF BOTANY AND BIOLOGY, MANITOBA AGRICULTURAL COLLEGE

I have read the article in the January GAZETTE with respect to a national flower for Canada. The idea is a very good one, and commends itself to the consideration of a conference on this matter.

In view of the fact that the fields of

Flanders are to be the new home of Canada's national flower, horticultural considerations become greater than characteristically Canadian ones, and I think that the columbine combines the most favourable features. It is typical Canadian (*Aquilegia Canadensis*), and responds well to horticultural treatment, i.e., it would transplant readily, and can be easily grown from seed. It makes a quick growth and a good showing. Its blood-red colour is quite in keeping with the blood that has been shed on the fields of Flanders, and its drooping habit quite characteristic of the modesty and resignation of those who fell. Westerners might be inclined to favour the anemone, either *A. Canadensis* or *A. Patens*, the prairie crocus, for the columbine is not found west of the Red River, except in an occasional ravine or coollee, whereas the anemones extend across the prairies to British Columbia. However, taking all things into consideration, the horticultural advantages favour *Aquilegia Canadensis*.

THE CROCUS POPULAR IN THE WEST

BY W. MURRAY, M.A., LL.D., PRESIDENT, UNIVERSITY OF SASKATCHEWAN

Canada is so very large and diverse that I fear that the national flower that would appeal to one part of the country would be almost unknown to another. The Canadian thistle is wide-spread enough to get general recognition, but no one wishes to do it honour. It was honoured in Scotland because of historical service which it had rendered. The mayflower would be very popular in the Maritime Provinces, and the crocus in the West. The rose, I suppose, would be a favourite in British Columbia. I think the selection of a national flower in this way is artificial, and will never catch the popular imagination. Some day something will happen that will give one flower a place in the thoughts of the people, and it will then become naturally the national flower. Would you regard the maple leaf as a sufficiently national emblem to take the place of a national flower?

THE MAPLE LEAF A SATISFACTORY EMBLEM

BY G. FRED. MCNALLY, PRINCIPAL, NORMAL SCHOOL, CAMROSE, ALTA

At a combined meeting of the students and staff of the Camrose normal school held on Friday, February 8th, it was decided that this organization did not approve of the suggestion that a national flower be selected for Canada.

The feeling was unaminous that the maple leaf was a satisfactory emblem, and that it would serve all the purposes which would be served by the selection of such a flower as was named in the suggestion contained in THE AGRICULTURAL GAZETTE.

It did not appear to me that, from the standpoint of this part of the country, at least, any one of the flowers named could sufficiently embody, or was itself sufficiently characteristic, to make a choice desirable.

VACANT LOT CULTIVATION

EXPECTATIONS AND PLANS OF THE CITIES OF CANADA FOR THE PRESENT YEAR

ALTHOUGH, in the majority of cases, plans for the present year regarding vacant lot gardening were still under consideration when the replies were written that have been received in answer to a series of questions addressed to the different cities that were known to have had systems in operation in 1917, as recorded in THE AGRICULTURAL GAZETTE of December, they indicate that the success then achieved, and in previous years, has proved most encouraging, and that the experience gained will be put to good practical use this year. In fact the methods adopted produced such excellent results that, in the majority of cases, there will be no change in organized operation for the approaching season. It is evidently felt that, pressing as the necessity was in 1917 for not alone every farmer, but every citizen, to aid in greater pro-

duction, the necessity for such work and such effort is far more pressing in 1918. All the cities in the country, and many towns, have awakened to the occasion and are bestirring themselves in the task of making productive what has previously been considered waste land, and, as such, has been allowed to lie idle.

When it is considered that in Montreal alone, vegetables to the value of $100,000 were grown last year, it is not difficult to believe that in all the cities and towns together, the productive worth of the efforts put forth amounted to a number of million dollars, which means that food stuffs of that value that would otherwise have been consumed in Canada were released for shipment abroad.

During the past few months many meetings have been held, at each of which emphasis has been placed upon the needs of the allied powers, caused mainly by the awful waste to be attributed to the wanton use of the submarine, but also due to the ravages of active warfare, and to the ever-increasing demands of the fighting forces. Lurid and past bounds of imagination that the statements that have been made appear to be, there is too good reason to believe that they fall short of the actual truth. Hence the reports of redoubled vigour in vacant lot cultivation that have been received by THE GAZETTE, and which are briefly summarized in the following, will be read with satisfaction.

While the need of the moment is overwhelming, the experience that is being gained from the movement, and the lessons that are being learnt, cannot fail in their far-reaching beneficiality to be ever profitable. Nor is it only from the actual task that knowledge is forthcoming, for in every city instructive lectures and practical demonstrations are being given for both old and young, and for men and for women. In Vancouver an experimental garden and open-air college have been established, and in other places arrangements have been made so that instruction shall not be limited to the preparatory season, but shall extend all through the growing, even to the harvesting and the succeeding preservation and conservation.

By the following summaries of the reports made to THE GAZETTE, it will be noticed that in every instance, greater achievements are expected in 1918 than in 1917, gratifying as were the results last year:—

QUEBEC

Montreal.—The success achieved last year was so great that the same plan will be followed this year. The Montreal Cultivation Committee has the matter in hand and will organize a number of sub-committees known as vacant lots committee, farm areas committee, home gardens' committee, planting committee, finance committee, municipal committee, publicity committee and ladies' committee. These sub-committees in turn will interest other people who undertake the supervision of certain districts. All the work is entirely voluntary, the expenses being met by private subscriptions. It is anticipated that the number of lots applied for last year, namely 2,000, will be greatly exceeded this year. The City Council has been asked for the same grant as last year, viz., $2,500. The securing of seed is left to the individual cultivator. Last year the committee paid for ploughing, but this year former plot-holders will dig their own lots. New land, however, wil' be ploughed by the committee and the actual cost charged to the cultivator. The interests of returned soldiers and their relatives or connections will be taken charge of by the Khaki League. The chief departure will be the encouragement of the group system as an addition to the individual system of 1917. It is hoped to interest groups to take up and operate co-operatively from one to five acres.

St. Lambert.—The Horticultural Society will again have charge of the vacant lot campaign. The town council will assist by ploughing and harrowing the land for cultivators, each of whom will be allowed to get his own seed. It is anticipated that more lots will be cultivated than last year, when the number totalled about 150. No charge will be made for lots and a supply of stable manure will be available for those willing to pay cartage. A course of instructive lectures is being given by expert horticulturists from Macdonald College, and the Horticultural Society will give prizes for the best cultivated new gardens and for canned vegetables.

Westmount.—The same plan will be pursued as last year, the city taking charge of the work aided by the Montreal Horticultural Society and the Montreal Florists' Club. The city of Montreal has consented to the use of part of Baldwin Park and will plough the ground free. The city of Westmount will plough lots in its municipality for soldiers or soldiers' families free. Donations of seed are made and the gardeners start the same in their green house, the plants being distributed about Empire Day. Last year over 20,000 plants were given out in this way. It is anticipated that 300 lots will be cultivated of 2,500 square feet each. Soldiers and their families cultivating lots will not be asked for any fee, but seeds and plants will be given them and the ground ploughed and in some cases fertilized.

ONTARIO

Brantford.—The Brantford Thrift League, composed of representatives of the Trades and Labour Council, Social Service League, Rotary Club, Travellers Club, Board of Trade, Board of Works and a committee of the City Council, will have charge of the work. The Council will subscribe $100 to the fund to cover the cost of advertising and ploughing for soldiers' wives or returned soldiers. Arrangements will be made with seed merchants for a special rate to be charged to lotholders for seed. It is expected that at least 1,000 lots will be under cultivation. The land will be free, but ploughing and preparing will be charged for at absolute cost, excepting as regards soldiers an ' dependent relatives. Each of the schools will have community lots.

Galt.—The Vacant Land Production Association of Galt will conduct affairs on the same plan as last year. They expect from 300 to 400 lots to be taken up, covering an area of 100 acres or more. The work is supported by voluntary subscription and anything undertaken for the lot-holders will be charged back to them at actual cost. Soldiers, either returned or otherwise, and their relatives will have the preference in the choice of lots.

Guelph.—The Guelph Horticultural Society, the Board of Trade, Trades and Labour Council, the Consolidated Separate and Public Schools, Sunday Schools, Y.M.C.A., Ontario Agricultural College staff, and a number of land owners, cooperate in the work, the Horticultural Society taking the lead. The city grants $500 towards expenses. Vegetable seeds will be supplied at cost, and the distribution will be largely undertaken by members of the Horticultural Society. Last year there were 2000 members and 1700 or 1800 gardens were cultivated. This year it is anticipated that there will be more. Under the heading, "Soldiers of the Soil," cards pledging service are widely distributed and freely signed. Every boy and girl under 18 is invited to enlist in the garden service corps, members of which who cultivate a home, school or vacant lot garden raising a crop of vegetables valued at not less than $5, for boys or girls from 10 to 14 years of age, and $10 from 14 to 18 years of age, at current market prices, will each receive a bronze button recognizing national service. Instructive talks and illustrated lectures will be given and press notices made. Literature will also be circulated. Gardens will be judged twice during the season and three cash prizes will be given in each ward.

Kingston.—The work is done through the Board of Trade, Board of Education, and a school garden committee. No change is to be made in the management this year, except, as the secretary says, as regards the putting forth of increased energy. A grant will be made by the city for ploughing, harrowing, and discing the same as last year. The school garden committee is giving a grant for the purpose of buying seeds for distribution to school children. It is expected that about 200 acres will be under cultivation. Patriotic citizens will, provide funds to meet any expense incurred. No charge will be made to lotholders. Ploughing and fertilizing will also be done, as far as possible, entirely free from cost. Soldiers and their relatives will be treated no differently to ordinary citizens except that they will be given the first consideration in everything.

London.—The McClary Welfare League and the Street Railway Potato Syndicate will carry on this year the same as last. The McClary League have bought a car of seed potatoes and contracted for vegetable seeds which will be distributed to the holders of 125 lots, comprising about 15 acres. No charge is made to lot holders and their lots will be ploughed free. Instructive lectures will be given every two weeks and supervision be taken of the gardens.

North Bay.—The Vacant Lot work here is entrusted to an organization composed of a committee of councillors assisted by interested citizens. In order that he may give more of his time to the vacant lot gardening work, a chairman will be appointed from the city council who will be relieved as far as possible of other duties. Railway property will be leased, divided into plots and given to any citizen promising cultivation. Private owners of vacant lots will also be requested to surrender them for the same purpose. About 1,000 lots covering 150 acres will be operated. The undertaking will be financed through the municipal council. No charge will be made to lot-holders and no assistance rendered further than the purchasing of seed and re-selling at cost. The children will be encouraged by the offering of prizes for the best results.

Ottawa.—The only change in the managerial operation of the Ottawa Vacant Lot Association will be that plot-holders will be charged a fee of one dollar, which will make them members of the Association. The societies associated with the work, besides the Ottawa Horticultural Society, are the Rotary Club, Women's Canadian Club, Soldiers' Wives League, *Journal* Printing Company, E. B. Eddy Company, Citizen Horticultural Society, and Boy Scouts. Last year the city granted $500 It is anticipated that more than 1,200 plots, and exceeding 100 acres in extent, will be under the supervision of the association. Voluntary donations will help n the financing along with the city grant. Lot-holders, so far as possible, will be helped to secure seed potatoes, tomatoes, cabbage, etc., at a low price. Manure will also be supplied as far as possible. The Soldiers' Wives' League are allotted an area and are given the same treatment as other lot-holders. Last year this particular organization did exceptionally well.

Port Arthur.—The Garden Club assisted by the City Council and Board of Trade will manage the situation on the same plan as last year. The Parks Superintendent will be general overseer and the city will be divided into districts, each in charge of a volunteer assistant. The City Council will do the ploughing and harrowing and charge one dollar for a 33-foot lot. The City Clerk's office staff will secure the lots and register members. The Parks Board will grow plants in a nursery for lot-holders. Orders for seed have been placed with the dealers and will be sold to cultivators for the same price as given for them. Currant and berry bushes will also be supplied. Lots for the wives of soldiers, or widows of soldiers, will be ploughed free and any other assistance that can be given will be forthcoming. Extra exertions are being made to encourage boys and girls in gardening. Advertisements on an extensive scale are being inserted in the local papers with a view to general encouragement.

St. Thomas.—Last year's representative organization having been found unwieldy the Horticultural Society will have full charge this year of the vacant-lot-garden idea. The city will assist to the extent of $300 and will give a grant of park land. A quantity of seed has already been ordered and will be disposed of at wholesale prices. A car-lot of Irish Cobbler potatoes from New Brunswick has been placed at the disposal of the Society. No charge will be made for lots, but ploughing and harrowing will be charged for, except in the case of the families of soldiers, on duty or returned. Lots have been specially donated for cultivation by school children.

Toronto.—The Vacant Lots Association and the Rotary Club, represented by twenty executive members, will have charge of the work this year, the same as last. An effort is being made to double the number of gardens. The city will make the same grant towards the work as last year, and will give the use of all vacant city property, besides ground enough for about 40 gardens in several of the parks. Orders for fourteen varieties of seed have already been given and $2 will be charged for seeds sufficient for a lot of 5,000 square feet. Lot-holders will procure their own seed potatoes. The seeds that the association has secured will be distributed, as follows:

¾ oz. Carrot, Nantes.
¾ " " Oxheart.
¼ " Lettuce, Nonpareil.
¼ " Cucumber, White Spine.
½ " Squash, Green Hubbard.
½ " Parsnip, Hollow Crown.
1 " Beet, Detroit Red.
1 " Beet, Egyptian.
1 " Onion, Yellow Globe Danvers.
1 " Turnips, Table, Swede.
1 " Radish, Turnip, White and Red.
2 " Nasturtium, Dwarf Mixed.
1 lb. Beans, Wardell's Wax.
1 " Corn, Golden Bantam.

It is possible that the gardens will reach a total of 1,500, covering possibly 250 acres, against 826 gardens and 150 acres last year. The association will do the ploughing and harrowing and even the manuring, where possible, free. The free use of spraying machines will also be given and poison supplied for insects. Lectures are being delivered in different parts of the city and a demonstration plot will be maintained to show cultivators how to sow, plant and encourage growth. Returned soldiers, or their relatives, or connections, will be supplied with everything absolutely free, including seeds and help during the season. When necessary, the gardens will also be planted. The association has a number of plots that will be cultivated by school children, by boy scouts, and by girl guides. Any school principal or teacher can have a plot for the benefit of the scholars. Mr. George H. Baldwin, F.R.H.S., is the moving spirit in the association.

Stratford.—The same plan will be followed this year as last. The representatives of the City Council, the Horticultural Society, the Park Board, Public School Board, and the Principal of the Normal School and Public Schools of the city, forming the controlling organization. The City Council grants a sum of $200 to defray the cost of ploughing the gardens and lots of the soldiers' dependents, advertising, etc. The application for lots last year numbered 156 and this year will exceed 300. The lots average 25x100 feet to half an acre in extent. Private subscriptions are relied on for financing the campaign. Lot holders will pay the exact cost of ploughing and harrowing. Returned soldiers and the

families of returned soldiers will have their gardens and lots put in planting condition free of charge. Literature and advertising matter will be distributed among the children and students of the different schools to take home to their parents. Prizes will be given for plot-holders at a vegetable show to be held in the fall for which no entry fees will be charged, and at which all amateur growers within the city limits will be invited to compete.

MANITOBA

Winnipeg.—The Weston Agricultural Society is the principal mover in the vacant lot gardening work. Prizes of $5, $3 and $2 will be given for the best care, cultivation, and results, besides those offered at a special exhibition. In addition to the work done by adults, it is expected that over 1,500 children will be occupied in the work this year and will compete for a prize shield given by ex-Mayor Waugh for the best work of children under 16 years of age. The city will be divided into districts and the district having the ten best gardens making the highest score will win the shield. The points given in judging will be for quality of plots and effort 40, freedom from weeds 30, layout 20, variety 10. The society will give prizes ranging from $2 to 25 cents for the ten best gardens in each district, also prizes at the school fairs for the individual exhibit of vegetables and flowers. This year encouragement will also be given to poultry and bee-keeping. The city will make a cash grant and plough lots not exceeding one-quarter of an acre for $1 each. Each individual will have to secure his own seed. The society will have under its supervision about 300 lots covering an area of 20 acres, which is double that of last year. A dollar per lot will be charged for ploughing and 50 cents per lot for discing and $1 for membership. Lectures will be given by Professors from the Agricultural College and expert gardeners. Gardens will be visited and notes made of results. The School Masters' Club is an organization authorized by the Board of Education that has an enrolment of 2,000 juvenile applicants for garden lots. Committees have been appointed to make the allotment, to circulate literature, and to help in gardening. The women teachers are taking much interest in the work. Domestic Science teachers will give instruction in preservation. The Winnipeg Gardens Society, the Elmwood Cottage Garden Society and the Winnipeg Horticultural Society are co-operating.

SASKATCHEWAN

Regina.—The Vacant Lot Garden Committee has been transformed into the Regina Food Production Association, which includes representatives of the city council, board of trade, army and navy veterans, the golf club, collegiate institute, horticultural society, ministerial association, rotary club, public schools, Y.M.C.A., civic economics committee, St. Andrew's society, Co-operative Consumers' league, vacant lot gardening association, boy scouts, Regina College, the Bureau of Public Welfare and other organizations. The fee for a lot has been raised from $1 to $2, which includes membership of the association and pays for ploughing. It is proposed to turn 50 acres of city property into a large vegetable garden. Land around the city that has been subdivided for speculative purposes is also to be placed under cultivation. The entire population is lending a hand.

Saskatoon.—The Parks Board last year dea with th matter of vacant lot cultivation with the result that 1,259 lots were cultivated and 750 bushels potatoes and 250 bushels of mixed vegetables raised. This year the city gardener has received close upon 600 applications or vacant lots. Many of these lots were ploughed last fall in order that the congestion which marked last spring should be avoided. The various city parks are put to practical use, a fee of $1.25 for each single 25-foot lot and $2 for each 50-foot lot being charged, to cover the cost of ploughing, etc. A special assistant has been employed to obtain permission from owners of vacant lots for their cultivation. The Parks Board has the whole matter in hand. It is anticipated that the lots under cultivation will approximately cover 31 acres.

ALBERTA

Calgary.—A big publicity campaign has been planned for the end of March and the early part of April. The Vacant Lots club is working with redoubled vigour. A complete card system has been installed for the handling of the work. The board of trade, Rotary club, city council and horticultural society, trades and labour council and Consumers' league, and pretty well all the civic and social organizations, are represented in the club. The city council gives office quarters in the City Hall, a cash grant of $850, and supplies the assistance of teams. The seed situation will be taken care of by local seedsmen. In 1917 over 2,000 twenty-five foot city lots were cultivated and this year it is expected that number will be increased. A dollar is charged for one 25-foot city lot and 50 cents for each additional lot. On request the ploughing is done at cost. Lots are ploughed free for the families of soldiers. Lectures are given with a view to stimulating the interests of both children and adults.

Edmonton.—The Vacant Lots Garden club this year has been definitely amalgamated with the horticultural society, the name of the new organization being the Edmonton Horticultural and Vacant Lots

Garden Association. The vacant lot cultivation end is in the hands of a committee called the Vacant Lots Garden committee. Attractive prizes will be offered for competition. The board of trade and the Rotary club are co-operating. The city council will give office space and free telephone and a guarantee against loss to the amount of $200.00. Upwards of 2,000 lots will be cultivated. The project is financed by a membership fee of $1.00 per member. The provincial Government gives the Horticultural Society a grant of $300 and citizens have donated between four and five hundred dollars in goods and cash for prizes. No special privileges are granted to returned soldiers, excepting that special classes are made for them in the prize list. Contracts for ploughing have been made and any work of the kind will be done for lot-holders at the contract price. About 25 schools will cultivate gardens. A first, second and third prize will be awarded to the three best gardens from the standpoint of crops of economic value and general appearance.

BRITISH COLUMBIA

Vancouver.—Mr. George D. Ireland, Employment and Relief Officer, writes: "Through the initiative of my Departme we had about twenty acres of vacant l under cultivation last year, which produc a crop of about forty tons of potatoes a ten tons of mixed vegetables. We hope increase our efforts greatly during 191 We will supply seed at first cost, and ploughing at a minimum charge. intend having a course of six lectures experts from the Experimental Farm a the University of British Columbia. The will, I expect, be at least, eight hundr citizens interested in the project in atten ance." A course of free lectures to be giv in the evening on garden farming announced by the University of Briti Columbia. The addresses will embra talks on soil, garden crops fertilize insect pests ungous diseases, potatoes a the general principles of garden farmin The city will purchase seed potatoes a fertilizers and re-sell them at cost.

Victoria.—The increased production co mittee havin charge of the vacant work have agreed to do the ploughing f $1.75, discing for 75 cents, harrowing f 50 cents, for lots 60 x 100 feet. Upwards 60 acres have already been ploughed and ploughing match for prizes of $15, $10, a $7.50 has been held on quarter-acre lots.

A BIRD HOUSE EXHIBITION

An exhibition of bird houses made by boys in the public schools of the city was held in Ottawa on March 4th under the auspices of the Ottawa Humane Society. Donations were received, and the bird houses were sold for the benefit of the Prisoners of War Fund. There were more than eleven hundred bird houses and feed receptacles shown. Wren houses predominated, but houses for martins, woodpeckers, and other kinds of birds were included. Prizes were awarded for the best specimens under the following classification:—

1. Houses made from natural wood covered with bark.
2. Houses made from sawn wood.
3. Martin houses.
4. The greatest number of bird hous made by any one boy.

A special prize was awarded to the scho that exhibited the largest number of house The school winning this exhibited o hundred and seventy-five bird house The purpose of this competition is inculcate in the minds of the boys a lo for birds. The boys are instructed how and where to place the houses, so to encourage the birds to occupy the to raise their families, and to assist in t production of crops by destruction insect life.

A WAR-TIME GARDENING SHORT COURSE

THE Ottawa Horticultural Society held a short course in war-time gardening on the evenings of March 11, 12, 13 and 14. For one-half hour each evening before eight o'clock practical demonstrations were given on such subjects as sowing seeds in flats, transplanting seedlings, selecting and cutting potatoes for seed and methods of applying spraying material. The instruction staff consisted of Mr. James Murray, Professor of Cereal Husbandry, Macdonald College; Mr. T. Macdonald College; Mr. A. Walke Gardener, Macdonald College; Mr. W. Macoun, Dominion Horticulturist; M F. E. Buck of the Division of Horticultu of the Experimental Farms, and officers the local horticultural society.

The Ontario Department of Agricultu gave a motion picture demonstration vegetable gardening activities. Lante slides were used in connection with sever other addresses. The attendance vari from two hundred to four hundred peopl

ASSOCIATIONS AND SOCIETIES

CANADIAN COUNCIL OF AGRICULTURE

The Canadian Council of Agriculture met in annual conference in Regina, Sask., on March 11 and 12, when resolutions were passed asking that the price for this year's wheat crop be set and a minimum price set for the crop of 1919, and favouring the removal of the duty on farm machinery and implements. H. W. Wood, President of the United Farmers of Alberta, was re-elected president and Roderick MacKenzie of Winnipeg, vice-president and secretary *pro tem.* Messrs. P. Wright, of the Manitoba Grain Growers, Geo. H. Chipman, editor of *The Grain Growers' Guide*, and J. A. Maharg, M.P., president of the Saskatchewan Grain Growers' Association, form the executive.

THE PROPOSED INTERNATIONAL LIVE STOCK SHOW

The representatives of the various Record and Live Stock Associations appointed at their annual meetings to confer with regard to the holding of an International Live Stock Show in Canada, held a meeting in Toronto on February 22nd. The meeting was called by Mr. Wm. Smith, M.P., Columbus, Ontario, President of the Eastern Canada Live Stock Union. Mr. W. A. Dryden, president of the Dominion Shorthorn Association, Brooklin, Ont., presided. The following resolution was passed: "That it is advisable to take steps to organize an International Live Stock and Dairy Show."

Three representatives each for heavy horses, light horses, beef cattle, dairy cattle, sheep, swine, poultry, dairy products, grain and seeds were appointed under the chairmanship of Mr. W. A. Dryden and the vice-chairmanship of Mr. W. W. Ballantyne, Stratford, as follows:—

Heavy Horses	Wm. Smith, M.P., Columbus.
	Peter Christie, Manchester.
	E. C. H. Tisdale, Beaverton.
Light Horses	Geo. Pepper, Toronto.
	James Cowan, Cannington.
	H. M. Robinson, Toronto.
Beef Cattle	H. M. Pettit, Freeman.
	Jas. Bowman, Guelph.
	L. O. Clifford, Oshawa.
Dairy Cattle	D. C. Flatt, Hamilton.
	John McKee, Norwich.
	B. A. Bull, Brampton.
Sheep	Jas. Douglas, Caledonia.
	J. M. Gardhouse, Weston.
	Lt.-Col. R. McEwen, London.
Swine	J. D. Brien, Ridgetown.
	J. E. Brethour, Burford.
	H. A. Dolson, Norval.
Poultry	John Saunders, London.
	W. W. Simpson, Guelph.
	J. G. Henderson, Hamilton.
Seeds	A. McKenney, Amherstburg
	W. J. W. Lennox, Toronto.
	W. J. Squirrell, Guelph.
Dairy Produce	G. A. Putnam, Toronto.
	G. G. Publow, Kingston.
	Frank Herns, London.

Professor G. E. Day, Guelph, was appointed secretary, and John Gardhouse, Weston, assistant secretary.

WESTERN LIVE STOCK SHIPPERS' ASSOCIATION

The Western Live Stock Shippers' Association held its annual meeting on February 21st, in Winnipeg, when the following resolution was passed "Whereas in view of the widespread efforts being made at the present time in the way of conservation, and realizing, as we do, the seriousness of the situation and the difficulties the food controllers have to contend with unless assured of the whole-hearted support of the nation in this time of stress, when the resources of the whole civilized world are being tested to the utmost, be it resolved that we, the members of the Western Live Stock Shippers' Association, do hereby pledge ourselves to encourage in every way possible the efforts being made to conserve grain and stock of all descriptions, especially in regard to the grain being fed to hogs in the stock yards; this conservation being in the best interest of the industry and not in any way detrimental to the greater production campaign being carried on at the present time." The officers elected were: President, Geo. Hamilton, re-elected; vice-president, T. Truscott; secretary-treasurer, A. Miller, Winnipeg.

UNITED FARMERS OF NEW BRUNSWICK

A meeting was held at Jacksonville, N.B., on March 9 and the United Farmers of New Brunswick organized with G. M. Hagerman, president, B. J. Hartt, vice-president, and Frank Everett, Jacksonville, secretary.

NOVA SCOTIA FRUIT GROWERS' ASSOCIATION

Among the resolutions passed at the annual meeting of the Nova Scotia Fruit Growers' Association, held at Port Williams N.S., was one expressing appreciation of the Dominion Government's effort to meet the views of the fruit growers of Annapolis Valley and the province generally. The resolution especially referred to the financial aid for carrying on experimental and instructional work derived from funds granted under THE AGRICULTURAL INSTRUCTION ACT. Another resolution advocated the adoption of a standard barrel for the whole Dominion. A third favoured the grading of potatoes, and a fourth asked for the appointment of a District Representative for Hants County to further instructional and demonstration work. The officers elected were: President, W. S. Blair, Kentville, N.S.; vice-president, F. H. Johnson, Bridgetown, N.S.; secretary, Manning Ells, Port Williams, N.S.

GENERAL STOCK BREEDERS' ASSOCIATION OF QUEBEC

The annual meeting of the Quebec General Breeders' Association, which is a federation of the four principal breeders' association of the province, was held on the 13th of February in Montreal under the presidency of Hon. M. Garneau, M.L.C., Dr. J. A. Couture acting as secretary. About 150 members from all parts of the province were present. Hon. M. J. E. Caron, Minister of Agriculture for Quebec, attended, and the Federal Department of Agriculture was represented by Mr. J. H. Grisdale, Director of Experimental Farms, and Mr. H. S. Arkell, Live Stock Commissioner.

There are now 939 members in the Association, which is 139 more than last year. This number is divided as follows among the four associations affiliated with the general association:—

	Members
French Canadian Horse Breeders' Association.	161
French Canadian Cattle Breeders' Association.	171
Sheep Breeders' Association	294
Pig Breeders' Association	313

The receipts for the year ending December 31st, were as follows:—

For the French Canadian Horse Breeders' Association	$461.70
For the French Canadian Cattle Breeders' Association	922.12
For the Sheep Breeders' Association	1,173.24
For the Pig Breeders' Association	2,129.09
Sale of breeding animals	16,427.45
Grants from the Dominion Department of Agriculture	500.00
Sundries	48.32
Total	$21,661.92

Expenditures:—	
For the four Associations	$2,233.57
For the sale of animals	16,796.74
Balance on hand	2,631.61
Total	$21,661.92

The deficit resulting from the sale of breeding animals at Montreal and Quebec was $381.19, instead of from $2,000 to $4,000 as for the first three or four sales. At the last annual sale the association offered 295 animals as follows: 97 head of cattle (70 Ayrshire, 20 Canadians, and 7 Holsteins), 122 sheep, and 76 pigs. The sheep included 19 Cotswolds, 47 Leicesters, 12 Lincolns, 22 Hampshires, 9 Oxfords, and 4 Cheviots. The pigs were 39 Yorkshires, 28 Chesters, 8 Tamworths, and 1 Berkshire. The expenditures caused by this sale were 35⅓ per cent of the purchasing price of the animals.

In addition to its annual sale, travelling sales were inaugurated this year by the association on the railroads. There was one which was held at fourteen centres on the I.C.R. between St. Charles and Rimouski. There were sold 71 sheep, including 34 males and 37 females. The total proceeds almost covered the purchasing price; the difference was $51.00.

The province of Quebec has supplied more members to the National Associations of Hogs and Sheep Breeders than any other province, viz., 321 for the Sheep Breeders' Association, as against 311 for Ontario, and 334 for the Pig Breeders' Association, as against 326 for Ontario. The following resolutions were adopted at the meeting:—

1. Urging the provincial Government to pass a law compelling cheese and butter factories to purchase milk according to the percentage of fat instead of by the "pooling" system.

2. Urging the Dominion Government to remove custom duties on agricultural machinery, chemical fertilizers, and cattle feeds.

3. Asking the Dominion authorities to send back to the land all returned soldiers who came from the land, and who are fit for farm work, so as to help production.

4. Urging, for the third time, the provincial Government to pass as soon as possible a law regulating the use of stallions.

The following officers were elected for the year: President, Hon N. Garneau, Quebec; 1st vice-president, Arsene Denis, St. Norbert (Berthier); 2nd vice-president, James Bryson, Brysonville; secretary, Dr. J. A. Couture, Quebec; directors, Messrs. Louis Thouin, Repentigny, representative of the French Canadian Horse Breeders' Association; Napoleon Lachapelle, St. Paul l'Ermite, representative of the Sheep Breeders' Association; Louis Lavallée

St. Guillaume, representative of the Pig Breeders' Association.

The officers elected at the annual meeting on February 12 of the French Canadian Horse Breeders' Association and French Canadian Cattle Breeders' Association were given in THE AGRICULTURAL GAZETTE for March. Those for the French Canadian Sheep Breeders' Association are as follows: President, Nap. Lachapelle, St. Paul l'Ermite; vice-presidents, James Bryson and H. Morin; secretary, Dr. J. A. Couture. For the French Canadian Pig Breeders' Association the officers are: President, Louis Lavallée, St. Guillaume; vice-presidents, Clovis Ouimet and Frank Byrne; secretary, Dr. J. A. Couture.

MAPLE SUGAR AND SYRUP CO-OPERATIVE ASSOCIATION

At the annual meeting of the Pure Maple Sugar Syrup Co-operative Agricultural Association held at Waterloo, Que., on the 19th of February, with an attendance of five hundred or six hundred farmers, a resolution was passed drawing attention to the fact that, despite the law, thousands of gallons of syrup and thousands of pounds of sugar imitations were still being sold. Another resolution was passed requesting the federal Department of Agriculture to arrange for regulations encouraging the production of maple syrup. The secretary of the Quebec Exhibition announced that a special exhibition of maple syrup products would be held in the Quebec exhibition building from June 25th to 28th, and that $1,000 in prizes would be distributed. The board of directors of the previous year was elected, viz.: President Gustave Boyer, M.P., Rigaud; vice-president, Chas. A. Fisk, Abbotsford, Que.; secretary-treasurer, Jos. H. Lefebvre, Waterloo, Que., with R. T. Brownlee, Hemmingford, Que.; J. H. Grimm, Montreal; J. E. Fortier, Beauceville, Que., as the other members. Mr. Michel Belanger, District Representative, of Lake St. John, gave a lecture on tapping trees, collecting the sap, evaporation, sugar making, packing, and selling.

BEAUHARNOIS DAIRYMEN'S ASSOCIATION

The annual meeting of the Association of Breeders' of Dairy Cattle of the District of Beauharnois was held at Huntingdon on February 22nd. The meeting was addressed by members of the staff of Macdonald College and others. The following officers were elected: President, D. H. Brown; vice-president, R. R. Ness, Howick; secretary-treasurer, W. F. Stephen, Huntingdon.

ONTARIO FRUIT GROWERS' ASSOCIATION

The 58th annual convention of the Ontario Fruit Growers' Association was held in Toronto, February 14 and 15. Resolutions were passed to the effect that the fruit growers support the campaign for increased production and conservation of food; that thanks be tendered to the Dominion Minister of Agriculture for the appointment of a traffic expert in connection with the Dominion Fruit Branch; that the Federal Government be requested to inquire as to the possibility of the conservation of fruit products by assisting the evaporating industry or the jam and canning industry; that the Government be requested to remove the duty on spraying machines, and that the Department of Education be requested to extend the time for high school pupils to work on the land to October 1st. The officers elected were: President, R. W. Grierson, Oshawa; vice-president, J. R. Hastings, Winona; secretary-treasurer, P. W. Hodgetts, Toronto.

ONTARIO VEGETABLE GROWERS' ASSOCIATION

The Ontario Vegetable Growers' Association, at its thirteenth annual meeting, passed a resolution urging the increased consumption of vegetables and a second resolution requesting that fertilizers be admitted free of duty. The officers elected were: President J. J. Davis, London; first vice-president, E. K. Purdy, Cataraqui; second vice-president, Maurice May, Tecumseh; secretary-treasurer, J. Lockie Wilson, Toronto.

ONTARIO ASSOCIATION OF FAIRS AND EXHIBITIONS

The 18th annual convention of the Ontario Association of Fairs and Exhibitions was held in Toronto, February 12 and 13. The President, Mr. S. W. Scarf, in his opening remarks, advocated the holding of school fairs in conjunction with the society fairs. Superintendent J. Lockie Wilson, in his report, pointed out that the grant from the Provincial Government for standing field crop competitions had been increased in ten years from $1,000 to $25,000. The larger exhibitions had paid $29,750 to members of the Association as prizes in grains, sheaves, and roots in the standing field crop competitions, and the agricultural societies had expended $65,000 in prizes during the last decade. The Federal and Provincial Governments during the same period had contributed $130,000 toward the prize money in the standing field crop competitions. The report announced that in order to stimulate production, the Provincial Minister of Agriculture had promised that the prizes offered for spring wheat in the standing field crop competition would be increased by 50%, making the grant from the Government to each society $75, instead of $50. This, with the $25 contributed by each society, would make the prizes offered for spring wheat competitions $100 in every case. The officers elected were: President W. S. Scarf, Durham; first vice-president, L. J. C. Bull, Brampton; second vice-president, W. J. Connelly, Cobden; secretary and editor, J. Lockie Wilson, Toronto; treasurer, J. Peart, Hamilton.

ONTARIO WINTER FAIR

At the annual meeting of the directors of the Ontario Provincial Winter Fair held in the Parliament Buildings, Toronto, February 22, it was reported that the prize money last year totalled $21,000, that the year's business amounted to close upon $43,000, and that a credit balance remained of over $400. This year's fair will be held at Guelph from December 6 to 12, entries closing November 20. The officers elected were: Hon. President, W. W. Ballantyne, Stratford; president, J. I. Flatt, Hamilton; vice-president, John Gardhouse, Weston; secretary-treasurer, R. W. Wade, Toronto; executive: John A. Boag, Queensville; Peter Christie, Manchester; R. S. Stevenson, Ancaster; W. Whitelaw, Guelph; J. D. Brien, Ridgetown; Wm. McNeil, London; A. McKenney, Amherstburg.

MANITOBA WINTER FAIR BOARD

The officers elected at the close of the Manitoba winter fair, held at Brandon, March 4 to 8, were:—President, J. D. McGregor; vice-president, Wm. McKirdy, Napinka; secretary, W. I. Smale; executive committee: the three officers, and Thos. Jasper, Harding, John Graham, M.P.P., Carberry; John Scharff, Hartney; J. R. Hume, Souris; A. C. McPhail, Brandon; N. W. Kerr, Brandon; Prof. E. W. Wood, Agricultural College.

MANITOBA HORTICULTURAL AND FORESTRY ASSOCIATION

The following officers were elected by the Manitoba Horticultural and Forestry Association at their annual meeting: President, George Batho, Winnipeg; first vice-president, H. W. Watson, Winnipeg; second vice-president, W. J. Roughen, Valley River; secretary-treasurer, Professor F. W. Broderick, Manitoba Agricultural College, Winnipeg. A conference with representatives of the Manitoba branch of the Canadian Seed Growers' Association led to the appointment of an advisory board of eleven to deal with potato problems, as follows: W. T. Macoun, Dominion Horticulturist, Ottawa; John De Graff, Kildonan; W H. Whellhams, East Kildonan; H. Stephens, Portage la Prairie; Professors V. W. Jackson, F. W. Broderick, and T. J. Harrison, Manitoba Agricultural College; W. C. McKillican, Experimental Farm Brandon; W. J. Harrison, Rural Route No. 4; Edward James, Rosser; and John Croone, Stonewall. Professor Harrison was made chairman. A committee was appointed to consider the name of a flower to be adopted as a national emblem. A resolution was adopted requesting the revision of the Manitoba Horticultural Societies' Act along the lines of the Ontario Horticultural Societies' Act.

MANITOBA AGRICULTURAL SOCIETIES

At the recent convention of the Manitoba Agricultural Societies held in Winnipeg the week ending February 23, resolutions were passed suggesting that all cured pork suitable for shipment overseas be withdrawn from the retail market and that suitable storage places be provided; endorsing the policy in respect to hog production by farmers and hog-feeding in villages, towns, and cities; favouring the mobilizing of labour for increased production; approving the placing of high school boys with suitable farmers for the summer; urging the standardization of farm implements, or, at least, the standardization of the parts most liable to break or need replacing; advocating the placing of a larger bounty on the destruction of adult wolves. The officers elected were: President, A. D. McConnell, Hamiota; vice-president, S. Larcombe, Birtle; secretary, H. W. Dayton, Virden.

MANITOBA HOME ECONOMICS CONVENTION

The Home Economics Convention held in Winnipeg the week ending February 23, passed resolutions asking the provincial Government to readjust the province into consolidated school districts of more reasonable or equal size, making the number of children of resident ratepayers the determining factor on the size of the district; pledging the convention to do all it can in the conservation of food by the use of substitutes; deciding to affiliate with the National Council of Women, and to bring the matter of federation under one name to the notice of all other provincial organizations, and urging the extension service to do all it can to prevent boys and girls from entering work which is not their own at the boys' and girls' club fairs, and suggesting that parents and friends of the children make a special effort to prevent such conduct. The directors elected were: Mrs. H. W. Dayton, Virden; Mrs. D. Watt, Birtle; Mrs. M. E. McBeath, Headingly; Mrs. J. B. McIntyre, Dauphin; Mrs. K. Gair, Portage la Prairie; Mrs. G. T. Armstrong, Manitou.

MANITOBA BEE-KEEPERS' ASSOCIATION

The ninth annual convention of the Manitoba Bee-keepers' Association was held in Winnipeg, February 19 and 20, when G. G. Gunn, Lockport, Man., was re-elected president, B. Brewster, Green Ridge, vice-president, and R. M. Muckle, secretary-treasurer. A resolution was adopted to the effect that all diseased colonies should be destroyed and owners allowed three-quarters of the values. The president urged that on patriotic grounds it was the duty of every bee-keeper to exert himself to the utmost in the production of honey. It was decided to hold summer field meets at Teulon, Manitoba, Souris, Dominion City, Rapid City and Swan River and a provincial meet at the home of the Rev. R. A. Rutledge, St. Charles, Man.

MANITOBA BRANCH OF THE CANADIAN SEED GROWERS' ASSOCIATION

The officers of the Manitoba Branch of the Canadian Seed Growers' Association, elected at the annual meeting in Winnipeg, February 22, were: President, Donald McVicar, Portage la Prairie; vice-president, W. C. McKillican, Brandon; secretary, W. T. G. Wiener, Manitoba Agricultural College.

MANITOBA VETERINARY ASSOCIATION

The annual meeting of the Manitoba Veterinary Association was held in Winnipeg, February 20, when the following officers were elected: President Dr. W. J. Hinman, Winnipeg; vice-president, Dr. J. Swanson, Manitou; secretary-treasurer, Dr. C. D. McGilvray, Winnipeg. Dr. C. Higgins and Dr. S. Hadwen, of the Health of Animals Branch, Ottawa, delivered addresses, the former on black-leg, anthrax and other contagious diseases to which animals are subject and the latter on swamp fever of horses, describing the results of investigations into this disease in Western Canada during 1917.

MANITOBA POULTRY ASSOCIATION

At the annual meeting of the Manitoba Winter Fair and Stock Show at Brandon, the Manitoba Poultry Association was reorganized with the following officers; President, M. W. Kerr, Brandon; vice-presidents, W. H. Brett, Winnipeg W. J Saunders, Killarney; W. Parrott, Neepawa J. H. Bartlett, Souris; secretary, W. F McGinnis, Brandon; treasurer, Jas. Mc Lean, Brandon.

SASKATCHEWAN GRAIN GROWERS' ASSOCIATION

The annual meeting of the Saskatchewan Grain Growers' Association held at Regina, February 12, 13 and 14, was the most numerously attended gathering of the Association yet held, eighteen hundred men and three hundred women registering. The annual reports showed that whereas the total business in 1916 was $1,058,000, in 1917 it was $1,643,000, being an increase of $585,000, or nearly 60 per cent. The officers elected were: President, J. A. Maharg, M.P., Moose Jaw; vice-president, A. G. Hawkes, Percival; secretary and director at large, J. B. Musselman, Regina. Other directors are: Thos, Sales, Langham; Mrs. McNaughton, Piche; H. C. Fleming, Tait; and John Evans, Nutana.

The resolutions passed included the following: Pledging the Canadian and Allied governments every support to make democracy safe; favouring the complete mobilization of the man power of the Dominion; voting $1,000 to the Allies Agricultural Relief Fund; favouring a survey of the boys of high school age in the province with a view to enable them to render all the help they can in seeding and harvesting the 1918 crop; approving removal of the duty on tractors; asking for further extension of the free list in order to include all farm implements and machinery, and requesting that a price be set on the same; pledging the convention to increase hog production, but at the same time suggesting that prices should be fixed on all coarse grains and hogs; requesting the Government to remove the duty on fuel and lubricating oils, and also to purchase seed and feed for the relief of settlers in South-Western Saskatchewan, whose farms suffered from drought last year; prohibiting the election to office o men interested in business in competitio with the grain growers' association; requir ing that candidates for office should dec ar themselves on the association's policy be fore their names are submitted to the vote requesting that a minimum price for whea be set for the period of the war, and for a year thereafter; instructing the executiv to invite all members of the Dominion Par liament to make a tour of Saskatchewan i a body during the coming summer; calling for closer co-operation between the Sas katchewan Grain Growers' Association and the Saskatchewan Co-operative Elevato Company; recommending that the exe cutive arrange for a training course for the sub-organizers and voluntary workers of the association along lines indicated in the recommendation of the special study committee; urging the further opening up o territory in Northern Saskatchewan; urging the Provincial Government to do everything it can towards increasing the usefulness o the telephone in rural municipalities; asking that a commission of experts be appointed to work out problems of the standardization of farm machinery; recommending the executive to appoint competent organizers under the trading department of the association to extend the operations of the locals by giving expert advice to those associations newly established and by organizing new ones; favouring the nationalization of railways, also the operating of all coal mines by the Government requesting the establishment of a maximum moisture content of not less than 13.50% before grading wheat tough, and not less than 16.50% before grading wheat damp

SASKATCHEWAN WOMEN'S GRAIN GROWERS' ASSOCIATION

At the annual convention of the women's section of the Saskatchewan Grain Growers' Association held at Regina, February 12, 13 and 14, resolutions were passed, among others, favouring the registration of all women between the ages of 18 and 50 for national service; favouring a Domin on Board of Health; asking the Provincial Department of Education to assist in affording agricultural education for children of poor parents; asking that the medical inspect on of rural schools be made compulsory; favouring a direct taxation on land for the purpose of raising Red Cross funds; urging that equal pensions be paid to the wives of privates as to those of officers asking the Department of Education te release girls for farm work in the same manner as is being done with boys, and favouring the establishment of community laundries. The officers elected were: President, Mrs. S. V. Haight, Keeler; vice-president, Mrs. C. E. Flatt, Tantallon directors at large, Miss Irma Stocking Delisle, and Mrs. Francis Shepherd Stalwart; secretary, Mrs. John McNaughton Piche.

SASKATCHEWAN HOME MAKERS' CLUB

The annual convention of the Saskatchewan Home Makers' Clubs will be held at Saskatoon on June 24, 25, and 26.

SASKATCHEWAN JUNIOR AGRICULTURAL SERVICE LEAGUE

Members of the Junior Agricultural Service League of Saskatchewan, which was instituted last year, before May 1 were responsible for the destruction of 514,140 gophers, and it was reckoned that about $225,000 worth of grain was thus saved. This year the objective is to destroy one million gophers, which should save close to half a million dollars' worth of grain

Under the direction of the Weeds and Seed Branch, which was responsible for the creation of the League, a small monthly publication is to be issued, in order to keep alive the interest and to instill into the minds of the children the necessity of avoiding the waste caused both by weeds and gophers.

Many letters have been received from boys and girls in connection with this matter, and also from school teachers. Several who killed more than one thousand gophers last year announce their intention of doubling their record this season.

SASKATCHEWAN CATTLE BREEDERS' SALE

The annual cattle sale, under the auspices of the Saskatchewan Cattle Breeders' Association, was held in Regina on Wednesday and Thursday, March 13 and 14.

Over 260 bulls and 65 females were sold. The average price paid for 200 Shorthorn bulls was $183, for 22 Aberdeen Angus $274, and for 39 Herefords $268. Thirty yearling Hereford heifers brought an average of $210, while 34 Shorthorn females averaged $195. Some excellent animals were brought out and in all cases where good breeding and fitting were in evidence good prices were obtained. The sale was a success, considering the very large number of animals offered, and the effect on the general live stock interests of Saskatchewan will be much greater than if inflated prices had prevailed.

A noteworthy feature of the sale was that a large number of the yearling bulls were purchased by men just starting up in the cattle business. This means that a larger number of pure-bred sires have been distributed and over a wider area than would have been the case if higher prices had prevailed. This fact will react favourably upon the breeder, for the more widely the pure-bred sire is distributed the greater will be the demand.

SASKATCHEWAN SHORTHORN CLUB

The Saskatchewan Shorthorn Club was organized at Regina on March 14th with the election of the following officers: Honourary president, Dean Rutherford, Saskatoon; president, R. W. Caswell, Saskatoon; vice-president, C. B. Latta, Govan; secretary-treasurer, H. Follet, Duval.

SASKATCHEWAN CLYDESDALE CLUB

The Saskatchewan Clydesdale Club was organized at Regina on March 14, the following officers being elected: Hon. president, Mrs. W. H. Bryce, Arcola; president, R. A. Taber, Condie; vice-president, G. Stutt, Regina; secretary-treasurer, J. Dougall, Condie.

ALBERTA DAIRYMEN'S ASSOCIATION

At the annual meeting of the Alberta Dairymen's Association, held at Edmonton, on Feb. 23, resolutions were passed urging that the sale of oleomargarine be discontinued after the war, asking the provincial and federal authorities to prevent the renovating of dairy butter; asking the provincial Department of Agriculture to establish a system of grades and grading of cream, or milk, conforming as nearly as

possible to the system now used in regard to butter, and that the grade standards and samples be left to the discretion of the Dairy Commissioner; urging that it be made compulsory to maintain uniform prices to all points for the same grades of cream, or milk, except that the creamery or cheese factory operators be allowed to meet their competitors at individual points; advocating that only persons or firms actually engaged in manufacturing butter or ice cream, and sweet cream vendors, or their employees, be allowed to purchase cream; suggesting that the license necessary to operate a buying station be granted only to persons who have proven their qualifications to the satisfaction of the provincial Dairy Commissioner or his staff, and endorsing the movement to form a Dominion Dairymen's Association.

ALBERTA PROVINCIAL HORSE BREEDERS' ASSOCIATION

The Stallion Enrolment Act formed the chief topic of discussion at the annual meeting of the Alberta Provincial Horse Breeders' Association, amendments being asked for to permit the Commission to refuse a certificate to a stallion in case it was thought, either on account of type or unsoundness, the animal was not entitled to the same, and to grant the Commission power of discretion to grade grade stallions according to type. The officers elected were: President, Geo. S. Cresswell, Edmonton; vice-president, J. G. Clark, Clark Manor; secretary, W. J. Stark, Edmonton.

THE ALBERTA PROVINCIAL SWINE BREEDERS' ASSOCIATION

The annual meeting of the Alberta Provincial Swine Breeders' Association was held at Edmonton, March 7th, when the following officers were elected: Hon. President, W. F. Stephens, Provincial Live Stock Commissioner; president, S.C. Swift, Viking; vice-president, Geo. R. Ball, West Salisbury; secretary, W. J. Stark, Edmonton. Mr. Geo. H. Hutton, Superintendent of the Dominion Experimental Station at Lacombe spoke of his experience with growing hogs at the Station, making special reference to the system of pastures and self feeders on the cafeteria plan, which allows hogs to select at their own will the rations that instinct encourages them to eat. Mr. Hutton said that if economy in feeding, and attending to hogs were followed, hog-raisers would not only reap many dollars, but their course would mean millions of dollars to the province.

ALBERTA PROVINCIAL SHEEP BREEDERS' ASSOCIATION

At the annual meeting of the Alberta Provincial Sheep Breeders' Association, held at Edmonton on March 7th, Mr. Jas. McCaig, Editor of Provincial Publications, said that sheepmen of to-day have the most progressive organization in Canada. with a Dominion-wide business organization for the co-operative marketing of wool. It was stated that the Association now has 172 members. The officers elected were Hon. President, W. F. Stephens, Provincial Live Stock Commissioner; president, A. B. Campbell, Edmonton; vice-president, Geo. R. Ball, West Salisbury; secretary, W. J. Stark, Edmonton.

UNITED FARMERS OF ALBERTA

At the 10th annual convention of the United Farmers' Association of Alberta held in Calgary on January 22nd, the following officers were elected: President, H. W. Wood, Carstairs; first vice-president, P Baker, Ponoka; second vice-president, W. D. Trego, Gleichen; third vice-president. J. W. Leady, White Court; fourth vice-president, Rice Sheppard, Edmonton; secretary, P. P. Woodbridge, Calgary. Resolutions were passed, among others, urging the rigid enforcement of all possible means for the prevention of destructive forest fires and for the encouragement of tree planting; deciding that before election to office in the Association, candidates should be required to state the exact source of their principal incomes and source of livelihood; asking the Provincial Government to encourage the use of vaccine for the prevention of black-leg in cattle; asking the Provincial Government to extend the county agent system as fast as qualified men could be secured; favouring the incorporation of the Association; giving the directors authority to apply for legislation conferring upon the association power to act as executives and administrators of estates and generally as trustees on behalf of members when required; suggesting the

establishment of labour bureaux at Calgary, Edmonton, and Lethbridge, with a view of supplying the farmers with farm labour and also of regulating wages; instructing the markets committee of the Association to endeavour to secure a system of grading and classifying live stock in the same manner as grain; deciding that any member of a local association may become a life member on payment of a fee of $15, until the first of January, 1919, when the fee shall become $25, all life members' fees to be held as a reserve fund.

ALBERTA AGRICULTURAL FAIRS ASSOCIATION

Announcement was made at the annual convention of the Alberta Agricultural Fairs Association held at Edmonton, on Feb. 21, that inspections under the Stallion Inspection Act would in the future be held at the fall fairs, instead of in the spring as formerly. A committee was appointed to draft a model programme, paying especial attention to the women's and children's departments. The officers elected were: Hon. president, Hon. Duncan Marshall, Edmonton; Hon. vice-president, H. A. Craig, Deputy Minister of Agriculture, Edmonton; president, E. L. Richardson, Calgary; vice-president, J. F. Day, Red Deer; secretary-treasurer, E. B. Fream, Calgary.

THE BRITISH COLUMBIA DAIRYMEN'S ASSOCIATION

The thirteenth annual convention of the British Columbia Dairymen's Association was held at Chilliwack on February 6th and 7th. Upwards of two hundred dairy farmers were in attendance. The programme was made up of addresses and discussions of timely and vital interest to the dairy industry. The following resolutions were passed:—

That the B.C. Dairymen's Association favours some effective movement among its members for the production of farm seeds, and that some co-operative method of handling and distributing the same be worked out by the Association.

That the B.C. Dairymen's Association instruct its executive committee to promote an effective scheme to save worthy heifer calves from slaughter, and to make them available to those districts in greatest need of them.

That this Association petition the Government of British Columbia to at once establish compulsory dairy cattle insurance that will provide adequate indemnity for animals slaughtered, and be maintained by equitable assessments from the provincial Government as representing the public and from the owners of the cattle.

That the executive of this Association appoint a committee to proceed to Victoria and negotiate with the Government for the passing of the necessary legislation at this session, that will secure the insurance on equitable lines.

That the dairymen and agriculturists of this province, through the members of the B.C. Dairymen's Association, heartily approve of the holding of the larger fairs during the war, and urgently request the Government to do all in its power to substantially assist financially and otherwise such fairs.

That this Association endorse the movement for the economic increase of pork production in the province.

That in the opinion of this Association the fixing by the Government of a minimum weight at which hogs may be slaughtered in this province would make it imperative that a minimum price be fixed.

DAIRY COMPETITIONS

In connection with the convention there was held an exhibition of creamery butter, and prizes were offered in competitions in milk production. In the butter competition ten creameries exhibited in the class for solid boxes and nine in the class for pound prints. Quality was higher than in previous years. In the milking record competition, classes were provided for animals of each of the dairy breeds obtaining the highest records of fat above the amounts required for qualification in their particular section in the Canadian Record of Performance. In the Ayrshire class a two year-old exceeded the required product on by 194 lb. and in the mature class by 182 lb. In the Holstein class a mature cow exceeded the requirements by 380 lb., and a Guernsey of the two-year-old class by 113 lb. There were also competitions between cow-testing associations in the province and cows in individual associations.

OFFICERS

The officers elected were: Honorary president A. C. Wells, Sardis; president, S. H. Shannon, Cloverdale; vice-president, J. W. Berry, Langley Prairie; secretary-treasurer, T. A. F. Wiancko, Department of Agriculture, Victoria, B.C.

BRITISH COLUMBIA STOCK BREEDERS' ASSOCIATION

At the annual meeting of the British Columbia Breeders' Association held at Victoria, February 19, Mr. A. D. Patterson was elected president for the twelfth year in succession, and Mr. W. T. McDonald, Provincial Live Stock Commissioner, was re-elected secretary-treasurer.

BRITISH COLUMBIA GOAT BREEDERS' ASSOCIATION

The first annual meeting of the British Columbia Goat Breeders' Association was held in Vancouver on January 26th. The Association, in conjunction with the Canadian Goat Society has been able to provide for goat pedigree registration under the Canadian National Live Stock Records. The following officers were elected for 1918: President D. Mowat, McKay; vice-president, G. H. S. Cowell, Port Alberni; secretary-treasurer, Geo. Pilmer, Victoria.

UNITED FARMERS OF BRITISH COLUMBIA

The second annual convention of the United Farmers of British Columbia was held at Victoria, B.C., on February 20. The officers elected were: President, Geo. Clarke, Saanich; vice-presidents, J. L. Pridham, Kelowna; R. A. Copeland, Kelowna; and W. Patterson, Koksilah; secretary, H. J. Ruscombe, Duncan. Resolutions were passed requesting that the Provincial Agricultural Act be revised and that a draft of the Act be submitted to the United Farmers before going to the legislature; asking that legislative action be taken to exempt improvements on farm lands from taxation; asking that steps be taken to eliminate the gopher pest, and that the provincial Government be requested to offer prizes to boys and girls as an incentive to destroy the pests; requesting the provincial Government to assist the farmers in obtaining seed wheat and oats on credit; praying the provincial Government to adopt measures to prevent oriental aliens from acquiring control of agricultural lands; requesting that customs duties be abolished on agricultural machinery and implements; asking that a minimum price be fixed for pork; asking that the Bank Act be amended so that a farmer giving a chattel mortgage would not have to pay a $5 lawyer's fee; asking the Government to take control of evaporation plants, or else compel evaporators to set a minimum price; urging the conscription of foreign labour; asking for stumping powder from the provincial Government on the same terms as farmers' institutes; applying to the provincial Government to adopt the local legislative system; appealing to the federal Government to change the timber law so that companies holding timber lands will be compelled to throw them open for settlement after a year's notice, and that the railway companies be appealed to to supply more refrigerator cars.

BRITISH COLUMBIA JERSEY BREEDERS

The British Columbia Jersey Breeders' Association was formed at Chilliwack, B.C., on February 7, when the following officers were elected: Hon. president, Professor J. A. McLean, University of British Columbia; president, A. H. Menzies, Pender Island; vice-president, E. H. Barton, Chilliwack; secretary-treasurer, G. S. Harris, Moresby Island.

NEW PUBLICATIONS

THE DOMINION DEPARTMENT OF AGRICULTURE

Report of the Agricultural Instruction Act, 1916-17. This report is a complete statement of the funds granted under the Act to the several provinces, and the purposes to which they have been put. Concise reviews are also given in classified form of the work that is being performed, both wholly and partially, by the aid of these funds. Comparative tabular statements covering the last five years show the upward trend and progress in the encouragement of agriculture, and especially in the arena of instruction, in research, in classroom, and in out-door demonstration, that is going on.

THE DOMINION EXPERIMENTAL FARMS

Report of the Dominion Experimental Farms for the fiscal year ending March 31, 1917. Instead of, as in former years, being published in volumes with full scientific details and explanations of experiments carried out at the Farms, the report this year is condensed into a book of 148 pages, in which the activities and operations of the Farms and Stations are outlined in concise descriptive and statistical form. Accounts of the experiments and tests that have been made, with the results obtained, are being published as distinctive bulletins. The Director of the Farms explains that this change is made to further economy and efficiency and that "the great amount of experimental work now being carried on, much of it of a complex character, makes it very difficult, if not impossible, to give a yearly detailed report of progress in such way that the average reader can follow it easily, and benefit therefrom." The report, however, as published, is very complete as to the work that has been accomplished at the Farms and Stations and contains a vast amount of information, in facts and figures, with comparative tables and descriptive text, regarding the year's activities.

THE DIVISION OF HORTICULTURE

The Potato in Canada, its cultivation and varieties, by W. T. Macoun, Dominion Horticulturist, Bulletin No. 90. This is the third edition of the regular bulletin of the Division on potato cultivation; revised and brought up to date. Consisting of 100 pages, the bulletin, after a description and history of the potato in Canada, gives statistics regarding the world's crop and then details experiments made at the Central Experimental Farm, describes the different varieties and how they may be originated, dilates on the importance of source and vitality of seed, the order and methods of cultivation and tillage, tells how to protect potatoes from insects and diseases and then proceeds to deal with storing, marketing, cost of growing, etc., continuing with some particulars of the boys' potato-growing contest in Carleton and Russell, with statistics of the average yields at the different experimental farms and stations, with the group classification of potatoes, with an extensive list of the varieties tested at the Central Experimental Farm, and finally, with a concise summary of conclusions.

THE DAIRY AND COLD STORAGE BRANCH

A New Plan for Cow Testing. Circular No. 24 of the Dairy and Cold Storage Branch, under the foregoing heading describes the new system that has been adopted for keeping the records of dairy herds. It tells what is meant by a herd record and why dairymen should keep such records. The circular also defines how the records should be kept and contains blank forms of application from farmers for assistance in herd record work and for employment as a milk tester. The necessary equipment for testing and other information are given.

THE ENTOMOLOGICAL BRANCH

Rats and Mice. Crop Protection Leaflet No. 7. This is a four-page leaflet by Dr. C. Gordon Hewitt, Dominion Entomologist and Consulting Zoologist, describing briefly the immense destruct on of food caused by rats and mice, and then telling how their inroads can be best prevented and the pests destroyed.

THE PROVINCIAL DEPARTMENTS OF AGRICULTURE

QUEBEC

Poultry Raising in Quebec in War Time, by M. A. Jull, Manager and Lecturer Poultry Department, Macdonald College, Quebec; Bulletin No. 54. Here is a twelve page bulletin containing information in plain, straight-forward language of the greatest value to the poultry raiser, whether on a limited or extensive scale.

Wheat Growing in Quebec in War Time.— By Jas. Murray, Professor of Cereal Husbandry, Macdonald College. In the shape of an eight-page folder, a strong and urgent appeal is here made to the farmers of Quebec to increase their growth of wheat this year from the four million bushels

of last year to eleven million bushels. Professor Murray points out that to do this, four hundred thousand acres would have to be sown more than last year.

ONTARIO

The committee in charge has had a bulletin prepared and published giving the results of the boys' potato growing contests in Carleton and Russell counties and the girls' gardening and canning competitions in Carleton county during 1917. Portraits of the winners and complete statistics regarding their work are furnished and a report given of the meeting held in the City Hall in Ottawa when the prizes were presented. The prizes were contributed and the bulletin, which comprises 32 pages, published through the generosity of Mr. R. B. Whyte, a public-spirited citizen of Ottawa.

A Farmer's Poultry House.—The District Representative of Lennox and Addington County has issued a large four-page leaflet giving instructions and advice, with diagrams and dimensions and quantity of material required to build a farmer's poultry house.

Co-operative Wool Sales.—An appendix to the annual report of the Live Stock Branch, taking 96 pages, recently published, gives a complete list of all the lots sold with the prices attached in every case. A deal of information is also given regarding the care of sheep, and shipping and packing of wool. Specific details are supplied of the requirements by judges of the different breeds.

The Fruit Branch circular of the Department of Agriculture for February contains a list of the varieties of apples, cherries, peaches, pears, plums and other fruits suitable for planting in Ontario. The list contains a number of varieties recommended by Mr. W. T. Macoun, Dominion Horticulturist, for northern sections.

MANITOBA

Agricultural Extension in Manitoba in 1917. Under this heading a twenty-four page report is given, with tabulated statements, of the activities engaged in and the work performed by the agricultural societies and home economics societies of Manitoba during 1917. The statement was prepared for presentation at the annual convention of the societies held in February this year.

The Boys' and Girls' Clubs Handbook is a book of 82 pages, not only giving the rules for contests in pig-raising, calf-raising, chicken-raising, corn-growing, garden-making, and seven other things, but also describing how the work that is entailed in each particular instance should be carried on. Information is also given on the organization of clubs and the assistance that may be expected from the Extension Service.

ALBERTA

The Directory of Poultry Breeders, published by the Alberta Provincial Poultry Association, with which is affiliated the poultry associations of Calgary, Edmonton, Lethbridge, Medicine Hat, Ogden and Stettler, contains the names of all the known breeders of pure-bred poultry in the province, the constitution and by-laws of the association and a complete record of the poultry prize winners at both the Edmonton and Calgary winter fairs.

BRITISH COLUMBIA

The Seed Growers' Directory 1917-18, Circular Bulletin No. 20, of the Live Stock Branch (Soil and Crop Division) of the Provincial Department of Agriculture, contains thirty pages of matter respecting the cultivation and growth of every kind of common vegetable, and also some facts regarding bulbs and flower seed production, by L. E. Stevenson, Dominion Experimental Station, Sidney, B.C. Professor Paul A. Boving contributes an article on the danger of experiments in the crossing of roots.

MISCELLANEOUS

The Report for the year 1917 of the Jewish Agricultural and Industrial Society shows that among other things 389 farm loans were granted during the year, and at the close of the year almost one million dollars, contained in 1,761 accounts, were outstanding. A total of 1,529 farm labourers had been placed. The Society co-operates with the New York State College of Agriculture in educational work amongst Jewish farmers. Short course scholarships are awarded to the children of Jewish farmers and other public-spirited work carried on. The Association publishes *The Jewish Farmer* in New York City.

The Nitrogen Compounds in Rain and Snow, by Frank T. Shutt, M.A., D.Sc., Dominion Chemist, and R L. Dorrance, B.A., is the subject of a twelve-page reprint from the Transactions of the Royal Society of Canada. The paper, which was read at the Society's May meeting, gives an account, with minute statistical details, of investigational work carried on for the ten years extending from 1908 to 1917.

NOTES

Special efforts are to be made this year to increase the growth of strawberries in New Brunswick. A number of prizes are to be offered for quantity and quality of production.

In the district of Kenora, Ontario, $1,100 has been raised in public subscription to finance the bringing in of a carload of brood sows to be distributed to the farmers and others.

The Wainfleet and Humberstone Township Farmers' club in Welland county, Ontario, by purchasing fence posts co-operatively were able to save between fifty and sixty dollars per car.

During the holding of the short course in Brant County, Ontario, the District Representative took the class to Toronto, where a day was spent visiting the stock yards, packing houses, city dairy and the Parliament Buildings.

The Public Library of Toronto has for six years held an annual exhibition of garden literature to which hundreds of people go to consult the pamphlets, catalogues, leaflets and books that can be of service to them in the work of gardening.

Mr. J. S. Knapp, District Representative, Waterloo county, Ontario, reports that a farmer in his district raised 3,150 pounds of mangel seed last year from two and one-half acres, which he is selling at from sixty to seventy-five cents per pound.

Through the efforts of public school teachers and pupils in the province of Saskatchewan a sum approaching one hundred thousand dollars has been raised within the space of eighteen months for patriotic pusposes. These include contributions to the Red Cross, Belgian Relief and the Canadian Patriotic Funds.

At a meeting of the Home and School Council in Toronto, Principal Colvin told of the garden work done by the Kitchener school. He said that 100 parents and 300 children cultivated three acres with the greatest success. A committee was appointed by the council to arrange for the systematizing and supervising of school gardens.

Mr. I. F. Metcalfe, District Representative, Manitoulin Island, reports that last year the Manitoulin Island Co-operative Association did a business of $38,402, while South Manitoulin Association, handling wool and lambs, did business amounting to $19,480.

With a view to encouraging the acreage of wheat to be grown in Ontario this year the Department of Agriculture is making a direct appeal to 100,000 farmers to raise 5 acres of spring wheat. A pamphlet describing the best methods of spring wheat growing in Ontario is being distributed.

The Collingwood Board of Trade last year carried on for the first time a series of garden work competitions between boys and girls. This year the competitions are to be extended to the beautifying of the home through the care of the lawns and growing of flowers and anything that will make the home more attractive.

In 1917 the agricultural societies of the province of Saskatchewan held 13 spring stallion shows, 50 ploughing matches, 2 good farming competitions, 133 exhibitions, 23 standing crop competitions, 52 seed fairs, 17 poultry shows and 60 short courses.

Among the vegetables produced in Prince Edward Island in back-yard and vacant-lot farming, were 75,000 bushels potatoes, according to the Provincial Department of Agriculture. It is expected that this year's produce will be very materially in excess of last year. Word has already been received by the Department of special garden lots being laid out.

An interesting fact with regard to the work among boys and girls has just come to the notice of the Director of Agricultural Extension in Saskatchewan. Mr. F. N. Spencer, a director of the Craik Agricultural Society, has for the last four years given a half bushel of registered seed wheat to the boys of "teen" age in his locality. He has also offered liberal cash prizes to the boys who showed the best results from their experiments. Three of these boys have won prizes at the Farm Boys' Camp, Regina. One of the boys is in attendance at the College of Agriculture, and two of the boys have been in attendance at the short courses which have been held at the college.

The following resolution was passed at the Fairs Association of Ontario convention: "That a committee consisting of Dr. C. A. Zavitz, Guelph; Dr. Charles E. Saunders, Ottawa; J. Lockie Wilson, Toronto; L. H. Newman, Ottawa; and Wm. S. Scarf, Durham, be appointed to investigate and determine the varieties of grains best suited to grow in the different sections of the province of Ontario."

According to G. R. Green, District Representative in Oxford County, Ontario, the poultry industry in that county is making rapid progress. At a poultry breeding station which supplies eggs for school fair districts, orders have been received for more than one hundred dozen settings from individuals in the district. These will be filled only after the requirements of the school fair districts have been met.

The Inverness County, N.S., Wool Growers' Association proposes to establish two or three stations in the county to collect wool for shipment to the grading station at Port Hood. The Association sold about two thousand dollars worth of wool last year. Arrangements are being made to add the marketing of cattle and lambs and the importation of fertilizers, seed, flour, and feeds to the activities of the Association.

It was announced by The Honourable Duncan Marshall, Minister of Agriculture for Alberta, at the annual convention of the Alberta Dairymen's Association, that the number of dairy cows in the province had increased from 179,000 in 1914 to 325,000 at the end of 1917; that the amount of butter made in the province had increased from 4,000,000 pounds in 1914 to about 8,000,000 pounds in 1917; that the amount of cheese manufactured in the province had increased from 70,000 pounds in 1914 to 745,000 pounds in 1917.

The Government of Alberta, through the provincial Live Stock Commissioner, bought at the packing plants and stock yards and kept at the exhibition grounds, Edmonton, 330 hogs. The females were all grades, but were chosen as being the most true to type. Yorkshire, Duroc-Jersey, Berkshire, and Poland China boars were secured, and the whole stock have been disposed of to farmers in the province. The pigs were in poor condition when bought, but were fed up before sale, first on a ration of oats and barley, and latterly from a car of screenings. They were also given all they wanted of coal slack mixed with salt and sulphur, with hay tea as a special tonic.

By order-in-council, the British Columbia Government has given notice that the rate of interest charged upon loans made by the Land Settlement Board under the provisions of the Land Settlement and Development Act, has been raised from 6½ per cent per annum to 7½ per cent per annum.

The Egg Circles at Cambray and Oakwood in Victoria County, Ontario, are managed entirely by women. The eggs are sold directly to the Housewives' League and the retail trade in the city of Toronto. Last year they disposed of 8,695 dozens of eggs at a price exceeding the prices paid by the local stores by 4⅓ cents a dozen. These circles also handle butter and poultry through the same channels.

The Canada Food Board during the early part of last month and the last half of February took active steps to encourage an increased production of maple sugar products. The assistance of the Provincial Departments of Agriculture has been secured. A great deal of appropriate literature has been circulated and owners of large estates have been appealed to for their co-operation. Replies promising their best efforts have been received from Nova Scotia, New Brunswick, Quebec and Ontario. The secretaries of the Farmer Clubs of every county in Quebec and the District Representatives of Ontario have all been addressed and promised support.

A feature of the short agricultural Course held by the District Representative in Middlesex county, Ontario, was the visiting of outside places. Visits were made to the asylum farm at London and the sanitarium at Byron, where excellent herds of dairy cattle and modern barns and equipment are maintained. At the latter institution a new type of open front poultry house was examined. The class also visited a green house where rhubarb growing was in progress, and they spent some time at the Tractor School for returned soldiers.

Mr. Wade Toole, B.S.A., who for years has been editor of *The Farmer's Advocate* at London, Ont., has been appointed Professor of Animal Husbandry at the Ontario Agricultural College, in succession to Professor George E. Day, who resigned to accept the secretary-treasurership of the Dominion Shorthorn Breeders' Association. Mr. Toole hails from Whitevale, Ontario county, and graduated in 1911 from the Ontario Agricultural College. He has been an earnest student of all appertaining to live stock and has been much sought after for advice.

INDEX TO PERIODICAL LITERATURE

PART V

The International Institute of Agriculture

T. K. Doherty, LL.B., Commissioner

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty, International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

888—**Agriculture in the Dominican Republic.**—ZIELINSKI, C. M. J., in *Supplement to Commerce Reports*, Annual Series, No. 26a., pp. 1-3. Washington, D.C. May 5, 1917. (2 pp. in Institute Bulletin.)

The Dominican Republic has an area of nearly 20,000 square miles, being about twice the size of the Republic of Haiti or more than five times that of Porto Rico. The latest estimate of the population is 700,000. The fertility of the land, which is mainly in the virgin state, presages the possibility of immigration and consequent development provided, of course, other factors remain equal.

One of the most important products of the Republic is sugar, produced mainly in the southern half. The 1916 crop, although about equal to that of 1915, brought excellent profits. The 1917 crop, estimated at about 150,000 long tons, is considerably more than the one preceding.

The Dominican Republic has rich forests, which are hardly diminished by the draft made during the four centuries since its discovery. The wooded area is estimated at 9,500,000 acres, about 85 per cent of the total land surface. Mahogany was formerly exported in considerable quantities and is known for its excellent quality. Pine covers a large area in the central and southwest parts. Lignum-vitae is plentiful, especially in the south. There are immense quantities of dyewood in the interior.

889—**Agriculture in the Philippines.**—*Commence Reports*, No. 154, pp. 28-31. Washington, D.C. July 3, 1917. (2 pp. in Institute Bulletin).

Few authoritative figures have ever been published regarding agriculture in the Philippines. This fact lends special importance to data collected by the Philippine Bureau of Agriculture and now made public by the Bureau of Insular Affairs at Washington.

The total area of the Philippines including in all 3,141 islands, islets, and reefs has been reported by the Manila Observatory to be 119,542 square miles, which is equivalent to 76,500,000 acres; but the area under cultivation in the six principal crops and three minor ones in the year ended June 30, 1916, was only 6,500,000 acres, or 8.5 per cent of the whole area of the islands. Rice was grown on 2,800,000 acres abaca on 1,235,000, corn on 1,070,000, coconuts on 680,000 (the average planting being 500 trees per acre) sugar cane on 444,000, tobacco on 145,000, and maguey on 76,000 acres. There were 2500 acres devoted to cacao and 2,000 to coffee.

891—**The Relation between the Hatching of the Eggs and the Development of the Larvae of Stegomyia fasciata (Aedes calopus), and the Presence of Bacteria and Yeasts.**—ATKIN, E. E., and BACOT, A., (Of the Lister Institute of Preventive Medicine), in *Parasitology*, Vol. 9, No. 4, pp. 482-536 London, July, 1917.

892—**Observations on the Influence of Salt and other Agents in Modifying the Larval Development of the Hook-Worms Ankylostoma duodenale and Necator americanus.** — NICOLL, WILLIAM, (*Australian Institute of Tropical Medicine, Townsville, Queensland*) in *Parasitology*, Vol. 9, No. 2, pp. 155-189. London, February, 1917.

CROPS AND CULTIVATION

894—**The Freezing of Fruit Buds; Researches made in the United States (1).** —WEST, F. L., and EDLEFSEN, N. E., in *Utah Agricultural College, Experiment Station Bulletin* No. 151, pp. 2-24. Logan, Utah, February, 1917.

When the plant tissue freezes, water passes out of the cells and forms ice in the intercellular spaces. If the thawing is done slowly enough, the water gradually passes back into the cells, which again resume their functions, provided the ice has not ruptured the cell wall. If, however, the thawing is done rapidly the cells can only partially reabsorb the water and die from loss of sap.

Low temperatures thus affect the tissues in two ways; 1) they induce the rupture of the cell wall; 2) they kill the cells by causing loss of sap.

The degree of resistance to cold varies in the different species in the various periods of their development: 1) according to the degree of the concentration of the cell sap; the more concentrated the latter, the lower the freezing point; 2) according to the dimensions of the intercellula · spaces which act as true capillary tubes; in fact, as a result of Walkers' experiment, it was found that liquid in a capillary tube can be cooled far below its freezing point without becoming solid.

There are three ways of combating sudden and great falls of temperature:

1) By selecting types possessing a high degree of specific resistance.

2) By choosing late kinds, in order that the trees may blossom at a time of year when frosts are of rare occurrence, and not severe.

3) By directly combating the cold by means of smoke, a method adopted with excellent results in the United States (California, Colorado, Oregon). Each orchard is furnished with a certain number of receptacles, arranged in the most suitable manner and filled with heavy oils which, on burning, produce a thick cloud of hot smoke that envelops and protects the plants while also preventing any loss of heat by radiation.

The meteorological stations, which are in communication, predict with great exactitude the approach of the cold waves and inform the fruit-growers in time to light the heavy oils in the receptacles at the right moment. This method, though reasonable and practical, is very costly and is naturally only applied in cases where the result is practically certain. Thus, if the minimum temperature predicted is so low that the rise in temperature produced by the smoke would not be sufficient to prevent freezing, it is best not to light the fires. The same advice holds good in the case of a temperature below the temperature limit. It is, therefore, most important to know the critical temperatures for the various stages of the development of the floral buds of the different varieties of fruit trees. The writers carried out a series of very careful experiments, in order to determine these critical temperatures. The apparatus or instruments, used by them were of 3 kinds.

1) *For laboratory tests.*—Three cylindrical concentric vessels, one placed inside the other. In the space between the wall of the first (the largest) and that of the second, is put the freezing mixture (ice and salt); the space between the walls of the second and third cylinders is filled with a salt solution, the temperature of the latter being kept constant by an apparatus provided with two small electric lamps which are lighted and extinguished automatically. In the interior vessel, or vessels, (for there may be 2), the branches of fruit buds are placed.

2) *Apparatus for freezing branches in the orchard.*—This consists of 2 vessels; in the first, which is filled with the freezing mixture, is placed a coil of rubber tubing which is fitted to the opening of the second vessel. Into the latter are introduced the branches of fruit buds; these must be bent, care, however being taken to avoid breaking them. The second vessel is double-walled, the space between the walls being lled with ice and salt. Through the rubber tube passes a current of air at a given temperature.

3) *Apparatus for freezing the entire tree.*— A double-walled half-cylinder made of galvanized iron and fastened on a wooden base on runners It is 6 ft. high and 6 ft. in diameter; within the two walls is placed the freezing mixture.

In the experiments, the following factors were taken into consideration: 1) The kind of floral buds; 2) their state of development; 3) the duration of the freezing; 4) the rate of thaw; 5) the humidity; 6) the minimum temperature (marked by Bekmann's thermometer). The injury done by the low temperatures is expressed by the percentage of buds killed.

Table I gives the results obtained with Elberta peach buds (laboratory experiments).

(1) See also Bulletin of Foreign Agricultural Intelligence, Nov., 1916.

TABLE I.—*Results Obtained with Elberta Variety of Peach*

No.	Date	No. of buds	Duration	Development	Temperature		Per Cent Damage
					Degrees F.	Degrees C.	
1		35	30 minutes	In bud	20.0	—6.66	66
2		38	20 "	Full bloom	24.0	—4.44	63
3		22	50 "	"	24.0	—4.44	64
4		42	5 "	"	25.0	—3.87	58
5		62	15 "	"	25.0	—3.87	28
6		35	10 "	"	25.0	—3.87	72
7		42	40 "	"	26.0	—3.33	40
8		37	40 "	"	27.0	—2.77	0
9		27	20 "	"	27.5	—2.50	0
10	25 April	80	10 "	Fruit setting	24.5	—4.11	30
11	26 "	16	10 "	"	26.0	—3.33	75
12	25 "	70	10 "	"	26.5	—3.05	48
13	26 "	49	10 "	"	27.0	—2.77	75
14	26 "	78	20 "	"	27.5	—2.50	56

Many experiments have been made with the Jonathan variety of apple and with Double Nattie cherries. The following are the most important results obtained:

1) There is a range of at least 5° F. (2.77° C.) between the temperature at which only about 5 per cent of the buds are damaged, and the temperature that will kill all of them.

2) In the case of Double Nattie cherries, when the fruit is setting 29° F. (— 1.66° C.) caused no damage and 24° F. (— 4.05° C.) killed practically all of them.

3) With Jonathan apple blossoms in full bloom, 28.5° F. (— 1.94° C.) caused no damage and 24° F. (— 4.44° C.) killed about half of them.

4) The results obtained in the case of the prune tree are set forth in Table II.

TABLE II.—*Test of Hardiness of Prune Buds to Frost*

No.	Date	No. of buds	Duration	Development	Temperature		Per Cent Damage
					Degree F.	Degree C.	
1	25 April	142	12 hours	Full Bloom	21.0	—6.10	100
2	25 "	101	15 minutes	"	24.5	—4.11	52
3	25 "	160	15 "	"	27.0	—2.77	47
4	26 "	67	15 "	"	28.5	—1.94	37
5	9 May	30	25 "	Fruit setting	25.5	—3.61	92
6	9 "	30	25 "	"	27.5	—2.50	47

5) The susceptibility of floral buds varies during the course of their development, and reaches its maximum values during fruit-setting. The temperatures which will kill about 50 per cent of the Elberta peach buds are as follows: 14° F. (— 10° C.), when they are slightly swollen; 18° F. (— 7.77° C.) when well swollen 24° F. (— 4.44° C.) when they are showing pink; 25° F. (— 3.87° C.) when in full bloom; 28° F. (— 2.22° C.) when the fruit is setting.

896—**Measurement of the Inactive or Unfree Moisture in the Soil by Means of the Dilatometer Method.**—BOUYOUCOZ, G. J., in *Journal of Agricultural Research*, Vol. VIII, No. 6, pp. 195-217. Washington, D.C., February 1917.

898—**Some Observations on the Occurrence of Infertility under Trees in India.**—JATINDRA, NATH SEN, (*Agricultural Chemist*), in *The Agriultucral Journal of India*, Vol. XII, Part III, pp. 390-405, plates XXXIII-XXXVII, tables 8, Calcutta, July, 1917. (1 page in Institute Bulletin.)

899—**Investigations in Cost and Methods of Clearing Land.**—THOMPSON, M. J., in *The University of Minnesota Agricultural Experiment Station Bulletin* No. 163, pp. 1-32. University Farm, St. Paul, Minnesota, September 1916.

Results of investigations, relating to cost and methods of preparing cut-over timber lands for farming purposes, carried out at the Minnesota Northeast Demonstration Farm and Experiment Station, near Duluth.

Fifteen acres of cut-over timber land were divided into three tracts of five acres each. On tract I the clearing was forced with dynamite; on tract II the stumps were first split with small charges of dynamite and then pulled with a machine; tract III after being brushed out was seeded to clover and timothy pasture, and cleaning

with dynamite was postponed five years until 1918.

The conclusions thus far arrived at may be stated as follows:

1. Cost (1) and method are determined largely by the character of the soil and the kind of vegetation.

2. The returns in forest products ($43.53 per acre) covered practically the cost of brushing and other cleaning work ($46.53 per acre) up to the stumping stage.

3. The cost per stump for blasting ($0.06 per stump) and pulling ($0.04 per stump) on tract II was almost identical with the cost of explosives alone ($0.11) on tract I.

4. The cost of clearing was much less on tract I ($0.04 per stump), since much less labour was required in piling and burning the stumps ($0.10 per stump on tract II).

5. The cost per stump for removal was least for the man-power machine ($0.09) slightly greater for the horse power machine ($0.12) and greatest for dynamite ($0.14). (This was for green timber and did not include the cost of piling which makes the use of dynamite the cheapest method by a good margin).

6. Some relation may apparently be established between the size of the stump and the size of the charge required to remove it.

7. The man-power puller will work to best advantage on the small farm, where the farmer has very limited means.

8. Under average farm conditions dynamite is usually to be preferred to the stump puller either alone or in combination. However, the plan of clearing being followed on tract III will not only be carried out at a lower cost as predicted, but is actually giving a larger net return in pasturage the first year than has been realized from the first crops from land on which the clearing has been forced. This is because forced clearing requires more labour and because land cleared by this method is relatively lacking in humus which curtails yields.

9. Following the removal of stumps from cut-over timber lands, on account of the shallow covering of vegetable matter, care should be taken to plough shallow the first time and to take immediate steps to increase the humus by seeding the land to clover and grasses, using barley or oats for a nurse crop.

The work from which these deductions were made was done on land which averaged more than two hundred stumps to the acre. These had a diameter of about 12 inches at the base and 10 inches at the cut-off.

Sixty per cent of the timber was green. The lower grades of dynamite were used on all kinds of stumps except green birch.

(1) Price of man labour 20 cents per hour and of horse labour 7½ cents per hour (horses work practically the entire year thus reducing the cost per hour).

Analytical data presented include: Cost of clearing expressed in units of time and in units of exchange.—Detailed study of the various stages of the clearing work.—Forest products, a credit in cost of clearing work.—Relative cost and efficiency of dynamite alone and in combination with a puller.—Individual stump studies.—Standardization of charge, based on size, kind, condition, and location of stump.—Comparative study of dynamites of various strengths. Special study of the man-power puller.—Land clearing practice.—Farm development.

901—Dry Farming Investigations at the Sherman County Branch Experiment Station.—STEPHENS, D. E., and HILL, C. E., in *Oregon Agricultural College Experiment Station, Bulletin* 144, pp. 47. Moro, Oregon, April 1917. (2 pp. in Institute Bulletin).

Besides the experiments with spring cereals carried out at Moro further experiments with winter cereals and other cultivated plants were made there and continued from 1911 to 1916 inclusive. The meteorological observations given in this bulletin cover the period from 1911 to 1916.

The experiments included: 1) varietal tests; 2) selection; 3) crop rotation; 4) methods of soil cultivation.

Winter Wheat.—44 varieties were tested Those belonging to the group of the Turkey and Crimean varieties gave the highest yields. These are the varieties chiefly grown in the west of the United States where winter wheat does well. They have a high milling value, and amongst them are found the wheats most resistant to cold. They are also very resistant to drought and are found in all the districts where dry-farming is practised; where there is a heavy rainfall Turkey wheats are not grown.

In experiments carried out over 4 years the average yields of the Argentine (32 bushels per acre), Kharkov (31.2 bushels per acre), Alberta Red and Armavir (31 bushels per acre) varieties, exceeded the local Turkey varieties by from 15 to 18%.

The experiments show the best time for sowing winter wheat to be between the 10th and 25th October. An average of from 45 to 55 lbs. of seed per acre was used. In dry soil, or where sowing is late in the autumn, these quantities must be increased.

Barley: Winter Barley.—This is not so resistant to cold as winter wheat. Many varieties were tested, but only 5 were retained. These are given below, together with the average yields obtained:

No.	Variety	Yield per acre (bushels)
1	Texas winter	49.0
2	Maryland winter	45.0
3	Tennessee winter	42.1
4	Chevalier	39.9
5	Utah winter	36 8

In 1916 a new variety, Trebe (936), was tested as a spring barley, and gave a yield of 95.8 bushels per acre.

The results of the experiments with different varieties of spring wheat, spring barley, oats, spelt and emmer described, have been published in the *U. S. Department of Agriculture, Bulletin* No. 498, and the 1916 results do not differ from those previously obtained.

Field Peas.—The Lima, White Canada, O'Rourke, Solo and Carleton varieties gave the highest yields. The average of 4 years is 22 bushels per acre. Grown in the same field—during 4 consecutive years. the yield was 18.8 bushels per acre.

The yield of spring wheat following on field peas was about equal to that obtained when wheat is grown on fallow land.

Maize.—The best results were obtained with Walla Walla White Dent, Min. No. 13, Northwestern Dent and Brown County Yellow Dent varieties.

Potatoes.—The highest yields were obtained with the Green Mountain, Pearls and Early Rose varieties.

A great many cultivation methods were tried for growing wheat under the summer-fallow-system. The results obtained so far prove that:

1) Autumn disking, if the stubble is heavy, is not profitable.

2) If ploughing is done early, spring disking is of doubtful value if the stubble is short.

3) Spring disking increases the yield of winter wheat if ploughing is deferred in the spring.

4) A farmer loses from 1 to 2 bushels of wheat per acre every week his ground is left unploughed after April 1, if the ground has not been well disked and all plant growth destroyed.

5) Ground ploughed in autumn with a mouldboard plough will give slightly higher yields than ground ploughed in autumn with a disk plough.

6) Early autumn ploughing, when the ground is dry, will give as high yields as late autumn ploughing when the ground is wet.

7) Deep ploughing (8 to 9 inches) will not give higher yields of spring wheat after summer fallow, than shallow ploughing (4 to 5 inches).

8) Yellow berries (grain rich in starch) in Turkey wheat are more prevalent on ground ploughed late, without being disked before ploughing, than on ground ploughed early in spring. This discovery is of great importance.

9) Subsurface or surface packers do not increase the yield of either winter or spring wheat after summer fallow.

10) Allowing weeds to grow in the summer fallow reduces the wheat yields.

11) Harrowing winter wheat in the spring is of no benefit unless it destroys weeds. With normal wheat stands, no increase in yields has been obtained when winter wheat has been harrowed in the spring.

In the rotation experiments the highest yields of spring wheat were obtained after a summer fallow. The yields of spring wheat, following on field peas and potatoes, were nearly as high as those obtained after summer fallow. Following maize, spring disked, the yields of spring wheat were 4.6 bushels per acre less than following summer fallow.

No important increase was obtained in the yields of a crop of small grain or maize when the previous crop had been turned under for green manure.

The yields of spring wheat, oats, barley and maize, in 1916, on ground which grew alfalfa for 2 years and was left fallow for 1 year, were not so high as on ground which had been alternately cropped to grain and left fallow.

Cooperative trials were made by farmers with seed obtained from the Branch Station. These showed that the highest yielding varieties at the Branch Station, when grown by farmers, will give equally favourable results over a large dry-farming area.

904—**Measures Adopted in England Respecting the Supplies and Prices of Basic Slag.**—*The Journal of the Board of Agriculture*, Vol. XXIV, No. 5, pp. 580-582 London, August 1915.

905—**The Nature of Cement Mill Potash.**—NESTELL, R. J., and ANDERSON, E., in *The Journal of Industrial and Engineering Chemistry*, Vol. IX, No. 7, pp. 646-651. Easton, Pa., July 1917. (1 page in Institute Bulletin).

906—**Studies on the Root Nodules of Non-Leguminous Plants in Japan.**—SHIBATA, KEITA and TAHARA MASATO, in *The Botanical Magazine*, Vol. XXXI, No. 366, pp. 157-182, 16 fig. Tokyo, June 1917. (1 page in Institute Bulletin).

909—**Effect of Frost on Plants at Leonardslee, Horsham, Sussex, England.**—LODER E. G., in *The Gardeners' Chronicle*, Vol. LXII, No. 1598, p. 57. London, August 1917. (3 pp. in Institute Bulletin).

911—**A New Physiological Theory of Here dity.**—RABAUD, ETIENNE, in *Comptes Rendus des Séances de la Société de Biologie*, Vol. LXXX, No. 15, pp. 738-744. Paris, July 28, 1917.

The two chief theories held to-day on the phenomena of heredity—that of Bateson and that of Morgan—are both based on the conception of "factors", units independent of each other and also, it would appear, of the living substance itself. These "factors" are purely imaginary; they may

therefore, be multiplied to infinity, and the most incongruous and unlikely propreties may be assigned to them. Having once admitted the existence of these factors, the central idea of both theories is their *segregation*, their division in definite proportions amongst the descendants of the hybrids. The questions of dominance or non-dominance take a second place, and the explanations given by Bateson and Morgan rest only on very improbable hypotheses.

The author addresses the following reproaches to theorists: 1) they have not examined in any way the processes produced in the first generation (F1); 2) they have only studied dominance, or its intermediate stage, in so far as the following process leads to segregation; 3) they have considered the question as if the second generation controlled the first, whereas it is obviously the contrary which occurs; 4) fascinated as they are by segregation they have failed to conceive any uniform function of the organism, whereas the organism is a whole.

Living substance is a complex mixture of colloidal proteins and electrolytic solutions, forming a heterogenous whole of *plastic substances*. These substances are dependent one on the other, their external exchanges are connected with a constant interaction, and the properties of each of them are determined by the very nature of this interaction. The organism is a whole, and it is only by this conception that one explanation can be given of all the various factors of heredity.

Heredity is not a vague "factor" giving rise to the theory of an immaterial "power" governing the organism from without; it is simply the continuity and resemblance of particles of living matter derived one from the other. The asexual generation shows this in all its simplicity; the sexual generation gives it a more complex appearance, but it remains none the less essentially a *fact of double continuity and double resemblance* when the two gametes which unite undergo no modification (in the opposite case there is continuity without resemblance; there is no heredity).

From the point of view of peculiarities emphasized by others or together forming peculiarities which, new in appearance, transmit a double resemblance, experiments in heterogenous fertilisation show the deleterious reciprocal actions of the sarcodes of different species. These experiments also prove this action to exist through all the degrees, from the total destruction to the simple physiological inactivity of one of the two united gametes, or of parts of these two gametes; that there is, at times, in this respect, a marked difference between the two sexes, and, finally, that the external influences modify sensibly the interaction of the sarcodes. According to the author all fertilisation due to the union of two gametes from distinct individuals is a heterogenous fertilisation.

Modern genetists admit that a special affinity unites two determined parts of the sarcodes, and that these parts act independently of the others; this hypothesis seems contrary to actual fact. The author, on the other hand, holds that, in the absence of precise data, it is best to state simply that certain parts of one of the gametes do not find conditions favourable to their development in the complex which results from the union of the two gametes.

With regard to the interchangeability of different racial characters in the hybrids of the second generation which may present a mixture of these characters, the author does not admit the theory of autonomous, interchangeable "factors". He regards these factors simply as another way of designating chemical bodies; since each property of a chemical body asserts itself under definite conditions, the effects of these properties will vary with the changes which these conditions undergo. All, then, is a function of the whole. When the gametes form in the hybrids of the first generation, a redistribution of the plastic substances is brought about and there result new complexes which differ little from the original sarcode (because this is composed of a certain number of the parts which constituted it previously). The various plastic substances occur in conditions fairly similar to their customary ones because the greatest change they can undergo is a modification of their exchange activity. It follows that, if the new complexes favour the physiological activity of these substances, they produce the effect which they would have produced in the pure gametes, or, at least, a very similar effect; but this effect is only the result of a given complex.

Mendelians do not admit the existence of intermediary forms, but affirm that segregation always occurs, though it is more or less marked in accordance with the number of "factors" participating in it, and which are all similar. Nothing, however, implies the impossibility of the formation of true intermediaries. Exact complete and intermediate dominance are in no way opposed to each other, they are only the extreme degrees of the heterogeneity of the gametes, quite compatible with persistence of the parts which constitute them.

For some Mendelians, the "combinations" produced in the distribution of the characters of the ascendants in the descendants are actual evolutionary variations, produced solely by hybridisation. According to the author this conception is incorrect, and the different arrangements to which the crossings give rise have no connection with any variation properly

speaking. If, at times, from one generation to another, modifications are produced, they are attributable solely to the fact that plastic substances, like all other chemical bodies, are subject to transformation; such transformation occurs especially during the course of their interactions, and may be either lasting or momentary. External influences play an important part. Variation leaves continuity intact, but interrupts resemblance.

In many cases the data gained by experience and observation give no very exact results, but they are preferable to the attitude of impressive precision found in modern works, a precision which is wholly artificial and highly dangerous, and which gives the illusion of the permanent where, essentially, only the temporary exists.

912—**The Determination of the Seeds of Cultivated Plants.**—FRANÇOIS, LOUIS, in *Annales de la Science agronomique*; I. Year 32, No. 1-6, pp. 30-55. Paris, January-June, 1915.—II. Year 33, No. 1-6, pp. 207-295. Paris, January-June, 1916.

Hitherto no author has collected the seeds of plants in view of their rapid determination with the aid of tables similar to those drawn up for plants. The author has undertaken this work. For the present he has restricted himself to the determination of the seeds of a certain number of cultivated plants; later he intends to publish a similar work on the seeds of the most common wild plants.

I.—In the first part seeds are discussed generally, and those of the Leguminosae, Gramineae, Cruciferae, Umbelliferae, and Compositae, the most important families on account of the large number of cultivated species they include, are reviewed successively. These general remarks are illustrated by 30 figures.

II.—The second part is devoted to tables of the characters of the seeds of cultivated plants. These tables allow of their rapid determination, which is still more facilitated by 110 figures, drawn from nature.

913—**Grass and Clover Seed Imports into the United States**—*Commerce Reports*, No. 107, pp. 498. Washington, D.C., May 8, 1917.

The following table, prepared in the seed laboratory of the United States Department of Agriculture, shows the amount of the various kinds of seeds subject to the seed importation act permitted entry into the United States during the fiscal year ending June 30, 1916, as compared with the nine months ending April 30, 1917:

Kind of Seed	July 1, 1915 to June 30, 1916	July 1, 1916 to April 30, 1917
	Pounds	
Alfalfa	3,251,796	2 882,337
Awnless brome grass	315	1,442
Blue grass:		
Canada	698,300	417,993
Kentucky	1 300	
Clover:		
Alsike	1,113,464	4,278,900
Crimson	4,503,983	5,004,927
Red	32,508,536	5,309,461
White	148,768	120,464
Millet:		
Hungarian or German	117,759	287,787
Broom corn	1,101,556	391,740
Mixtures	33,297	141,069
Orchard grass	754,476	1,286,342
Rape	4,018,908	2,015,636
Rye grass: (*a*)		
English	1,510,440	1,513,955
Italian	382,841	439,333
Timothy	118,737	1,507
Vetch: (*a*)		
Hairy	67,683	223,869
Spring	61,613	23,800

(*a*) Subject to the Seed Importation Act Since November 1, 1916.

914—**The Cultivation of Wheat by Hoeing**—REY, EMILE, in *Journal d'Agriculture pratique*, Year 81, New Series, Vol. 30, No. 18. Paris, September 6, 1917.

The three arguments against the cultivation of wheat by hoeing are:

1) The difficulty, in many cases, of drilling in lines; it should, however, be easy to construct simple and strong drills at a moderate price, which could be used in practically all soils;

2) Shortage of labour; this difficulty could be overcome as in cultivation of other crops by hoeing;

3) The fear of smaller yields owing to the lines being of necessity wider apart.

It was for the purpose of clearing up this last point that the cultivation experiments described in the present paper were undertaken. The results obtained in 1916 with Bordeaux wheat are first discussed.

In order to be able to use horse-drawn machines, a width of 24 ins. was given to the spaces down which the animal was to pass, and these spaces were separated by double lines of wheat 8 ins, apart. Each line thus had half of the large space, 12 ins., plus half of the small space, 4 ins., a total of 16 ins., that is to say, there were two and a half lines to every metre.

Four lines were sown with the following quantities of wheat:

1st line.—40 seeds to the metre per line, or 1 seed every 25 mm.

2nd line.—40 seeds to the metre, but placed 2 and 2 in holes 0.05 m. apart.

3rd line.—20 seeds to the metre, 2 seeds in each hole, 0.10 m. apart.

4th line.—13 to 14 seeds to the metre, 2 seeds in each hole 0.15 m. apart.

The yields of the different lines only varied very slightly; that of the 25mm. line was just a little greater than the others. Preference should, therefore, be given to close sowing.

In 1916 a yield of 71.37 bushels per acre was obtained from wheat cultivated by hoeing and sown as described above on the 9th November, 1915.

The experiment was repeated this year with the same Bordeaux wheat, sown and cultivated by the same methods. There were two sowings, one on the 28th September, 1916, and the other on the 3rd November, 1916.

The first sowing gave a yield of 90.7 bushels. This increase is doubtless due to the early sowing, though this has not been confirmed because, at the time the paper was written, the second crop had not been harvested.

The experiments prove that widening the spaces between the lines in the cultivation of wheat by hoeing, far from causing a decrease in yield, causes a considerable increase owing to the beneficial effect of the hoeing and tillage.

916—**Grass Land and Ploughed Land.**—STAPLEDON, R. G., (*Adviser in Agricultural Botany, University College of Wales, Aberystwyth*), in *Supplement to the Journal of the Board of Agriculture*, No. 17, 39 pp. London, May, 1917. (2 pp in Institute Bulletin).

LIVE STOCK AND BREEDING

925—**The Sheep Tick and its Eradication by Dipping.**—IMES, M., in *United States Department of Agriculture, Farmer's Bulletin* 798, pp. 31. Washington, D.C., May, 1917. (2 pp. in Institute Bulletin).

927—**Gradual Conversion of Colostrum into Normal Milk.**— *Oesterreichische Molkerei Zeitung*, Year XXIV, No. 14, p. 129. Vienna, July 15, 1917.

During the course of last year the Station for Milk Control at Memmingen (Bavaria) made a series of analyses with the object of following the gradual transformation of the colostrum of milch cows into normal milk. The results of these analyses are given in a table which shows that if with certain data, the milk has reached the normal figure as early as the 5th day, the acidity only becomes normal on the 10th. Further, the relation between casein and albumen and the fermentation experiments have shown that the milk is not capable of caseification before the 10th day and that, for selling milk for direct consumption it is advisable to wait till the 14th day, on account of the facility with which the milk of the preceding period adheres to cooking vessels and acquires a burnt flavour.

928—**Alfalfa Silage.**—REED, O. E., in *Kansas State Agricultural College, Agricultural Experiment Station, Bulletin* No. 217, pp. 1-20. Manhattan, Kansas, May 1917.

Seven small silos were erected in the spring of 1914 at the Kansas Experiment Station with the purpose of studying alfalfa silage. The experiment was carried on for two years, the silos being filled for the first time in the spring of 1914 and again in the spring of 1915.

The following combinations of material were siloed:

First Year

Alfalfa alone.
Alfalfa and corn chop, 10 to 1.
Alfalfa and blackstrap molasses, 20 to 1.
Alfalfa and alfalfa-molasses feed, 10 to 1.
Alfalfa and straw, 4 to 1.
Alfalfa and green rye, 2 to 1.
Rye alone.

Second Year

Alfalfa alone.
Alfalfa and blackstrap molasses, 20 to 1.
Alfalfa and blackstrap molasses, 10 to 1.
Alfalfa and corn chop, 10 to 1.
Alfalfa and sweet-sorghum stover, 6 to 1.
Alfalfa and green rye 2 to 1.
Rye alone.

A palatability test, conducted each year, obtained information as to how cattle would relish the various combinations. Chemical analyses were made of the silage by the chemistry department. Bacteriological study was also made of the silage by the bacteriology department. Some of the chemical analyses are reported in this bulletin, but a detailed report of the chemical and bacteriological studies will be published separately.

During the first trial several difficulties such as insufficient weight to insure proper packing and method of sampling were encountered, but these were overcome during the second trial.

A summary of the chemical analyses of the second year experiments is given in Table I. The first analysis in each case represents the composition of the mixture as it was run into the silo. The samples for the second analys's were composites taken several times during the process of silage making and represent the finished product.

The palatability test showed that the silages containing the highest percent of acid were most palatable to the cattle.

The following deductions were made:

Alfalfa will make a fairly good quality of silage and it will be readily eaten by cattle if fed within a few months after being siloed.

TABLE I.—*Percentage Composition of Alfalfa Silage. Second trial 1915-1916*

Silo No.	Description of Sample	Moisture	Ash	Protein	Crude Fibre	Nitrogen Free Extract	Ether Extract	Acidity	Sugar
1	Alfalfa alone—								
	When filled	62.75	4.60	6.94	10.32	13.63	1.76	0.450	1.039
	Taken out	67.23	4.17	5.51	9.75	12.23	1.11	1.483	—
2	Alfalfa and molasses, 20:1—								
	When filled	70.83	3.21	4.75	6.93	13.10	1.18	0.394	1.157
	Taken out	73.08	2.80	4.48	7.67	11.00	0.97	2.413	—
3	Alfalfa and molasses, 10:1—								
	When filled	64.85	4.95	5.31	7.53	16.07	1.29	0.389	5.890
	Taken out	63.53	5.22	5.93	9.49	14.44	1.39	3.009	—
4	Alfalfa and corn chop, 10:1—								
	When filled	66.80	3.25	5.25	7.21	16.02	1.47	0.378	0.900
	Taken out	67.08	5.23	5.10	8.59	12.79	1.20	2.242	—
5	Alfalfa and sorghum stover, 6:1—								
	When filled	64.75	4.15	5.69	10.54	13.27	1.60	0.387	0.696
	Taken out	62.30	5.56	5.51	11.26	13.82	1.55	1.856	—
6	Alfalfa and rye, 2:1—								
	When filled	63.25	5.36	6.00	9.23	9.18	1.58	0.495	3.170
	Taken out	67.40	4.21	4.93	10.20	11.86	1.40	1.975	—
7	Rye alone—								
	When filled	62.25	3.65	3.80	6.17	23.05	1.08	0.450	1.870
	Taken out	62.27	3.72	3.83	13.17	15.67	1.34	1.917	—

Observations during the experiment indicate that when it is possible to make alfalfa into first-class hay it should not be put into the silo. During a rainy season it is almost impossible to get the hay up without some damage and under such condition siloing may be justified.

The addition of carbohydrate material, such as corn meal, blackstrap molasses, sweet-sorghum stover and green ryes to alfalfa when put into the silo resulted in preserving it for a longer time than when the alfalfa was siloed alone. Of the supplements used in these experiments blackstrap molasses proved to be the best, corn chop was next in order, followed by sweet-sorghum stover and green rye. The mixture of alfalfa and blackstrap molasses was the most practical one used. Inasmuch as the addition of the molasses to alfalfa did not increase the bulk, it was possible to preserve large quantities of alfalfa within a comparatively small space.

There is as much acid produced in alfalfa silage as in kafir or cane silage. This would indicate that the acid content of silage is not always an index to the quality of the silage.

Rye alone will make a fair quality of silage when preserved in large silos and cut when the grain is in the late milk and early dough stages.

29—Studies of Free-Martins.—I. LILLIE, FRANK R.: The Free-Martin; a Study of the Action of Sex Hormones in the Foetal Life of Cattle, in *The Journal of Experimental Zoology*, Vol. 23, No. 2, pp. 371-452. Philadelphia, Pa., July 5, 1917.—II. CHAPIN, CATHARINE LINES, A Microscopic Study of the Reproductive System of Foetal Free-Martins, *idem.*, pp. 453-482. (2 pp. in Institute Bulletin).

930—Family Performance as a Basis for Selection in Sheep.—RITZMAN, E. G., and DAVENPORT, C. B., in the *Journal of Agricultural Research* Vol X, No. 2, pp. 93-97. Washington, July 9, 1917.

Two methods of selecting mates are in current use. The commonest is that of picking out the best individuals or those that exhibit the traits which are desired in the offspring, and is based in the principle that the somatic traits of the parent are the best index of its germinal derterminers, so that somatic selection is, at the same time, gametic selection. This principle, is however, false, because the animal may be heterozygous in any trait, that is to say that, besides determiners for a certain character, it may also have allelomorphic cells where this character is absent. For this reason this method gives very slow progress, and sometimes none at all.

The second method of se ection is based on the principle that the individual's somatic traits constitute a partial and imperfect index to its germ plasm, and that a better index is obtained by considering the characters of as many close relatives as possible.

These principles have been applied in the sheep breeding experiments carried out at the New Hampshire Experiment Station. The aim of the experiments is to produce a race of sheep combining good qualities of conformation, size and wool. These qualities were judged by the following scale of 100 points:

SIZE.—Body weight, 5 points; height at shoulder, 5 points; chest circumference, 5 points; loin width, 5 points; hind-leg circumference, 5 points.

WOOL —Weight of fleece, 10 points; length of staple, 10 points; diameter of fibre 10 points; crimp of wool, 10 points.

CONFORMATION.—Ratio, head width: ength, 3 points, ratio, neck length: circumference, 2 points; ratio, fore-leg length: trunk length, 10 points; ratio, chest width: depth, 5 points; ratio, chest width: trunk length, 5 points; ratio, loin width: trunk

length, 5 points; ratio, croup length: trunk length, 5 points.

As only a few rams are bred, selection is much more rigorous for males. The general method of selection is illustrated by the following example: In the 1916 selection the available ram lambs belonged to 12 "families". A "family" includes brothers, sisters, and the two parents. In selecting the character "body weight", the average weight of all the members of each family group at a fixed age is calculated. The family having the highest average weight is graded 1; the next highest, 2; and so on. If two families have the same average they receive the same number. Naturally, each family has different numbers for each character. When the rank of each family with respect to every quantitative trait has been determined, the rank is multiplied by its appropriate weight factor, as in ordinary scoring. The family which gives the lowest sum of products grades highest.

The rank of the families having been thus established the best ram is chosen from each. In this case the individual is also considered. If, for example, the best ram from the best family is sickly or has any physical defect, he is discarded for the best ram of the next best family. Thus the consideration of the relative values is supplemented by that of the 'idea" type at which the selection aims.

These experiments are not yet finished, but the uniformity and excellence of the progeny obtained already show that this method is well worth the extra labour it entails.

931—**Investigation in Animal Nutrition: Beef Production.**—HAECKER, T. L., in *The University of Minnesota Agricultural Experiment Station Bulletin* No. 155, pp. 1-32. St. Paul, Minn., March, 1916. (2 pp. in Institute Bulletin).

932—**Experiments in Feeding for Beef in Canada.**—I. HUTTON, G. H., and FAIRFIELD, W. H., Feeding for Beef in Alberta, (Results of Experiments at Dominion Experimental Stations in Alberta from 1909 to 1915) in *Dominion of Canada Department of Agriculture, Experimental Farms Bulletin* No. 30, pp. 1-38. Ottawa, 1916.—II. MCKILLICAN, W. C., Experiments in Steer Feeding in Manitoba (A Summary of Tests at the Experimental Farm, Brandon, Manitoba, from 1892 to 1912), in *Dominion of Canada Department of Agriculture, Experimental Farms Bulletin* No. 13, pp. 1-24. Ottawa, 1916. (2 pp. in Institute Bulletin—)

934—**Fertility and Age in the Domestic Fowl.**—PEARL, RAYMOND, in the *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 3, No. 5, pp. 354-356. Washington, D.C., May, 1917. (2 pp. in Institute Bulletin).

935—**The Feeding of Poultry.**—*The Journal of the Board of Agriculture*, Vol. XXIV, No. 2, pp. 189-190. London, May. 1917.

In view of the necessity of reserving as much grain as possible for human consumption it is necessary to ascertain whether poultry keeping increases or decreases the national food supply. In order to solve this question the President of the Board of Agriculture calls the attention of poultry-keepers to the following facts.

On an average, an 18 months old pullet has eaten 100 lbs. corn and meal, or their equivalent in other foodstuffs, it has laid 180 eggs, and, when killed, weighs, about 4½ lbs. The dry edible human food contained in its carcass and in the eggs it has laid is about 6½ lbs., so that it has eaten about 15 lbs. of corn and meal, or their equivalent, per 1 lb. of human foodstuff produced. Therefore, if the grain and meal eaten by the hen are fit for human food, poultry-keeping reduces the national food supply. On the other hand, if the pullet is fed on scraps, waste, tail corn, or other materials unfit for human consumption, the national food supply is increased.

If this test be applied to other animals, the pig is found to be a more economical source of food. The following suggestions are, therefore, made to poultry-keepers.

1) Poultry should be kept in small numbers only, so that they may be fed exclusively on scraps or other material unfit for human food.

2) When the quantity of such food available is sufficient to keep a pig, the pig should be preferred to poultry.

3) At the end of the laying season the number of hens kept should be reduced, and the number of poultry kept for fatterning restricted to the amount of material unfit for human consumption available for feeding them.

938—**The Biology of the Spawning Migration of Shad (Alosa spp.)**—ROULE, LOUIS, in *Comptes rendus des Séances de la Société de Biologie*, Vol. LXXX, No. 15, pp. 705-706. Paris, July 28, 1917.

939—**Carajat Incubator for Hatching Trout Fry.**—GERDIL, H., in *La Vie agricole et rurale*, Year 7, No. 35, pp. 151-154 Paris, September 1, 1917. (1 page in Institute Bulletin).

FARM ENGINEERING

940—**Machine Cultivation Trials at Mettray France.**—SAGNIER, HENRI, in *Journal d'Agriculture pratique*, Year 81, No. 15, pp. 283-284. Paris, July 26, 1917. (1 page in Institute Bulletin).

941—**The Moline Farm Tractor.**—I. *Il Giornale di Risicoltura*, Year 7, No. 10, pp. 133-136, Vercelli, May 30, 1917. —II. *Engineering*, Vol. CIV, No. 2692, p. 131, London, August 3, 1917. (1 page in Institute Bulletin).

942—**The Crawley Agrimotor.**—*The Implement and Machinery Review*, Vol. 43, No. 508, pp. 391-392. London, August 1, 1917. (1 page in Institute Bulletin).

944—**Patent Stone Sand and Asphalt Distributing Machines.**—*Engineering News-Record*, Vol. 79, No. 4, pp. 191-192. New-York, July 26, 1917.

945—**Simultaneous Harvesting and Breaking-up of Stubble with a Tractor.**—RINGELMANN, M., in *Bulletin de la Société d'Encouragement pour l'Industrie National* Vol. 127, No. 3, pp. 594-599. Paris, May-June, 1917. (3 pp. in Institute Bullet'n).

948—**A Potato Storehouse.**—I. RINGLEMANN, MAX, in *Journal d'Agriculture pratique*, Year 81, Vol. 30, No. 5, p. 91, 1 fig. Paris, March 8, 1917. —II. KROTOFF, M., in *Bulletin de l'Union des Agriculteurs d'Egypte*, Year 15, No. 120, pp. 83-87, 1 fig. Cairo, June-July, 1917.

RURAL ECONOMICS

950—**Farm Management Investigations in the United States.**—(Report of the Committee on Investigations of the American Farm Management Association) in *Record of the Proceedings of the Seventh Annual Meeting of the American Farm Management Association*, pp. 87-107. Washington, D.C., 1917. (5 pp. in Institute Bulletin).

951—**Farming in the Bluegrass Region** (A Study of the Organization and Management of 178 Farms in Central Kentucky. —ARNOLD, J. H., and MONTGOMERY, FRANK, in *U. S. Department of Agriculture Bulletin*, No. 482 (Office of Farm Management), pp. 1-32. Washington, D.C., February 19, 1917.

AGRICULTURAL INDUSTRIES

953—**A Comparison of Several Classes of American Wheats and a Consideration of Some Factors Influencing Quality.**—THOMAS, L. M., in *U. S. Department of Agriculture Bulletin*, No. 557, pp 1-28. Washington, D.C., May 18, 1917.

The investigations reported in this Bulletin were made in the Office of Grain Standardisation of the Bureau of Plant Industry in cooperation with the Office of Markets and Rural Organization, in connection with the enforcement of the United States Grain Standards Act. The fitness of the several types of wheat for the manufacture of white flour and the adaptation of the flour from these several types to the manufacture of different kinds of bread products were studied, in view of a division of wheats of distinctly different character into general classes. A comparative valuation of the wheat within any one class was also made.

In all, five distinct classes of wheats, grown in various sections of the United States, have been studied:

1) Soft red winter wheat, or "red winter," as it is better known on the market, is the principle class of wheat grown in sections east of the Mississippi River, in the State of Missouri, and in parts of the States adjoining the west and south.

2) Hard red winter wheat is grown chiefly in Nebraska, Kansas, and parts of Oklahoma and Montana, although small quantities are grown in the adjoining States.

3) Hard red spring wheat is grown in North Dakota, Minnesota, South Dakota and Montana. This wheat is more generally known commercially as northern spring wheat.

4) Durum wheat is grown in about the same territory as hard red spring wheat and to a limited extent in the southern great Plains area and Intermountain and Pacific Coast States.

5) White wheats are grown to a comparatively small extent in some of the Eastern States and more generally in the Intermountain and Pacific Coast States. Only a limited amount of work was done on this class of wheats, and in this respect reference is made only to some factors relating to the quality of the flour produced from them. There are other classes of wheats, particularly the western red wheats, both spring and autumn sown, of which no mention is made in this bulletin.

A partial survey of the results of this work is presented in the following summary:

1) Normal, plump, dry and sound wheat of all classes yields approximately the same percentage of flour. Over 80 per cent of the samples of each of the three classes of the more common wheats, soft and hard red winter and hard red spring, yielded between 67 and 75 per cent flour.

2) There is direct relation between milling yield and the moisture content of wheat, and in a general way the yield varies inversely with the moisture content. Were it possible to eliminate other factors, such as variation in plumpness of the kernels, it is probable that this relationship would be more apparent.

3) The weight per 1,000 kernels or average weight of kernels, has very ittle value in judging the potential flour yield.

4) Although there are frequent exceptions when individual samples are considered, average results show a very striking relation between weight per bushel and flour yield, the latter varying directly with the former. The ratio between these two figures, however, is not quite the same for the different classes nor is it the same for all varieties within each class.

5) In colour the bread from the flour of the various classes of common wheat shows about the same ranges and averages. The flour from durum wheat is considerably more creamy and thus averages several points lower than that of any other class.

6) Bread from all normal durum samples has a tint or colouration varying from slightly creamy to bright yellow, while, of the hard red winter samples, 77.6 per cent show a noticeable creamy tint, of the hard red spring samples 69.5 per cent, and of the soft red winter samples only 18.9 per cent.

7) The general results indicate that test weight and soundness when considered together, are of far more value in appraising quality than when either is considered by itself.

8 Small amounts of inseparable material are general y accompanied by a decrease in flour yield, as would be expected, since, as a rule a large part of such material usually finds its way into the bran and shorts.

9) Loaf volume and texture are the two factors which are considered as indicative of strength. While a great range of strength was found within each class of wheat the averages for each class show considerable differences between the various classes when considered as a whole. Given in order from weakest to strongest the classes are soft white, soft red winter, durum, hard red winter, and hard red spring wheat.

10) The average loaf volume in cubic centimeters for each of these classes s soft white wheat, 1.909; soft red winter, 1,965; durum 2,070; hard red winter, 2,219; and hard red spring, 2 421. In the matter of texture the several classes stand in the same order, except that soft red winter has a slight advantage over durum wheat.

11) Of the four more important classes under consideration, durum is the h ghest in crude-protein content; hard red spring, second; hard red winter, third; and soft red winter, fourth.

12) High crude-protein content as a rule is accompanied by high strength, but the relation between these two factors varies with the different classes of wheat, and extremely high crude-protein content is sometimes accompanied by a decrease in baking strength.

12) The average water absorption of the flour from durum and from hard red spring wheat is about the same and that of hard red winter is only slightly lower.

The water absorption of the soft wheats averages from 3 to 4 per cent lower than for the hard wheats. The range of water absorption of each class varies within wide limits.

14) There is a direct relation between the water absorption of the flour and the bread yield of a unit quantity of the same. As a rule, the higher the absorption the greater the weight of the loaf.

956—**The Carbone Method for Retting Textile Plants by Microbiological Action** (1).—I. CARBONE, DOMENICO, Sopra un bacillo macerante ærobico, in *Annali d'Igiene spezimentale*, Vol. XXVI, Pt. 1, pp. 57. Rome, 1916.—II. CARBONE, DOMENICO, Sul'a macerazione rustica della canapa: Prima nota, in *Le Stazioni Sperimentali agrarie italiane*, Vol. IV, pp. 261-299. Modena, 1917.—III. TOMBOLATO, ARTURO, Il metodo Carbone per la macerazione microbiologica delle tessili e la sua importanza pratica. Abstracted from: *I Progressi nelle Industrie Tintorie e Tessili.* Bergamo, 1917. (1 page in Institute Bulletin).

(1) See also Agricultral Gazette, May, 1917, page 427.

960—**Investigation of the Methods and Costs of Marketing Butter in Kansas.**—MACKLIN, THEODORE, in *Kansas State Agricultural College, Agricultural Experiment Station, Bulletin* No. 216, pp. 1-80. Topeka, Kansas, April 1917. (2 pp. in Institute Bulletin).

PLANT DISEASES

967—**The Acidifying Action of the Basidiomycete Coniophora Cerebella on Timber.**—PETRI, L., in *Annali del R. Istituto superiore forestale nazionale*, Vol. II (1916-1917), pp. 433-447. Florence, 1917. (1 page in Institute Bulletin).

969—**A New Disease of Wheat, Probably of Bacterial Origin.**—SMITH, ERWIN, F., in the *Journal of Agriculrural Research*, Vol. IV, No. 1, pp. 51-53. Washington, D.C., 1917.

Preliminary notice is given of a disease of *Triticum* spp. which has appeared in various parts of the United States of America. It was first observed in 1902 on wheat from Indiana, being considered as probably of bacterial origin. It was again found, in 1915, in large quantities of material from Kansas and Indiana. In 1917 the disease was observed in Texas, Oklahoma, Kansas, Arkansas, Missouri and neighbouring states.

The disease is being fully studied in the Washington Plant Pathology Laboratory in collaboration with the Kansas and Wisconsin Experiment Stations.

The disease is characterized by the appearance of black, longitudinal, parallel stripes of varying depth, on the glumes of the wheat when it is nearing maturity. The stripes are usually more numerous and marked on the upper parts, where they often fuse; they frequently reach to the base of the glume. Inside, in the parts corresponding to the stripes, the glumes have black or brown spots, invaded by bacteria; in some cases fungi are also found. In bearded wheats the awns are often attacked and discoloured, at least at their base. In the advanced stages of the disease the rachis and culm are covered with black or brown streaks. The leaves too are attacked. When the disease is serious the caryopses appear very shriveled, and, sometimes, there are cavities filled with bacteria in them. As the ears are stunted and the caryopses considerably shriveled there is a corresponding reduction in yield.

For next autumn, only seed from fields known to be free from this disease should be used, and no manure should be used derived from animals whose food or litter contains straw attacked by it. Such manure should only be used on fields in which neither wheat nor other cereals are grown. Animals fed on the straw of the diseased wheat should be kept away from fields in which wheat is to be grown.

974—**New Species of Peridermium on Pinus in the United States.**—HEDGCOCK, GEO. G., and HUNT, N. REX, in *Mycologia*, Vol. IX, No. 4, pp. 239-242. Lancaster, Pa., 1917.

INJURIOUS INSECTS

977—**Observations on the Coccidae of Europe, Africa and America.**—NEWSTEAD, ROBERT, n *Bulletin of Entomological Research*, Vol. VII, Part 4, pp. 343-380, fig. 1-27, plates VI-VII. London 1917. (2 pp. in Institute Bulletin).

982—**Euzophera osseatella, a Microlepidopteron Attacking Potatoes, In Egypt.**—CASORIA, M., in *Bulletin de l'Union des Agriculteurs d'Egypte*, Year 15, No. 120, pp. 77-81. Cairo, 1917. (1 page in Institute Bulletin).

CO-OPERATIVE FRUIT AND VEGETABLE CANNERIES IN THE UNITED STATES

Growers of fruit and vegetables in many parts of the United States have thought to become rich by disposing in a co-operative cannery of such of their surplus products as could not be marketed in a fresh state. Such hopes have been largely unrealized. Of some $158,000,000 worth of canned and dried fruit and vegetables marketed in 1914 the growers sold only $3,500,000 worth.

Practically all the co-operative canneries in the United States are found in the Pacific North West and California. These canneries have individual turnovers ranging from $50,000 to $1,500,000. Together with the Oregon Agricultural College, the Office of Markets and Rural Organization made a survey of the canning industry of the Pacific North West; and it also investigated co-operative canning plants in California and other parts of the United States. These studies enabled the essentials of success and the reasons for failure in this industry and this country to be ascertained.

It should be borne in mind that a canning

business should not exist for by-products, that if built up primarily to get rid of lower-grade fruit and vegetables it is not likely to be successful. Many canneries have failed because they were organized only to utilize that portion of a fruit or vegetable crop which could not be marketed in its fresh state because of its deteriorated condition or bad quality.

The most successful co-operative canneries now at work handle a wide variety of produce through a long season, some beginning with strawberries in May and ending in December with late vegetables. By making use of the various crops as they ripen the busy season may be made to last about six and a half months.

The cannery should be situated as near as possible to the centre for the production of its material. The quantity of produce delivered to it as material should moreover allow it to transact such a volume of business that the overhead expenses will represent a small unit of cost per case. Canneries should generally be near a centre of population from which they can secure at a reasonable price the necessary pickers and other supplementary help. In many farmers' co-operative canneries the skilled labour used in the manufacturing department is supplied by the sons and daughters of the farmer co-operators. These young people earn pocket money and the cannery secures reliable and skilled help, year by year In some districts the berry-picking season is looked upon as a holiday time, and many families in the Pacific North West and in California look forward to it.

From the neighbouring towns they—especially the women and children—move into the berry fields and spend from two to six weeks as pickers. They are fairly well paid and have an excellent outing. One cannery employs as many as 15,000 pickers in a season and provides good accommodation for camping.

The sanitary condition of a cannery should be satisfactory. There should be a plentiful supply of good water, The roads should be sufficiently good and there should be suitable provision for transport.

Proximity to markets is important.

Managers of several co-operative canneries state that a lack of sufficient capital is their chief handicap. Canning is a manufacturing business and therefore needs a much larger capital than the average co-operative entreprise. To be successful the association should have enough paid-up capital to make the plant and equipment practically free of debt when the first canning season opens. A considerable sum is needed for operating expenses before the final returns for canned goods are received, this last event often taking place eighteen months or more after the raw material is delivered.

A liberal fund is therefore necessary for the making of advances to growers when they deliver their produce. Such advances range from 35 to 65 per cent of the estimated value of the produce. If the plant be free of debt, enough money can usually be obtained from banks to finance the business of the early season, and in the later season additional money can be raised on warehouse receipts of the canned goods. Some of the larger canneries have as much as $200,000 worth of canned goods in their warehouses at one time, and need a proportionately large surplus fund and good credit to finance their business during the canning season. Such credit was possessed by a Western farmers' cannery which recently bought a trainload of sugar for its year's business, having secured for such purpose a loan of $85,000 from one bank.

Membership of a co-operative cannery should not be acquired for less than $25. A grower who has enough produce to interest him in the cannery ought to be willing to invest at least $100 on acquiring membership or to take stock up to that amount.

The advice of someone well qualified to judge of buildings and equipment should be secured when the purchase of these is being considered; and a cannery should not be constructed except on plans made by experienced engineers or cannery men.

The manager should be familiar with manufacturing processes and with organization, should have a knowledge of accounts and should be an efficient salesman. In the larger canneries he should have as assistant a manufacturer, who should have had practical experience in the particular kind of canning for which he is engaged.

A regular supply of the right kinds of produce is necessary if a cannery is to do sufficient business. Therefore contracts for supplies should be, if possible, for a number of years. Wherever the size of the business justifies the expense a cannery should employ a "field man" to work among the farmer co-operators, helping them to solve their difficulties, hearing their complaints, explaining the principles and advantages of association.

Some canneries which handle large quantities of berries have a department for sending fresh fruit to distant markets. When the market for fresh fruit is profitable all fruit of suitable quality is sent away —the ripe fruit goes to neighbouring markets and fruit ready for immediate use to the cannery. When markets are not favourable all the fruit is canned and held until it can be sold at fair prices. One co-operative canning association has sent as many as twenty-one refrigerator-carloads of fresh red raspberries in one express train, while it was operating two large canneries. Several co-operative canneries in the Pacific North West also operate evaporators in

which plums, loganberries, apples and some raspberries are dried. Other canneries have vinegar plants.

It is necessary that the manager keep in close touch with markets and know of their demands and conditions of trade preferences and of any improvements made in the canning business, in order that he may market products to the best possible advantage. A large portion of a season's output is sold for future delivery, and therefore great care must be taken in estimating output in order to prevent an oversale.

It may happen that cars are sold as early as April for delivery in September or October.

In one State a large number of the co-operative canneries have formed an association and appointed a joint agent, who is a canned goods broker, to handle their output. There is much need for greater co-operation among farmers' canneries for the purpose of standardizing output and forming a central agency for sales, in so far as the law allows.

THE FIRST YEAR OF THE UNITED STATES FEDERAL FARM LOAN ACT

The Federal Farm Loan Act was passed on 17 July, 1916, (1). It is interesting to take stock of the difficulties that have occurred in applying it and of the degree in which it has satisfied the need for credit of the rural population of the States. The twelve Federal Land Banks had up to 1 August, 1917, made loans amounting to $3,940,400. This total represents loans approved and actually made out of a sum of about $100,000,000 for which application was made. About $50,000,000 of this latter sum was applied for through formally constituted channels. The remainder represents the amount which National Farm Loan Associations still unchartered have reported that they wish to borrow as soon as they have perfected their organization.

The lending business did not begin in earnest until July. During that month the machinery of the system was thoroughly in working order and money was put out rapidly. The following figures explain the lending business in July, 1917.

FEDERAL LAND BANKS	Amount Applied for	Amount of Approved Loans	Amount of Loans Made	Total Amount of Loans Made up to August, 1917
Springfield	$ 735,785	$ 479,100	$ 29,900	$ 36,600
Baltimore	1,261,211	551,400	177,000	257,057
Columbia	2,199,423	1,042,824	43,200	42,200
Louisville	1,547,257	2,072,200	243,000	250,000
New Orleans	10,417,708	3,868,878	149,950	210,265
St. Louis	4,553,560	1,651,620	87,899	—
St. Paul	3,541,250	1,290,300	83,400	115,100
Omaha	3,435,326	985,090	55,450	101,150
Wichita	3,435,090	2,968,950	784,900	1,771,100
Houston	2,788,681	1,350,561	93,130	121,130
Berkeley	—	—	—	391,700
Spokane	3,953,361	2,724,880	434,630	642,005
	$34,310,652	$16,016,853	$2,232,059	$3,940,407

(1) See Bulletin of Foreign Agricultural Intelligence, September, 1918.

The Federal Farm Loan Board believes that loans will now be made with increasing rapidity. The Federal Land Banks were at first handicapped by lack of funds. Some of them made loans in excess of their capital stock, themselves borrowing money to do so in the outside market. The sale of farm loan bonds is however now well under way. The Land Banks and the private banking syndicate which are marketing these securities have already obtained subscriptions aggregating about $30,000,000. As soon as this money is collected it will be issued to the farmers at the 5 per cent farm mortgage rate which has been established by the board. The bonds yield interest at the rate of 4½ per cent. The banks expect to pay the expenses of operation out of the margin of ½ per cent. It is the intention of the board ultimately to bring about such complete organization and so to perfect its machinery that this margin will be only ⅛ per cent. The policy will be to put the saving into the pocket of the farmer rather than the investor in bonds, that is to reduce the mortgage rate rather than increase the yields of bonds. What effect an increase in the war bond rate will have on the sales of these land securities is conjectural. The board

believes that the land bonds will go on selling because it will tell the public that to finance the farmer is as important to the war as to finance the soldier, if not more so.

Two elements retard the making of farm loans—the lack of trained men in the banks and the difficulty as to farm titles.

The Federal Land Banks are paying small salaries to appraisers of land, which has made it difficult for them to secure the competent service needed to make their loans safe. Their work is moreover new and they cannot yet be presumed to have passed the experimental stage.

As regards titles it has been found on examining applications for loans that an unexpectedly large number of farmers cannot furnish legal evidence of these. They are not uncertain but merely unattested. Under the statute the Land Banks cannot lend on lands held by such uncertified titles. There is further a lack of uniformity, the attestation of titles being more difficult in some States than others, and every farm loan district embraces several States.

The banks have been led to advocate the adoption of a uniform system of registerng titles. Should it be made universal by Federal law farmers would have no difficulty in proving their titles by a reference to the registers. It may be expected that the Farm Loan Board will make some recommendation of this kind to Congress in next winter's session.

The board originally contemplated selling from $100,000,000 to $150,000,000 in farm loan bonds a year. Unless the machinery for the actual granting of loans is made to work more quickly it is unlikely that they will be able to do this.

A considerable access of business was expected this autumn because farmers would want money for autumn planting. The board hopes that before next spring—the first full planting season since the system has been completely at work—it will be able to grant loans more expeditiously on all properties which deserve to be financed.

The Federal Land Banks and the Federal Farm Loan Board may prove to be suitable means for the solution of problems even of national importance. It is reported that in certain Southern States the British government has requested British subjects holding in them farm mortgages to call for the payment of the loans and withdraw the money from the country to invest it in British government war issues. It is credibly asserted that the mortgage loans affected amount to nearly $110,000,000—far more than the farmers would immediately procure from American investors. Only the Federal Farm Loan system seems to be in a position to take up these obligations. It may have to solve a yet larger problem. In order adequately to participate in the flotation of the war bonds of the United States government, the American life insurance companies may have to reduce to some extent their present large holdings of farm mortgages. Here again the Federal Farm Loan System may be the only recourse open to farmers obliged to pay off maturing mortgages which they had expected to be able to renew indefinitely.

SETTLEMENT OF EX-SERVICE MEN WITHIN THE BRITISH EMPIRE AFTER THE WAR

The report of the committee appointed by the Secretary of State for the Colonies to consider the measures to be taken for settling ex-service men within the British Empire after the war has recently been issued. The terms of reference were: "To consider and report on the measures to be taken to settle within the empire ex-soldiers who may desire to emigrate after the war. To collect and prepare for distribution to intending emigrants of this class information which shall show clearly the nature of any facilities afforded by the governments of the dominions and States. To advise as to the best methods of making this information accessible to the troops. To make recommendation as to the steps which should be taken by His Majesty's Government, in concert with governments of the States and dominions, for the constitution of a central arthority to supervise and assist such emigration."

The committee were informed that the term "ex-soldiers" included ex-service men from both the navy and the army and their wives and children. The committee felt themselves at liberty to consider also the case of widows and orphans of ex-service men and of women who, like nurses and munition workers, had done war work.

Evidence as to facilities for settlement on the land was taken from *a*) representatives of the overseas dominions, *b*) various bodies dealing with emigration, *c*) similar bodies dealing with settlement within the United Kingdom. The committee hold that there is no conflict between the opportunities offered at home and overseas, for both should have place in one great policy of settlement within the empire.

THE ESTABLISHMENT OF RELATIONS WITH THE TROOPS

The committee hold that the proper time for distributing information as to opportunities for settlement among the troops is that which will elapse between the cessa-

tion of hostilities and the grants of furlough which will precede discharge.

The committee understand that the authorities contemplate issuing to each man, before demobilization, a form on which he will state *inter alia* his wishes as to future employment, and that demobilization committees will be appointed, in connection with the Employment Exchanges to advise the men as to the various kinds of employment available.

The committee therefore suggest that:

1) The form which each man receives should enable him, if he so desire, to express his preference for employment in the oversea dominions of the empire;

2) The names of all those who thus express such a preference should be sent for record, with all other relevant particulars concerning them, to the Central Emigration Authority to be constituted as stated below;

3) The local demobilization committees, in order to advise men as to opportunities overseas, should be in direct correspondence with the Central Emigration Authority, which should issue the necessary literature and full instructions; representatives of the Central Emigration Authority should visit these committees and attend as many of their meetings as possible; wherever possible men well acquainted with oversea affairs should be nominated by the Central Authority as permanent members of the local committees.

THE SETTLEMENT OF EX-SERVICE MEN AT HOME

The existing schemes for the settlement on the land within Great Britain of discharged soldiers and sailors are on a small scale. They provide for the settlement of no more than 240 men or if their wives and families be taken into account of 1,200 persons. In addition general legislation has provided for all tillers of the soil by the guaranteed minimum price for wheat and oats from 1917 to 1922, and by guaranteeing a minimum wage of 25s a week to agricultural labourers.

The attention of the committee was mainly directed to emigration.

THE CONSTITUTION OF A CENTRAL EMIGRATION AUTHORITY

The committee lay stress upon the necessity for the prompt creation of a new Central Emigration Authority.

They make the following suggestions with regard to it:

1) It is undesirable to set up an authority to deal with the emigration and settlement of ex-service men, which would be independent of any existing or prospective authority concerned with emigration generally;

2) The oversea governments should be closely connected with the new authority;

3) It should be in working order before the war is over;

4) It should be so constituted as to be capable of carrying out any emigration policy on which the home government, in consultation with the oversea governments, may decide.

The committee recall that the Dominions Royal Commission recommended that a central authority should be set up as a department of the home government; and that a consultative board should be appointed, which should include representatives of the oversea dominions and others, and advise the new authority, securing the necessary co-operation between the home and oversea governments with regard to migration. The committee go further than the Royal Commission for they consider that the representatives of the oversea dominions should be connected with the new authority not in an advisory but in an executive capacity.

The committee propose that actual executive duties should be entrusted to a board for whose work a minister of the United Kingdom should be responsible. This minister must appoint the board's chairman, who should be able to devote his whole time to its work. Its other members should include one representative nominated by each of the following: the Colonial Office, the War Office, the Board of Trade, the Local Government Board, the Ministry of Labour, the governments of Canada, Australia, New Zealand and South Africa, one of the Agents General for the Australian States and one of the Agents General for the Canadian Province. The board should also have five unofficial members of whom two should be women.

THE QUALIFICATIONS OF EMIGRANTS

Emigrants should be qualified first by training or experience and secondly by the possession of capital.

The committee lay particular stress on the necessity of providing *training* for men who have not already had agricultural experience. They should generally receive their training in the place of emigration either on a training farm or similar institution or as labourers on a privately owned farm. During the period of training it will be impossible for their wives and families to live with them, and this justifies a postponement of the emigration of many women and children which will lessen the difficulties of transport. In some cases men who have been settled for a short time in a State or Dominion will be able to obtain reduced passages for their wives and families.

The committee recommend that if, as seems probable, the emigration overseas even of the men be delayed for a few months after the war by the lack of available transports, some knowledge of agricultural work

A TABLE ILLUSTRATING GOVERNMENT SCHEMES FOR SETTLEMENT OF EX-SERVICE MEN OVERSEAS

Dominion or State	Extent of Individual Grant	Conditions	Crops	Government Loan	Repayment	Whether previous experience necessary	Training	Capital Necessary	Other Remarks
CANADA—									
1. Dominion Lands..	160 acres in Manitoba, Alberta, Saskatchewan	Free.....	Wheat, mixed farming	£400 (1) In maximum	In 15 years at 5 per cent	Yes	Dominion Demonstration Farms or with approved farmers	None.....	Available also for widows of soldiers and sailors who have died on active service.
2. New Brunswick	10-160 acres	Cost governed by cost of improvements (clearing, well, house)	Dairy farming, fruit, potatoes	£100-£300	10 per cent on application, balance within 20 years	Yes	Demonstration Farms	£100-£400 desirable	Community settlements to be established, accommodating from 100 to 250 families, with church, public hall, schools, etc.
3. Nova Scotia..	Private farms for sale	Cost from £120-£3,000	Mixed farming, fruit, dairy farming, stock-raising	Up to £500	Secured by mortgage	Advisable	Employment on Farms	£300 necessary	Government will assist in choice of farm and employment in order to gain experience.
4. Quebec.....	Land offered in lots of 100 acres	£6 per acre, payment within five years	Heavily timbered land	—	—	Yes	—	—	Suitable only for native-born Canadians. Within 5 years settler must clear 15 acres, build house and put up a barn.
5. Ontario.....	160 acres	Free, subject to conditions as to clearing, cultivation and residence	Root crops and hay	£100	In 10 years at 6 per cent	Yes	Demonstration Farm at Monteith	Not absolutely essential	Men without experience will be trained at Monteith Experimental Farm at a reasonable wage; and subsequently a farm colony will be established near one of the railways
6. British Columbia	Not yet fixed	Pre-emption claim to land purchasable for £2	Timbered, fruit crops, mixed farming	A fund to be provided	—	—	—	—	——
AUSTRALIA—									
1. New South Wales	From 2 to 250 acres, average size 50 acres	Rental 2½ per cent of capital value	Fruit, dairy and mixed farming	½ of holder' interest	When land becomes productive	Yes	Govt. Farm at Griffith	£50-£100 desirable	——
2. Victoria.....	Not fixed; land chiefly in irrigation areas.	3 per cent deposit of capital value; 6 per cent per annum for 31½ years	—	£500 maximum	Long period on easy terms	Yes	Agricultural College at Dookie	At least £300	——

A TABLE ILLUSTRATING GOVERNMENT SCHEMES FOR SETTLEMENT OF EX-SERVICE MEN OVERSEAS

Dominion or State	Extent of Individual Grant	Condltions	Crops	Government Loan	Repayment	Whether previous experience necessary	Training	Capital Necessary	Other Remarks
3. Queensland...	10-1,280 acres	Rent 1½ per cent of capital value (average 25s. per acre)	Poultry farms, fruit, mixed farming	£500	Within 40 years at increasing rate of interest	—	Training farms to be established	—	No deposit and no rent for first three years, 60,000 acres already set apart and further acres as required and after construction of railways.
4. South Australia	From a few acres upwards	—	Wheat, fruit and grazing, acc. to dist.	Liberal advances promised	On easy terms	Yes	Farms comprising similar land	Some capital desirable in all cases	Two large blocks of land N. of Adelaide, Mount Remarkable and Mount Crawford estates set apart, suitable for wheat and grazing.
5. Western Australia	(i) From 160 acres (ii) 160 acres	(i) Payment of survey fee and up to 840 acres at 15s. per acre (ii) Same terms.	(i) Wheat (ii) Fruit-growing, intensive cultivation	Loan from Agricultural Bank	—	Yes	Depots to be established at each settlement	Some capital desirable	Men can usually find employment on arrival and support themselves while acquiring experience.
6. Tasmania....	From 200 acres, according to class of land	Men must have been previously resident in Tasmania. By purchase or on lease	Mixed farming, fruit, mostly timbered	£300	Within 4 years	Some experience	State Farm at Deloraine	—	—
NEW ZEALAND	Provisions apply o	nly to officers and m	en of the New	Zealand for	ces and resident	s who have	served in other co	ntingents.	
UNION OF SOUTH AFRICA.....	A limited scheme to be framed	Openings for settlers who will take up undeveloped irrigation holdings	—	—	—	Indispensable	Preliminary training on the spot	£-1,000	Presence of native labour makes immigration of unskilled labour impracticable.
NEWFOUNDLAND..	No special scheme at present	—	—	—	—	—	—	—	Main industries depend upon the fisheries, forests, and mines, Farming usually combined with some other occupation
RHODESIA.....	British S. Africa Co. offers 500,000 acres	Practically free of rent to men with requisite capital	Ranching; some crops	—	—	—	Locally	About £1,000	Some knowledge of horses, live stock, and handicrafts valuable. Openings for men who can direct the labour of others.

(1) The Dominion Government has also announced its intention of giving financial assistance to any approved settler on other than Dominion lands in any province of the Confederation.

should be given to them in Great Britain on the farms established or to be established by the Young Men's Christian Association, the Church Army and other public bodies. The Committee attach considerable importance to the suggestion that the home government should provide soldiers, while they are awaiting demobilization, with instruction in carpentering, building and other crafts.

Some *capital* will be necessary for emigration to almost every country in which the settlement of the soldiers and sailors is contemplated. The amount needed varies from a very smal sum in the Prairie Provinces of Canada, Ontario and New Brunswick to £1,000 or £1,500 in the Union of South Africa and Rhodesia. In some cases the land is granted freely; and in most other cases payment for it is distributed over a number of years, varying from five—during which the settler must reside on his holding and clear 15 acres, building a house in the first eighteen months—in Quebec, to thirty in Australia. The oversea governments or the agricultural credit banks are ready to advance money for improvements at a moderate rate of interest; and suggestions for the expenditure of money by the home government in the form of advances of capital were considered by the committee. The amount of capital needed by an emigrant is thus smaller than at first sight appears.

A general consensus of opinion among witnesses before the committee was in favour of the preference of *married* men among the ex-soldiers and sailors for settlement overseas. The committee emphasize the need to facilitate the emigration of women relatives of these men, of widows and orphans of soldiers and sailors, and of other women who may be displaced after the war. They consider the emigration of women to be essential to all effective settlement of the empire; and go so far as to state that they consider grants of money enabling the emigration of wives, children, other women relatives and fiancées of the men to be more justified than grants which would help only themselves.

In every case the *oversea governments* must be satisfied that the immigrants to their territories are persons whom they are prepared to welcome.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the November number of the International Review of Agricultural Economics. Persons interested in any of the articles in this list may obtain the original Bulletin on application to the Institute Branch, so long as the supply for distribution is not exhausted:

AGRICULTURAL STATISTICS

HARVESTS IN THE SOUTHERN HEMISPHERE

Speaking generally, the southern hemisphere crops promise to be almost more plentiful than ever before. In Uruguay, the forecast of the wheat harvest is for 18,372,000 bushels, while in 1916-17 the yield was only 5,390,000 bushels, and the average from 1911-12 to 1915-16 was 6,713,000 bushels. The results of this year have therefore attained the extraordinary proportion of 341 per cent and 274 per cent as compared with the two figures of yield just mentioned.

The outturn is also very satisfactory in the Union of South Africa, where this year's crop is estimated at 8,833,000 bushels, compared with 4,970,000 last year and a five years' average of 6,520,000.

In New Zealand too the forecasts are gratifying. The yield of wheat in that country is expected to be 8,000,000 bushels, compared with 5,037,000 last year and a five years' average of 6,405,000. The yield of oats for New Zealand is estimated at 21,138,000 bushels, being 337 per cent of the crop 1916-17 and 137 per cent of the average.

But it will be best to abstain from too much generalization, and from the assumption that these results indicate a really exceptional yield in the southern hemisphere this year. Only when we have in hand the data from Argentina and Australia can we pronounce definitely as to the aggregate harvests of that hemisphere.

CROP CONDITIONS IN ENGLAND AND WALES, FEBRUARY 1st

The Crop Reporters of the Board of Agriculture and Fisheries, reporting on the agricultural position on February 1st, state that the hard frosts which prevailed over most of the country during the first half of January appear to have done little harm to the crops. Wheat is everyhwere looking well, especially the early sown, but the later wheat is backward. Oats and beans are also mostly satisfactory, though the latter is somewhat backward and a thin plant in the east. The severe weather and snow stopped field work generally at first, but good progress could be made towards the end of the month, and cultivation is generally well forward for the time of year.

GRAIN RESERVES IN THE UNITED STATES

The United States Department of Agriculture estimates that on March 1, 1918, there remained in farmers' hands 111,272,000 bushels of wheat compared with 100,650,000 on March 1st, 1917, 244,448,000 in 1916, 152,903,000 in 1915, and 151,809,000 in 1914.

The amounts of other grains in farmers' hands on March 1, 1918, 1917 and 1916 were as follows:

	1918	1917	1916
Corn	1,292,905,000	782,303,000	1,116,559,000
Oats	595,195,000	394,211,000	598,148,000
Barley	43,404,000	33,244,000	58,301,000

BROOMHALL'S FOREIGN CROP CABLE, MARCH 12th

France.—Weather mostly springlike and ample moisture is reported. Agricultural outlook is favourable and acreage larger than last year. Native supplies moderate and foreign arrivals increasing.

Morocco.—Crop prospects are favourable with fine weather prevailing. Harvesting, though late, is expected to be good. Barley is in good demand for seed purposes and supplies fair. Sowing of wheat increased.

South Africa.—Wheat crop has been officially reported as a record one. Oats and barley also yielded large. Potatoes poor. Exports moderate.

Spain.—Rains together with mild weather greatly improved wheat prospects. Hard frost in some districts caused some damage. Planting continues under favourable weather conditions, moisture plentiful. Native supplies good but foreign arrivals continue.

Italy.—Weather fine and cold. Growing wheat is doing well and reports on the whole are favourable. Some fears have been expressed of a return of severe weather as snow is disappearing. Native supplies light. It is reported that much of the acreage formerly allotted to melon growing will be put under wheat.

United Kingdom.—Early sown wheat is looking well but late planted is backward. Oats are in satisfactory condition. Severe weather interfered with field work, but cultivation is now progressing rapidly. The acreage will be large. Scotland wheat acreage 10 per cent over last year. Wheat is being used more freely by millers.

Balkan States.—Weather favourable. Snow was abundant and moisture plentiful. Supplies ample and outlook for corn fine.

Scandinavian Peninsula.—Weather remains cold and agriculture is slow. Supplies scanty. Foreign arrivals moderate.

Russia.—All reports confirm a very disastrous winter for agriculture, as severe cold has been evidenced, with snow scattered and only heavy in parts. Much of the great belt was partly bare. Ukraine is holding about 48,000,000 bushels of wheat. North ports are bare of supplies.

NUMBER OF SHEEP IN NEW ZEALAND

The number of sheep in New Zealand on April 30, 1917, was 25,270,386, compared with 24,788,150 on April 30, 1916, an increase of 482,236 or 1.9 per cent.

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DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

The Agricultural Gazette

of Canada

EDITOR: J. B. SPENCER, B.S.A.

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THE INTERNATIONAL INSTITUTE OF AGRICULTURE

The Agricultural Gazette

OF CANADA

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THE AGRICULTURAL GAZETTE of Canada is published monthly, in English and in French, by the Dominion Department of Agriculture. It is not intended for general circulation. A limited number of copies, however, are available to subscribers at $1.00 per annum, or 10 cents per copy.

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PROGRESS OF CO-OPERATION

AN attempt has been made in this issue of THE AGRICULTURAL GAZETTE, with a series of reports from a variety of associations formed for co-operative purposes, to indicate how greatly the system has progressed in recent years, and to show to some extent its scope, aims, and objects.

There is naturally a unity, or commonness, of purpose in every organization. Each exists primarily for the uplifting and benefitting of the members, but together they have a wider mission. The prompting desire is by organization and co-operation to advantage themselves, but once united a deeper and a wider meaning is apparent in the movement, and that is the placing on a higher plane the basic industry of Canada.

Without the organization that co-operation implies this country cannot hope to rival, or to successfully compete against, or with, other nations.

Co-operation means system. Co-operation means capital. Without both, Canada can never take her place in the marts of the agricultural and industrial world that her vast producing resources entitle her to.

Yet a few years ago co-operation among farmers in a business sense was almost an unknown quantity. Organizations and associations existed, but their motives, although partially of an economic nature, were as much the attainment of collective influence as the betterment of the trade and business prospects of the members.

Co-operation fills a sphere, and establishes a medium, that those associations and societies barely touched, and, at the same time, embodies practically all that they represented.

The articles published in this number of THE GAZETTE, without being either didactic or statistic, are illuminative of the immense strides that co-operation has made, and is making, among the agricultural community. As an example of this, it can be here stated that in the province of Saskatchewan alone, the number of co-operative societies increased from 102 in 1914 with a membership of 2,850, a paid up capital of $13,494.20, and assets of $37,337.55, to 309 associations with 9,444 members, $92,940.27 paid up capital, and assets of $295,012.40, in 1916. By May, 1917, the associations had further increased to 367. Similar, or proportionate, progress is reported in every other province.

In earlier issues of THE GAZETTE, the steps that have been taken in the co-operative marketing of wool, of poultry, of dairy products, and other lines of the agricultural industry, have been chronicled, but in this number it is sought to mirror the more intimate form of transactions in farm requirements.

WHAT THE PROVINCES ARE DOING

THE Honourable Mr. Crerar, Minister of Agriculture, in the House of Commons on March 27th, gave the following summary of what the provinces are doing, concluding with some suggestions as to the necessity that is with us to produce and save:

Commencing with the provinces by the sea, Nova Scotia has set itself a fine objective this year. It is going to produce enough wheat and coa se grain to supply its demands, whereas every other year it has imported. The province of New Brunswick is in the same position. In the province of Quebec, where ordinarily they produce about a million bushels of wheat and consume about twelve million bushels, they are aiming this year—and the provincial authorities tell me they expect to realize that aim—to produce enough wheat to feed themselves, which will release ten or eleven million bushels of wheat to go overseas. Ontario will also increase its wheat production. In the western provinces we will have, I venture to say, the largest acreage that we have ever had in respect to grain production, and, if we are only favoured with a good season, we will probably have the largest crop of wheat that the West has ever had. But I want to impress this fact upon our people: in order to get these results in the different provinces, in order to supply the help that is necessary to make up the deficiency in labour, we must have recourse to organization, and you cannot do that unless you get men, and if you get the men you have got to pay them.

I want to make one other observation before I close, and it is this, the people of Canada have not been as economical as they should have been in the past; I think we have been rather an extravagant people. Today we are driving home to the people of the Dominion, through the educational work carried on under the auspices of the Food Board, the great need of thrift and of saving. I hope, in fact I am sure, the effort will bear fruit in the future. There is no disguising the fact that we shall have to face very heavy burdens after this war is over. We can only successfully meet those heavy burdens by encouraging in every way possible the principles of thrift among our people. We have got to produce, but, above everything, we must save; and today the educational work that is being carried on by the bulletins that my hon. friend, the member for Wright, alluded to, and carried on through the medium of addresses, through moving picture shows and pictures thrown on the screens, and meetings held throughout the country, and utilizing every agency that can be utilized, is driving home to our whole people this principle of thrift, this need of saving, and they are realizing today, as they have never realized in the past, what can be done by a little effort in the way of saving, the conserving of food supplies, and the conserving of everything.

SOLDIERS' SETTLEMENT LOAN REGULATIONS

THE Soldiers' Settlement Loan Regulations adopted by Order in Council, under authority of the Soldier Settlement Act, 1917, were announced on the 5th day of April, 1918. The regulations provide that loans may be granted to any person who has served in the naval or military expeditionary forces during the present war and who has left the forces with an honourable record, and any person who has been engaged in active service during the present war in the naval or military forces of the United Kingdom, or of any of the self-governing British Dominions or Colonies, and who left with an honourable record; also any British subject resident in Canada before the war, who has been engaged in active service in either the naval or military forces with an honourable record, and, finally, the widow of any man who died on active service.

The loan, which must not exceed $2,500, is to be used for acquiring

land for agricultural purposes; the payment of encumbrances on lands used for agricultural purposes; the improvement of agricultural lands; the erection of farm buildings; the purchase of stock, machinery, equipment and such other purposes as may be approved. Applicants will be required to give complete information about themselves and regarding the land it is contemplated to farm. Application must be made to the local representative of the Soldiers' Settlement Board, and an inspector will be appointed to visit the land for which the loan is desired. In the provinces of Manitoba, Saskatchewan and Alberta, and in the railway belt of British Columbia, the agents of Dominion Lands are to act as local representatives until otherwise decided by the Board.

The amount of a loan will depend on the security the applicant can give. Loans must be secured and cannot be made upon a lease-hold estate or other limited title. No patent can issue for Dominion lands on which a loan has been raised until the loan with interest at 5 per cent has been paid in full. Persons who have obtained a loan for less than the maximum amount permitted by the Act, and who are in good standing in the matter of payments of principal and interest, can apply for a second or subsequent loan.

Settlers must commence to improve and work the land on which the loan is granted without loss of time, and must fulfil the cultivation and residence duties prescribed by the Act. All loans are to bear interest at the rate of 5 per cent per annum. Repayment is to be made in equal annual instalments extending over a period of not more than twenty years. The Board can defer the payment of the whole, or part, of the first two instalments to a later date if deemed expedient. Settlers can pay up at any time with interest to the date of payment. Transfers are to be subject to conditions prescribed by the Board. Failure to comply with any of the conditions makes the loan become immediately due and payable. All moneys loaned are to be expended under the supervision of the Board. The settler must specify in writing the goods or property which are to be purchased with the moneys comprising the advance required, the prices of the same, and the names and addresses of the persons, firms, or corporations from whom the said goods are to be purchased.

The Board, can, with the approval of the Governor-in-Council, make provision for the placing of returned soldiers with farmers in order that they be instructed in farming, establish agricultural training stations for returned soldiers, hire farm instructors and inspectors to assist settlers with information and instruction in farming, and provide training in domestic science for settlers' wives and female dependents.

Agriculture is sufficiently important to invite the special attention of boards of trustees of rural schools and of schools in cities and towns. Progress will not be rapid unless the teaching of the subject is backed by a strong public opinion, and the boards and trustees must assist in creating that opinion. When such supporting public opinion is assured, the subject may then be made compulsory in the public schools.—J.B. Dandeno, Inspector, Agricultural Classes, Ontario.

PART I

Dominion Department of Agriculture

THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF ANIMAL HUSBANDRY

ECONOMICAL SUBSTITUTES IN SWINE FEEDING

BY G. E. ROTHWELL, B.S.A., ASSISTANT DOMINION ANIMAL HUSBANDMAN

THE present cost to produce a hog finished for the market, where maintenance, breeding, and feeding charges for the dam are properly charged, and where a conservative percentage of the feeding and breeding costs is added to cover overhead charges and risk, would appear from estimates at the Central Experimental Farm to average $20. A fair, but not excessive, profit should be possible with present pork prices where good management is applied.

The feed situation, however, is, far from bright at the present time. Standard hog foods comprise but a short list—corn, barley, wheat by-products, and oats. Corn has been practically off the market, is now procurable in a limited way, but at a price almost prohibitive for fattening purposes. Barley is far from readily available, and at top-notch prices. Wheat by-products are now limited to shorts and bran. The former, possibly the most commonly used Canadian hog food, will be available, it is to be hoped, in fairly reliable quantities with no possibility of a surplus, and at a fixed price. Oats at present prices may be used with economy only to induce milk flow and the growth of bone and sinew, i.e., with the milking sow and the weaned pig. In short, the whole matter of available hog foods rests upon an entirely unstable foundation. Are there avenues of relief?

THE USE OF CONCENTRATED SUBSTITUTES FOR CEREAL GRAINS

At the Central Experimental Farm during the past several years numerous concentrated by-products have been used in the experimental feeding of hogs. A complete résumé of such work would be lengthy, and distinctly unprofitable in the present instance. It would be idle to contemplate the use of foods now off the market, or quite unreliable of supply.

Of the concentrates which may now be procured—in, however, limited quantities—cottonseed meal, gluten meal, gluten feed, linseed oil meal, distillers' grains, corn oilcake, and corn bran may be mentioned. Not any one of the above concentrates may be listed as readily procurable.

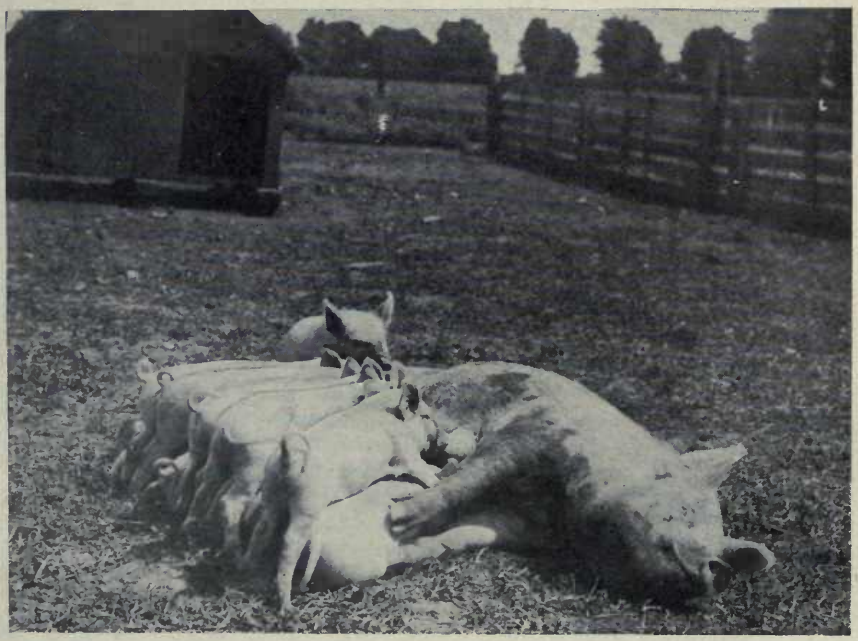
CONCENTRATES FOR FATTENING

In 1915-16 and 1916-17, cottonseed meal, gluten feed, linseed oil meal, and distillers' grains were all shown to have high values for fattening purposes where these feeds entered into the mixtures in quantities depending upon their protein content. Briefly, in 1915-16 the

following percentage additions to a basic corn, shorts, barley ration gave economical and healthful results,—gluten feed 20%, linseed oil meal 17%, and cottonseed meal 13%. The following winter, a similar experiment showed the injurious effects (protein poisoning) of increasing the percentage addition in the case of linseed and cottonseed meal. Where fed in the original percentages good results were obtained. Distillers' grains were further shown to give good results as a 20% addition.

Linseed oil meal may be safely fed as indicated, and is a concentrate to be recommended at the present time. Gluten feed as high as 30% of the ration is another valuable substitute where procurable. Cottonseed meal, while giving phenomenal results, should not be widely recommended as a hog food. Distillers' grains are becoming increasingly difficult to obtain. Corn oil cake (no experiments at Ottawa), where procurable, is a high-class concentrate fed with shorts or bran and skim-milk. Corn bran, of limited supply, may enter profitably into the ration of the brood sow, or the fattening hog. Not more than 20% should be fed owing to the rather fibrous nature of the food. While more in the nature of a by-product, elevator screenings, graded as buckwheat screenings, has given consistently good results, a fact particularly worthy of note at the present time. In 1915, a ration of buckwheat screenings and skim-milk proved about equal to a standard ration of corn shorts and oilcake, showing a value of $27.60 at prices then current. In 1918, in a series of experiments conducted in duplicate, buckwheat screenings and milk gave the highest gains in both first and duplicate lots. The addition of shorts, oil meal, and tankage, was apparently in no wise an improvement over the whole screenings.

The one thing to be remembered, however, is that the inferior grades of elevator screenings have been proved of little value for swine feeding (C.E.F. 1917).



THE FOUNDATION OF THE HOG FEEDING QUESTION—A LARGE HEALTHY LITTER IN SUMMER QUARTERS

CONCENTRATES FOR THE YOUNG AND GROWING PIG

There is little room for deviation from accepted practice in the feeding of young pigs. A bone building ration with low percentage fibre is necessary. Ease of digestibility is essential. Wheat middlings and skim-milk while being taught to eat, with middlings, sifted oats, a little corn, and skim-milk after weaning, form excellent rations. Skim-milk is almost a necessity. To find a substitute, three years of experimental work have been carried on at Ottawa. Tankage, oil meal, and skim-milk were the chief centres of interest. Briefly, tankage proved a poor substitute where it directly replaced skim-milk, both in quality of pigs and cost to produce. As an addition to a ration containing skim-milk, it showed consistently inferior to oil meal. In fact, as has already been pointed out, no benefit could be seen in adding this expensive meat by-product to an already balanced ration. Thus, while skim-milk and corn or barley gave consistently marked results over corn, tankage, and water, it also showed a slight superiority over corn, tankage, and milk for weaned pigs.

Tankage, however, may be regarded as a milk substitute. Best results have been obtained at Ottawa where pigs were weaned without milk by supplying the meal dry in a self-feeder, part of which was partitioned off and filled with dry tankage. This was consumed as required. Water was, of course, supplied at all times. While experiments at Brandon in 1916, with the feeding of tankage to young pigs, show conspicuously the value of skim-milk, the former stood in the light of a good substitute. Grain only produced gain at a cost of 9.8 cents; grain plus 16% tankage 7.1 cents, and grain plus skim-milk 6 cents. The pigs fed averaged 85 pounds in weight, as against the six to eight week old weanlings of the Ottawa tests. It must be remembered, however, that the reputation for tankage has been gained largely through its use as a balance to corn, a grain that for the production of economical gains must be fed with some protein supplement.

THE USE OF SOILING AND PASTURE CROPS

Soiling Crops.—The use of green feed, cut and fed to hogs, while applicable in cases where a few hogs are kept has the following disadvantages:—(1) It is wasteful—the hogs soil much of the material; (2) the feed when exposed to the sun becomes soft and unpalatable; (3) laborious,—nowadays the hog should largely feed himself. Nevertheless, in 1913, on a meal valuation of $28 per ton, green cut clover was worth $4.81 as a hog food, replacing one-sixth of the meal ration. In 1915, green cut rape was actually fed at a loss when added to the meal and milk ration. In 1916, green cut alfalfa showed a value of $2.62 per ton. The beneficial effect of feeding clover and alfalfa to pen-fed hogs was very evident from a health standpoint.

The subject of pastures for the growing pig is receiving much attention at present. Owing to cramped quarters, little experimental evidence is available from Ottawa, and information is largely gleaned from stations at Lacombe, Brandon, and Lethbridge.

As a single pasture crop alfalfa would appear to be unexcelled. Rape has also given good results. Clover is almost equal to alfalfa, a significant fact, considering that the growing of red clover is wider spread, subject to fewer difficulties, and generally better understood than alfalfa. Heavy seedlings (3 to 3½ bushels per acre) of barley, oats, or wheat have given excellent results. Of the cereals sown singly, barley has proven the best pasture crop. A mixture of barley, wheat, and oats, equal parts, has also been used successfully, later reports indicating, however, that the mixture is inferior to barley alone. As a commercial proposition, a summer pasture of alfalfa, clover,

or a spring-sown grain or grain mixture will give cheap, home-grown, self-harvested feed for growing pigs. Late summer and fall pasture should be supplied by rape. As to the stock-carrying capacity of the crops mentioned, an acre is conservatively shown to pasture from ten to fifteen hogs in the growing season.

The economy of pasturing is strikingly shown in one experiment (Lacombe), where the cost per hundred pounds gain in paddock feeding was $5.30. The average cost to produce with six groups each pastured on the different crops mentioned was $3.54.

Vegetables, orchard, and garden refuse have a certain value as hog food, and, while no actual data is available, such material is carefully collected, and affords a healthful and more or less efficient meal-saving food for breeding stock and growing pigs. It should be emphatically pointed out that, as shown, one of the most economical substitutes for meal with the growing and fattening hog is pasture; also that it has been clearly demonstrated that the use of the above food should not be forced too heavily upon the pig under three months. For the weanling, a ration light in fibre is essential.

MILK PRODUCTS AS SUBSTITUTES FOR MEAL

Skim-milk for the growing hog may rightly be claimed as the best single food. The common statement that with meal at $20 per ton, skim-milk is worth 20 cents per cwt. is all too conservative. For light, growing hogs, 60 pounds and over, 400 pounds skim-milk has showed equal on the average to 100 pounds meal, which at present prices gives milk a meal equivalent value of 63 cents. While the above may be taken as an average, experiments too numerous to mention specifically have shown that for the young growing hog, skim-milk at pre-war prices for meal ($25 to $28) showed values ranging from 28 cents with heavier hogs, to 79 cents for lighter individuals.

Buttermilk, fed fresh, wherever comparison has been possible, is the equal of skim-milk. Whey is not generally procurable on the Farm system. While not regarded as valuable to the same extent as either of the two previous products, reports from Lacombe in 1917 show 100 pounds fresh whey capable of saving 19.2 pounds meal, or attaining a value of almost 20 cents per cwt. with meal at $20 per ton. Much of the palatability, and consequent value of whey, is frequently lost through feeding it in a badly soured or decomposed state. Of all milk products, it may be generally stated that the value of whey is least appreciated. At the present time it is possibly the only one wasted to any extent, and particular stress should be laid upon its value as a meal substitute, fed sweet and fresh.

Skim-milk must not be over-fed, however, for most economical returns. A small proportion of skim-milk fed shows a high meal equivalent. Much valuable feed is not only wasted, but lost with disaster to the pig as well, from over-feeding skim-milk. A study of experimental evidence would show that for the best results with young pigs, 1 pound of milk to 2.5 or 3 pounds of meal should be fed. A greater proportion of milk shows a decreased value as a meal substitute. For older hogs less milk may be used, tests and general observation at Ottawa indicating that for the 100 pound hog and over not more than 5 pounds should be fed daily.

Practice has indicated the advisability of feeding milk sweet to very young pigs. As the digestive system becomes stronger, however, comparison shows little difference in the results of feeding sweet or soured milk, provided whatever condition favoured is uniformly kept up, i.e. milk always sweet or always sour. Sour milk is certainly easy to obtain, and would also seem to have a beneficial action upon the digestive apparatus not seen with the sweet product. Best results with whey or buttermilk have usually been ob-

tained where they are fed fresh, before sufficient change has taken place to decrease palatability and digestibility.

SAVING LABOUR IN HOG FEEDING

Practice indicates that two feedings daily is sufficient for the fattening hog; indeed, that with the exception of the young pig, feeding twice daily is preferable to three. In 1914, at Brandon, this fact was indicated, no appreciable difference in gain being shown to balance the extra labour of feeding. Realizing that the indication of one experiment is not conclusive, it may be said that close observation at Ottawa and findings of other institutions point to the same result. Many hog men feed breeding stock, and even growing hogs, on good pasture but once daily. After such a statement, there is an apparent inconsistency in the fact that results equal to those of expert hand feeding may be obtained where the food is placed within reach of the hog at all times. Yet such is the case. Experiments at Ottawa, Brandon, and Lacombe all point to the feasibility of the self-feeding method, and to the fact that it gives results equal to hand feeding with a reduction of from 60% to 80% of the labour of feeding.

SELF-FEEDING TRIALS

At Ottawa, the use of the self-feeder vs. trough feeding for three years would indicate (1) self-fed hogs require .1 pound more meal per pound gain than to the trough fed (average of two years); (2) that entirely aside from the saving of labour, hand feeding gave rather cheaper costs (.29 cents) per pound gain; accounting for labour saved, this slight gain would be reversed; (3) that invariably hogs may be finished in shorter time where self-fed; (4) that waste is almost entirely eliminated (provided the feeder is of correct design); (5) that digestive disturbances sometimes caused by over-feeding by hand are rarely, if ever, seen; (6) that while it is quite possible to wean little pigs direct to the feeder, they make more economical gains where hand fed until three months of age.

SIX-FOOT FEEDER, A SIZE SUITABLE TO GENERAL FARM REQUIREMENTS

At the Experimental Farm at Brandon, Man., self-feeders gave excellent satisfaction in pasture experiments conducted in 1916, and their use was recommended by the superintendent. No comparative results were available.

THE SELF-FEEDER ON PASTURE

At the Experimental Station at Lacombe, Alta., where swine feeding is a major feature, self-feeders were tested in 1916. This experiment, conducted on pasture, indicated a greater grain cost per pound gain for the self-fed hogs of .84 pounds, and a lesser time cost of 51 days in a feeding period of 92 days. While, as at Ottawa, hand-feeding here gave slightly lower grain costs on a short feeding test, later indications were that self-fed hogs, fed to a finish, showed greater economy of gain than those fed by the common method.

During the past season the self-feeder-pasture system is shown as being the most economical. Rape pasture saved 2,453 pounds of grain per acre, as compared with the grain cost of producing the same amount of pork without pasture, both groups being self-fed. Rape pasture, with meal self-fed, carried hogs at the rate of 9,254 pounds per acre for a feeding period of one hundred and forty-six days. For the pasture season, with grain self-fed, indications are that an acre of land will carry an average of four thousand pounds live weight of hogs. As for the self-feeder, this device would appear to increase the capacity or power of one man, one hundred per cent. at least, as compared with hand feeding.

As to economy of grain, these later experiments showed for the self-fed group 4.34 pounds of grain per pound gain, as against 4.72 pounds for the hand-fed lot, both on rape pasture. With the self-feeder, the grain cost per pound gain is usually higher than where hand-fed. At Ottawa, in 1917, the following results were obtained on dry lot feeding:—

	Meal, milk (trough-fed)	Meal, milk (self-fed)	Meal tankage (self-fed)
Average weight per pig at start	16.9 lb.	20.8 lb.	26 lb.
Number of days in experiment	88 days	66 days	66 days
Average weight per pig at finish	92.1 lb.	90 lb.	60.9 lb.
Average daily gain	8.5 lb.	1.05 lb.	.53 lb.
Meal eaten per pound gain	1.51 lb.	1.79 lb.	3.9 lb.
Skim-milk per pound gain	5.2 lb.	4.1 lb.	
Cost per pound gain	4.8 lb.	5.3c.	10.1c.

The rapidity of gain of the self-fed group, the value of skim-milk as a meal substitute, and the high cost of production of the tankage fed group, are points worthy of note.

FACTS AND DEDUCTIONS FOR THE COMING SEASON

1. Wheat by-products, barley, corn, and certain of the concentrates already mentioned, may be procurable during the coming season. There is no guarantee of supply.

2. Barley is practically the equal of corn. By growing barley this summer, the hog feeder may be more independent of the feed market.

3. All possible conservation of meal is desirable. Milk products, unless their use is possible for direct human consumption, form the greatest of pork-producers and grain substitutes.

4. Garbage, where the collection of such may be arranged and regulations complied with, is almost a complete food in itself, or at least, possible of substituting a large part of the grain ration.

5. Middlings, the food of the little pig, and no longer obtainable, may be replaced by 70% shorts, 20% corn meal, and 10% oil meal. With this, milk in some form is the one best food. Too much substitution with the young pig is likely to result in disaster.

6. Increased hog raising with decreased labour, is made possible by the self-feeder.

7. Pastures, as mentioned, form meal substitutes that cannot be neglected this year by the grower of swine who looks for a fair profit.

8. A combination of pasture or successive pastures with milk by-product and grain self-fed, is especially recommended as an ideal system. Tankage and a self-watering device are mentioned where milk is not obtainable. Cheap, home-produced feeds are thus largely supplied. The hog supplies a great part, but not all, of the labour.

THE DIVISION OF HORTICULTURE

THE VALUE OF GARDEN COMPETITIONS

BY W. T. MACOUN, DOMINION HORTICULTURIST

IF I were asked to state in a few words what is the greatest value of a garden competition, I should say, "It is the inspiration to greater effort and higher achievement." But while it is possible in a few sentences such as that to say all that is really necessary on the value of competitions, it is presumed that something more is expected.

THE DIFFERENT ORDERS OF GARDEN MAKERS

Makers of gardens may be divided into several groups: First, those who are enthusiastic and ignorant, but anxious to learn; second, those who are ignorant, but too confident or conceited. They have the confidence of ignorance, which is not an uncommon characteristic of the man or woman who has read a great deal about gardening and thinks he or she knows all about it, although his or her practical experience is very small. Then there is the skilful and successful gardener who has good reason for thinking himself in a class by himself, but fails to recognize the merit of others; and, finally, there is the enthusiastic, successful and skilful gardener with his place clean and in good order, always on the lookout for information, and eager to impart his knowledge to others.

A garden competition puts each of these gardeners into the proper place, and opens the eyes of each to individual shortcomings, and to the skill and good taste of others. The gardener, in thus having a proper value placed by the judge, gets both information and inspiration to greater effort next year.

BENEFITS DERIVED FROM COMPETITION

The friendly rivalry which a garden competition brings about leads to intercourse which would not otherwise take place, and the visits which competitors pay to one another's gardens, and the observations made from the street, and the new varieties which they are becoming acquainted with, do much to bring about a greater incentive to improvement, and the standard of each is raised.

Not only is the owner of the garden benefitted by the competition, but naturally the whole family is more interested in the garden than they would be if it had not been entered in the competition, and there is no doubt but that the younger members will be more likely to make gardens of their own later on if they go from a home where there has been a good garden.

Then there is the value of a garden competition to the town or community. Good gardens scattered here and there through the city or country give an enviable reputation to the community, and the more good gardens there are the better the reputation.

If a garden, through the special effort which a competitor makes, becomes conspicuously better than those nearby, the likelihood is that the owners of the latter will at least

keep their places neater than they otherwise would do. It is seldom that a garden that has been raised to a certain standard through the efforts made to win in a competition is allowed to return to the condition it was in before.

RESULTS OF COMPETITIONS

There have been garden competitions held in the city of Ottawa since 1901, and it is believed that very good results have come from them. The first competition was inaugurated by Lady Minto, the second by Lady Grey, and then the Ottawa Horticultural Society continued the good work. Last year the Ottawa Vacant Lot Association held a very successful vegetable garden competition, and there has been one in connection with the St. Andrew's Church Glebe Gardens, Ottawa, for the past three seasons. The provincial vegetable field and garden competitions are well known, and have been productive of much good.

There should be a score card for the best results in a garden competition. It is useful both to the judge and to the competitor. Judges differ in their ideas of the value to be set upon different things, and, when judges are changed every year, competitors never know what to expect or to prepare for, but when a score card is available both to the judge and to the competitor, each acts, or should act, according to it.

EXAMPLE SCORE CARDS

Following are some score cards used in Canada which have come under the writer's observation:—

THE OTTAWA VACANT LOT ASSOCIATION

Score Card for Lots Growing Various Vegetable Crops

Lot No..... Maximum, 100 points, based on the following: Area....

	Public Score	Judge's score		
		July	Aug.	Sept.
1. Arrangement of the crops and methods of planting and caring for them	20			
2. Uniformity of the stand	10			
3. Healthiness and freedom from disease and insect pests	15			
4. Number of kinds grown and value of the vegetables	30			
5. General neatness of the plot and freedom from weeds, etc	25			
Total	100			

.....Date.

Name of Lot Owner.....Address.....

Prize awarded .....Judges.....

ST. ANDREW'S CHURCH GLEBE GARDENS
SCORE CARD

	Possible Score		Judge's Score.
General appearance considering:—			
(1) Method of planting	10		Potatoes
(2) Arrangement	10		
(3) Uniformity of stand and growth	15		25
(4) Vigour and freedom from injuries	10	45	
Quality, and value of vegetables		20	25
Assortment of vegetables		20	
Cleanness and neatness		15	50
Total		100	

....

Date. Judge.

Where more than one visit is made the score for method of planting and arrangement is not made after the first visit.

ONTARIO DEPARTMENT OF AGRICULTURE
SCORE CARD, GARDEN COMPETITION

	Possible Score	Judge's Score
Layout and general arrangement, considering:		
(a) Straightness of rows and proper spacing of plants	10	
(b) Arrangement of space in garden	10	
(c) Neatness and cleanliness round buildings and yard	10	
(d) Neatness, care and cultivation	40	
(e) Clean fence corners, headlands, pasture plots	10	
(f) Closeness of planting and marketable value of crop per acre considered	20	
Total	100	

.....Judge.

.....Date.

If points are lost owing to natural difficulties impossible to overcome, the judge may allow a maximum of five points.

FLOWER GARDEN COMPETITION

Score card used in judging gardens in the Lady Minto and Lady Grey Flower Garden Competitions:—

	Points
General effect	20
Cleanness and order	20
Floral display	20
Labour and enthusiasm	20
Total	80

Five visits were made, making a total of a possible 100 points for each.

THE DIVISION OF POULTRY

THE DISTRIBUTION OF DAY-OLD-CHICKS

BY F. C. ELFORD, DOMINION POULTRY HUSBANDMAN

WE have done comparatively little in the distribution of day-old chicks. We have occasionally sent newly-hatched birds to our branch farms, and our branch farms have shipped to us, and one to another, with very good results. We have used the ordinary corrugated paper boxes manufactured and sold by practically all supply houses for this purpose.

The chicks are shipped as soon as they are taken out of the incubator, shipped without feed or water, and are usually at their destination when it is advisable to give them feed.

Our experience has shown that trips over two days in length are not satisfactory, but distances that require less than 48 hours can be covered without difficulty.

This year we hoped to have been equipped for hatching larger quantities at our various farms, in which case we would have sold day-old chicks much more extensively than we have done up to the present. The equipment for this extra hatching, owing to difficulty in transportation, has not yet been delivered, and it may be our expectations in doing more in the day-old chick business will not be realized this year.

The day-old chick industry is growing. Every year more inquiries for the chicks come in, and though throughout Canada the shipping of day-old chicks in preference to eggs is comparatively new, the indications are that it is becoming the more popular way of getting the young stock.

THE ENTOMOLOGICAL BRANCH

THE HABITS AND CONTROL OF WHITE GRUBS IN MANITOBA

BY NORMAN CRIDDLE, DOMINION ENTOMOLOGICAL LABORATORY, TREESBANK, MAN.

WHILE White Grubs have never been a very serious pest in the Prairie Provinces, they are, nevertheless, at times of considerable economic importance as destroyers of growing grain, grasses, and certain kinds of truck crops. The June beetles, the adults of the white grubs, attack the foliage of many trees and shrubs, at times effecting much injury. As the beetles feed upon the leaves of trees, they are, in consequence, restricted in their feeding areas to situations from which they can easily gain access to their food plants, consequently, we do not find them on the treeless plains.

Four different species of White Grubs are at present known to occur within the province of Manitoba, namely, *Lachnosterna anxia* Le Conte (=*dubia* Sm.), *L. nitida* Le Conte, *L. drakii* Kirby (=*grandis* Sm.), and *L. rugosa* Melsh.

Distribution and Environment

Lachnosterna anxia Le Conte. This species is an inhabitant of either rich soils or lowlands, and, therefore, most frequently met with along the river flats or in the vicinity of moist willow-inhabiting areas. It has a wide range in these situations, and extends in the West from the eastern border of Manitoba to the Pacific.

L. nitida Le Conte. In Manitoba this species is frequently found in company with the last, but has a greater preference for woodlands and a drier condition of soil. The adults seldom leave the open groves in which they breed, and thus, while numerous, are easily overlooked.

L. drakii Kirby. An inhabitant of sandy soils in the vicinity of open woods; larvæ are often found among the roots of low bushes such as wild cherry, thorn, etc., and in dry valleys. It is quite abundant in its chosen haunts, which frequently overlap those of *L. rugosa*.

L. rugosa Melsh. Like *L. drakii*, this species inhabits sandy soils, and the only difference in its choice of locality is that it prefers higher and more open situations for breeding purposes.

Life History

SUMMER HABITS

All the above species have in the province of Manitoba a four-year life-cycle, of which the egg stage occupies about one month, the larval life three years, the pupal condition one month, and the beetle eleven months. Since, however, all eggs are not laid at the same time, and pupæ may be met with from the end of June until the middle of September, these stages collectively cover considerably longer periods.

L. anxia Le Conte. Adults emerge during the middle of May, their time of appearance being apparently governed by factors which also influence the leafing of trees. Thus, we can reasonably expect to meet with the adults of this species at the time when willows and aspen poplars are beginning to burst their buds. While, however, the beetles appear in late May, they do not attain their greatest activities until June, when most of the eggs are laid. But few adults survive beyond the middle of August. The eggs are deposited singly in small cavities prepared by the female beetle; surrounding these are little balls of earth, also constructed by

the beetle, upon which, there is every reason to believe, the small grubs feed. The egg itself is at first cylindrical, but later becomes almost round by expansion. Eggs are generally found to a depth of one to four inches, a few being deposited each day, the entire period of egg-laying extending over several weeks.

After eating its way through the earthen chamber, the small larva lives chiefly upon decayed vegetation for the first season. The second summer is also one of comparatively small economic importance, and it is only when the grubs become very numerous that they are appreciably destructive. Thus, the third season's growth is under way before the insect acquires the reputation of being a pest. It has now, however, reached a stage when living roots are sought in preference to decayed matter, with the result that many kinds of crops may suffer. The destructive tendencies increase as the larvæ develop, and reach their greatest magnitude in June at the end of the third year, a week or two before pupation. When about to pupate the grub constructs a large chamber close to where it has been feeding. It then gradually becomes motionless and assumes a soft, watery condition, yellow in colour. The grub now gradually shortens, and in due course transforms into a true pupa. The prepupal yellow stage commences about June 26th; pupæ are present early in July, and beetles have developed from them by the middle of that month. Adults usually remain in the pupal chamber until about to emerge the following spring.

With the addition of the brief details presented below these facts are equally referable to all our species.

L. nitida Le Conte. This species is rather later in appearing than *L. anxia*, and seldom leaves the vicinity of its breeding grounds which are described above. In feeding, it seems to have a preference for aspen poplar, though it has also been found attacking elm. Eggs are prevalent in July, and from then larvæ commence to appear late in the month and continue to do so throughout August. In the years the larvæ turn to pupæ, these latter are numerous by July 13th, and have developed into beetles between August 1st to September 3rd.

L. drakii Kirby. Our largest kind. Beetles appear slightly later than *L. rugosa*, and have reached the height of their flight at the time when the oak trees are leafing out. Their chief food consists of aspen poplar and oak. Eggs newly laid were discovered on June 23rd, from which young grubs continued to hatch from July 11th to September 5th. Pupæ are numerous by July 15th, and have been taken in the field as late as September 15th. Fully developed beetles appear in early August, though the majority do not develop until late in the month.

L. rugosa Melsh. By far the most abundant species on sandy soils. Beetles emerge soon after the trees come into leaf. They are general feeders, and have been taken from the following trees or shrubs: apple, plum, cherry (wild), thorn, rose, elm, maple, oak, and aspen poplar, the last named being most frequently attacked and the first but rarely.

Large numbers of eggs were collected in the field. They were found at depths varying from one to seven inches, and are plentiful in the soil from the third week in June until August. Larvæ commence to appear in mid-July and continue to do so until September. Most examples, however, emerge from the eggs between July 20th and August 8th. Prepupal conditions commence about July 10th, from which true pupæ are formed some eight days later. These have transformed into beetles about the middle of August. There is, however, considerable variation in the various developments.

WINTER HABITS OF LARVAE

All White Grubs winter some distance beneath the surface, the depth at which they do so varying with the

different species; thus, the average depth at which the larva of *L. anxia* hibernates is forty-four inches in dryish woods and from fourteen to twenty-five inches in wet situations. The average depth of *L. nitida* is thirty-four inches, *L. rugosa* seventy-four inches, and *L. drakii* about forty inches. But few examples of this last have been located in their winter homes, consequently there is some doubt as to the exact depth at which these latter grubs hibernate. With those species which are found in or around woods or bushes, the falling leaves and drifting snow naturally protects them from frost. In the more open parts, such as those inhabited by *L. rugosa*, there is no such protection, hence we might expect, as is actually the case, that there would be a greater penetration into the soil to escape the cold.

MAY BEETLE, OR JUNE BUG, THE ADULT OF THE WHITE GRUB. (After Gibson)

WINTER HABITS OF BEETLES

The fact that *Lachnosterna* larvæ burrow downwards in winter time is well known. It has not hitherto been recorded that some of the beetles do likewise, though it is, nevertheless, a fact. Of our four species, *L. anxia* and *L. drakii* remain in the pupal chamber, or very rarely burrow down a short distance. *L. nitida* usually moves slightly below its pupal cell, and is found at a depth of approximately six inches, with odd ones going down to as far as one foot. *L. rugosa*, however, is quite unlike the other three species, and has a marked downward movement, which commences soon after the beetles attain maturity, that is to say, about September 1st. From this time, the beetles make their way rapidly downwards, and at the approach of winter average twenty-nine and a half inches below the surface, with a minimum depth of sixteen inches and a maximum of forty-seven inches. Specimens dug up and placed again in the soil burrowed to an average depth of twenty inches in forty-eight hours.

PUPA OF MAY BEETLE. (Original)

It is interesting to note here that allied genera have also developed this habit. For instance, the adults of *Diplotaxis obscura* Lec., a prairie species, have been found in Manitoba at a depth of from twenty-four to thirty-five inches below the surface. *Serica serica* Ill., a wood-loving insect, does not burrow downward, but

WHITE GRUB FEEDING ON ROOTS OF GRASSES. (After Gibson)

the larvæ do. Adults of *Dichelonycha subvittata* Lec. have been located at depths of fifteen inches in the soil.

All of our *Lachnosterna* beetles work upwards ahead of the larvæ.

This is doubtless due to their being less deep in the soil, and in consequence feeling the effects of the spring thaws sooner. On reaching the surface they do not necessarily emerge, but may remain among the leaves or earth close to the surface ready to take advantage of the first really warm evenings when they arise and fly to the trees to feed.

EGG OF MAY BEETLE. (Original)

METHODS OF CONTROL

Methods recommended for the suppression of White Grubs are based entirely upon a knowledge of the life-habits of the insects and those of their natural enemies. The following facts have been of particular importance in enabling us to arrive at conclusions concerning the more practical means of controlling White Grubs in Manitoba.

1. The grubs are below the plough line from October 7th to May 14th.

2. The beetles of *L. rugosa* are below the plough line from September 1st to May 1st.

3. Eggs are most prevalent in the soil between June 12th and July 24th, and nearly always occur in soil upon which vegetation is growing, especially grasses.

4. The prepupal and pupal stages occur between June 10th and August 15th.

5. The average depth at which all stages of these insects are found in summer is four inches.

6. Birds are most persistent followers of the plough during their breeding season or while migrating; gulls and terns from May 16th to June 22nd, and for a short time late in July; crows and blackbirds, including grackles, from the time grubs appear in May until July 1st.

From the foregoing we reach the conclusion that to attain the best possible results under conditions existing in Manitoba, ploughing should be done between May 14th and July 1st, and at an average depth of five inches. The idea is, of course, to turn up as many grubs, eggs, or pupæ as possible, a majority of which will, in all probability, be picked up by birds. Many eggs will be destroyed by the plough alone, but it is advisable to harrow as soon as possible after ploughing, as by this means numerous egg cells will be broken, causing a large percentage of deaths among the eggs and newly-hatched young, besides exposing them to attack by birds. Exposed pupæ will also be destroyed by this method.

So far as the interests of farming is concerned, it will be observed that the above recommendations do not in any way clash with the best cultural methods. There is good reason for believing, too, that they will prove of value in the destruction of wireworms.

With reference to the large part birds are expected to play in this work, it may be claimed that birds are not always present in sufficient numbers, and that their capacity is, after all, limited. Granting this to be true in certain districts, we must remember that White Grubs are only found within comparatively close range of trees, and that their principal habitats coincide with the haunts of crows, the most persistent of all plough followers. Thus, if there are no crows present the farmer and sportsman are probably largely to blame, and the question then resolves itself into the economic one as to which does most harm, the crows or the White Grubs. We do not think there can be much doubt on this point in grub-infested localities. The writer has personally seen fully ninety per cent. of White Grubs

exposed picked up by crows when he was himself the ploughman.

Blackbirds (*Agelaius phœniceus*) are more dependant upon water than crows, hence are not so evenly distributed, but when present prove very efficient grub destroyers. Cow birds (*Molothrus ater*) are also extremely useful in this respect, and probably largely compensate for their parasitic habits by this means.

Fall ploughing in Manitoba, while accounting for a few pupæ in September, is not a practical means of destroying White Grubs. Birds at that time have congregated into flocks preparatory to migrating southward, and are then more inhabitants of grain fields. Thus, the grubs readily make their way into the ground again. After October 7th, most of the grubs have burrowed down below the frost line; they are also out of reach in April and usually in early May.

CROPS MOST SUITABLE FOR SOWING ON INFESTED LANDS

Grass lands are especially attractive to June beetles for egg-laying purposes, and should there be any of these insects in the neighbourhood they are sure to be found breeding in such places. This also applies with equal force to wireworms, and only in a slightly less degree to grass-stem maggots. It is a misfortune that one of our most useful and widely grown grasses in Manitoba (western rye grass) is specially attractive to all of these insects, and that in White Grub areas it suffers very severely from their attack. Fortunately, this drawback does not apply to anything like the same extent where brome grass is concerned. The farmer must suit his own convenience as to sowing these grasses, taking into consideration the fact that rye grass is especially attractive to insect pests while brome grass is not. This latter, however, has the misfortune of being difficult to eradicate.

Grass lands, as was pointed out above, should be ploughed not later than July 1st to destroy White Grubs. Wheat should not be sown upon such land if avoidable, but preference may be given to winter rye, the next cereal in resisting power being spring rye, and after this oats. Usually a slightly thicker seeding than usual is advisable on newly-ploughed grass lands.

NATURAL ENEMIES OF WHITE GRUBS

While the birds mentioned previously might rightly be claimed as natural enemies of these insects, the above heading is more strictly referable to those animals which habitually live upon them without availing themselves of the aid supplied through man by means of the plough or some other cultural implement.

SKUNKS. These animals have been so misunderstood and their powers in other directions so exaggerated that the average farmer would probably be the last to rate them as his friends, though in reality he has few more useful ones among the wild animals. Should there be a skunk present the farmer may soon learn whether his fields are infested with white grubs through the many small holes which the skunk has made in digging them out. As this animal locates its food by scent, it is able to ascertain the presence of grubs without seeing them, and thus becomes extremely useful as a means of their destruction. In pointing out the value of skunks as destroyers of noxious insects we must not, however, forget that they also occasionally destroy hens eggs and poultry, though the small losses occasioned in this way are not to be compared with the benefits described above.

BIRDS. Robins are eager seekers after White Grubs, and have been known to frequent infested fields for weeks. Crows, apart from their habit of following the plough, are also very useful as grub searchers; the same may be said of flickers.

There are many other animals that eat White Grubs, or the June beetles

to which they develop, such as badgers, shrews, and even field mice.

INSECT AND OTHER INVERTEBRATE ENEMIES OF WHITE GRUBS

Parasites undoubtedly play an important part in reducing our farm pests to normal numbers, and in this respect they are equally effective in controlling White Grubs. Of the more important parasites reared from these latter during the last four years in Manitoba the following seem worthy of record.

TACHINIDAE. The species *Cryptomeigenia theutis* Walk. attacks the beetles, from two to nine puparia having been found in single individuals; about fifty per cent. of these beetles were killed by this parasite in 1914. . *Microphthalma disjuncta* Wied. a common fly parasite in White Grubs and allied genera.

DEXIDAE. *Ptilodexia abdominalis* Desv. and *P. tibialis* Desv. In larvæ, the former rare and the latter numerous. *Myiocera cremiodes* Walk. (?) has also been found in grubs.

MITES. *Tyroglyphus heteromorphus* Felt and others have caused the death of many White Grubs.

HAIR WORMS. *Mermithidæ*, long thread-like animals which live within the bodies of White Grubs and emerge after killing them. These have been responsible for about an eight per cent. death rate during the years covered by this investigation.

Fungous and other diseases have also caused many deaths, and seem to play an important part in White Grub reduction.

Mention may also be made of species of *Tiphia* and *Elis*, so useful in other parts of North America. Their appearance among *Lachnosterna* in Manitoba has, however, been seldom observed.

THE SEED BRANCH

SEED TESTING IN MARCH

BY J. R. DYMOND, SEED ANALYST

MORE samples are received during March each year than in any other month. Usually about 25 per cent of the samples received from farmers, dealers, and others, during the year come to us during this month. This year 2,444 samples were received at Ottawa, and 2,469 at Calgary, as compared with 2,665 and 3,182 for the same period last year.

The following table summarizes the results of the germination tests reported during the month:

	Wheat	Oats	Barley	Corn	Peas	Beans	Mangels and Beets
Number of samples reported	90	214	60	169	63	73	51
Average per cent germination	90.9 %	84.2 %	91.5 %	49.3 %	86 %	75.8 %	59.7 %
Number germinating up to standard for good seed	56	71	39	10	39	20	1
Number germinating below ⅔ of standard for good seed	3	23	2	66	2	13	15

Quite a large number of samples of western oats were sent for test by farmers who were thinking of using them as seed. Many of these samples contained four or five hundred noxious weed seeds per pound, including western false flax, stickseed, wild oats, ball mustard, hare's-ear mustard, stinkweed, and wild mustard. Many of them germinate from 50%

to 75%. The use of such seed will not only produce a very poor stand of grain, but will pollute the land in which it is sown with some of the worst western weeds.

The grading of timothy and clover samples is summarized below:

	Timothy	Red Clover	Alsike	Alfalfa	Mixture
Number of samples received	648	581	267	46	101
" received from farmers	242	135	64	11	40
" " " merchants	392	423	185	34	60
" grading No. 1	75	118	49	12	2
" " " 2	219	166	78	13	30
" " " 3	184	201	67	14	28
" " rejected	168	93	71	7	40
Other reports	1	2	1	0	1

THE LIVE STOCK BRANCH

THE GRADING AND MARKING OF EGGS

HIS Excellency the Governor General in Council, on the recommendation of the Minister of Agriculture, and under and in virtue of the provisions of subsection (*c*) of Section 9 of "The Live Stock and Live Stock Products Act, 1917," has approved the following regulations respecting the grading and marking of eggs:

1. Canadian eggs for export out of Canada and eggs for domestic consumption intended for shipment from one province to another, but not including eggs intended for incubation, shall be classified and graded as follows—

Class (1)—Fresh eggs which have not been held under refrigeration at a temperature of 40° or less except when in transit or subjected to artificial preservation.

Grade (a) *Specials*—Eggs of uniform size, weighing 25 ozs. to the dozen or over or 47 lb. net to the 30 dozen case; clean and free from stain, strong and sound in shell; air cell small, not over 3/16 of an inch in depth; white of egg to be firm and clear and yolk dimly visible.

Grade (b) *Extras*—Eggs of good size, weighing at least 24 ozs. to the dozen or 45 lb. net to the 30-dozen case; clean; sound in shell; air cell less than 3/8 inch in depth; white of egg to be firm and yolk slightly visible; maximum allowance at time of inspection not to exceed 2% variation from the grade stated.

Sub-grade (1) *Pullet Extras*—Eggs which have the quality of extras but which fall short in weight shall be known as pullet extras providing they weigh at least 20 ozs. to the dozen or 37½ lb. net to the 30-dozen case.

Grade (*c*) *No. 1's or Firsts*—Eggs weighing at least 23 ozs. to the dozen or 43 lb. net to the 30-dozen case; reasonably clean; sound in shell; air cell less than ½ inch in depth; white of egg to be firm; yolk may be distinctly visible but mobile; air cell stationary; maximum allowance at time of inspection not to exceed 2% variation from the grade stated.

Grade (d) *No. 2's or Seconds*—Eggs sound in shell; may contain weak watery eggs and eggs with heavy yolks, and all other eggs sound in shell and fit for food.

Class (2) *Storage Eggs* which have been "held" under artificial refrigeration at a temperature of 40° or less.

Class (2a) *Preserved Eggs* which have been subjected to any process, liquid or otherwise, intended to preserve their quality.

Grade (a) *Extra Eggs* of good size, weighing at least 24 ozs. to the dozen or 45 lb. net to the 30-dozen case; clean; sound in shell; air cell not less 3/4 inch in depth; white of egg to be firm and yolk slightly

visible; maximum allowance at time of inspection not to exceed 2% variation from the grade stated.

Grade (b) *Extra Firsts*—Eggs weighing at least 23½ ozs. to the dozen or 44 lb. net to the 30-dozen case; clean; sound in shell; air cell less than ⅜ inch in depth; white of egg to be firm; yoke may be moderately visible but mobile; air cell stationary maximum allowance at time of inspection not to exceed 2% variation from the grade stated.

Grade (c) *No. 1's or Firsts*—Eggs weighing at least 23 ozs. to the dozen or 43 lb. net to the 30-dozen case; reasonably clean; sound in shell; air cell less than ½ inch in depth; white of egg to be firm; yolk may be distinctly visible but mobile; air cell stationary; maximum allowance at time of inspection not to exceed 2% variation from the grade stated.

Grade (d) *No. 2's or Seconds*—Eggs sound in shell, may contain weak watery eggs and eggs with heavy yolks, and all other eggs sound in shell and fit for food.

Class (3) *Cracked and Dirty*—Eggs, shells which have been checked or broken, smeared, soiled, or damaged in shell, but fit for food.

2. Every case containing Canadian eggs intended for export out of Canada shall be marked on both ends in a legible and indelible manner, with the class and grade of eggs contained therein, and the words "Canadian Eggs," and every case containing eggs that are to be shipped from one province to any other province in shipments of 100 cases or more, shall be marked on both ends with the class and grade of the eggs contained therein, and with the name of the country of origin when other than domestic product. The Minister may from time to time prescribe the form and the size of the letters that are to be used in such markings. Such marks may be accompanied by other trade designations or brands, providing such designations or brands are not, in the opinion of the Minister, inconsistent with or marked more conspicuously than the marks prescribed in these regulations.

3. Canadian eggs for export out of Canada shall be tightly packed in Canadian standard cases in new white fillers and flats, with kiln dried excelsior or corrugated cushions at top and bottom, or one-third fillers on bottom with flats over top and under bottom fillers.

4. Canadian standard cases shall be made to contain thirty dozen eggs. They shall be made of clean, dry and odorless wood. The ends and centre partition shall be not less than five-eighths of an inch thick, the sides, top and bottom not less than three-eighths of an inch thick.

5. Cases containing Canadian eggs in lots of twenty-five cases or more intended for export out of Canada, and eggs intended for shipment from one province to another province in shipments of 100 cases or more, shall not be shipped until they have been inspected and marked by an inspector.

6. The mark of approval to be placed on each case, hereinafter called the "Government Mark," shall include the Maple Leaf and the words "Canadian Eggs," and "Government Inspected" together with the Inspector's number, the device to be in such form as the Minister may approve.

7. Before the Government mark is placed upon any case, the Inspector shall draw samples of at least five per cent of the cases to be marked and shall examine at least one-half of the eggs in each case. The Inspector shall satisfy himself that the samples taken are representative and shall take any further samples and make any further examination that he deems necessary.

8. No cases containing eggs shall be marked with the Government mark unless the warehouse or rooms in which the eggs are held are in a clean and sanitary condition, and further, no cases shall be marked unless suitable accommodation is provided for inspectors to make the necessary examination, such accommodation to include a dark room, facilities for candling, and such fittings as may be required to insure a proper examination.

9. No person other than a duly appointed Inspector shall apply any Government mark to any cases containing eggs.

10. After the contents of any case bearing the Government mark have been removed, such mark shall be obliterated. This shall be done by the person or persons removing the eggs from the case.

11. Collectors of Customs throughout Canada shall not allow any Canadian eggs to be shipped for export out of Canada that are not marked in accordance with these regulations.

12. These regulations, in so far as they affect export shipments, shall come into force as soon as they are published in the *Canada Gazette*, and in so far as they affect shipments from one province to another province, shall come into force on 1st May, 1918.

PART II
Provincial Departments of Agriculture

CO-OPERATIVE PURCHASING OF FARM REQUIREMENTS

In THE AGRICULTURAL GAZETTE for April, 1917, (pages 285-287), there was published a series of articles from different provinces on the subject of "Organization for Marketing Farm Products". Subsequently, in the same volume, other phases of the subject, such as the extension of the system in Ontario counties (pages 784-787), the co-operative marketing of wool (pages 313 and 863-873), etc., were dealt with. The co-operative purchasing of farm requirements, such as breeding animals, fertilizers, seeds, implements, weeds, binder twine, spraying materials, etc., remained to be dealt with, and this forms the topic of the series of articles that follow. In the requests for the required information that were sent to officials of Departments and secretaries of associations, the suggestion was made that the replies should cover:

1. Organization for co-operative purchase.
2. The business policy, with special reference to financing.
3. The method of securing orders from members and the distribution of goods.
4. The amount of business transacted during the past year and the growth or expansion in recent years.
5. Plans for the future, if anything in the way of innovation or extension of service is contemplated.

NOVA SCOTIA

BY DANIEL A. MCISAAC, MANAGER, INVERNESS FARMING CO-OPERATIVE SOCIETY

WE are entering the second year of our organization for purchasing farm requirements co-operatively. The growth and expansion of our work in membership far exceeds our expectations. Our experience in soliciting sufficient membership the first year, in order to fulfil our charter requirements, was a somewhat slow process. However, being successful, our first move was to secure a quantity of spring fertilizer and seeds to the value of some three thousand dollars. I am referring to this particularly for the reason that I wish to point out to you our first methods in financing this business, and our success in connection with it. Not having any paid up capital, we were obliged to raise this amount in the bank and pay the drafts as drawn on us. With the fertilizer we found it necessary to give the members four months, with joint notes payable to the society bearing interest, which balanced the interest on the principal, and on the specified date every dollar was paid in, and we sold our goods at a much reduced price from what local dealers were asking.

I am in a position to say that the success of our transactions made a very favourable impression upon many, so that applications for membership began increasing, and we

have at present upwards of 200 farmers enrolled. The action taken by us was an incentive to a great many to become convinced that co-operation was necessary, not only in creating more harmony, but in establishing and defining the problem of the purchase of farm requirements on more direct business lines. Heretofore, the securing of items essential to us was largely left in the hands of any middle man that would voluntarily undertake the work.

We now fully realize the importance to us as farmers of organizations of this nature, and to have headquarters established where each individual farmer can go and ascertain where he can purchase his requirements at the lowest price, and market his goods as well.

The amount of business that will be done by our Farmers' Co-operative Society during 1918 will be very considerable, and we are only commencing. Our membership at first was but 15; to-day it is over 200. Within a year we expect to have a thousand members in the county.

We have proof that the co-operative system is a first-class paying proposition.

NEW BRUNSWICK

BY JAS. D. McKENNA, SECRETARY, NEW BRUNSWICK AGRICULTURAL SOCIETIES UNITED

THE practice of buying co-operatively in New Brunswick has been largely confined to the efforts of the New Brunswick Agricultural Societies United. This organization has been established for some few years, and has been supplying fertilizers through agricultural societies. The success of the movement is beyond question. The price of the fertilizer to the consumer has been reduced very considerably, but there is still a lack of appreciation on the part of the farmers of the advantages to be derived from pooling their orders and buying in the cheapest market.

Another attempt at organization was made through *The Maritime Farmer* to supply mill feeds and flour at cost. This movement has been vigorously opposed by most of the milling companies and retail merchants. The farmers during the past few months have been organized in all parts of the province to buy flour and feed for delivery in the fall of 1918.

If the millers will not come to terms, it is anticipated that small flour mills will be erected in many parts of the province, and various farm organizations will bring their wheat from the West and grind their own flour. Many of these mills will be run co-operatively, so that the farmers will derive full advantage from all earnings. Farmers are beginning to realize that their flour purchase will prove an important factor in conditions next fall, and in sections the entire membership of the agricultural societies have pledged themselves to order from only such mills as are prepared to recognize the farmer's money as well as the middleman's.

It is felt that co-operation in New Brunswick will eventually attain the same growth as it has in Nova Scotia, where the movement is quite strong.

ONTARIO

BY F. C. HART, B.S.A., DIRECTOR, CO-OPERATION AND MARKETS BRANCH

THERE are between 300 and 400 farmers' clubs in the province, and a considerable proportion of these are doing co-operative business, mainly in the purchase of supplies. Most of these clubs are unincorporated, and are simply a means by which the farmers of a community may group their orders for supplies. I should state, however, that an increasing number of these clubs are becoming incorporated, as they realize the benefit of having a legal status. There are very few other organizations organized primarily for the purchase of supplies. A large number of producing organizations carry on the purchase of supplies with their other activities.

Where an organization is incorporated it is usually financed either by means of share capital or on the capital note system, that is, each member gives a demand note to be used as collateral in the purchase of supplies, or for other business. The unincorporated clubs, or organizations, raise capital either by means of these individual notes of the members, a joint and several note of the members, or a joint and several note of the officers of the club. In some instances also, members are required to pay cash when they give their order, so that payment may be made for goods immediately on arrival.

An illustration of the method by which some few clubs operate through the local dealers is that they club their total orders, say for seed, and ask for tenders on the bulk order; the local seed merchant receiving the order fills the individual orders at his own store and takes payment in cash. This obviates the difficulty of the secretary keeping books and doing the detail work necessary in filling orders. It is, of course, not always possible to do the work in this way.

In handling the supply business many of the clubs pay no attention to the dealers' prices of the goods the club is handling. Goods are purchased at wholesale prices, and are re-sold to members of the club at a slight advance to cover any small expense of managing the club. This results in price-cutting on local dealers. In many instances, also, because of unforeseen expenses, the small margin taken by the club over the wholesale price is not sufficient to cover expenses, and many of the clubs are beginning to realize that it would add to the permanency of their business if the local price were charged to members, and that the profits thus created were returned to members in proportion to the amount of business done. A number of the organizations are now doing business on this basis, with much better satisfaction both to members and to the trade.

A number of the clubs are purchasing what is known as shelf goods, that is, the small articles that are handled by the general store-keeper. Because of less expensive business in the plant of the clubs, they are able to undercut the prices of such local store-keeper, and, from the experiences of some districts, it would appear desirable to eliminate this class of business until such time as the club is in a position to establish a store of its own.

The co-operative purchase of seeds, feeds, binder twine, and such as are raw materials necessary for the farmer and can be purchased in wholesale quantities, are legitimate and profitable lines for a co-operative association to handle.

UNITED FARMERS OF ONTARIO

BY J. J. MORRISON, SECRETARY

CO-OPERATIVE purchasing of requirements in Ontario, like co-operative selling of products, is in an experimental stage. The people, in seeking relief from economic pressure, have embraced the bald idea of co-operation, much the same as a wayward individual might embrace prayer for immediate and specific relief from the pending result of thoughtless or deliberate violation of moral or physical laws.

Co-operation being a system rather than a dogma, its most successful principles will be evolved from experience in the application of various procedures in reaching its objective. The people, in seeking this objective, must, like a surveyor, be prepared to follow the best course available, to double back if insurmountable obstacles are met with, and, perhaps, take a new course, ever keeping before them their objective and their determination to reach it, by whatever means the great teacher "experience" may indicate.

The United Farmers of Ontario, in seeking this objective, proceeded with the belief that enlightenment was one of the greatest essentials toward success, that organization would lead to enlightenment, it in turn to unity of thought and action; but all men not being equally enlightened, therefore, the greatest incentive to organization or co-operation is remuneration for the effort put forth. Thus commercial activity becomes a strong factor in this co-operative endeavour.

The economic pressure in the purchase of supplies being the most apparent to rural producers, it naturally assumed precedence over the sale or distribution of their products, as the line of least resistance and of immediate results.

In order to bring this about it was found necessary to form small groups of men who desired to co-operate, or merge their purchasing power, that all might benefit from the consolidation of interest. These groups of men are called clubs, and are the first stage in the active co-operation of the United Farmers of Ontario.

BUSINESS POLICY AND METHODS

Business policy immediately becomes a function and a necessity, but, to a people unskilled in business and undecided as to their requirements, it again becomes necessary for every new group or club to evolve its own business policy. Other clubs can only advise, because adherence to the movement being purely voluntary, recognition of their autonomy in individual club effort is imperative. Gradually their policy of purchase and finance is becoming established, just as established business methods are followed by the commercial world.

Briefly, the clubs meet periodically, place their orders with their secretary, who places their combined orders with the central office, which is to the clubs their supply house. The goods ordered are shipped by the central office to the secretary c.o.d. The local club generally has a bank credit established by collateral note, or other security, on which the secretary and president of the club can draw by cheque as necessity requires. Clubs may distribute goods received at retail prices, and pay a dividend to their patrons, or they may sell at cost of purchase, plus distribution charges, as in their discretions is most desirable; central office does not interfere, although the former plan is apparently attracting the attention of many individual members. Orders for supplies are all voluntary. Soliciting for the same has not yet been practised by either the central or the club. The central sends quotations periodically to clubs, but does not solicit orders.

The goods are distributed by the secretary or manager of the club from the car, or from the club store-

house, which is becoming a necessary and not an uncommon adjunct of the club.

ORGANIZATION AND EXTENT

The United Farmers of Ontario is an association governed by a board of directors elected in annual convention. All organizational and educational work is promoted by the U.F.O., which now comprises about 15,000 members and 400 organizations.

The United Farmers' Co-operative Co., Ltd., is organized under the Joint Stock Companies Act of Ontario. The authorized capital is $250,000, divided into 10,000 shares of $25 each. These shares are sold to members of the United Farmers of Ontario and form the capital stock of the company. The by-laws provide for one man one vote, and no proxy voting. Shareholding is limited to not more than ten shares to one individual. The shareholders number over 1,000. Business is transacted on a cash basis, and has advanced from less than $1,000 in 1914 to over $1,000,000 in 1917.

Extension of the business, embracing the sale of various products of the farm, has been introduced, and will be further developed as necessity demands, until all departments of the agricultural industry are covered. Competent managers will be placed over each department with a general manager over all. By this means, the cost of production and of distribution will be lessened, leaving greater rewards to be divided between producer and consumer.

Agriculture will become more profitable, labour will gravitate to the land. It will not be found necessary to exhort women, children, and old men to return to the land. Agriculture will become a self-sustaining, self-respecting industry.

VINELAND GROWERS' CO-OPERATIVE ASSOCIATION

BY W. M. GAYMAN, SECRETARY

IN almost every community where twenty-five or more farmers are located, you will find a feed store or a mill, a grocery and hardware store, and a farm implement dealer. These various businesses are, in many cases, handled very efficiently, and in many other cases the opposite could more accurately be said of them. It is surprising in looking up the financial rating of a vast number of these smaller concerns to find that credit is poor, and that they have not sufficient capital to enable them to buy any of the commodities they handle in carlots. The farmers in the above particular community are clearly not being served as efficiently as is their privilege. In other cases, the dealer may be financially strong. If he is acquainted with the market, he knows the best time to buy. He buys at this time and in large quantities, but instead of giving his customers the benefit of the good bargain, he may sell at the later higher market price, and thus make so much larger profit for himself. Let these same twenty-five men form a stock company. Each man should subscribe for one hundred, two hundred, or five hundred dollars' worth of stock, according to the amount of business it is hoped to handle. This will give three to five thousand dollars capital. The appointment of the directors is the next important item. Seven farmers who have made a success in their individual farming make good directors.

If the business is large enough, it will be necessary to hire a manager. In our company each member is bound to place his order for all supplies through the secretary. This gives him a chance to buy in large quantities. Each member should give the secretary an idea of the approximate amount of goods he will require. If the business will warrant

a warehouse along the railroad siding, it will always be a valuable asset, and will be of great assistance in distributing supplies. If the warehouse cannot be built the first year, a temporary building can be rented. In our company last year we purchased supplies to the value of $62,000. We dealt in coal, feed, sulphur and spray materials, baskets and crates, cedar posts, nursery stock, hay, and straw. These were sold to our members at fair market value. Our gross profits exceeded five thousand dollars.

DUNDAS CO-OPERATIVE ASSOCIATION, LIMITED

BY R. H. ASHTON, SECRETARY

THE Dundas Co-operative Association, Limited, was organized in the year 1915 under the laws of the province of Ontario, with an authorized capital of $10,000.00, divided into five hundred shares of $20.00 each. The objects of the association are to produce and market and to buy, sell, and deal in farm products, and to buy, sell, own, control, and deal in farm supplies, machinery, buildings, and land as needed in its business.

EGGS AND POULTRY

The business policy, with respect to handling eggs, has been to advance to the farmer the local market price as near as possible when the eggs are collected or delivered at the candling station. Each individual lot of farmer's eggs is graded, and the farmer is credited with the quantity falling into each grade. The eggs are then sold for the members, and after payment of all expenses the profits are divided among the farmers by way of a co-operative dividend, not on the amount of share capital each has invested but according to the quality and quantity of eggs sold through the association during the year. Only shareholders are actually entitled to participate in the co-operative dividend, but in order to demonstrate to the farmers the principles of co-operation, the advantages and privileges of the association were extended to all farmers selling through the association during the year 1917. The result has been that more stock has been taken up and a greater interest is now being manifest in the association. Poultry is handled in a similar way to eggs. In the handling of feed, it is considered better to charge the local retail price so as not to antagonize the local retail dealer, and, after payment of the expenses, the profit is divided among the farmers annually by way of a co-operative dividend on the amount of feed each farmer buys through the association.

METHOD OF FINANCING

The financing is done through the bank by promissory note, and by an assignment of the unpaid portion of the stock subscribed for as collateral, and by hypothecation of warehouse receipts issued from the local cold storage on produce stored.

No attempt has yet been made by this association to purchase other supplies, but the question is a very important one, and has been considered by the management. If entertained, the business will be handled on the same principles as eggs and feed. When the farmer thoroughly understands co-operation, and that it is to his financial interest to buy or sell through a co-operative association, there will be no difficulty in getting orders through a proper mail order system. By that method will be saved the expense of house to house canvas by agents.

The business of the association has grown since the year of its inception, 1911, from $3,243.10 to $94,-933.63 in the year ending December 31st, 1917.

LEEDS FARMERS' CO-OPERATIVE COMPANY

BY THOS. J. WEBSTER, LANSDOWNE

THE Leeds Farmer's Cooperative Company, Limited, is a joint stock company with four hundred shares, each representing $25, payable at the rate of $5 per annum. When it is necessary to have more money for a short period, the executive give a joint note. They usually buy f.o.b. Lansdowne, with draft attached to bill of lading. Each branch has a local agent, who canvasses the members of the branch to ascertain their requirements. Having obtained this information, he sends it on to the sales manager, who buys for all the branches to the best advantage. Last year was our first. We bought for our members clover and timothy seeds, feed corn, oats, mill feed, bran, middlings, oil-cake, flour, and poultry, to the extent of $53,573.44. We charged 2 per cent. for handling these goods, which covered all the expenses, and left a surplus that was added to the general account. We are extending the business of buying this year by adding coal, fencing, binder twine, and other lines that appeal to the executive.

HAWTREY FARMERS' CLUB, OTTERVILLE

BY CHAS. H. PEMINGTON, SECRETARY

REGARDING co-operative work here might say that we formed our club with the intention of buying our supplies, mostly feeds, in carlots. Our nearest mill will only supply 500 lb. of shorts, and less of bran, at one time, and this will only partially supply the community's needs, let alone the amount of driving necessary to procure such small amounts. We have experienced no trouble in securing cars of feed until the past two months. In addition to feeds we have purchased some seed.

We have arranged a credit with our local bank by each giving a note for one year to use as security in releasing cars shipped to us. Each member is required to pay for his goods at the time of delivery, so that our account at the bank is cleared in a few days.

Our method of securing orders is for the most part by phone, though some of our orders are taken at the meetings at that time. When the orders approach a carload, we generally purchase, and the balance usually is spoken for in the time between ordering and delivery. In delivery, the phone also serves, and we all plan to unload at one time, and we pay one man to look after the unloading on that day.

We organized our club about a year ago, and since then have ordered between $4,000.00 and $4,500.00 worth of feeds and seeds, and would have done nearly as much more had we been able to secure the seeds the past two months. We not only save on our purchase, but save almost as much on our haul.

We find that in order to give our members proper service, we should have regular shipments ordered considerably in advance of requirements, and this would require a small storehouse for portions of cars not sold at the time of the arrival of the car. The store house could be opened, say, once a week at small expense. We are also beginning to co-operate with other clubs of neighbouring localities in making up carlots. This last might easily be developed to quite a considerable extent, especially benefiting the smaller clubs.

LAMBTON COUNTY CO-OPERATIVE ASSOCIATION

BY AMOS GROH, MANAGER, PETROLIA

THE Lambton County Co-operative Association is organized for the purpose of selling farm products, as well as for purchasing supplies. However, we have not yet finished our first year's work, and are not far advanced in selling lines, perhaps not over $20,000 of the $100,000 turnover comes under sales. The first season's work, from a financial standpoint, has been quite satisfactory, the association having established itself during the summer months, and closed its books after 8½ months' business with not a penny of debt, but with a light favourable balance. But the balance sheet is not the test of this organization. It has entered the test to see if a real co-operative system can be established. Its task is a psychological one, the task of changing the mental attitude of its members from the bargain-counter type to that of a real moral, social, and economic factor in rural life. If this can be done (and it is being done), the solution of the economic problem cannot fail to be apparent on the right side of the ledger.

The organization, as its name indicates, is designed for the county. Its members consist of such farmers as have signed a $25.00 note designed for the purpose, made to the credit of the organization. The notes thus signed are deposited in the bank, with proper papers hypothecating their value, as security for such sums of money as the association may require to carry on its business. Nothing in the form of cash is required from the members to carry on the business of the association, except prompt payment for such goods as they may purchase through it, unless perchance the management should lose money in bad deals.

Any five or more members, with the sanction of the central board, can organize a local club. These various clubs in the township elect representatives to the county board, which organizes the central board, whose business is the general management of the association's affairs. The central office negotiates for supplies and reports periodically to the secretary of the local organization, who keeps in touch and receives such orders and requests as his club may be interested in, and places the same before the central. In normal times much of this work would consist of shipments of carlots of supplies, such as feeds, fertilizers, salt, coal, sugar, flour, cement, fencing, fence posts, binder twine, potatoes, fish, and much in less than carlots, which would be unloaded direct to the members of the various clubs around the shipping point.

I have not been long enough at work to be able to give figures of the year's work, but the progress made is quite promising, both in increased organizations and in additional notes sent forward. There is also evidence of a hearty acceptance of the real principles of co-operation.

LENNOX AND ADDINGTON

BY G. B. CURRAN, B.S.A., AGRICULTURAL REPRESENTATIVE

ALL the farmers' co-operative associations in Lennox and Addington county have been formed under the Ontario Companies' Act as a non-share company with capital notes. Each organization has received a charter from the Ontario Government, and when applying for the charter they have taken out a charter giving them the right to both buy and sell all kinds of farm products or supplies. In a district where the farmers wish to organize a co-operative association a public meeting is called, and if enough farmers decide to organize a co-operative association five men are elected to apply for a charter. The cost of

obtaining a charter is $10.00 Government fee, and in our case $10.00 for the lawyer's fee. As soon as the charter and by-laws are received, an organization meeting for the election of directors and officers is held. Only members can vote, and, therefore, before any officers or directors are elected all those in the meeting must pay their membership fee, or else take no further part in the meeting. This rule has been forced very strictly at all our organization meetings, so that farmers who do not intend to join, or kickers, cannot obstruct the proceedings. The membership fee in all cases is one dollar per year.

THE BUSINESS POLICY

The first rule of all our co-operative associations is that goods will be ordered and sold only to members. If any farmer wishes to get the benefit of the co-operative association's purchases he must become a member. To become a member each applicant must pay a yearly membership fee of one dollar, and sign a capital on demand note for $100.00. The application is then passed upon by the directors, and if approved the farmer is listed as a member. The capital notes are taken to the bank and deposited as collateral security. The bank will advance at any time 75% of the face value of these notes. Most of our associations have at least 60 members, so that they have a credit of $4,500.00.

However, if the association orders a carload of corn, which is worth approximately $2.000.00, the manager takes the sight draft to the bank, and the bank advances $2,000.00. The association charges $1.00 per ton for handling feed. Thus if a car contains 30 tons the association will receive above the sight draft value $30.00. Each farmer that has ordered feed goes to the bank and pays in for the amount he has ordered, and receives a slip from the bank authorizing him to get his amount of feed from the car. The bank has a list from the manager, and only accepts the amount of money specified on this list. The farmer takes his bank slip to the car, gives the slip to the manager, and the manager gives him the amount of feed called for. In this way, when the car is unloaded the feed is all paid for, and the association has, in this case, $30.00 more to its credit than in the morning. From this $30.00 must be deducted the manager's expenses and cost of loan by bank.

The bank charges 7 per cent. interest on the amount of the loan for the number of days the association has the money borrowed. As the sight draft is not paid until the car has arrived in the station, and the car is always unloaded within 48 hours after it has arrived in the railway yards, the interest to the bank is usually only for one or two days, and is, therefore, a very small item of expense. By having the farmers pay in their money at the bank instead of at the car, the work of the manager at the car is very much simplified. Another advantage is that if a farmer has not the ready cash to pay for his feed he can step in to the manager of the bank and arrange for a loan on his personal note, and step out to the teller and pay the association in cash without going outside of the bank building. In cases where there is no bank in the same town where the car is unloaded, the money has to be paid at the car door. By the above method of financing, farmers pay for their feed when they get it, the same as when they go to any feed dealer or store.

METHOD OF SECURING ORDERS AND THE DISTRIBUTION OF GOODS

Each association has a manager whose duty it is to receive orders and to superintend the unloading of goods at the car. All orders must be given to the manager in writing. If phone orders are given the Associaton

will not be responsible for any mistake. Each farmer wishing to order feed sends in his written specifications of the amount he wants of the various kinds of feed, and the approximate date he needs it. The manager totals up these amounts, and orders a carload as soon as he has received sufficient orders. Members are requested to send in their orders two weeks to thirty days in advance of their requirements. When the goods arrive, the manager notifies each member who has ordered goods in writing telling him to appear at the car on a certain date and take delivery of his goods. By this method, all cars are unloaded within the specified time, 48 hours. In fact, all have up to this time been unloaded the first day.

BUSINESS TRANSACTED DURING THE PAST YEAR

Owing to the fact that the first association in this county was organized December 1st, 1917, our seven associations are all very young. However, each association has now unloaded a car of feed corn secured from the Feed Branch, Dominion Department of Agriculture, and one or more carloads of bran or shorts, and approximately $25,000.00 worth of business was transacted during January, February, and March. The associations are also planning to handle a carload of binder twine, a carload of seed oats, and a carload of seed potatoes, and intend to buy during the summer and early fall months sufficient feed to last their members all next winter. The associations also decided to ship hogs co-operatively. The first shipment recently went out, and was satisfactory in every way to the members. Future shipments will be made whenever sufficient hogs are supplied by the members to fill a car.

PLANS FOR THE FUTURE

The work of buying farm supplies through co-operative associations has been perfectly satisfactory in every way, and the only plan for the future is to continue to expand the business and, whenever thought necessary, to purchase additional lines of farm supplies. The associations are considering seriously the marketing of farm supplies, and particularly the shipping of carloads of hay and grain. From present indications, the farmers' co-operative associations will continue to grow in strength and importance until they are serving a vast majority of farmers in the county of Lennox and Addington. We have discovered some splendid business men and leaders among our farmers' co-operative associations, and with men of such quality interested in this new line of work there is no question in my mind but that this work will be a success.

THE SITUATION IN THE PRAIRIE PROVINCES

IT would seem that, with the exception of binder twine and occasionally coal, lumber, flour and perhaps a few other commodities, very little is done by the locals of the Grain Growers' Association or of the United Farmers of Alberta. No doubt in a few instances, where a number of farmers have grasped the real idea and genuine advantages of buying co-operatively, arrangements are made to lump orders and buy in carlots through the local secretary of the association. In Alberta and Manitoba, a whole lot of this kind of buying is now done through the elevators, and not through the secretaries of locals of the other associations. In Saskatchewan, special co-operative associations

have been incorporated at many points, and these have taken over the purchase of supplies.

WORK OF THE LOCAL ASSOCIATIONS

There is a tendency to differentiate between the local associations that have been formed for social and legislative work and those that look after the farmers' business. Of course, since the elevators and the incorporated associations that exist in the three provinces do not cover as much ground as do the locals of the associations, a certain amount of buying through these locals still continues. Many of these locals, and also a number of the incorporated associations in the three provinces, place their orders with the central company. The central office of the Saskatchewan Grain Growers' Association has also constituted itself into a trading institution. Many of the incorporated associations in that province deal with that central, but not all of them.

THE METHOD OF OPERATION

The company has elevators at over 300 points in Manitoba, Saskatchewan and Alberta. At each point the elevator agent, in addition to looking after shipments of grain and live stock, or handling grain through the elevator, tries to assist the farmers of the locality in whatever way he can in regard to their purchases of machinery and other commodities. This business is done on an entirely cash basis, and local associations, when placing their orders as an association, can make arrangements for the financing of them in whatever way they see fit. If they have a real live association, properly organized, there is little difficulty experienced in arranging with the banks for payment of a carlot of goods on arrival. A common practice is for twenty or thirty or forty farmers each to sign a demand note for a given amount and the bank will hold these in connection with financing such purchases as are previously referred to. In case of incorporated companies, they, of course, have a certain amount of paid-up capital, and arrangements are made for a line of credit at the local bank.

In regard to soliciting orders, most of the work is done at a meeting of the members, or by sending out letters. In many localities, practically every member has a telephone, and the secretary can easily arrange to take orders over the phone.

THE PAST YEAR

Information is not available to make a statement respecting the volume of business transacted during the past year. Some associations have had more than $100,000 of a turnover; in one or two cases close to $200,000 has been reached, but this included shipments of live stock as well as purchase of commodities.

SASKATCHEWAN

BY W. W. THOMSON, DIRECTOR, CO-OPERATIVE ORGANIZATIONS

CO-OPERATION in the purchase of farm supplies is carried on, perhaps more extensively in Saskatchewan than in any other province of the Dominion, but the great bulk of this work is done by the agricultural co-operative trading associations, and by the local grain growers' associations, rather than by organizations directly supervised by the provincial Department of Agriculture. Since the province was granted autonomy, the provincial Government has con-

sistently encouraged he organization of co-operative producing, purchasing, and marketing associations as a solution of many of the difficulties confronting the agricultural community, and, as a result, the province today possesses a well-organized system of co-operative trading bodies. At the present time there are in the neighbourhood of 1,400 local grain growers' associations in Saskatchewan, and these had a total membership of 23,792 persons during 1917. These local bodies do a very large amount of collective purchasing through their central trading organization. The 1918 annual report of the associations' central executive shows that during 1917 the trading department handled supplies to the value of $1,643,000.

There are also upwards of 365 co-operative associations registered under the Agricultural Co-operative Associations Act of 1913. These are incorporated trading bodies in which shareholders have the protection of limited liability. They are financed by the sale of share capital, distribute their profits on a patronage basis, and are controlled on the one man one vote principle. They handle flour, feed, coal, binder twine, building material, and practically all kinds of farm supplies. All goods are bought and sold for cash, and very material savings are effected.

THE GROWTH

The table which follows shows the development of these bodies since they first came into being in the spring of 1914. Reports for 1917 are not yet complete:—

Year	Associations	Number of Shareholders	Paid up Capital	Value of Supplies handled
1914	102	2850	$13,494.20	$239,320.42
1915	173	5537	39,421.49	805,456.88
1916	309	9444	92,940.27	1,984,545.85
1917	367	—	—	—

LIVE STOCK BUYING

In addition to the co-operative purchasing carried on by the trading organizations just described, a considerable amount of co-operative buying has been done through the live stock and other branches of the Saskatchewan Department of Agriculture. During the past five years, the Live Stock Branch has purchased large quantities of both pure-bred and grade cattle and sheep with funds provided under the provincial Live Stock Purchase and Sale Act. These animals, many of which were purchased outside the province, were sold at actual cost, either for cash or on a part cash and part credit basis, to farmers throughout the province, thus enabling many stockmen to lay the foundation of herds and flocks, and building up the live stock industry.

The following table gives the number of the different kinds of live stock distributed during each of the past five years:—

	1913	1914	1915	1916	1917
Pure-bred Bulls	19	41	84	150	101
Pure-bred cows	18	14	12	6	15
Grade cows and heifers	345	483	363	342	1267
Pure-bred rams	—	13	35	10	33
Grade Range Ewes	1000	482	2120	852	3415
Total distributed for year	1,382	1,033	2,619	1,360	4,831

The provincial Live Stock Commissioner, in his capacity as secretary of the Saskatchewan Sheep Breeders' Association, has annually purchased and sold at cost sufficient quantities of sheep dip and branding fluids to meet the needs of the sheep men of the province. Paper twine for tying fleeces of wool and well woven jute sacks suitable for shipping wool have been supplied each year to sheep men at cost by the Co-operative Organizations Branch in connection with its co-operative marketing project inaugurated in 1914.

CO-OPERATIVE CREAMERY OPERATIONS

In connection with the operation of the co-operative creameries of Saskatchewan, the principle of co-operative buying has been in operation for several years. These creameries, which now number about twenty, have been under the direct control of the Dairy Branch since the year 1906. During these years the cream cans, butter boxes, paper, salt, fuel, and other supplies have been purchased on the co-operative plan, and the farmers who are the principal owners of these creameries have received the benefit of the savings made, which, during these years have amounted to a considerable sum.

ALBERTA

BY C. RICE JONES, PRESIDENT OF THE FARMERS' CO-OPERATIVE COMPANY

THE business of the co-operative department of the Alberta Farmers' Co-operative Elevator Co. increased during last year beyond all expectations. The department handled during the twelve months ending August 31st, 1917, a total of 2,691 carloads of supplies, as compared with 998 cars the previous year, not taking into consideration a considerable amount of goods handled in less than carload lots. The total turnover in dollars and cents was $1,519,984.33, more than twice the volume handled in the period ending August 31st, 1916, which covered thirteen months, and nearly three times the volume handled in the corresponding period for the previous year, when the turnover amounted to 828 carloads, of a value of $532,734.11. In terms of carlots, the supplies handled were as follows:—

Material.	Carloads.
Binder Twine	91
Barb Wire	68½
Fencing and Gates	6½
Bale Ties	1
Salt	36
Flour and Feed	151
Posts and Poles	304
Cordwood	11
Hay	169
Lumber	320
Coal	1519
Fruit	14
	2,691

BRITISH COLUMBIA

BY WM. E. SCOTT, DEPUTY MINISTER OF AGRICULTURE

A CONSIDERABLE movement has been made by our farmers during the past few years towards organization along co-operative lines for the protection and advancement of farmers' interests. The provincial Government have always made a point of encouraging co-operative effort along good sound business lines by our farmers, and in order to help them towards organization provision has been made in the "Agricultural Act, 1915," for the formation of farmers' co-operative associations.

Part II. of the Act deals with

incorporations without share capital, where the incorporated association has a yearly subscription. Under this part of the Act, farmers' and women's institutes, agricultural fairs, associations, fruit growers', poultry, dairymen's, and live stock associations have been formed.

ACTIVITIES OF FARMERS' INSTITUTES

Farmers' institutes have done a considerable amount of co-operative work along the lines of purchasing the supplies necessary for farmers in manufacturing the finished product of the farm. Most of our farmers' institutes now bring in feed stuffs such as bran, shorts, grain, etc., by carload lots and distribute them to members at cost. This work has rapidly spread during the last few years, and has saved our farmers many thousands of dollars.

In the case of organizations without share capital, such as farmers' institutes, they finance this work on a strictly cash basis. Farmers inform their secretaries as to the quantities of feed stuffs that they require and hand in the cash. A carload is then secured at the lowest possible cost, and on arrival is distributed forthwith to the farmers who made up the order. Other supplies are brought in in addition to food stuffs, such as fencing material, spraying mixtures, farm machinery, etc.

Part III. of the Act provides for the incorporation of co-operative associations with share capital. A considerable number of such associations are now incorporated in the province. They consist principally of creameries and fruit growers' associations. These organizations also do a considerable amount of business in the way of co-operative buying of farmers' supplies. The method in which the business is transacted is along similar lines to farmers' institutes, and as a rule the financing is done on a cash basis. In some instances, however, accommodation is afforded through the banks.

OTHER OPERATIVE ASSOCIATIONS

These associations formed under Part III. of the Act also market farmers' produce on a co-operative basis, and in this direction the main energies of these associations are concentrated. Excellent results in co-operative marketing have been secured by our creamery associations and by the fruit growers' associations, especially in the principal fruit growing districts, and the extent of the business carried on by them is very considerable.

The Okanagan United Growers, Limited, an organization of fruit and vegetable growers in the Okanagan Valley, does a large business in the Prairie Provinces, and to a less extent in our coast cities. By means of this organization fruit growers have been able to get away from internal competition, and consequent cutting of prices, and have been able to market their produce for far better prices than in the days previous to this good co-operative undertaking. The benefits received by the organization of farmers and fruit growers along co-operative lines are plainly obvious in the results that they have obtained, and, as a consequence, the movement is rapidly spreading throughout the province. The chief value of the work lies in the fact that by means of these organizations farmers are prevented from selling one against the other, with the inevitable lowering of prices which is entailed by individualistic action of this nature. By purchasing supplies, they save a large amount of money, and in marketing their produce they get far better prices than would be possible under the unbusiness-like individualistic method previously followed by farmers.

FIELD CROP COMPETITIONS

It is interesting to note in connection with the following series of articles containing conditions for field crop competitions in different provinces, that the funds required are at least partially derived from grants under The Agricultural Instruction Act of Canada. For field crop and poultry judges and short courses, Ontario devoted $4,703 of its appropriation under the Act; Quebec devotes $9,000 to seed selection, clover plots and demonstrations of the nature of which these competitions partake; Saskatchewan devotes $5,000 of the funds to field husbandry and weed control, and British Columbia places $8,000 from the same source to the credit of field crop demonstration stations.

QUEBEC

THE Minister of Agriculture for the province of Quebec has announced a special grant to agricultural societies which intend this year to hold standing crop competitions. The objects of the grant are stated to be:—

1. To stimulate the farmers in the growing of choice seed grain;
2. To encourage the practice of growing seed for next year's crop separate from the main crop, using only the best obtainable seed, sowing it on the best prepared land and the cleanest, allowing it to thoroughly ripen, and threshing and storing separately;
3. To obtain pure grain, i.e., free from other varieties, the presence of which can best be detected when the grain is growing;
4. To encourage the use of seed from heavy yielding strains;
5. To promote the sowing of seed from clean, vigourous crops of uniform stand and with bright stiff straw, in the case of smaller cereals;
6. To encourage careful and intelligent farming and the production of grain free from weed seeds.

THE REGULATIONS

The regulations governing the competitions are as follows:—

1. Competition shall be limited to one crop, to be selected by the society, which should be one of the most important to the farmers of the district. Entries for competition must consist of a field not less than three acres, and where clover, potatoes and timothy are entered, the minimum plot not less than one acre.

Selection must be made from the following crops, viz., wheat, oats, barley, corn, peas, clover, timothy and potatoes.

2. Competitions shall be limited to the members of agricultural societies. Competitors shall be allowed to make entry in only one society and but one entry can be made by each competitor.
3. Societies desiring to enter this competition must notify the secretary of the *Council of Agriculture before the first of May*, and must not make more than 25 entries.
4. The list of the competitors shall be transmitted to the secretary of the Council of Agriculture *before the first of July*.
5. Societies must charge competitors an entry fee of not less than 25 cents and not more than one dollar.

PRIZES

The Department of Agriculture will grant $75 to each of the societies, to be employed in paying prizes of not less than $20, $15, $12, $10, $8, $6, $4. The grant will be equal only to the amount paid for prizes, if it is below $75. Prizes will be awarded by the judges only to fields deserving. The fees received with the entries will be equally divided amongst the successful competitors, in addition to the special grant. If the number of competitors is less than ten, the prizes will be: $10, $8, $6, $4, $2, $1.

The plots will be visited by judges appointed and paid by the Department of Agriculture of Quebec, and the secretaries of the agricultural societies who will organize such competitions are required to advise the Secretary of the Council of Agriculture at least 15 days before the contest will be held, of the dates when the judges will be required.

ONTARIO

THE Superintendent of Agricultural Societies, Mr. J. Lockie Wilson, has announced the following conditions for this year's standing field crop competitions:—

1. Societies can enter two crops, to be selected by the Board of Directors. Each field entered must consist of not less than five acres nor more than twenty in one block; but for beans, potatoes, mangels, turnips, clover or alfalfa, the minimum plot must be not less than one acre. In Northern Ontario, the minimum for grain will be three acres, and for roots one-half acre.

If a field contains more than five acres and the competitor wishes to reduce it to the minimum acreage allowed, it will be necessary for him to either cut a swath between the part to be judged and the balance of the field, or set a row of stakes not less than four feet high for a division line. Unless this is done the judge will be required to score the whole field.

Selection must be made from the following crops, viz.: spring or fall wheat, white oats, barley, rye, flint corn, dent corn, peas, alsike clover, red clover, alfalfa, potatoes, mangels, turnips, beans, or other staple crop grown for seed in Ontario.

2. Competition will be limited to those who are paid-up members of an agricultural society for the current year, and fields entered should be not more than fifteen miles from its headquarters. Competitors will be allowed to make entry in *one society only*, for one or two varieties of crop, and only one entry can be made by each competitor in each kind of crop. *This rule must be strictly observed.* A father and son residing on the same farm cannot make separate entries.

3. Societies desiring to enter this competition must notify the superintendent not later than the first day of May, except for corn, the latest date for making entry in which will be May 15th. *Not less than ten bona fide entries for each crop in any society will be accepted.*

4. Individual entries must be forwarded by the secretary of each society on or before May 25th, 1918, except entries for corn, which can be sent in up to June 15th.

5. A society may charge an entry fee of not more than one dollar for each crop entered by a competitor, but this is optional with the directors.

6. The Government grant to a society for each crop, except spring wheat, will be $50, making a total grant of $100 if two crops are entered. This amount must be supplemented by the society to the extent of $25 for each competition. In the event of one crop being entered, the total amount of prize money offered will be $75; for two crops the prizes to be awarded will be $150. In order to encourage the production of spring wheat the Government grant to a society for this crop during 1918 will be $75, which, supplemented by the society's $25, makes a total of $100 in prize money for spring wheat alone.

7. Seven prizes must be offered as follows: for each crop, except for spring wheat: first, $20; second, $15; third, $12; fourth $10; fifth, $8; sixth, $6; seventh, $4. *These must be paid in full to the winners without any deduction.*

For spring wheat the prizes will be: first, $25; second, $20; third, $16; fourth, $14; fifth, $11; sixth, $8; seventh, $6.

8. The secretaries of societies should urge competitors in the different crops to select, if possible, the same variety of grain or other crops, and have them sown as nearly as possible during the same week. By so doing the crops will ripen more evenly and the work of the judge be facilitated.

9. The Ontario Department of Agriculture will furnish judges free of charge.

SASKATCHEWAN

BY S. E. GREENWAY, DIRECTOR EXTENSION DEPARTMENT

THE Dominion Seed Commissioner has suggested some very desirable modifications in the method of conducting standing crop competitions. They consist chiefly in making it compulsory for the competitor to grow crops from seed wheat which meets with the approval of a provincial seed board, and, as soon as practicable, that prizes shall be paid only on eed crops grown from approved seed cks. These and other valuable suggestions will, in the interest of good seed, be ultimately adopted, but whether they should be adopted immediately is perhaps a matter for further discussion. There would

seem to be something that might be said in favour of the old system. Many farmers are wrongly convinced in their own minds that certain varieties and certain crops are best. Scientific opinion may see it otherwise. Would it not be the more direct way to attain the end sought by taking the farmer into his field and pointing out to him the limitations of wrong choice and methods? Compulsion might merely keep him from being an entrant.

METHOD OF PROCEDURE

The plan followed in the past is as follows:—

Any agricultural society or grain growers' association may earn up to $50 for each kind of crop up to five kinds, the word "crop" including grains, grasses, clovers, fodders, field roots, and garden stuff. In other words, any society can, by diversifying its field competitions, earn up to a total of $250 annually on account of its activity. In order to do so, however, it will be necessary for the society to award at least $375 in cash prizes, the grant paid being two-thirds of such awards.

The offer of these grants is figured to encourage societies and associations to adopt more generally this excellent activity, and to give recognition to the fact that the number, as well as the average, of our crops is increasing. Undoubtedly, the standing crops competition is one of the most profitable activities in which an agricultural society can engage. The skill of the farmer can best be judged from an inspection of his fields. It is there also that the proper cultural methods and the principles underlying the selection of good seed can best be brought home to the agriculturist.

THE CONDITIONS

The conditions of the competition are:

1. The fields of cereal crops shall be ten acres or more; the fields of grass five acres or more; alfalfa five acres or more for forage, one acre or more for seed; corn or roots for forage one acre or more. A separate prize list shall be offered for each competition to be held under the society.

2. Prizes to the amount of not less than $50 shall be offered for cereal crops, and $25 for the others. There may be four or more prizes in each competition, as may be decided by the society.

3. Fields entered for competition shall be situated in the district tributary to the headquarters of the society or association with which entry is made. The plots must be plainly marked off previous to the arrival of the judge.

4. Unless the society or association decides otherwise, the whole of the plot entered for competition shall consist of only one va iety of wheat.

5. Each competitor shall be allowed to make one entry only in each class.

6. The society or association shall decide the amount of entry fee to be paid to the secretary when making the entry.

7. The awards will be made by judges supplied by the Extension Department, College of Agriculture, Saskatoon.

8. Entries shall be made on or before July 15th to the secretary of the society or association.

9. The secretary shall mail to S. E. Greenway, College of Agriculture, not later than July 18th, a statement showing all entries made, arranged in the most suitable driving order for the judge.

10. The first or any other prize need not be awarded unless in the opinion of the judge the exhibit is worthy, and represents a proper choice of seed for the district.

GOOD FARMING COMPETITIONS

Conditions have never been favourable in Saskatchewan as yet for the furtherance of good farming comcompetitions. At least, no amount of urging has carried conviction as to the desirability of the competition. The line of least resistance has been toward large cultivated areas and large cereal turn-outs rather than to farm home-making. In a few cases and in a few districts, an occasional farmer can be found whose chief interest is to put himself in a beautiful setting. His neighbour, who may for some reason be unable to give his time to adding beauty to his assets, does not feel like competing. This condition is general. At the same time it is fast becoming less noticeable.

The constant rural betterment which is going on largely through the agency of agricultural society activities—every ploughing match, summer-fallow competition, seed drilling competition, road-making competition, and standing crop competition—is taking on more and more some of the aspects of the good farming competition. That is to say, the whole tendency of rural betterment through one agency is gradually permeating the whole life of the farmer. There are lots of cases which might be cited, even in this new province, where slovenly farmers have developed the self-respect which is manifest in true culture, just because they got whipped at their first ploughing match a few years ago.

POINTS ALLOWED AND THEIR DIVISION

The score card at present used in this competition is as follows:—

DESCRIPTION.	Perfect Score	Actual Score
1—General Appearance	50	
2—Farmstead—110 points		
(a) House, grounds, and garden		
(b) Outbuildings and yards		
1. Suitability, convenience, and sanitation	50	
2. State of repair and location	25	
3. Water supply and location	25	
4. Workshop and appliances	10	
3—Windbreaks—40 points		
(a) Location	25	
(b) Kind of trees and condition	15	
4—Crops—200 points		
(a) Suitability	50	
(b) Condition	75	
(c) Freedom from weeds	50	
(d) Cultivated hay or crop	25	
5—Live Stock		
Horses—100 points		
(a) Breeding	50	
(b) Condition, care and management	25	
(c) Suitability	25	
Cattle—100 points		
(a) Breeding	50	
(b) Number	20	
(c) Feeding, care, management, condition	30	
Sheep—50 points		
(a) Breeding and care	25	
(b) Number and condition	25	
Hogs—50 points		
(a) Breeding and care	25	
(b) Number and condition	25	
Poultry—50 points		
(a) Breeding and management	40	
(b) Conveniences	10	
6—Machinery, Harness and Tools—50 pts.		
(a) Suitability	25	
(b) Quantity	25	
(c) Condition for age	25	
(d) Protection and provision for repairing	25	
7—Improvements—100 points		
(a) Disposal of manure	30	
(b) Fences and rotations	30	
(c) Neatness and thoroughness of cultivation	40	
8—Methods	50	
Total	1000	

BRITISH COLUMBIA

BY H. O. ENGLISH, CHIEF SOIL AND CROP INSTRUCTOR

FARMERS' institutes wishing to conduct field crop competitions in B.C. in 1916 and previous years were required to secure at least six entries before such competition could be held. In 1917 the minimum was raised to eight. The larger competitions were far more productive of good results, and it was decided in 1918 to raise the minimum to ten. This is the only change in the rules and regulations governing the open field crop competition.

Provision has been made, however, for the conducting of seed production competitions in 1918 with each of the principal field and garden crops. This work is being fostered by the newly organized B.C. Seed Growers' Association, and the prizes offered will serve as a bonus to the seed grower taking most interest in the work. In these competitions, classes have been provided for 23 crops, including grains, clover, alfalfa, vetch, corn, peas, potatoes, mangels, turnips, carrots, beets, rape, radish, onions, cabbage, lettuce, kale, parsnips, garden peas, and beans. The acreage varies from one acre with the field crop to ¼ acre with vegetable and root seed crops. The seed fairs provided for in connection with our field crop competition will be developed to provide prizes for all kinds of vegetable and the principal flower seeds.

RECENT AGRICULTURAL LEGISLATION

ONTARIO

AT its recent session the Ontario Legislature passed two bills relating to agriculture, and adopted several amendments also relating to agriculture to Acts in the Revised Statutes of 1914. One of the Acts changes the name of "District Representative" to "Agricultural Representative." This bill is entitled "The Agricultural Representatives Act." It provides, as before, that such Representatives shall be graduates of the Ontario Agricultural College; that assistants and clerks shall be appointed as necessary; that the Representatives shall be under the control of the Minister of Agriculture; that the municipality shall pay $500 towards the expenses of the work, and that an accounting shall be made each year to the County Council.

PROTECTION OF SHEEP

The second bill repeals The Dog Tax and Sheep Protection Act in the Revised Statutes of 1914. The measure is still entitled "The Dog Tax and Sheep Protection Act." It provides, subject to the provisions of paragraph 9a, section 400, of the Municipal Act, for a tax of $2 on one dog, and $4 for each additional dog, and $4 for a bitch, if only one, and $6 for each additional bitch, owned by any one person. Any local municipality may, at any time, increase such tax. If a bitch is spayed the tax is to be the same as that on a dog. Owners of a kennel registered in the Canadian Kennel Register may pay $10 to the municipality as a tax on such kennel for one year, and for such payment the kennel is exempt from assessment and any further tax. According to the paragraph of The Municipal Act referred to, if the license fee equals or exceeds these taxes the latter are not to apply. The bill provides, as previously, for the collection of the taxes. Any person may kill any dog found pursuing, worrying, or wounding sheep, or that is found straying between sunset and sunrise. The owner of any sheep killed or injured is entitled to recover damages from the owner of the dog. If the owner of sheep killed or injured cannot recover from the owner of the dog, the treasurer of the municipality is to pay the aggrieved party the full amount ordered to be paid by the Justice on conviction, in addition to the cost of the proceedings. If the ownership of the dog is not discovered, the municipality becomes liable for compensation for the amount of the damages sustained, providing that application has been made for damages within three months after such sheep has been killed, injured, terrified ,or worried. The council of every municipality is required to appoint one or more competent persons to be known as sheep valuers. Within 48 hours after the discovery of any damage, the owner, of the sheep, or the clerk of the municipality, must notify a sheep valuer, who is immediately to proceed to make investigation and determine the extent of the damage. If the owner of the sheep considers the award inadequate, he can appeal to the Minister of Agriculture, who may name a competent arbitrator. The appeal must be made within a week after the award of the local valuer has been received, and must be accompanied by a deposit of $25, which is forfeited if the award of the local valuer is sustained. If the municipal corporation does not fulfill the requirements of the Act,

the person who has sustained the damage has a right of action against the corporation. The corporation can proceed against the offending party for its own benefit, but any excess of the amount claimed by the owner of the sheep that is recovered must also be paid over to him. If the sheep are killed or injured while running at large upon any highway or unenclosed land, the owner has no claim for compensation from a municipal corporation.

LAND DRAINAGE AND OTHER ACTS

By amendment to The Tile Drainage Act, Revised Statutes, 1914, instead of debentures being made payable twenty years from the first day of August in the year in which the money was borrowed, the time is to be reckoned from the date the debentures bear. The Department of Agriculture Act, Revised Statutes, 1914, cap. 45, is amended by striking out sections 9 to 17, inclusive, all of which refer to the Bureau of Industries. Section 32 of the Agricultural Societies Act, which confers authority to prohibit undesirable shows and performances, and forbids all gambling and games of chance at exhibitions, is amended by substituting the following for section 6, which made the penalty for violation of the section not less than $20 nor more than $100:

> Every person guilty of a violation of any of the provisions of this section, in addition to any other liability which he may incur thereby, shall incur a penalty of not less than $100, nor more than $300, for a first offence, and, in default of immediate payment of the penalty, shall be imprisoned for a period of three months unless the penalty or costs are sooner paid, and, for every offence committed after conviction for a first offence, shall be liable to imprisonment for a period of six months.

Section 3 of The Veterinary Surgeons Act, cap. 171, R.S., 1914, is added to by making all penalties recovered for illegal use of the title "veterinary surgeon," or for imposition connected therewith, payable to the treasurer of the Ontario Veterinary Association, to form part of the fees of the association, and to be accounted for as such.

APPROPRIATIONS FOR AGRICULTURE

Following are the appropriations for the years ending October 31st, 1918 and 1919:—

	1918	1919
Civil Government	$ 93,908.26	$ 91,200.00
Agricultural and Horticultural Societies	176,750.00	165,750.00
Live Stock Branch	56,693.74	51,850.00
Institutes	46,800.00	33,800.00
Bureau of Industries	3,000.00	
Dairy Branch	148,819.95	145,800.00
Fruit Branch	75,650.00	64,500.00
Ontario Veterinary College	32,450.00	31,650.00
Miscellaneous	242,550.00	192,150.00
Agricultural College:		
Salaries and Expenses	205,092.01	192,641.00
Macdonald Institute and Hall	49,190.00	45,990.00
Forestry	1,000.00	1,000.00
Animal Husbandry, Farm and Experimental Feeding Department	29,150.00	26,550.00
Field Experiments	22,905.00	20,705.00
Experimental Dairy Department	11,056.00	11,056.00
Dairy School	8,165.00	8,165.00
Poultry Department	20,003.00	15,193.00
Horticultural Department	17,748.00	15,548.00
Apicultural Department	1,750.00	1,750.00
Soil Physics Department	4,000.00	4,000.00
Mechanical Department	1,350.00	1,350.00
Totals	$1,248,030.96	$1,120,648.00

MANITOBA

AT the session of the Manitoba legislature for 1918, seven bills relating to agriculture were passed. These included an Act to establish a Government employment bureau, the annual Municipal Seed Grain Act, and Acts amending the Dairy Act, 1915, the Horse Breeders' Act, the Sheep Protection Act, the Settlers' Animal Purchase Act, and the Noxious Weeds Act.

DISTRIBUTION OF LABOUR

The Act establishing a Government employment bureau attaches the bureau to the provincial Department of Agriculture, and defines its object to be the distribution of labour throughout the province. An advisory board may be created, consisting of one representative of the Trades and Labour Council, the organized farmers, the employers of non-agricultural labour, and the secretary of the provincial Bureau of Labour. Branch bureaux can be established wherever thought necessary. Section 9 of the Act prohibits any person, corporation or association from receiving payment for supplying labour or information regarding employers wanting workers, or workers wanting employment. In case of a strike, no bureau can send labour without informing the person of the existence of the strike. Contravention of any provision of the Act brings liability to a fine of not less than $10 or more than $25.

ANNUAL SEED GRAIN ACT

The Municipal Seed Grain Act gives municipalities, within six months of its passing, power to raise a loan not exceeding $60,000 for the purpose of furnishing seed grain to farmers, or to relatives of soldiers, or to the soldiers themselves. Returns have to be made to the provincial Minister of Agriculture of the manner in which the money is used. Limitation of the value of the seed grain advanced to any one person was originally set at $600, but, by an amendment passed at the same session, the limitation of the value was increased to $1,200. In the case of soldiers on service, notes signed on behalf of the absent owner can be accepted as made by him.

HORSE BREEDERS' ACT

The Act amending the Horse Breeders' Act provides that it shall be the duty of veterinary inspectors to prosecute any breaches or violations of the Act, and that, until a foal reaches the age of one year, the owner of the sire of such foal shall, without registration, have a lien for the unpaid service fees of the mare; also that the stallion owner may seize and sell the foal for the service fees, or any part thereof, remaining unpaid, the sale to take place at auction on ten days' notice. The lien is to be deemed as having arisen at the time of service and takes precedence of all other claims on the foal.

SHEEP PROTECTION ACT

The Sheep Protection amendment Act provides that, if the owner of a dog killing or injuring sheep is unknown, the owner of the sheep can recover two-thirds of the value of the sheep from the municipality on satisfying the court that he has used due diligence to ascertain the owner of the dog. Any action under the Act must be taken within three months after the killing or injury has occurred.

The Settlers' Animal Purchase Amendment Act provides that, with the consent of the Minister of Agriculture for the province, the number of settlers in any community or organizations can be increased.

DAIRY ACT AMENDMENT

The bill amending the Dairy Act

of 1915 provides that instead of a vote for every share, a shareholder shall have one vote only, and that there shall be no voting by proxy. Paragraph (*a*) of section 50 of the Act is changed to require on the first quality of butter the name and address of the creamery and "the number of the churning" instead of, as formerly, after the address the words "Manitoba creamery butter." Section 75 is amended by adding "That no person shall accept cream from any receiving station that has not complied with the other provisions of the section." To section 75 *b*, sub-section (i) is added, making the fee for registration five dollars, which must be paid with the application for registration. Operators in a dairy are required to take out a license for which a fee of one dollar is charged.

NOXIOUS WEEDS ACT AMENDMENT

By the amending Act to the Noxious Weeds Act, "and annual" is added after "perennial" in reference to sow thistle, and "toad flax" added to Class I of the named weeds in paragraph (*b*) of section 2.

Subdivision 2 of section 15 is amended to provide that the owner or agent of unoccupied land may appoint a resident agent for the purpose of notification.

Section 21 of the Act is added to by a new section providing that costs incurred in enforcing the Act in individual cases shall be placed upon the collector's roll to be collected the same as taxes.

Section 30 is amended so that the fine for a first offence against the provision ordering the destruction of noxious weeds shall be fifteen dollars, and not more than fifty, instead of exactly fifteen dollars, as formerly.

APPROPRIATIONS FOR AGRICULTURE

The appropriations for agriculture and immigration for the year ending November 30, 1918, are:

Salaries	$13,316.66
Supplies and Expenses	1,500.00
Agriculture and Statistics	122,495.00
Manitoba Agricultural College	205,135.00
Immigration and Colonization	45,000.00
Agricultural Publications	20,100.00
Miscellaneous and Unforeseen	2,000.00
Birtle Demonstration Farm	2,560.00
Settlers' Animal Purchase Act	6,800.00
Total	$418,906.66

Saskatoon, Sask., feeds 500 to 800 hogs on garbage, mixed with a small amount of grain. The City of Worcester, Mass., feeds 3,000 hogs on garbage. Springfield, Mass., sells $50,000 worth of municipal fed hogs. Grand Rapids, Mich., feeds 300 cattle, 400 sheep and 700 pigs on garbage and a certain amount of hay. Arlington, Mass., Lowell, Mass., Fall River, Mass., and Providence, R.I., all distribute their garbage to private companies who feed it to live stock.—Canada Food Board Note.

WAR-TIME HOG RATIONS

NOVA SCOTIA

BY JOHN M. TRUEMAN, PROFESSOR OF AGRICULTURE, AGRICULTURAL COLLEGE, TRURO

DURING the past three years the Nova Scotia Agricultural College has fed a few pigs with grain, skim milk, and mangels. The results of these feeding tests have shown that gains can be made with a comparatively small amount of grain. They also show that when skim milk and mangels are fed, gains can be made with less total digestible nutrients than when grain is fed alone. Many experiments have proven that gains cannot be put on pigs for less than 400 lb. of grain per 100 lb. of gain, and in most cases still more is required. In the tables given below, it is shown that gains were made for an average of 148 lb of grain, 900 lb. of skim milk, and 110 lb. of mangels. Allowing 75% of total digestible nutrients in the grain, 9% in skimmed milk, and 7.5% in mangels, the total in the above feed would amount to 201 lb of digestible nutrients. If, on the other hand, 400 lb. of grain had been fed, it would have contained at least 300 lb. of digestible nutrients. Here, therefore, is not only a saving of high-priced grains by feeding skim milk and mangels, but also an actual saving in the amount of digestible nutrients required to produce 100 lb. of pork. Table No. 1 shows the average daily ration of the pigs for 18 weeks. The amouut of feed given was quite small when the pigs were only 6 weeks old, but, as they approached the age of 24 weeks, they consumed as much as 4 lb. of grain, 15 lb. of skim milk, and 4 lb. of mangels per day. This was when they had reached a live weight of 200 lb. or over.

TABLE NO. 1—AVERAGE DAILY RATIONS FROM 6 WEEKS OLD TO 24 WEEKS OLD

	Lb. of grain.	Lb. of skim milk	Lb. of mangels	Equivalent to grain	Cost in cents
Cross-bred, York—Berk 1915	2.60	14.0	1.4	5.5	8.4
Pure Yorkshire, 1916	2.24	12.6	2.0	5.0	9.0
Pure Berkshire, 1916	2.02	12.6	1.3	4.7	8.4
Pure Yorkshire, 1917	2.37	14.1	1.9	5.4	12.3
Pure Berkshire, 1917	1.85	11.0	1.38	4.2	9.5

TABLE NO. 2—FEED EATEN TO PRODUCE 100 LB. OF GAIN.

	Lb. of grain	Lb. of skim milk	Lb. of mangels	Equivalent to grain	Cost
Cross bred, York—Berk 1915	157	850	84.0	338	$5.11
Pure Yorkshire, 1916	143	812	121.3	321	5.71
Pure Berkshire, 1916	145	910	94.8	339	6.10
Pure Yorkshire, 1917	142	908	137.0	351	7.98
Pure Berkshire, 1917	150	928	112.0	350	7.91

In the above tables 500 lb. of skim milk and 750 lb. of mangels are allowed to equal 100 lb. of grain. Prices allowed were as follows: In 1915, grain $1.50 per cwt., skim milk 30c. per cwt., and mangels 15c. per bushel; in 1916, $1.80 for grain, 35c for skim milk, and 17c. for mangels; and in 1917, $2.50 for grain, 40c. for skim milk, and 20c. for mangels.

ONTARIO

BY H. M. KING, B.S.A., LECTURER IN ANIMAL HUSBANDRY, AGRICULTURAL COLLEGE

DESPITE the fact that prices for pork product are ruling fairly high, the question of growing, and particularly of finishing, swine is a difficult one to solve under present conditions. Certain feeds which we have become accustomed to use being practically off the market, it is necessary that, during this season at least, the method of operation be somewhat altered. The greater and more judicious use of pasture crops appears to be one of the chief points in the solution of the problem. Experimental work at the Ontario Agricultural College has demonstrated that hogs generally make the best use of pasture when they have attained a weight of one hundred pounds or more, but feed conditions and market demands have a bearing on this point. During the present season, then, it appears as if we will have to rely considerably on pasture particularly for growing pigs, and thereby, partially, at least, save the concentrates for finishing. The use of a good annual pasture mixture is to be commended.

Skim milk and whey are year by year becoming less available in certain districts where large numbers of hogs were formerly produced. To take their place, tankage is undoubtedly the best available feed. Even though costing considerable per ton, it can be fed profitably under present conditions. Skim milk has its greatest value when fed to young pigs, and particularly during the first month or two after weaning a combination of skim milk and tankage has given quick gains in our experimental work. Sour skim milk and sour whey have given practically as good results as sweet milk and whey for very young pigs. Care should be taken not to feed sweet and sour milk or whey intermittently. Possibly the best showing of skim milk in our experimental work has been where the proportion of milk to meal was about 2.5 to 1. In one trial in which this proportion was used, it was shown that 365.6 pounds of skim milk proved equal to 100 pounds of meal, but in later years the returns from skim milk have not been so marked; about 3 to 1 is a good ratio between the skim milk and meal. Mill screenings are being fed experimentally during the present season, and apparently with success. At the present time it appears as if the gains will be more cheaply produced than if cereal grains were used altogether. The heaviest feeding of screenings used is one-half the meal ration.

If, by a more general and judicious use of the various pasture crops, it will be possible to grow the spring litters of pigs to considerable weight the question of providing concentrates to finish them is one that is difficult to solve. If seed can be secured, we are planning to experiment in the growing of a few acres of early maturing corn which may be harvested in different ways, and, possibly, if the labour situation does not change, it will be, partially, at least, harvested by the hogs themselves. Whether or not what we propose can be done economically remains to be seen.

ALBERTA

BY JAS. MCCAIG, EDITOR OF PUBLICATIONS, DEPARTMENT OF AGRICULTURE, EDMONTON

OUR hog enterprises on the demonstration farms are concerned with raising pure-bred stock for distribution to farmers, rather than the raising of hogs for pork production.

We have not used concentrated substitutes to take the place of cereal grains in the feeding of hogs. Our growing pigs consist of young spring litters. The pastures that we use are mixtures of oats and wheat, oats and barley, and, later, rape. When the pigs are weaned they are fed shorts at first, followed by sifted oat chop, and after that time, when they reach 160 to 180 lb., they are fed barley and oat chop along with the pastures.

We have very few fattening hogs; the number being limited to a few male pigs that are not good enough for breeding purposes. They are fed in the same way as the growing pigs, with an increase in the grain ration toward the finishing period. We feed twice a day.

SHORT COURSES IN AGRICULTURE

ONTARIO

FOR WOMEN

THE Ontario Agricultural College will hold a short course in practical work for young women at the college during the three weeks commencing the 1st of May. The course of instruction will be made as practical as possible. Most of the time will be spent at work in the gardens, orchards, stables, farm dairy, and poultry yard, giving actual practice in the operations which women are likely to be called upon to perform on the farm. The practical work will be supplemented by lectures when necessary. The course is given without fee, but the students will be charged fifteen dollars for board and room. Students will be required to be over eighteen years of age, in good sound health and physically capable of undertaking light farm work. A condition of entry upon the course is that students shall remain three weeks, and agree to spend at least four months upon a farm during the year.

AT NEW LISKEARD

AGRICULTURAL instruction activities at the New Liskeard agricultural school were commenced with a three-days' short course and seed fair during the first week of April. A two-story pavilion has been completed for the judging of live stock and the holding of seed fairs and lectures. At the seed fair there were 120 entries of grain, grass seeds and potatoes exhibited by fifty farmers. Dr. C. A. Zavitz, who judged the seed, was favourably impressed with the adaptibility of the district for growing Marquis wheat, Canadian Beauty and Golden Vine peas, O.A.C. No. 3 oats, O.A.C. No. 21 barley, and alfalfa seed. Some excellent potatoes were grown, but there were too many varieties. The short course and fair, financed largely in every province out of AGRICULTURAL INSTRUCTION ACT funds, were organized by Mr. W. G. Nixon, Superintendent of Government Farms at New Liskeard, Monteith, and Kapuskasing.

SASKATCHEWAN

BY S. E. GREENWAY, DIRECTOR EXTENSION DEPARTMENT

LECTURERS at the short courses in Saskatchewan this year report the most enthusiastic meetings yet held in the province. Of the sixty odd courses held, not more than three or four were ound wanting in the matter of interest. Exact figures of attendance are not yet available, and it is not expected that any records will have been made, but nevertheless considerable satisfaction has been expressed, both by the lecturers and the public.

We were able this year to give the farmers and their wives considerable poultry work and farm accounting, in addition to the usual field and animal husbandry work. The demand for greater production and conservation developed more or less tenchical work regarding rationing, both for man and beast, which was received with surprising avidity. This is especially true in its relationship to the feeding of farm stock, since feeds are so scarce and so costly, and the need of pork products so great. This situation has been largely responsible for the interest in simple farm accounts, as the farmers desire to know, with some degree of definiteness, just whether their operations in the production of pork are going to net them a profit or not. It is satisfactory to note that they are going to do their part in the production of bacon and fat, though the profit may not be large.

It might be added in this connection that the food conservation and pork production propaganda has been carried on at all the seed fairs held this winter, of which there has been over sixty. The method of conducting the seed fairs for a number of years has been to give them very practical short course features. Often poultry shows are held, and, as the activity usually extends over two or more days, much time is given up to discussions, demonstrations, and judging competitions in cereals, animals, and poultry. Also, at the short courses the schools are visited and several hours of work put on with the pupils. This feature of our extension work has been responsible for the greatly increased interest in scientific agriculture in the province, both in the schools and among the farm people.

In addition to the foregoing, regular work for boys' and girls' clubs was put on by special speakers. This movement is receiving a great impetus this year.

THE DISTRIBUTION OF BABY CHICKS

QUEBEC

BY BROTHER WILFRID, POULTRY SUPERINTENDENT, OKA AGRICULTURAL INSTITUTE

I AM asked by Reverend Brother Liguori to give you the results of our experiment on the distributton of one-day chicks. I do so with the greatest pleasure, all the more so because when I made my first experiment in this line in 1913, people generally disbelieved the idea that it could be successful. It was a new thing in our province, it is true, but it was done elsewhere; why could it not be practised here also?

In 1913 some 200 chicks were shipped, and all of these got to destination safe and sound. Since then the demand has increased, and last year over 2,000 were distributed, giving entire satisfaction to the purchasers.

During these four years only one

accident happened, and that was because of a two days' detention in a railroad station. The chicks, which should have been delivered on Saturday evening, were delivered only on Monday. This was too much for them, and they died. Last year, in shipment of fifty, only two chicks were found dead, probably on account of overcrowding in a shipping basket. These are the only accidents that have been recorded in four years.

We are expecting an increase in the demand this year. As the purchaser knows now what to expect, he is ready to receive the chicks when they arrive, and he knows there is more advantage in purchasing chicks than eggs for incubation that often have to suffer from mishandling during transportation.

The baskets which I use for shipping are fruit baskets, of a size proportionate to the number of chicks shipped. The inside of the basket is lined with sack-cloth, and a filling of chaff is put between this cloth and the facing of the basket. When the chicks are in the basket, I put a layer of good felt right between the back of the chicks and the cover of the basket. When the temperature is somewhat cold, I put paper, newspapers, etc., between this layer of felt and the cover of the basket. That is all.

The special baskets are more expensive than those which I use.

I have shipped chicks everywhere in the province, and even as far as North Bay, Ontario, always with complete success.

Last year I had to make special hatchings to satisfy late requests.

Chicks must not, on any occasion, be older than one day, especially when they are shipped over long distances.

They should be placed in a good warm brooder, or under a hen, as soon as they arrive.

As soon as they arrive, they should be given sour milk; this should be their first meal. They should be fed sparingly during the first few days.

I have not received any complaint regarding the distribution of chicks.

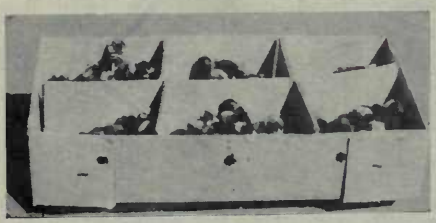
MANITOBA

BY M. C. HERNER, PROFESSOR OF POULTRY HUSBANDRY, AGRICULTURAL COLLEGE

THE chief question in the day old chick business is, can it be made profitable? In the South, and in sections of the East, this is one of the best paying branches of the poultry industry. Day-old chicks can be produced, shipped, and laid down at northern points at 25 per cent less than they can be hatched here, and still leave a good margin of profit for the plant engaged in the business. Climatic conditions are so favourable in those sections that good hatches can be obtained early in the spring and the chicks shipped north before the hatching season properly started there.

In this western country the greatest difficulty is to get the high fertility and hatching power that a plant should have early in the season to make the business profitable. The price of day-old chicks, apart from quality, depends altogether on these two factors. If eggs for hatching are worth 8 cents each when they go in the incubator, and it takes two and a half eggs to make one chick, the initial cost of these day-old chicks is from 20 to 25 cents each, without figuring on the labour, oil, and so on. In some breeds like Wyandottes, Reds, and Orpingtons it is next to impossible to get even as good results as these, and the price per chick would, therefore, have to be correspondingly higher. With Leghorns there is likely to be a reasonable profit on these prices, and with Barred Rocks the plant would break about even. As the season advances better results can be obtained, as the

fertility increases and the hatching power improves. Averaging up conditions as they are in the West from year to year, a safe estimate in hatching work would be one chick for every two eggs set. This refers to incubation work on a large scale. On this basis it is obvious that in making a specialty of the baby chick business, higher prices must be charged than where more favourable conditions prevail. No poultry plant in the West can afford to sell day-old chicks for less than 25 cents each, and make it a paying business, and at this rate breeding stock of only ordinary quality can be used.



A HUNDRED BABY CHICKS PACKED READY FOR SHIPPING; COVER OF BOXES TO GO ON

WORK OF THE DEPARTMENT

This Department has made a practice during the last three seasons of selling day-old or baby chicks. The work has been confined almost entirely to White Leghorns. Only a limited number of Barred Rocks have been distributed. The first season the work was undertaken only White Leghorns were sold, and the price was 20 cents each right out of the incubator. No chicks were delivered before May 15th. One lot of 50 were taken out of the incubator the day they were hatched and shipped a distance of 1,400 miles with only one dead when they reached their destination.

The first season upwards of 1,500 were sent out, and not a single case of poor success in brooding and rearing was reported. The second season only 1,000 were sent out. During the past season we sent out upwards of 2,000 baby chicks varying in age from day-old chicks to 3 and 4 weeks of age. Practically all that were over a day old were taken by purchasers coming on the plant, and taking them away. We disposed of a large number of baby chicks one, two, three and four weeks of age at 20, 30, 35, and 40 cents each respectively. A large number of these went to back-yard poultry raisers in the city. Chicks can be shipped more satisfactorily a day old than at an older age. The chance of loss is lower.

PACKING AND SHIPPING

The method of packing is quite simple, strong card board boxes are

BABY CHICKS READY TO SHIP; THREE SIZES OF BOXES, 12, 50, AND 100

used. They come in sizes to hold a dozen, 25, 50, or 100 chicks respectively. Those holding 25 or more are divided into compartments by card board partitions. There are small air holes punched in the side of the box to furnish sufficient ventilation. The sooner they are shipped after hatched and properly dried the less risk. No feed or water need be given en route. A small quantity of bran in the bottom of the box will prevent spreading the legs of the chicks, and crippling them in this way. Care must be taken not to put in too much, or they might be smothered when the box is tilted a little. The express companies generally rush baby chicks through as quickly as possible, and take every reasonable precaution in handling them. Just recently the United States has admitted baby

chicks to parcel post. This is certainly a good thing for the poultrymen, and is likely to work out to the further development of the baby chick business.

A BIG DEMAND

This season there is an enormous demand for baby chicks, both from the farmers and from the back-yard poultry-keepers. Most of them want to do away with the work of hatching their own, and are willing to pay a good price for them. The prospects are for a good trade in them, both from the buyer and seller's view point. The fertility and hatching power is high this year, and the egg production so far this spring has been high too. It would appear that this branch of the business should yield a fairly good profit this year.

The incubators must be used to do a baby chick business. There is always the danger of having shipments go out that were hatched under abnormal conditions, or conditions which affect the vigour and vitality to such an extent that the purchaser has poor success in rearing them. Often a purchaser has good success with one shipment, and in the next lot many of them may die off. If, however, the principles of artificial incubation are properly followed, and the eggs used are from strong, vigorous, and healthy breeding stock, there is no reason why good results should not be attained in rearing the baby chicks. Over crowding and over heating en route may sometimes happen, in which case the mortality in rearing would likely be quite high.

UNCERTAINTY OF HATCHING

Poultrymen can never give a straight out and out answer as to the probable extent of the baby chick business because there are so many factors entering which affect the hatching, shipping, brooding and rearing. The poultry plant can never be absolutely sure of a certain number of chicks from a given lot of eggs, nor can we give a definite estimate as to the number that will live. Notwithstanding these facts, we consider that the baby chick business has great possibilities. As the methods and systems of artificial incubation on a large scale are being better understood, improved, and perfected one drawback after another is likely to be removed. It is a new business, and as such is not different to any other business. It requires time to place it on a permanent footing.

ALBERTA

BY A. W. FOLEY, POULTRY SUPERINTENDENT

WE have been developing the poultry work in this province for a number of years by the distribution of baby chicks. I believe this to be a better method than the sending out of eggs. In the case of eggs there is often delay by not having hens ready at the proper time, and there is always a possibility of breakage making more or less chance work in the results.

With baby chicks our experience is that the chicks arrive in good condition no matter what portion of the province we ship to. Occasionally they are 48 hours on the road. The chicks get better handling and attention from the express companies plaint regarding their arrival. In this case the purchaser takes no chances, as he gets what he orders in good condition. As a matter of fact, we are so much in favour of the system that we are each year enlarging on our work, and now have an incubator of 3,600-egg capacity in use at the plant.

We ship in 25 chick lots in the regular baby chick shipping cases that we purchase from supply houses for this purpose. The boxes have about an inch of soft straw or hay in the bottom, and the chicks are placed in the boxes as soon as they are nicely dry after the hatch is over. For ventilation in transit a number of holes are punched in the sides and

NOVA SCOTIA

AGRICULTURAL INSTRUCTION ACTIVITIES

BY J. G. ARCHIBALD, B.S.A., DEPARTMENT OF CHEMISTRY

THE principal activities of the Department have for some time past been centred around its propaganda for increased production. The meetings held throughout the province have been unusually well attended. Five short courses have been held, the average attendance being 150. Some of the leading features of the propaganda have been:

(1) The policy of offering to pay farmers' associations and dealers for loss resulting from non-sale for seeding purposes, of any grain or other seed imported for that purpose. This has resulted in bringing in a very substantial supply of good seed—probably ample for the country's needs this year.

(2) Government purchase of available supplies of fertilizer. Very fortunately a shortage of fertilizer was foreseen last fall, and the Department has secured one hundred carloads, none of which was sold till the trade supply disappeared. The cars are now being rapidly placed, and this source of supply should prove of material aid in increasing production.

(3) The securing and location of considerable quantities of hardy strains of seed beans is now having its effect. These are being bought by farmers and townspeople in the northern and eastern parts of the province, who, heretofore, did not grow beans at all. They are high grade seed, purchased in small localities from men who have made a specialty of bean growing under comparatively severe weather conditions. Varieties have thus been secured which mature from ten days to three weeks earlier than the ordinary kinds.

(4) Fourteen Fordson tractors have to date been ordered for the province. These are to be re-distributed from Truro. In this connection it is interesting to note that the Agricultural College is fortunate enough to possess the first one of these machines ever turned out, it having been donated by Mr. Ford himself in the fall of 1917.

(5) The Department has made a special feature of a 25% bonus on the cost to farmers purchasing two-furrow ploughs. As a result 200 extra ploughs of this type have been sold in the province. As every purchaser gives his guarantee that the plough will be used to the utmost of his endeavour, this means a very considerable increase in the acreage under cultivation.

(6) Arrangements are being made for the establishment of a farm credit scheme through the banks. Details of the plan are not yet complete, but will be announced in the course of a few days.

FOOD PRODUCTION WEEK

The Lieutenant-Governor proclaimed the week beginning April 7th, as a week of dedication to the food production campaign. He wrote a personal letter to every clergyman in the province setting forth the facts, and urging the importance of a maximum effort on the part of all. The "Soldiers of the Soil" were mustered throughout the province during that week. As this movement has been well and thoroughly organized by the Canada Food Board, it should be the means of furnishing the farmers with much useful and sadly needed labour.

The Agricultural College closed on April 11th. Sixty-two students have been enrolled this session, about half the number that attended before the war. The closing address was given by Dr. J. W. Robertson.

A DAIRY PRODUCTS COURSE

The Inter-provincial Dairy School for the Maritime Provinces has just finished its sessions at the college. A very successful course is reported with a total attendance of 55. Of these 35 took the creamerymen's course, 18 the course for cheese-makers, and 9 the course on milk testing and cream separators. It will be noticed that this makes a total of 62, instead of 55. This is due to the fact that some took more than one course. Probably the most outstanding feature of the work was the presence of Mr. Geo. H. Barr, Chief of the Dairy Division at Ottawa, who conducted in person the instruction in cheese-making.

QUEBEC

DEGREE IN HOUSEHOLD SCIENCE

BY F. C. HARRISON, D.SC., PRINCIPAL, MACDONALD COLLEGE

THE work for the new degree in household science will consist of two years in the faculty of Arts of McGill University and two years at Macdonald College. Good residential accommodation is afforded for women at the Royal Victoria College, Montreal, and in the women's residence at Macdonald College.

First year work will be that of the first year of the B.A., with French recommended as an alternative language provided matriculation has been reached by those taking French; or, the first year may be that of the first year course for B.Sc.

Second year work will be that of the second year of B.A., with English and Latin together with botany, chemistry, zoology, and English literature or French, and any one of the following subjects at the choice of the student: economics, history, philosophy; or, the second year work may be that prescribed for the B.Sc., which includes English, biology and chemistry, and a choice of one of the following: geology, mathematics, physics, economics and political science, English history and philosophy.

The work of the third and fourth years at Macdonald College will consist of English and economics, the same as that given to the third and fourth year students in the faculty of agriculture; science subjects, such as chemistry, physics, biology, and bacteriology, partly taken in the school of agriculture and partly in the school of household science, and the technical subjects—foods, textiles, clothing, the home and the institution—will be given entirely by the school of household science.

This course represents two-fourths academic work, one-fourth scientific, and one-fourth technical, a proportion very similar to that given for the B.A. in Household Science at Toronto University, and somewhat similar to that given in a large number of American institutions, for example Chicago, Columbia, Wisconsin, and Cornell universities, where similar course have been in operation for over ten years.

The title of the degree will be Bachelor of Household Science, and the abbreviation B.H.S.

MAPLE PRODUCTS EXHIBITION

THE prize list of the exhibition of Maple Products at the Provincial Exhibition Park, June 25, 26, 27 and 28, provides for eight classes as follows:—

1. For the best maple sugar, not less than 10 lb. in one pound cakes, made by the exhibitor—$12, $10, $9, $8, $7, $6, $5, $4, $3, and 15 prizes of $2 each.

2. For the best soft sugar in tins, not less than 10 lb., made by the exhibitor. (This sugar must be made with the sap gathered in the last days of the season.) —$10, $9, $8, $7, $6, $5, $4, $3, and 10 prizes of $2 each.

3. For the best bottled maple syrup, not less than one gallon, made by the exhibitor—$15, $12, $10, $9, $8, $7, $6, $5, $4, and 15 prizes of $3 each.

4. For the best artistic display of maple sugar and syrup made by the producer of same. Not less than 10 gals. of syrup and 50 lb. of sugar, in cakes, in tins, etc.— $12, $10, $8, $6, $4.

5. For the best artistic display of maple sugar and syrup made by a dealer or trader, 20 gallons of syrup and 100 lb. of sugar, in cakes, tins, etc.—$25, $20, $15, $10 $5.

6. For the best way of preparing and offering on the retail market maple sugar in the easiest marketable way, so as to increase the selling of same, particularly to the desirous public at large. The exhibitor will exhibit a global quantity of 2 gallons of syrup and 15 lb. of sugar—$20, $15, $10, $8, $6, $4, $3.

7. For the best products made with maple sugar and syrup, such as candies, chocolates, butter, confectionery of any kind, in the easiest marketable way, etc., made by any person in the Dominion. Not less than 3 lb. for each exhibited variety —$15, $12, $10, $8, $6, $4, $3.

8. For the best illustrated trade mark or advertisement of the most original and best adapted for the selling of maple products. Any person in the Dominion may compete. The exhibitor will make a solemn declaration of the work being his own—$15, $12, $10, $8, $6, $5, $4, $3.

The federal Government has made a special grant, through the Dominion Minister of Agriculture, in aid of the funds called for by this prize list. A number of special prizes are also being given. Entries are required to be made on or before June 12 and exhibits must be in place by ten o'clock Tuesday morning, June 25th. No entry fee is required. At the closing of the exhibition, the Provincial Exhibition Commission will sell the exhibited products at wholesale market prices, deducting 10% to cover expenses. Exhibitors winning prizes will be asked to give particulars concerning their methods of making maple products and the condition of their bushes. These answers will be gathered and published. In all 125 prizes are to be offered.

A SURVEY OF SUGAR GROVES

BY G. C. PICHE, CHIEF OF THE FORESTRY BRANCH

A survey of maple sugar groves in various parts of the province was begun last fall by the Forestry Branch. The object of this survey is to gather accurate data on the following:

1. The proportion of the various species of trees in each grove, to determine the influence, if any, of a mixture of trees on the yield of the sap, etc., etc.
2. The influence of the soil.
3. The influence of the topography of the ground.
4. The temperature.

Notes are also made on the equipment available, the methods of tapping the trees, of gathering the sap, and also on the yield of sap, by species of maples, by a number of trees, and as influenced by the frost.

Information is also being gathered on the methods of making syrup and sugar, and, finally, a statement showing the profits or losses of the industry will be made up.

All reports will be compiled at the Forestry Branch by counties and by districts; thus before long complete and careful statistics concerning this

valuable industry will be available.

Sugar now sells at a high price. It is, therefore, in the interest of our farmers to work their sugar groves so as to secure their own supply of sugar and syrup.

All the owners of sugar groves desiring to help in the survey are invited to write to the chief of the Forestry Branch, Quebec, who will be glad to receive any information that can be given.

ONTARIO

FARM MANAGEMENT SURVEYS

A REPORT has been issued of the first farm management survey carried out by the Ontario Agricultural College under the direction of Professor Andrew Leitch, B.S.A. The survey was made in the township of Caledon, Peel County, on 113 farms. The work was done during October and November last year, and embodied the farm year October 1, 1916, to October 1, 1917. The purpose of this survey was to permit of a study of those factors, which have the greatest influence towards raising or lowering the net income of the average farm.

Owing to some of the farmers not having threshed, only 82 of the original 113 records were completed. The following table shows results of the survey:—

INFLUENCE OF SIZE OF FARM ON *LABOUR INCOME

TABLE I.

Acres	Under 85	86–100	101–150	151–241
No. Farms	25	16	22	19
Size—Average Acres	72.3	93.2	129.6	175.3
Capital—Average	$6944	$8942	$12635	$16111
Capital in Buildings—Average	2192	2678	3693	4472
Capital in Machinery—Average	422	510	598	789
Productive Capital—Average	4330	5754	8344	10850
Percentage of Capital in Buildings and Machinery Average	37.7	35.7	34.0	32.7
Crop Acres per Horse—Average	18.8	21.1	20.6	22.5
Crop Acres per Man—Average	46.9	58.0	60.5	63.4
*Labour Income—Average	$507	$891	$1091	$1581

	Average of all farms.
Receipts per Live Stock Unit	$74.70
Feed per Live Stock Unit	56.80
Profit per Live Stock Unit (over cost of feed)	17.90
Crop Yields	100%

Table 1 shows one very striking result—that the amount of labour income increases directly with the acreage of the farm, or, otherwise, increases directly with the size of the farm business. All the farms were engaged in practically the same type of farming. As will be seen, the average labour income for the group of farms under 85 acres in extent was $507, whereas that for the group over 150 acres in extent was $1,581, those of the other two groups ranging proportionately between.

*The term "Labour Income" represents the net receipts after paying all expenses on the farm, including 5% interest on the capital invested, and paying for all labour save that of the man who actually operated the farm.

INFLUENCE OF GOOD CROPS AND GOOD STOCK

TABLE II.

	Live Stock Below Average	Live Stock Above Average
Crops Below Average	No. Farms ..... 26 Average size ..... 108 Labour Income ..... $508 Labour Income per acre $4.70	No. Farms ..... 21 Average size ..... 112 Labour Income ..... $1047 Labour Income per acre $9.35
Crops Above Average...	No. Farms ..... 14 Average size ..... 127 Labour Income ..... $977 Labour Income per acre $7.70	No. Farms ..... 21 Average size ..... 120 Labour Income ..... $1530 Labour Income per acre ... $12.75

Table 2 shows the relative influence of crop and live stock production on the labour income. Owing to the difference in the average size of the farm in the various groups, the "Labour Income per Acre" has also been calculated. It will be seen on comparing both groups with live stock below the average, that an increase in efficiency of crop production means an increase of labour income of $469—or an increase of $3.00 per acre. Likewise in the groups with live stock above the average, an increase in crop production increases the labour income by $483—or $3.40 per acre. But on comparing the two groups with crops below the average it will be seen that an increase in returns from live stock adds $539 to the labour income—at the rate of $4.65 per acre. And comparing the two groups with crops above the average, we find that an increase in stock returns means an addition of $553 to the labour income—or $5.05 per acre. Otherwise, if we make a comparison of the group with both crops and stock below the average with the group underneath, and the crop to the right, we see that, with stock the same and crops increased, the raise in labour income is $469—or $3.00 per acre—whereas with crops the same and stock returns increased, the raise in labour income is $539—or $4.65 per acre. Thus the conclusion is necessarily reached that in the area surveyed, the greatest opportunity for raising the labour income lies in increasing the quality of the live stock.

TO WHAT EXTENT DOES GOOD FEEDING PAY?

TABLE III.

Feed fed, per *L. S. U.	Under $43	$43–50	$50–60	$60–70	Over $70
Average cost per L. S. U.	$36.46	$45.90	$54.21	$63.74	$82.62
Receipts per L. S. U.	67.91	70.56	78.74	77.09	78.41
No. Farms	16	14	19	16	17
Average size, acres	108	129	129	116	96
Labour Income	$991	$1241	$1104	$907	$722
Labour Income per acre	$9.2	$ 9.6	$ 8.6	$7.8	$7.5

This table adds further proof to the well-known law that after a certain degree of production has been reached, a higher degree cannot be attained without lowering the net profits. The cost of the final returns is more than the sale price. The amount of feed which may be fed profitably will, of course, depend upon the quality of the stock. With the average of Caledon township stock, approximately fifty dollars worth of feed may be fed profitably. It will be seen that the receipts per live stock unit in the last three groups

*The "Live Stock Unit" is represented in one mature cow or horse, or a proportionate number of smaller animals maintained for one year, as for example, 2 head young cattle, 7 sheep, 100 hens, hogs according to weight.

are practically the same. The increase in feed did not increase the returns. Hence, the profit was lowered with the direct effect of lowering the labour income. In the group which was fed most heavily, each live stock unit yielded a loss of $4.21 on feed alone. The labour expended on this stock was also lost. As the average size of farm varies somewhat in the different groups, here also the "Labour Income per Acre" has been calculated. It is the highest in the second group, where the average feed consumed amounted to $45.90 per live stock unit.

SUMMARY

Briefly, then, the findings of the survey thus far may be summed up as:—

1. The size of the business on the small farm engaged in general mixed farming is too small to pay all expenses and leave more than a very small labour income for the operator.

2. High profits from live stock have a greater influence on the labour income than have high crop yields.

3. The quality of the live stock determines the amount of feed which may be fed profitably. Heavy feeding to stock of low quality means a loss rather than a gain. In order that the crops grown may be fed upon the farm to keep up the soil fertility, and at the same time yield a profit, the quality of the stock on a great many farms must be increased.

A SURVEY IN OXFORD COUNTY

A second farm management demonstration survey has been carried out under Professor Leitch. The work has been done in the county of Oxford, where farms have been selected to represent average dairy farm conditions in Western Ontario. Parts of seven townships were covered, including 430 farms, which is about one-fifth of the farms in the territory covered. The staff of this survey was employed during two months, covering the period from February 19th to April 19th. A similar survey will soon be commenced in the county of Dundas, where conditions representing average dairy farming in Eastern Ontario will be exemplified. It is the purpose of the Ontario Agricultural College to repeat these surveys annually in these districts for five years, and to deal with other districts and other conditions of farming. The Caledon township survey was carried on with funds provided under THE AGRICULTURAL INSTRUCTION ACT. The later surveys are being financed with provincial funds apart from the salary of Professor Leitch, which will continue to be drawn from THE AGRICULTURAL INSTRUCTION ACT appropriations for the province of Ontario.

THE DEPARTMENT'S TRACTOR SERVICE

BY C. F. BAILEY, B.S.A., ASSISTANT DEPUTY MINISTER OF AGRICULTURE

THE Ontario Department of Agriculture in its campaign for greater production met the labour difficulty in some measure last year by securing 127 tractors, which were placed at the disposal of the farmers throughout the province to assist in ploughing and harrowing. In adopting this policy the Government also desired to demonstrate the usefulness of tractors on the average Ontario farm. In accordance with this idea, 11 different makes of 16 different types were purchased, so that farmers might have an opportunity of comparing the different machines under field conditions. Each machine was equipped with a

3-furrow plough, and in some cases with disc harrows. Owing to the difficulty and expense of transporting the machines, the Department required sufficient contracts to be secured with farmers within a comparatively small area, generally a township, in order to insure the continuous use of the machine for the greater part of the season. With a view of assisting as many farmers as possible, from 15 to 20 acres were ploughed for each farmer, except in cases where there was no immediate demand for the tractor.

THE EXPENSE

The farmer was charged 45c. an hour for the machine and a mechanic when actually employed. He also supplied the fuel and oil for the machine and board for the mechanic. The charge made was not sufficient to pay the cost of operation, and, in the majority of cases, the cost to the farmer was considerably less than the cost of ploughing with horses, the total cost per acre varying from $1.02 to $3.10, or an average of $1.60 per acre. The Department naturally met with difficulties in placing in operation so many tractors covering a large territory, the worst probably being the securing of competent operators. The men would sometimes be familiar with engines, but would know very little about ploughing, and frequently the opposite was the case. This fact led to further complications, such as engine troubles and difficulty with the ploughs. However, considering the fact that this was a new field of work, with no previous experience as a guide, the results in the main were quite satisfactory. Approximately 20,000 acres were ploughed in this way, 75% of which would not have been ploughed without the use of tractors. Another encouraging fact is that a large portion of land ploughed in this way was sown to fall wheat.

THE CALL OF THE DAY

If the need for greater production was important last year, it is many times more urgent to-day, and every effort is being put forth to have every possible acre under crop this year. Plans were completed some time ago for putting all the Government tractors in operation as soon as the season opened, and, with the benefit of last year's experience, it is expected that many of the difficulties met with then will be overcome. The services of the best mechanics employed last year have been again engaged, and assurances have been given by the Military Hospitals Commission that a number of returned soldiers who are being instructed on tractors will be available for this work.

WORK FOR AGRICULTURAL REPRESENTATIVES

Agricultural Representatives will again have charge of the tractors used within the borders of their respective counties. It will be their duty to secure contracts, route the machines, engage operators, and become responsible for the general supervision of the work. The difficulty in getting mechanics for making repairs resulted last year in a great loss of time and much inconvenience, both to the farmer and to the Department. In order to overcome this difficulty, the tractors are to be put in groups of from 12 to 15, the number depending on the distance they are apart, and an experienced mechanic will be placed in charge of each group. It will be his duty to inspect and repair all tractors under his charge, and in this way insure the proper care of the machines. Thus it is hoped to secure greater efficiency and to avoid serious breakdowns, which resulted at our first essay, not only in loss of time and inconvenience, but also in extra expense. The operators in charge of the machines will be paid $2 a day and board, with a bonus of 25c. for each acre ploughed. Last year these men were engaged by the month It is hoped that the bonus system will make for greater

efficiency. In order that the overhead expenses in connection with the operating of tractors may be more nearly met, the Department has slightly increased the rates for ploughing and harrowing.

THE AGREEMENT

Following is the agreement farmers are required to enter into:

ONTARIO DEPARTMENT OF AGRICULTURE.
TORONTO.

Post Office Address.....

County..... 191
Township.....
Concession.....
Lot.....

I,.....hereby beg to make application to the Ontario Department of Agriculture for the service of a tractor outfit and operator. I desire to have.....acres ploughed, and will be ready to have the work done as soon as possible after above date.

In consideration of the Department being able to accept this application, I hereby agree to the following:—

To pay for work done at the rate of 50c per hour plus an additional charge of 50c for each acre ploughed, or 20c for each acre disc harrowed, provided that in no case shall the combined cost, as above stated, exceed $2.50 per acre for ploughing and $1.25 for disc harrowing;

To supply at the machine all fuel and water required, and to fill both tanks with gasolene and kerosene respectively when the work on my farm is completed, provided that the same has been done before the machine left the farm on which it worked immediately before coming to my farm, and that this has been taken into consideration in arriving at the amount consumed in the work on my farm;

To supply board and lodging for the operator while on my farm;

To sign a daily report to be submitted by the operator showing hours worked, acres ploughed, and such other information as may be required;

To pay accounts within thirty days after the work on my farm is completed.

I also agree that this application shall have the full force and effect of an agreement from the time said tractor outfit arrives on my farm.

Signed.....
Witness.....

FARMERS SHOULD BE OWNERS

While it is expected that a considerable amount of work will be done by the Government-owned tractors, yet the number of acres ploughed will be small as compared with the total acreage under cultivation in the province. To some this might suggest the advisability of the Government purchasing a larger number of tractors, but it must be borne in mind that such a policy would lead to an investment of an exceedingly large sum; besides this the difficulty of administrating the work would be greatly increased, with the result that efficiency would be seriously impaired. The solution of the difficulty would, therefore, seem to be that the farmer should own his tractor, and it is pleasing to note that a large number of farmers have already become owners of machines. There is also no doubt of the growing interest in tractors. This is easily shown in the large attendance of 155 at the first Farm Power Course held at the Ontario Agricultural College in January of this year.

RESULTS OF EXPERIENCE

From the experience gained by the use of Government-owned tractors last year, it would appear evident that the tractor will eventually find its place on many farms in the province of Ontario. This will mean, of course, that fields in many cases will have to be rearranged and made larger, as there is great loss of time in turning the tractor at the end of the furrow. For this reason it would seem well not to have the fields less than 15 acres. It has been clearly demonstrated that tractors are unsuited on farms that are hilly or stony. The machines experience much difficulty on hilly land, and on stony land difficulty is met in keeping the ploughs properly adjusted, besides there is danger of bending beams and breaking plough points. While tractors will undoubtedly replace horses to a considerable extent, their value will be largely found in taking care of the peak load on the farm: in other words, they will be

found extremely valuable during spring for seeding operations, and, again in the fall, for ploughing. They will also take the place of the stationary engine for such work as threshing, grinding, sawing wood, pumping water, etc.

CARE REQUIRED IN BUYING

The selection of a tractor is a matter for careful consideration. It would be difficult to recommend any particular type, as there are a number on the market which have given fairly good satisfaction under field conditions. The purchaser must be guided to some extent by his own requirements, and the amount of money he is prepared to invest. Generally speaking, however, a tractor should not have less than 9-18 horse-power to do the work required of it on the general run of Ontario farms.

Having secured a good tractor, it is most important that it be put in the hands of a competent operator. Many of the difficulties encountered are more largely due to lack of care and improper use than to any weakness in the tractor itself. A tractor is an expensive piece of machinery, and, if the best results are to be secured, it will have to receive much greater attention than is usually given to machinery on the average Ontario farm.

TRACTOR SCHOOLS

THREE-DAY tractor schools were held at the towns of Preston and Ayr in the month of March. The classes were arranged by the Agricultural Representative of the county, Mr. J. S. Knapp, and were conducted by Mr. W. H. Day, Professor of Physics at the Ontario Agricultural College. The attendance varied from fifty to sixty at Ayr and from sixty to seventy at Preston. A sectionalized gasoline engine was used to demonstrate the lectures which covered:

1. The general purpose of gasoline engines.
2. Electricity.
5. Carboration.
4. Ignition.
5. Operation, care, and troubles.

An expert operator supplied by a manufacturing institution assisted in the demonstrations.

CO-OPERATIVE SHORTHORN SALE

BY N. C. MACKAY, AGRICULTURAL REPRESENTATIVE, BRUCE CO.

THE second annual sale held recently by the Bruce Shorthorn Club was very satisfactory. About 400 farmers and dealers were present. We had several buyers from the West, but they were only able to get two old enough to ship. Due to the fact that we did not plan on having a sale until a month before it was held, most of the animals that were offered were only about six months old, as the breeders did not hold anything for the sale. Only two sold for less than a hundred dollars, ninety dollars being the lowest price secured. The highest price was $170.00 for a calf only a little over a year old. The average price was $130.00. One of the pleasing features of the sale was that many small breeders who were rather sceptical were forced to admit that the animals that were auctioned generally brought a good deal more money than they were holding theirs at, and we do not anticipate any difficulty in getting a much larger number of contributors for 1919.

SEED POTATO INDUSTRY FOR NEW ONTARIO

A movement is in progress within the Department of Agriculture of Ontario to establish the growing of seed potatoes as an industry in especially suitable districts of New Ontario. Three cars of selected and approved potato seed of the Irish Cobbler and Green Mountain varieties have been procured from the province of New Brunswick. These are being distributed to farmers in the districts of Muskoka and Parry Sound, Algoma and Fort William. From three to four meetings were held in each of these districts with a view to securing the intelligent co-operation of the farmers. The staff of speakers consisted of Dr. C. A. Zavitz, Professor of Field Husbandry, Ontario Agricultural College, Mr. Justus Miller, Assistant Commissioner of Agriculture, and Mr. A. H. MacLennan, the vegetable specialist of the Department of Agriculture. Two of these speakers addressed each of the meetings. The meetings were organized by the respective Agricultural Representatives for those districts.

PROFESSOR OF ANIMAL HUSBANDRY AND FARM SUPERINTENDENT, ONTARIO AGRICULTURAL COLLEGE

MR. Wade Toole, B.S.A., whose appointment as Professor of Animal Husbandry at the Ontario Agricultural College was announced in the April GAZETTE, assumed his new duties on the first of May. Professor Toole will also be Farm Superintendent. His immediate staff will consist of Mr. H. M. King, B.S.A., Lecturer in Animal Husbandry, and official in charge of the cattle and horses of the college farm; Mr. J. P. Sackville, B.S.A., Lecturer in Animal Husbandry, who will be in charge of sheep and swine; and Mr. Andrew Leitch, B.S.A., as Farm Manager. In addition Mr Leitch will continue to direct the farm management surveys under the immediate direction of President Creelman.

MR. WADE TOOLE, B.S.A.

MANITOBA

THE WEEDS COMMISSION

BY GEO. BATHO, EDITOR OF AGRICULTURAL PUBLICATIONS

THE Manitoba Weeds Commission, on March 20th, held at Sinclair, Man., the last meeting of a series that has continued all winter, and that covered a total of 70 places visited.

The total attendance at these meetings was 3,691 persons, some of the best audiences turning out when the weather was very uninviting. An encouraging feature of the gatherings has been the keen interest taken by reeves and municipal councillors. It is part of the work of the municipal councils to engage the municipal weeds inspectors, and, therefore, it is a healthy sign when they show themselves anxious to understand the work that the inspector has to do and a sympathetic desire to help him make his work effective. In one case, for instance, the reeve attended three different meetings held in various corners of his municipality.

Lantern slide illustrations were used not only to show the weeds of principal interest, and to illustrate their root systems, foliage and manner of bloom, but also to show the actual field results obtained by different methods of work in several parts of Manitoba. Some of these photos were taken in heavy crops of wheat growing in 1917 in fields that had been condemned on account of sow thistle in 1916, and had been thoroughly summer fallowed for the remainder of the season. The importance of apparently small matters in soil culture was strongly pushed home both by Messrs. Bedford and Brown, and the presentation of actual photos taken in the field made a convincing appeal.

In addition to grown-ups at the meetings the senior pupils and teachers attended at quite a number of points, and so a most practical lesson was added to the agricultural instruction which is being given in the school.

At the close of the formal addresses a very valuable aftermath showed itself at many places in the way of round table talks, participated in by those who were especially interested in some particular phase of this very large and difficult problem. So intense was the interest and so anxious were those present to secure all possible suggestions that these group discussions often lasted one or two hours.

The commissioners express much satisfaction at the gradual improvement in the type of men appointed as weeds inspectors by most of the municipalities. Municipal councils have for the past two seasons been urged to select men past middle age who have "made good" at farming on their own account, but who may be unable to do the most active kind of work in the field. Probably over one-half of the inspectors own autos, and use these in their work. The effect of securing men of this type for this position is that the Act is administered with sympathy and judgment, and with more emphasis on cleaning cultivation with tillage implements, and less use of the mowing machine after the crop is grown.

EXHIBITS AT FAIRS AND EXHIBITIONS

BY T. J. HARRISON, B.S.A., PROFESSOR OF FIELD HUSBANDRY

DURING the past season the Manitoba Department of Agriculture and the Agricultural College have made considerable use of exhibits at the fairs and exhibitions to teach the farmers within the province the advantage of better agricultural methods, and to advertise to the farmers outside of the province the agricultural possibilities of Manitoba. The exhibits, that were prepared, can, therefore, be divided into two classes, those designed to teach, and those designed to advertise.

EDUCATIONAL EXHIBITS

The educational exhibits were designed and prepared by the staffs of both the Department of Agriculture and the Agricultural College and were shown at fairs within the province. At these fairs members of the staffs were present to explain the exhibit, if necessary, and to answer other enquiries made by the farmers.

EXHIBIT AT BRANDON SUMMER FAIR

The exhibition of the Western Agricultural and Arts Association held in the city of Brandon is one of the largest fairs held in Western Canada. It was for this exhibition that the biggest exhibit was prepared. The space occupied was 150 feet long by 14 feet deep. The decoration and general design of the whole exhibit were under the direction of Mr. Louis Kon of the Immigration and Colonization Branch, and great credit is due him for the artistic arrangement of exhibits and signs, and the background. The exhibit was divided into twelve

MANITOBA PROVINCIAL EXHIBIT, PEORIA, ILL., SOIL PRODUCTS EXHIBITION

divisions. The material in each was prepared and exhibited by the different departments of the college and branches of the Department of Agriculture. In each division an endeavour was made to bring out just one idea.

The poultry exhibit, under Professor Herner, specialized on better market eggs. The exhibit was designed to show the best methods of egg production and transportation of the eggs from the farmer to the consumer.

The dairy exhibit under Dairy Commissioner Gibson endeavoured to teach improvement in Manitoba butter production.

The apiary displayed under the Provincial Apiarist, showed by signs and exhibits of honey and live bees that bee-keeping in Manitoba was a profitable line of farming and not a fad.

Beautify the home surroundings was the message of the Horticultural Department, where Professor Brodrick stood sponsor. A lesson here was taught by having a model home and good surroundings.

Destroy the gopher and weeds was the message of the Biological Department under Professor Jackson.

The Publications branch of the Department of Agriculture showed how it was possible to start a good agricultural library with little or no cash outlay.

MANITOBA EXHIBIT AT STATE FAIR, SPRINGFIELD, ILL.

The Household Art Department had an exhibit showing what a first-year student at the college learned in garment making, millinery, house planning and home adornment. This exhibit was under Professor Margaret Kennedy.

The Field Husbandry Department endeavoured to show that it was the duty, and not the privilege, of every farmer to produce to the utmost. This exhibit consisted of miniature elevators and revolving placards.

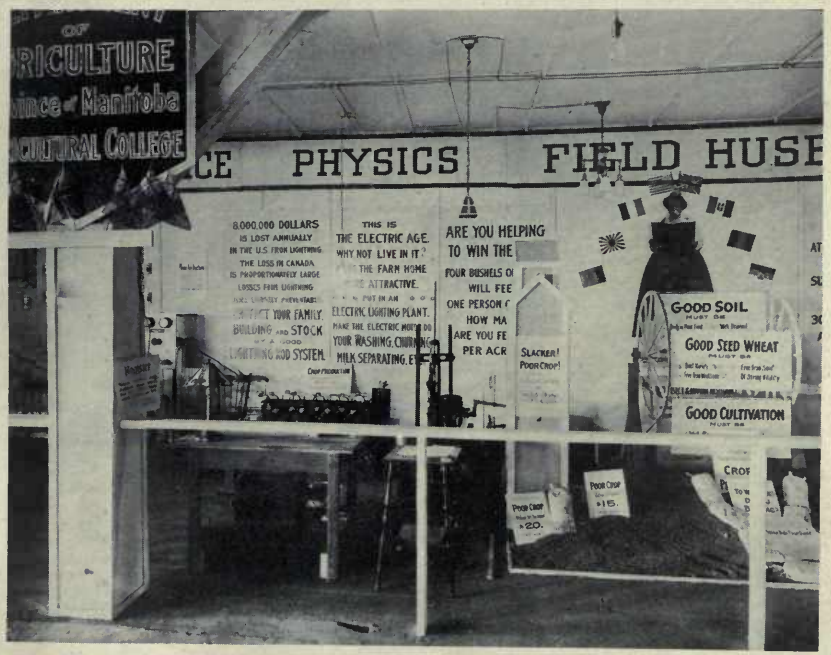
The Physics Department, in charge

of Professor S. C. Lee, had an exhibit showing two methods by which that department could be of use to the farmers. Demonstrations were given three or four times daily on the effectiveness of lightning rods in protecting farm buildings. The main part of the exhibit consisted of a well-equipped farm electric lighting plant.

The Extension Service had a complete exhibit showing the use of

SECTIONS OF BRANDON EXHIBITS AT RURAL FAIRS

After the Brandon fair was over, Professor Herner took the Poultry exhibit to the Agricultural Society fair at Virden, and Miss Kennedy the Household Art section to the summer fair at Souris. The management of both these fairs were loud in their praise of these exhibits and were anxious to secure a similar collection for their exhibition next year.



MANITOBA AGRICULTURAL COLLEGE EXHIBIT AT BRANDON

gasoline engine in driving a cream separator, churn and wash machine, etc. They also emphasized the necessity of home canning of vegetables and fruits. In addition to the general exhibit demonstrations were going on almost continually in the auditorium in the centre of the building on canning, cooking, killing and dressing chickens, lightning control, etc.

THE FIELD HUSBANDRY EXHIBIT

The Field Husbandry department of the Manitoba Agricultural College, assisted by the extension service, were the first of the Manitoba Agricultural College departments to make a move towards placing an exhibit at the rural agricultural fairs within the province of Manitoba.

The exhibit, which was firstly set up at the Agricultural College, was made interesting, instructive and

educational, comprising three divisions, namely, 1st, grain section; 2nd, farm section, and, 3rd, grasses and clover section.

The grain section consisted of six varieties of each of wheat, oats, and barley arranged in order of their yields made in a three-year test on the experimental plots of the college. In the centre, near the back was placed the sweepstake wheat of 1917, and, on either side, the sweepstake wheat of 1915-16.

The farm section consisted of two representative half sections: one divided for a six-year rotation, and the other for a four-year rotation. The six-year rotation, or mixed farm, comprised fields consisting of fifty acres and containing one field of corn, two of wheat, one of oats and one of barley, one of hay and pasture, the rotation followed being 1, wheat; 2, wheat; 3, oats or barley seeded down to hay; 4, hay; 5, pasture, broken in July, and 6, corn or summer-fallow. The total profit of this farm was $9.61 per acre.

The four-year rotation or grain farm was divided into four sections of 75 acres each; two fields for wheat, one for oats and one for summer-fallow. The rotation followed was 1, wheat; 2, wheat; 3, oats, and 4, summer-fallow. The total profit of this farm was $3.11 per acre.

The grasses and clover section was arranged in order of their suitability to Manitoba and their rate of production. In front of the case containing these were placed jars containing three recommended varieties of corn, and those given out for the corn contest, namely, Minnesota No. 13, Early Gehu, and North-Western Dent. Two other jars in the foreground showed the result of two-year selection of ears and kernels had upon the increase in production and uniformity of cob, etc.

The background of this exhibit consisted of beaver board charts eight feet high. Upon these were printed the yields and length of time in maturing of grains and grasses. These were placed behind their perspective sections, while the centre section had as its background the results of rotation experiments on the mixed and grain farms. The border of each chart was decorated with either sheaves of wheat, oats or grasses and clovers. Spaces at the top and bottom were filled with pictures of noted cattle and sheep and other experimental work at the college.

This exhibit was sent out on July 3rd in charge of Geo. C. Simpson to fairs at Morden, Melita, Hartney, Deloraine, Cartwright, Crystal City and Boissevain. The exhibit was heartily welcomed at each of these points, and on an average at the seven fairs, five to seven hundred people stopped to ask questions regarding many of the agricultural problems, such as:

(a) Suitability of corn in Manitoba for fodder.
(b) The working out of six-year rotation.
(c) The identification of weeds and their eradication.

Bulletins upon the field husbandry subjects were distributed, and those wishing other bulletins were given the list of the college bulletins, which could be obtained free of charge from the college.

IMMIGRATION AND COLONIZATION BRANCH EXHIBITS

The Immigration and Colonization branch of the Department of Agriculture, under the direction of Mr. Louis Kon, prepared and showed exhibits at many of the state fairs in the United States. The exhibits at Springfield and Peoria, Illinois, were of exceptional merit. These exhibits have had a remarkable effect on the immigration to the province of Manitoba. The best evidence that the exhibits were a success is the following quotation from the review of the Spring state fair in the *Breeder's Gazette*:—

"A choice space was filled by a Manitoba exhibit, displayed with the cunning of a Canadian hand in such affairs. It sought to tole away Illinois farmers at a crisis in American agriculture."

THE MANITOBA SOIL PRODUCTS EXHIBITION

BY S. T. NEWTON, DIRECTOR OF EXTENSION SERVICE, DEPARTMENT OF AGRICULTURE

THE Manitoba Soil Products Exhibition was held during farmers' week at Winnipeg, and proved the most successful show yet held in the province, no less than 175 individual exhibitors having entries, while the total number of entries was over 400.

In addition to the excellent cash prizes given by the Government, thirty splendid special prizes donated by the Winnipeg business firms served to arouse a great interest in all departments.

The prizes were evenly distributed over the province, a noticeable feature being that many of the best prizes, including the grand championship, were won by men who are members of the Canadian Seed Growers' Association. Brockington Brothers, of Melita, in the south-western corner of the province, won the highest honours in wheat, while the second highest went to J. W. Carruthers in the centre of the province, and third to S. Larcombe of Birtle, in the north. First place in oats was won by R. B. Dickinson of Birtle, and the second place by M. P. Mountain of the same place. The prize winning barley was grown by J. F. Symonds, Elkhorn.

In the north-western district there was only a difference of 1¼ points between the first prize sample and the one that got eleventh prize.

There were ten entries in Marquis for every one in Red Fife, thus showing that Marquis is steadily forcing Red Fife out of the province.

This year the boys' and girls' clubs were represented by fifty-one entries, and the quality of the grain shown by them proves that in the near future they will be contending for the very best prizes.

In potatoes, the quality and the number of entries were very gratifying, no less than sixty-three exhibits being placed.

SASKATCHEWAN

CO-OPERATIVE POULTRY MARKETING

BY W. W. THOMSON, DIRECTOR CO-OPERATIVE ORGANIZATIONS

THE co-operative poultry marketing work of the Saskatchewan Department of Agriculture has just been completed for the 1917-18 season, and we are pleased to be able to state that the season's work has been the most satisfactory yet experienced, both in regard to quantity of poultry handled and prices realized. This work was first undertaken in the fall of 1915, its object being to encourage poultry raising, first by providing a market where farmers and others interested in poultry raising could dispose of their surplus stock for cash rather than for trade at local stores, as was the usual practice, and, second, by marketing in such a way that the producer was assured the full dressed value of his product, less the actual cost of handling.

The actual carrying out of the project was undertaken jointly by the Co-operative Organizations Branch of the provincial Department of Agriculture and the poultry husbandry department of the Saskatchewan College of Agriculture. A poultry killing and marketing station was opened in Saskatoon in the late fall of 1915, and poultry producers

were invited to ship their birds in alive to the station. When birds were received at the killing station they were graded, weighed, killed, dressed and packed under the supervision of experts provided by the College of Agriculture. Representatives of the Co-operative Organizations Branch then took charge of the dressed birds and forwarded advance payments to the shippers at prices which had previously been advertised, funds for this purpose being supplied under the provincial Agricultural Aids Act. The dressed poultry was either sold at once, or, if the market was not favourable, was placed in cold storage and sold when prices had advanced. When all of the birds were sold, a final payment was forwarded to the producer, returning to him every cent realized from the sale of his birds, less the actual cost of transportation, killing, boxes, and storage charges.

PROGRESS OF THE MOVEMENT

This system of marketing has proven very satisfactory, and large quantities of poultry have been handled each season. During the first season only one killing station was operated. In 1916, two stations were operated, one in Saskatoon serving the northern part of the province, and one at Regina for the southern section, both stations being operated for five weeks beginning November 13th. In 1917, these stations were again operated for five weeks beginning November 5th, and in addition a sub-station was operated at Tantallon for the week November 5th to 10th. The advance payments have always been about equal to the local market prices, and a final payment of from 1c to, for some grades, as high as 4c and 5c per pound has been paid in each year. The following is a list of the advance payments paid during the past season, payment being based on the live weight in each case: No. 1 chicken, 14c per lb.; No. 1 fowl, 12c per lb.; No. 1 duck and geese, 14c per lb.; No. 1 turkeys, 18c per lb.. Second-grade birds were paid for at 3c a pound less than No. 1's of the same kind.

The following table shows the quantity of the various grades of poultry received at each of the killing stations operated during 1917, and also the average set price realized for each grade and kind. The prices quoted are those realized on the live weight in every case. The expense of handlingi ncluding grading,killing, boxing, storage, and insurance, amounted to approximately 5c per lb., leaving a considerable amount to be distributed as final payments on almost every grade.

LIVE WEIGHTS

Grade	Kind	Regina	Tantallon	Saskatoon	Total	Average price realized on live weights.
		lb.	lb.	lb.	lb.	lb.
1	Chicken.....	9336	1904	11421½	22,661½	23c.
2	"	4346	991	2602½	7,939½	19c.
3	"	163	13	402	578	12c.
1	Fowl.....	9748	2295	8317	20,360	19c.
2	"	2539	1322	2064	5,925	16c.
3	"	46	2	413½	461½	9c.
1	Turkey.....	5858	387	6446	12,691	29c.
2	"	1010	162	1411	2,583	25c.
3	"			120	120	12c.
1	Duck.....	1761	189	2081	4,031	20c.
2	"		24	155	179	16c.
1	Geese.....	482	555	1135	2,172	21c.
2	"		38		38	16c.
TOTALS		35,289	7,882	36,568½	79,739½	

ALBERTA

ORGANIZATION FOR INCREASED CROPS

BY J. McCAIG, EDITOR OF GOVERNMENT PUBLICATIONS

THE Department of Agriculture for Alberta has entered on a vigorous campaign, covering the whole of the province for increased crop production and increased breaking for cropping in 1919.

The system adopted is the subdividing of the province into districts, fifteen in number, in the centre of which a field agent is placed with proper office and transportation equipment. The centres at which work will be carried on are Spirit River, Edmonton, Vegreville, Vermilion, Wetaskiwin, Lacombe, Sedgewick, Youngstown, Olds, Calgary, Claresholm, Lethbridge, and Medicine Hat. The agents are being selected largely from the instruction staff of the agricultural schools who have already proved themselves efficient in extension and school fair work.

LABOUR MOBILIZATION AND RE-SETTLEMENT

The duties which the agents are expected to discharge take account of the utilizing of all the labour and power resources of the province. In preparation for increased production half a dozen labour bureaux have already been established in the province for the enrolment of available help, both male and female. At present there is a surplus, but it is expected that before May 1 the demand will have absorbed the total supply available. Labour bureaux are operating at Medicine Hat, Lethbridge, Calgary, Red Deer, and Edmonton to date. A number of returned soldiers make up part of the present supply. Returned soldiers who have been brought up on farms obtain work quickly, or go on land of their own. The plans of the Department take account of providing for the inexperienced town or city soldier who wants to go on land. In fact the Department is giving chief attention to absorbing the largest possible number of returned soldiers by having them take up home-making on the land for the sake of the recuperative offices of country work. Homes are to be sought among experienced and public spirited farmers, to educate these men in the operations of the farm, in order to qualify them for the land settlement loan provided by the Dominion for returned soldiers.

HOW MORE CROP IS SECURED

The features of the cropping propaganda carried on by the field agents will be: the increase of seeded areas where the land is in suitable condition; the carrying on of new breaking; the fullest use of power resources by moving of teams and tractors, where work is completed, to farms requiring more power; the securing of supplies of good seed, where required, with the aid of the provincial seed branch; the control of weeds, and the furnishing of help and advice on all problems of the farm. In areas where tractors are in common use, the field agents will be the mechanics and gas engine instructors of the agricultural schools. There are not fewer than a thousand tractors now in the province, over two hundred of which have been placed through the office of the Department of Agriculture.

BRITISH COLUMBIA

FARM COST ACCOUNTING

BY A. B. TWEDDLE, PROVINCIAL STATISTICIAN

RECORDS of the cost of producing farm products stand ready to serve the same economic purpose as the cash register in a mercantile business by stopping leakage. Of all the industries in the world agriculture is the greatest, the most varied and complicated, and yet the only one in which accounting has so far been of secondary consideration, hence the annual leakage must be large. Time, effort, and vast sums of money have in the past been spent in gaining knowledge of plant and animal production, and in educating farmers in a like way, but up to the last ten or fifteen years little thought was given to the business side of farming, and yet it is probable that more farmers fail financially from a lack of proper business methods and records than from ignorance in handling land, plants, or animals, or because of poor production. The average farmer is already a naturalist and arduous labourer, but few possess the knowledge of business principles necessary for merited success.

Years ago when farmers lived largely on the products of their farms, and bought and sold very little, records or accounts of any kind were not so essential. Conditions, however, suddenly changed. Machinery was introduced in the factory and on the farm. Farmers began selling most of their products and buying necessities. Land, which could be had almost for nothing, became high priced, the standards of living changed, so that the farmer had to become a mechanic and business man as well as a naturalist and labourer. He had to develop efficiency to organize his farm as a successful business enterprise.

ADVANTAGES OF ACCOUNTING

It is in such organization that well-kept records of the farm transactions, or operations in the past, are an essential factor. By such records the farmer is better able to know which branch of his farm is being operated at a loss, and which has proven most satisfactory. He then knows which branch to eliminate entirely, and which to strengthen in order to meet changed demands.

Such records are also a safe guide to the farmer in the marketing of his products, since by them he knows exactly what it costs him to produce, and, by studying and analyzing such statistics as will show him total production, supply, and demand and market prices, he is in a position to know when to sell, and the price he should ask in order to secure the desired profit. Having gained such knowledge, he also fortifies himself against unscrupulous middlemen, who might otherwise fatten upon his ignorance of the true conditions of the market.

Cost accounting has long been recognized by manufacturing and other industries to be as important as regular financial accounts, but only in comparatively recent years has this subject come prominently into the lime-light in its relation to the farming industry, and is now being more discussed than ever before in the history of agriculture.

IN THE UNITED STATES

Such work has been conducted by universities and agricultural colleges

in the United States for at least fifteen years, and with very satisfactory results; in fact, so much so, that curricula now include "Farm Cost Accounting." Departments of Agriculture are now making such work a part of their regular activities.

Some systems adopted required the services of a field offlcial, whose duty it was to call upon those farmers keeping records, every few days, and even remain on a farm two or three days in succession in order to render assistance. Attempts were made to get farmers to keep certain definite accounts themselves without any assistance, but results were not very satisfactory. It was then that what is known as the diary system was adopted, which allowed the farmer to tell his daily story in his own accustomed manner, and at the end of the year the required records were extracted and compiled by the government office or universty for the use of the farmer in the future. This system at once became popular among farmers.

The British Columbia Department of Agriculture are this year adopting this system in principle.

A number of chosen farmers are co-operating with the Department in that the records are kept by the farmers. The Department will undertake to compile these records at the end of the year and submit a statement to the farmer, along with his diary, which he may have for reference and guidance. A complete inventory of the farm at the beginning and another at the end of the year is required, which serves as the basis. From results, it will be possible to not only see how a particular farm business stands as a whole, but in respect to its various branches as well.

The longer such records are kept the more valuable they will become to the farmer, for not only will they be better kept from year to year, but future calculations can be based upon an increasingly reliable average of the past.

SIMPLICITY OF THE SYSTEM

Every effort should be made to stimulate interest in this work. Since such a simple system is now available every one of our farmers should avail himself of the opportunity to become enlightened regarding his farm business.

The fact that our farmers are to-day doing all that is physically possible towards greater production is heartily appreciated, and in view of this fact it may seem hard to devote time to keeping records. The keeping of the records in accordance with the diary system does not require more than five to eight minutes per day where the entries are made daily. The inventory may be largely made during rainy days, whilst the compiling is done during a slack period. Such work will furnish evening employment for members of the family the year round, and will stimulate greater economy and interest in the farm business.

In consequence of the scarcity of country elevator agents, the North-West Grain Dealers' association, the headquarters of which are at Winnipeg, has appointed a committee of seven to organize a school of instruction for such men, the idea being to offer this education to returned soldiers, whether they are at present employed or not, so as to better equip them for the necessary work of the country.

PART III
Junior Agriculture

DEMONSTRATIONS, COMPETITIONS, AND CLASS-ROOM STUDIES IN RURAL LIFE FOR BOYS AND GIRLS.

Of the activities dealt with in this section of The Agricultural Gazette this month, several are wholly, or in part, fostered and encouraged by grants derived from allotments of funds under The Agricultural Instruction Act. Boys' and girls' competitions (see page 507) get direct support in this way of $2,000 each in Nova Scotia and Quebec. In other provinces aid practically in the same direction is given under different headings (such as grants to school fairs). Clubs for boys and girls (see page 513) are immediately financed from the federal grant to the extent of $2,000 by New Brunswick, $1,000 by British Columbia, and $17,000 by Manitoba. Under the heading of teaching agriculture (see page 509), household science, etc., Ontario has set down from the federal grant $30,000, Saskatchewan $25,000, and British Columbia $20,000. Directly for household, or domestic science, Quebec (see page 516) devotes $10,000 from the federal grant.

FINANCIAL AID FOR PIG CLUBS

ONTARIO

BY G. B. CURRAN, B.S.A., AGRICULTURAL REPRESENTATIVE, LENNOX AND ADDINGTON

THE Merchant's Bank of Canada have set aside $1,500 for the formation of a boys' and girls' pig club in Lennox and Addington county. The plan is as follows:—

The bank supplies each child with a registered Yorkshire sow, 6 to 8 weeks old, and also with a grade pig of the same age. The child signs a note to the bank for the actual cost of these pigs, the loan to be repaid when the grade pig is sold for meat purposes in the fall of 1918. The father must sign an agreement that he will supply the feed for the pigs and give the child every encouragement and guarantee that the child will repay the loan. By this plan every child who enters the pig club will own a pure-bred registered Yorkshire sow next fall. Applications are already pouring in from all parts of the country. The Merchant's Bank of Canada is encouraging this pig club work for the sole purpose of improving the bacon industry in Lennox and Addington county.

ALBERTA

BY J. McCAIG, EDITOR OF PUBLICATIONS

W J. Elliott, Principal of the Olds School of Agriculture, has been given the work of organizing boys' and girls' clubs for the raising of pigs in Alberta this year. Mr. Elliott has a critical knowledge of this class of live stock and is well qualified to manage

co-operative work among young people. He conducted two or three clubs last year as an extension interest from the school and had good results. This year he will promote a number of new clubs and give assistance in the organization and management of a number that have been started by bankers, secretaries of agricultural societies, and other business men. The bankers especially have shown a wholesome interest in developing the care of stock by the young people of the farm, and the Department will make it possible for this interest to realize itself profitably to all concerned.

The plan being followed this year is that the Department organizer will purchase the stock, distribute it, give instruction in the care of it, arrange the fair prize list and supply judges. The banker will choose his club membership, finance the young people, keep track of their operations during the season, and help to finance the prize list. The enterprises may be the raising of two pure-bred young sow pigs, one of which will be sold to pay for the pair, the feeding of a pair of young butcher pigs, or the raising of litters. The Department has issued two simply written bulletins, one on the organization and operation of pig clubs and the other on care and management.

It is expected that the number operating this year will be kept down to about twenty-five in order to make sure of good management and supervision.

BOYS' AND GIRLS' COMPETITIONS

SASKATCHEWAN

BY JOHN G. RAYNER, B.S.A., DIRECTOR, BOYS' AND GIRLS' CLUBS, EXTENSION DEPARTMENT, COLLEGE OF AGRICULTURE

NO definite organization plan, or set of rules and regulations, has been outlined for the direction of the boys' and girls' club work in Saskatchewan for this year. It is felt that the club work is of such importance that it would be wise to take time to look into the movement as carried on in other provinces and profit by the combined experiences of these before deciding upon a definite plan. Accordingly for this year a circular was addressed to all agricultural societies urging these societies and any other interested bodies to arrange for special competitions for the boys and girls, exhibiting the products of the contests in the fall under whatever auspices seemed advisable; and then next year the work will be continued under a definite organization plan.

While all competitions will be encouraged, special emphasis is laid on pig raising, poultry raising, and potato growing contests. These three projects will direct the abundant energies of the boys and girls toward the production of three of the most wholesome foods we have and which can be produced more rapidly and abundantly than most other foods. And in additon to aiding in production, they will give the contestants the advantages of ownership and business training, and will provide them with the stimulation of expressing themselves in terms of achievement and contest.

For the general guidance of those arranging for these contests the following principles were given:

"While the immediate value of these contests would be the assistance to the greater production campaign, it must be kept in mind that the ultimate object of the work is largely educational, and in this connection the following points should be observed:

"A thorough report kept by the boys and girls of the work they do will make them take much more interest in the contests, and make them of more value throughout.

"Community breeding should be encouraged; that is, only one breed of pigs, and of the bacon type, should be used in any community and similarly with poultry. The advantages of this will be obvious.

"The contest material, such as pigs and poultry, should be paid for in some way by the exhibitor. Where material is given free the interest and sense of pride in the work is not so great. Ownership also gives the opportunity for business training. Suitable financial arrangements can be made with most of the banks.

"The giving of such prizes and shields, medals, ribbons, etc., should be encouraged rather than the giving of large cash prizes. And it is a good principle to offer a large number of small prizes making the chances of winning a prize greater, and, therefore, giving more encouragement, than to give only a few prizes of larger denomination.

"The girls should be encouraged to take part in these contests just as much as the boys. Experience with the boys' and girls' club work in many places has demonstrated that the girls take just as much interest in the contests, and show just as much ability as do the boys."

Boys' and girls' club work has been organized and carried on in some districts in Saskatchewan for some time, notably in the Weyburn Inspectorate, under the direction of Inspector A. Kennedy. The rules and regulations under which he carried on the work have been reported in previous issues of THE GAZETTE.

ALBERTA

GENEROUS AWARDS AT SUMMER AND WINTER FAIRS

A special prize list has been published giving details of the grand aggregate of $6,500, that is to be offered for girls' and boys' competitions, at the Calgary Industrial Exhibition, June 28th to July 6th, and at the Alberta Winter Fair, Calgary, December 10th to 13th. The competitions are open to girls and boys, residents of Canada, nine years or over and under seventeen years of age on the last day of the exhibitions. The animals exhibited may be pure-bred or grade, and need not be owned by the exhibitor, but the exhibitor must have fed, cared for, and fitted his or her entry from April 1st for the Industrial Exhibition and from September 1st for the Winter Fair, and must personally handle the entry in the ring or pen. Parents, guardians or employers are required to certify that the applicant is eligible as to age and has complied with the conditions of the competitions. One entry only can be made by an exhibitor in each class.

INDUSTRIAL EXHIBITION PRIZES

At the Industrial Exhibition prizes will be given as follows:

$600 for foals born in 1917, divided *pro rata* according to the number of entries actually shown, in Class 1, for heavy foals, and Class 2, for light foals.

$330 for ponies: 16 classes, 4 prizes in each, except in champion classes, for which champion and reserve ribbons are given.

$900 for calves born in 1917, divided *pro rata* for three classes, viz, beef steers, pure-bred or grade steers, heifers, pure-bred or grade; dairy heifers, pure-bred or grade.

$300 for sheep shearing contest for boys or girls, under seventeen years of age on July 6th, 1918, 50% being given for the time taken and 50% for quality of work.

$300 for pig growing contest, the sow to be of any age with a litter of pigs farrowed this year, 20% being given for number of litter and 80% for quality, uniformity, and condition of litter.

$150 for poultry for flock of five hens and one cock, Wyandottes, Rocks, Orpingtons, Rhode Island Reds, or Leghorns.

$150 for two one-pound prints of butter made in home dairy, wrapped in parchment paper.

$150 for single loaves of home-made bread from Government standard flour.

$109 for cooking tea biscuits, doughnuts, ginger snaps, and layer cake.

$97 for displays of wild flowers and of the orchid and lily families.

AT THE WINTER FAIR

At the Alberta Winter Fair, to be held at Calgary, December 10th to 13th, prizes as follows will be given:

$400 for Alberta Lamb Competition.
$2,275 for baby beef competitions (for steers) and Canadian heifer competitions, $1,500 to be awarded in two open classes and $775 in several special classes, in addition to the $250 challenge shield described in Vol. IV. of THE AGRICULTURAL GAZETTE, page 999.

Special prizes are offered for heifers and steers shown by girls; also by the different breed associations for steers and heifers exhibited by boys and girls.

In the Baby Beef Competition and Canadian Heifer Competition, the $1500 will be divided into 14 prizes, ranging from 17% to 2%. A special prize of $100 is offered if the winning steer is an Aberdeen Augus. His Honour the Lieutenant Governor offers a gold medal for the winner of the Canadian heifer competition. In addition, special prizes are offered for two grade heifer calves sired by a registered Holstein and shown in the dairy calf competition at the industrial exhibition.

GRANTS FOR TEACHING IN AGRICULTURE

ONTARIO

BY J. B. DANDENO, Ph.D., INSPECTOR OF ELEMENTARY AGRICULTURAL CLASSES

IN the schedules of grants to boards and teachers for maintaining classes in agriculture in the public and separate schools of Ontario, the grants for school garden work are not given separately as such, consequently, it might be well to give this fact briefly by itself. Where a board maintains classes in agriculture with a school garden, the grants to the board are $30.00, where a teacher is employed who holds a certificate in agriculture, and $20.00 where the teacher holds a second class certificate, but who has no certificate in agriculture. In order that these grants may be paid, the money must first have been spent, and an annual report made to the Department of Education. In 1917, there were 987 schools with classes in agriculture, and of these about 500 had school gardens. In graded schools, that is schools of cities, towns, and villages, the provisions are limited so as to include only such teachers as hold certificates in agriculture. The grants to boards may reach a maximum of $150.00 for each school, providing a number of classes receive regular instruction. The clause referring to such cases states: $20.00 for each teacher giving instruction in agriculture, not exceeding $150.00 for each school." It should be noted that the amounts specified include such sums as may be used for equipment other than that directly applicable to the school garden.

SASKATCHEWAN

BY A. W. COCKS, B.Sc., DIRECTOR OF SCHOOL AGRICULTURE

EARLY in September the Department of Education informed boards of trustees of secondary schools in the province of Saskatchewan, that a grant of $500 would be paid to any high school or collegiate institute district which made provision for a special course in agriculture as provided for by the regulations governing high schools and collegiate institutes.

All pupils who could satisfy the principal of the school as to their general fitness were to be admitted without further examination.

The payment of the grant was subject to the following conditions:

(*a*) The instruction in agriculture to be given by a teacher possessing the B.S.A. degree of the University of Saskatchewan, or other qualifications satisfactory to the Department of Education;

(*b*) The monthly average attendance in this course to be at least ten;

(*c*) The equipment provided for the course to be satisfactory to the Department of Education;

(*d*) The character and scope of the instruction to be in accordance with the requirements of the Department;

(*e*) The length of the course to be at least five months.

The course of study was outlined as follows:

1. *English.*—Reading and literature, composition, spelling, writing, public speaking.

2. *Mathematics.*—Arithmetic and mensuration, farm accounts and business forms.

3. *History.*—Canadian history and civics.

4. *Agriculture.*—(a) *Field Husbandry*—Plant growth, soils, tillage, crops—field and garden, fertility problems.

(b) *Animal Husbandry*—The place of farm animals in our agriculture; a brief study of types and breeds; care and management; horses; cattle—dairy and beef; sheep; swine; poultry.

Animal products, with special reference to milk and cream, butter, eggs, dressed poultry and wool. Production, care and marketing of animal products.

(c) *Implements and Machines*—A study of the kinds, suitability, care and management of implements and machines of the farm, tillage, seeding, harvesting, threshing.

(d) *Economics*—Farming as a business; agricultural resources; wealth and its production.

An elementary study of the following in relation to farming; insurance,—hail, fire, life, live stock.

Interest, taxes, rents. Banking, cheques, notes, drafts, bonds, deposits, bills of lading.

Trust and Loan Institutions, Co-operative Institutions.

With respect to the work in English, mathematics, and history, it was recommended that the courses of study for public and high schools be used as a basis for selection of material, due regard being paid to the ability and requirement of the class.

EQUIPMENT

The following is a list of the equipment suggested for the special course in agriculture:

1. Simple apparatus and re-agents as used for the teaching of elementary physics, chemistry and biology.
2. Thermometer, barometer, microscope, hand lenses, balance, lactometer, Babcock milk tester.
3. Collections of weeds and weed seeds; samples of grains, samples of fertilizers, specimens of farm and garden crops.
4. Soup plates, saucers, tumblers, flower pots, glass jars, etc.
5. Charts of types of farm animals, poultry, etc.
6. Agricultural library of reference books, reports, bulletins, pamphlets, etc.

The use of other material for demonstration purposes might be obtained by visits to neighbouring farms, grain elevators, creameries and implement houses.

DIFFICULTIES IN THE WAY

It was hoped that the College of Agriculture would be able to recognize this course as equivalent to a

portion of the work required for the associate diploma in agriculture, but owing to the fact that up to the present time no high school has been able to conduct such a special course the recognition of the course by the College of Agriculture has not yet been finally considered.

Several of the high schools and collegiate institutes of the province made earnest attempts to comply with the conditions and obtain a good number of students for the course. Many of the boards advertised the course very widely, and some conducted a personal canvass among the farmers of the neighbourhood. It was found that while many boys were anxious to take advantage of such a course the shortage of labour prevented them from leaving the farm for a period of five months.

A year ago, in the spring of 1917, such a course was conducted for the first time at the Estevan high school. About sixteen boys attended for a portion, or the whole, of the ten weeks of the course. Mr. C. M. Learmonth, B.S.A., was in charge of the special work in agriculture and was assisted by the other members of the staff of the high school. It was difficult for the boys to attend more than four or five weeks of the course and this year the board has found it impossible to comply with the conditions of the Department.

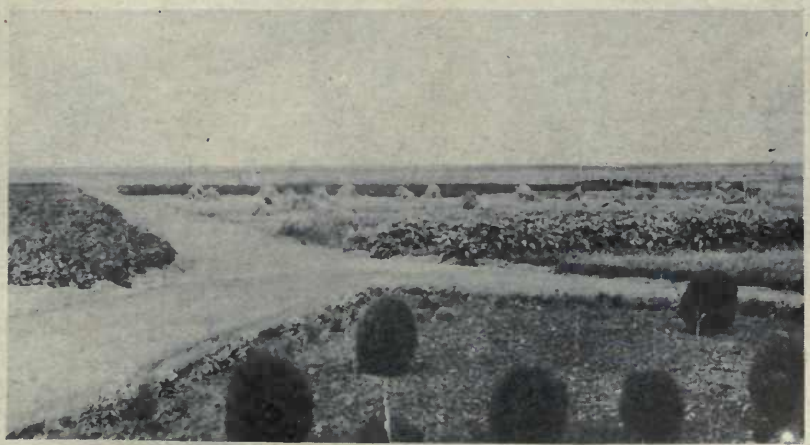
CONSOLIDATED SCHOOLS AND AGRICULTURAL EDUCATION

SASKATCHEWAN

BY A. W. COCKS, B.Sc., DIRECTOR OF SCHOOL AGRICULTURE

OF the 19 consolidated school districts in Saskatchewan only a few employ more than two teachers. The size of a consolidated school district in this province is, on an average, only twice the size of an ordinary district. Hence the consolidated school in its equipment and organization differs very little from the average village or small town school. Instruction in agriculture, therefore, is no better organized in the consolidated schools as a class than in any of the other schools in the province.

The Cupar school district is one

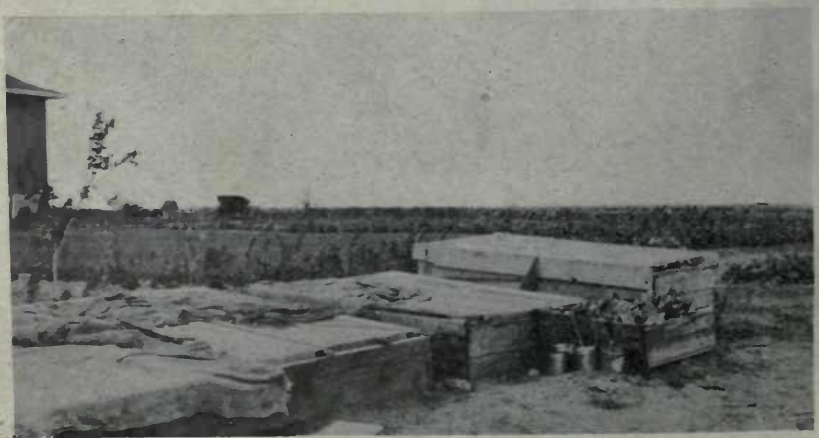


DEMONSTRATION PLOTS, GRIFFIN S.D., SASK.

of the best equipped of the consolidated schools in the province and employs four teachers, one of whom is responsible for high school work, including instruction in agriculture of the high school course of study. The district possesses about five acres of land and steps have been taken to protect this plot by a shelter belt, and to use a certain portion of it for experimental and demonstration plots.

The Creelman school district, although not a consolidated school district, has made preparations for the better teaching of agriculture by obtaining 10 acres of land which is being prepared for use in connection with instruction in agriculture. A report on this district, with photographs, has already appeared in THE AGRICULTURAL GAZETTE. An article describing the work being attempted at Griffin school district was published in the November, 1917, issue. This district is not a consolidated district, although consolidation is being considered. A professional gardener has been employed to care for the four acres belonging to the district, and to give instruction in the practical work of gardening and elementary agriculture.

SCHOOL BUILDING, GRIFFIN, SASK.



COLD FRAMES, GRIFFIN S.D., SASK.

ALBERTA

BY R. A. BARRON, B.A., SUPERVISOR OF CONSOLIDATED SCHOOLS

THE policy of consolidation in Alberta is of comparatively recent date; the legislation permitting the consolidation of rural schools only being introduced in 1913, in which year one consolidated school district was organized. The following year two districts, in 1915 ten districts, and in 1916 sixteen districts were organized. At the present time we have about forty-six consolidated school districts, but it was only at the beginning of the present year that the policy of supervising these schools was inaugurated, and we have had scarcely time to get our bearings.

The distinctive phase of my work just now, and which will occupy my attention for some time, is the consolidating of our consolidations; that is to say, directing the operation, management, and academic work along lines which will make our rural consolidated schools truly rural and align them with practical agricultural life. This work is being undertaken in the midst of a very active campaign for organization in the consolidated districts, and we are now considering negotiations with over one hundred groups of units which desire consolidation.

BY JAS. C. MILLER, D.Sc., PH.D., PROVINCIAL DIRECTOR OF TECHNICAL EDUCATION

WE have now forty-six consolidated school districts, and this number will probably be more than duplicated in the course of the next two years.

The organization towards consolidation of rural schools having developed only during the last two years, it will be a year or two yet before they have matured their plans for special educational programmes.

In the majority of cases they are providing ample grounds for playground purposes and the teaching of agriculture, gardening, and tree planting. In many cases, also, they are providing a residence for the Principal. The buildings are in most cases planned to make possible the teaching of elementary handicraft, household arts, and elementary science as related to farm activities.

NEW BRUNSWICK

BOYS' AND GIRLS' POULTRY CLUBS

BY A. C. McCULLOCH, POULTRY SUPERINTENDENT

IN taking up poultry work in New Brunswick the line which seems to require the most immediate attention is the improvement of the general class of stock kept on the average farm, and a considerable increase in the numbers maintained. Practically every farmer keeps poultry, but a small percentage of them have pure-bred stock and thirty-five or forty mature birds is considered a large flock.

Plans have been completed for the operation of a Boys' and Girls' Poultry club in each county, and several have already been organized. These clubs will serve as community breeding centres from which eggs and stock can be obtained for the formation of other clubs in neigh-

bouring settlements and in other parts of the county. A pedigree of each flock will be kept.

Each club member is supplied with fifty hatching eggs from high laying flocks or strains of Barred Plymouth Rocks. No charge is made for these at time of delivery, but in return the Poultry Division has its choice of four birds, mostly pullets, in the fall of the year, or fifty eggs the following spring. An important feature of the work is that for two years the breeding of pullets from eggs supplied, and their progeny, is subject to approval of the Poultry Division. This will prevent possible mating with inferior stock, and in two years' time each club member should have a good-sized flock of pure-bred, high-laying Barred Plymouth Rocks.

AIMS, RULES AND REGULATIONS

The following are the aims of the clubs, rules and regulations governing them, and a blank contract which the members sign when they receive the eggs:—

The aims of this club shall be:—

1. To increase poultry and egg production in New Brunswick.
2. To improve the quality of poultry and eggs produced in the province.
3. To study type in utility chickens.
4. To learn better methods for the production, care, and handling of poultry of all ages and in all seasons.
5. To hold a boys' and girls' poultry club fair once a year.
6. To study the marketing of poultry and eggs—when to market and how to prepare for market to secure the best returns.
7. To study all available literature on poultry husbandry.
8. To develop this district into a community breeding centre.

The officers of this club shall consist of:—

1. A president, vice-president, secretary-treasurer, and an honorary president and honorary vice-president.
2. Officers shall be elected for a period of one year and shall continue to hold office until new officers have been elected.

Rules and regulations:—

1. Club members must agree to the breed selected by the Poultry Division of the Department of Agriculture.
2. A club must have at least fifteen (15) members.
3. Boys and girls between the ages of twelve (12) and eighteen (18) years may become members of the boys' and girls' poultry club.
4. No boy or girl may join a poultry club without the consent of parent or guardian.
5. Boys or girls cannot join a poultry club unless they have the proper facilities to care for the poultry at all seasons of the year, or agree to provide the same according to instructions rom the Poultry Division Members must have proper feed available.
6. Members of the poultry club must mark their poultry of all ages in such a way as will distinguish it from other poultry raised on the same place. The members' club chickens should be raised in a separate place to other chickens if possible.
7. The club must hold an annual poultry fair in the fall of each year, the date selected subject to the approval of the Poultry Division. The poultry club fair sha'l be held in conjunction with the pig club fair in the same locality, and if possible on the same date as the local fair of the district.
8. All members of the club must show all their chickens at the club fair.
9. An annual membership fee of twenty-five cents (25c) shall be paid to the secretary-treasurer of the club by each member at the time of joining. This money shall be devoted to carrying on the business of the club.
10. The annual meetings shall be held some time in January of each year, when the officers for the ensuing year will be elected by ballot. Club meetings shall be held regularly every two months in the months of January, March, May, July, September, and November. Dates of all meetings are subject to approval of the Poultry Division. This will permit the more frequent attendance of speakers arranged by the Poultry Division.
11. Special meetings may be called by the president at any time to transact important business.
12. The secretary-treasurer shall notify all members when either a special or a regular meeting is to be called.
13. Twice a year or oftener the Poultry Division will arrange for a representative to speak at the club meetings, and to discuss important problems with the club.
14. The Poultry Division will supply the president of the club with papers on poultry husbandry which shall be read at the regular meetings of the club by members appointed by the president. He shall also appoint a member to lead in the discussion after the reading of the paper.
15. I hereby agree to abide by the rules of the above club, and do everything in my power to promote its interests.

THE AGREEMENT

This contract made and entered into by and between..... party of the first part and..... .....party of the second part, both of the county of..... and province of New Brunswick,

Witnesseth:—That the party of the second part has this day secured from the party of the first part.....Barred Plymouth Rock eggs, which he or she agrees to take possession of and incubate according to instructions given by party of the first part.

That party of the second part further agrees:—

To raise, feed, house, breed, and market the chickens hatched from the eggs supplied, and their progeny, for two years, according to instructions from party of the first part.

To become, at the same time, a member of.....Boys' and Girls' Poultry Club, to bind himself or herself to abide by the rules and regulations of the club for two years to the best of his or her ability, to exhibit when called upon, all the chickens raised from the eggs supplied by the party of the first part, at the club poultry show.

To return to the Poultry Division a complete record each year for two years of all chickens hatched from eggs supplied, and their progeny, according to the provisions in record blanks furnished.

To return to party of the first part, in the fall of the first year, one strong healthy chicken for each.....eggs supplied (.....chickens), or in the spring of the second year the same number of eggs of as good quality as were supplies to him the first year, whichever party of the first part desires, and to sell to party of the first part, at a rate not exceeding..... cents each, as many other eggs laid during the hatching seasons of 1919 and 1920 by birds hatched from eggs supplied and their progeny, as party of the first part desires.

If sufficient chickens to fulfil this contract are not raised, party of the first part sustains the loss.

If for any reason either party shall fail to fulfil this contract, or any part thereof, he shall forfeit all right to the eggs, chickens hatched from them, or their progeny.

In testimony whereof the parties have hereunto set their hands this the..... day of.....191...

.....
Party of the First Part.

.....
Party of the Second Part

I hereby consent that party of the second part may enter into the above contract.

.....
Parent or Guardian.

ORGANIZING THE CHILDREN, THE TEACHERS AND THE TRUSTEES

BY R. P. STEEVES, B.A., DIRECTOR, ELEMENTARY AGRICULTURAL EDUCATION

I am endeavouring to organize the children in the schools under the teachers and school trustees, with other interested citizens, for an effort to secure greater production this year. Our plan is to form an association in each centre, using the schools of the surrounding country as parts in the general plan. This association agrees upon a plan of a school fair, and immediately sets to work to formulate a prize list, which is published in every school and department. This sets forth to the children what work is to be in competition next fall, and serves as an objective in stimulating their efforts. This same association has a committee of management, which arranges for local supervision during the first five weeks of the summer vacation, so that children having plots will have assistance and encouragement during the growing period of their crop.

Each department, or school, elects a representative from among the children, who becomes a member of the association and assists in working out the plans. The idea is to give to each school its measure of responsibility and to link up school work with home effort. We seek to develop a public opinion in each centre and vicinity that will give the work a standing among the people and in the eyes of the pupils.

We hope by such efforts to have a

large number of fairs next fall that will include a great many more schools than in former years. Our idea is, if possible, for the children of New Brunswick to produce this year $150,000 worth of food, and yet not interfere with the attendance at school of those who enter into this work.

MANITOBA

GOPHER CAMPAIGN, 1918

TO increase production we must prevent waste. The gopher is the enemy of production. Let us keep submarines out of the wheat fields. Children can get the gopher and help production. Last year the school children of the province got 100,000 gopher tails in four days. This year, the Department of Agriculture, realizing the value of children in getting rid of the gopher, gave every possible encouragement, and extended the bonus for gopher tails from April 1st to May 10th. This enabled schools to obtain playground outfits, gramophone, etc., for if each child in a school of fifty had got twenty gopher tails a week, it would have meant $100 to that school.

The motto was: Get Together and Help Your School.

Gophers destroy millions of bushels of wheat each year. Most farmers will agree that gophers can and will destroy a bushel of grain each. The scarcity of grain and the high prices make this a more serious matter than ever before. With wheat at $2.21; oats at $1.00; barley at $2.00; and rye at $3.00 per bushel, we cannot afford to have gophers running away with it. There are, or were, not less than 10,000,000 gophers in the province. If half of them were working in the grain fields, the loss would be 5,000,000 bushels, which means $10,000,000 or more.

Such interest was taken in the gopher contests this year that Professor V. W. Jackson of the Biology Department of the Manitoba Agricultural College, put on a school competition, which, getting half-a-million gophers in April, was as good as two million gophers in June after each pair had raised a family of eight.

BRITISH COLUMBIA

DOMESTIC SCIENCE INSTRUCTION

ACCORDING to the report of the organizer of Domestic Science for the province of British Columbia, there are forty-five domestic science centres in the province. The subjects embodied in the course are well taught and great advancement in sewing and knitting has been made. Considerable attention has also been paid to economical cookery, as well as to canning and preserving of fruit, vegetables, and fish. The necessity for such knowledge has been amply demonstrated by the war. Teachers adopt many different methods of attaching the lessons in domestic-science centres, but they all practice those which are more or less scientific in character and discard those of a purely empirical nature. This instruction is already given to great advantage in the normal school at Victoria.

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications, and Notes

THE QUESTION OF A NATIONAL FLOWER

CONSIDERED BY THE STUDENTS OF THE FREDERICTON, N.B., NORMAL SCHOOL

BY R. P. GRAHAM, INSTRUCTOR IN NATURE STUDY

THE reasons for establishing a national flower as outlined in the January number of THE AGRICULTURAL GAZETTE were explained to the classes of the Normal school, Fredericton, N.B., and the flowers suggested by the Ottawa Horticultural Society were discussed, in so far as their merits were then known. From this discussion, the following points arose and were tabulated for general consideration:

1. Is it a native flower?
2. Is it found all over Canada?
3. Does it express Canadian characteristics, sentiments or ideals?
4. Is it adapted for cultivation?
5. Will it grow under different soil and exposure conditions?
6. Is it adapted for use in educational work, e.g. drawing, painting, composition, literature, song?

Two weeks were given for general discussion and consideration and then the students were asked to vote on the primary question. "Is a National Flower Desirable?"

As our students represented all the counties of New Brunswick it was thought desirable to ask each student to suggest one flower that would be fairly representative of his or her own district, the list thus obtained to form the basis of further discussion before the classes and investigational work as to the merits of the different flowers by the students. The ballot used was of the following form:

County.....

I am (or am not) in favour of a National Flower for Canada.

and

I suggest .....

because.....

.....

Name.....

These ballots were fastened together in booklet form according to the counties represented, and the answers tabulated. The preliminary list of flowers thus obtained will form a basis for lessons and assigned subjects of study in our course, so that the respective merits, and lack of merits, of different flowers will have been brought before the student teachers before they go out to take charge of schools. Information has been obtained from Mr. F. E. Buck on the merits of the six flowers suggested by the Ottawa Horticultural Society, and these are under discussion by the classes at present.

The total votes cast in favor of a national flower were 213 with none against. The leading flowers were: violet with 111 votes, buttercup with 32, columbine with 16, and mayflower with 12.

REPORT OF THE COMMITTEE OF THE DEPARTMENT OF BOTANY, UNIVERSITY OF TORONTO

ON March 15th and 22nd, 1918, special meetings were held in the botany and forestry building, University of Toronto, for the purpose of discussing the question of the selection of a national flower for Canada. Professor R. B. Thomson, of the Department of Botany, University of Toronto, acted as chairman.

The meeting was well attended by representatives from the various educational, artistic, and practical institutions of the city, in response to invitations issued to the

various departments of the University of Toronto, McMaster University, the University Schools, the Faculty of Education, city collegiates, reference library, Ontario College of Art, artists, nature editors, the city Parks Department, the Ontario Horticultural Association, and the Toronto Horticultural Society.

THE MAPLE AS A NATIONAL EMBLEM

The first point brought before the committee was the question of the extension of the authorized use of the maple as a national emblem.

It was moved by Professor Smith, of McMaster University, seconded by Professor Keys, of Toronto University, and carried unanimously:

"that the maple be officially recognized by the Government as our national emblem, and come more definitely into our national devices."

The second point raised was as to whether the selection of a national flower would detract from the true significance of the maple. There was considerable diversity of opinion on this point, but the general feeling of the meeting was that the first motion would sufficiently protect the standing of the maple.

FOR THE SOLDIERS' GRAVES

The advisability of selecting a national flower, or of submitting a list of Canadian plants to be grown on the graves of our soldiers in Flanders, was next discussed.

A motion was put by Mr. Owen P. Staples, seconded by Dr. Faull, of the University of Toronto, and carried unanimously,

"that we submit to the Ottawa authorities a list of Canadian plants suitable for planting on the graves of our heroes in France"

The flowers selected were as follows:—Aquilegia, cornus canadensis, hepatica, trillium.

Dr. Faull moved, seconded by Dr. Coleman, University of Toronto, and the motion carried unanimously,

"that if a national flower be selected it be chosen from this list, but that the final decision be postponed until its horticultural possibilities be determined by experience in cultivation."

A PROVINCIAL FLOWER

The next three motions, all of which were carried unanimously, were:

"that we approve of the principle of a provincial flower."

"that, if it comes to the selection of a provincial flower, it be selected out of this list."

"that we recommend each of the other provinces be requested to submit a list similar to this."'

POPULARIZING THE MATTER

The next point under discussion was the desirability of gaining the ear of the teachers and school children of the country, and, ultimately, through them, the enlistment of the interest of the people. As an initial step in this direction Mr. Ivey of Harbord Collegiate, Dr. Cosens of Parkdale Collegiate, and Professor Thomson, University of Toronto, were delegated to represent the committee before the Teachers' Convention in Toronto.

POINTS OF FIRST IMPORTANCE

The following points in connection with the plants submitted were deemed of prime importance in the choice of a national or provincial flower:

1. The plant should breathe with the spirit of Canada, or of the province it is chosen to represent.
2. It should not be used by any other country or state.
3. It should be confined to a definite species, the best of its kind the world over.
4. It should have no horticultural rivals.
5. It should have its widest distribution in the area which it is selected to represent.
6. It should admit of easy propagation under various conditions of soil and climate and yet not become a noxious weed.

THE OTTAWA LIST

According to these criteria the following points concerning the plants submitted by the central committee at Ottawa should be noted:

I. *Aquilegia.*—(1) It is more representative of the United States and of Europe than of Canada.

(a) Rhydberg's new Flora describes 19 species in the Western States alone, six of which occur in Western Canada, but are of wider distribution in the States.

(b) Bailey gives ten European (mainly Russian forms).

(c) The only form found in Eastern Canada is the species Aquilegia canadensis. This is just as typical of the States and is even more widely distributed there (Britton & Brown: "Nova Scotia and N.W. Territories south to Florida and Texas").

(2) Aquilegia is already before the Senate as a possible national flower for the United States. Its claims have already been presented in the press.

(3) One species, coerulea, has already been chosen by Colorado, and our adoption of Aquilegia would put our Dominion on a par with a single state.

(4) Canadian forms do not show either the variety of colour, or length of spur so conspicuous in American and European forms.

(5). However, Aquilegia is easily propagated and grows readily under ordinary conditions. It is also very well known.

II. *Aster.*—No one species is characteristic of Canada nor yet of any province. It might readily run wild and become a noxious weed wherever introduced.

III.—*Iris.*—The Iris or Fleur-de-lis is the national flower of France, and even appears on the coat of arms of Quebec. It is thus preempted.

IV.—*Trillium (grandiflorum).*—Occurs in greatest abundance in Ontario and Western Quebec. Would be a natural choice for the provincial flower for Ontario. However, it dies down in summer if planted in the sun and the flowers have poor lasting qualities.

V.—*Larkspur.*—Not a distinctive flower of Canada.

VI.—*Pæony.*—Already chosen as a national flower by China.

THE TORONTO LIST

I. *Aquilegia.*—Given in the Ottawa list.

II.—*Cornus canadensis.*—Bunchberry or Dwarf Cornel.—Characteristic of Canadian woods across the breadth of the Dominion (Britton & Brown: "Newfoundland to Alaska and south). It is clean, clear-cut in appearance and readily adaptable to design. The flowering period is good and the fruit has a beauty of its own. Its inflorescence could be made symbolic of the confederation of provinces into the Dominion. The plant admits of easy propagation and is already established in cultivation on rockeries in Great Britain. A good choice for a national flower, but unfortunately at present not as widely known to the people as is desirable.

III. *Hepatica.*—Wide in distribution but characteristically eastern, not west beyond Manitoba. Known also in Europe and Asia and in the Himalayas (*species falconeri*). No definite floral colour, purely a spring form with ephemeral flowers and leaves becoming distorted in summer. Easily propagated, however, and adaptable to design. Good for Ontario.

IV. *Trillium.*—Given in the Ottawa list.

THE TIGER LILY SUGGESTED

BY RICHARD H. McDONALD, WINNIPEG

I should recommend the committee in charge of the selection of a national flower for Canada to investigate the claims of the Tiger or Orange Red Lily (*Lilium Philadelphicum*). It is I believe a wild flower not met with in Europe at all. It also seems to be peculiar to this northern country. It is very general in some parts of Ontario, if not all, and one of the most common of the western flowers indigenous to the prairie. It is not a wood flower as is supposed, but flourishes best on sandy soil, in its wild state. There is no more splendid sight than miles of this flower in the months of July and August with its deep reddish orange flower standing up so bravely instead of being pendulous like the Canadian lily. Masses of this bloom on our soldiers' graves would certainly be most effective. It is very hardy and also has the advantage of not making big roots. It seems to me a characteristically Canadian flower which would improve by cultivation.

The outcome of the war is so dependent upon the food supply that it is not too much to say that upon the crop of 1918 the result very largely depends. This is not merely a farmer's problem, for he cannot increase production without labour. It is not wholly a problem for city or townsmen, for while they may do their best to assist, the farmer holds the key to the situation. It is the biggest job Ontario has ever been called upon to undertake, and the solution of the problem must rest equally in the hands of the farmer and townsman. Unless our men, women and children are willing to work together, forgetting largely the distinction of rural and urban, we shall fail to do our best. —*Circular to County Councils of Ontario.*

ASSOCIATIONS AND SOCIETIES

CANADIAN NATIONAL LIVE STOCK COUNCIL

A committee consisting of regularly appointed delegates of the Live Stock Record Associations in Canada met in Toronto on April 6th to deal with the matter of forming a Dominion-wide live stock council. This matter was fully discussed at the annual meetings of the Record Associations held during the winter, when the delegates were appointed. This Council, representing all the live stock associations and societies in Canada, with a combined membership of upwards of 25,000, will have authority to deal with railway companies, governments, and other organizations in matters pertaining to the commercial interests of the live stock industry valued at a billion dollars. The following resolutions were adopted:

1. That a National Live Stock Council be formed.
2. That it be named the Canada National Live Stock Council.
3. That it shall consist of eleven members composed of five representatives of the Western Canada Live Stock Union, three of the Eastern Canada Live Stock Union, and two of the Canadian National Live Stock Record Committee, with the Chairman of the Record Board as Chairman of the Council.

The Live Stock Record Committee was authorized to notify the secretaries of the Eastern Canada and Western Canada Live Stock Unions of the number of representatives to which they are entitled, and to ask them to appoint their members as early as practicable. In response to this notification the following were nominated as members of the first council:

Representing the Western Live Stock Union—F. H. Auld, Regina, Sask.; Andrew Graham, Pomeroy, Man.; Dr. J. G. Rutherford, Calgary, Alta.; J. L. Walter, Clive, Alta., and Dr. S. F. Tolmie, M.P., Victoria, B.C.

Representing the Eastern Live Stock Union—J. D. Brien, Ridgetown, Ont.; W. A. Dryden, Brooklyn, Ont., and Geo. Pepper, Toronto.

Representing the National Live Stock Record Committee—W. F. Stephen, Huntingdon, Que., and Robert Miller, Stouffville, Ont.

Chairman—Wm. Smith, M.P., Columbus, Ont.

The Record Committee was authorized to draft a provisional constitution and to carry on such other work as is necessary in completing the organization of the Council.

RECORD COMMITTEE OF THE NATIONAL RECORD BOARD

At the annual meeting of the Canadian National Live Stock Record Board, held in Toronto, on April 5th, 1918, the record committee of 1917 was re-elected as follows: Chairman, Wm. Smith, M.P., Columbus, Ont.; representing heavy horses, Peter White, K.C., Pembroke; light horses, Robert Ness, Howick, Que.; dairy cattle, W. F. Stephen, Huntingdon, Que.; beef cattle, Robert Miller, Stouffville; sheep, J. M. Gardhouse, Weston, Ont.; swine, J. E. Brethour, Burford, Ont.; secretary-treasurer, John W. Brant, Ottawa.

CANADIAN FLAX GROWERS' ASSOCIATION

The annual meeting of the Canadian Flax Growers' Association was held in London, Ont., on March 8. There was a large attendance; a number of representatives of the flax industry being present from the United States. A deputation was appointed to wait on the Ontario and Dominion Governments to urge the importance of the Canadian flax industry, especially in view of the fact that a large quantity of flax fibre is required for the manufacture of aeroplane wings. It was pointed out that the fibre and seed grown in Ontario last year for export amounted in value to $1,954,000. A resolution was passed requesting that expert labour engaged in the flax industry be exempt from military service. The officers elected were: President, Amos Tipling, Wingham, Ont.; first vice-president, A. L. McCready, St. Mary's, Ont; second vice-president, Samuel Barbour, Toronto; secretary, R. L. Defries, Toronto.

CANADIAN GOOD ROADS CONGRESS

The fifth Canadian Good Roads Congress will be held in Hamilton on May 7th to 10th. The programme will consist of addresses and discussions upon current problems dealing with road construction and improvement. An exhibition of road materials and machinery will be a feature of the congress. The secretary of the congress is Geo. A. McNamee, Montreal, Que.

AN ONTARIO DAIRY COUNCIL

A conference of representatives of dairying organizations in Ontario was held at the Ontario Agricultural College on April 4th and 5th. The conference was called by H. H. Dean, Professor of Dairy Husbandry. In opening the conference, Professor Dean explained that it was called for three purposes, to discuss—

1. The dairying situation in the province.

2. The advisability of forming a provincial-wide organization covering all phases of dairying.

3. To bring the dairymen of the province into closer touch with the Agricultural College.

There were about eighty delegates present, representing the milk producers and dealers and the manufacturers of cheese, butter, ice cream, powdered milk, condensed milk, etc. At the first session, a committee representing all the various interests was appointed to consider the advisability of forming a provincial-wide dairy association. On the following day the committee recommended:

"That a Provincial Dairy Committee be formed, composed of two members from each existing dairy association, or any dairy association which may be formed, and departmental representatives to be named by the Minister of Agriculture, for the purpose of making definite recommendations for creating a permanent provincial dairy council; and that the Minister of Agriculture of Ontario be requested to take action in accordance with this resolution at the earliest possible date."

PRINCE EDWARD ISLAND STOCK BREEDERS' ASSOCIATION

A re-organization meeting of the Stock Breeders' Association of Prince Edward Island was held at Charlottetown on April 2nd. A resolution was passed asking the Government to continue its usual grants to the provincial and county exhibitions, as it was felt that the withdrawal of such grants would have a serious effect on the Island's live stock industry. The officers elected were: President, W. W. Crosby; vice-president, W. M. Lee; secretary, W. J. Gibson, Charlottetown.

NEW BRUNSWICK FRUIT GROWERS' ASSOCIATION

The New Brunswick Fruit Growers' Association met in annual meeting at Fredericton on March 13, and elected these officers: Hon president, T. H. Estabrooks, St. John; president S. B. Hatheway, Kingsclear; vice-president, Frank Fawcett, Sackville; secretary-treasurer, A. G. Turney, Fredericton.

NEW BRUNSWICK FARMERS' AND DAIRYMEN'S ASSOCIATION

The officers elected at the annual meeting of the New Brunswick Farmers' and Dairymen's Association were: President, C. M. Anderson, Sackville; vice-president, J. A. Bernier, Edmundston; recording secretary, C. M. Shaw, Hartland; corresponding secretary, A. R. Wetmore, Clifton; treasurer, H. H. Smith, Hoyt.

Among the resolutions passed were the following: Regarding bulls running at large, requesting the provincial Government to introduce a law prohibiting this running at large on the public highways in any part of the province; recommending that a larger measure of instruction be given in the public schools of the province relative to local conditions and activities in the country regarding agricultural pursuits; requesting that the Government guarantee that the price received for pork by the farmers, for the next two years, shall not be less than 20c per lb.; petitioning that the restriction against oleomargarine be reimposed immediately at the close of the war; opposing the daylight saving law; calling upon the Food Controller to insist upon millers abandoning the practice of forcing flour upon the people by refusing to sell feed without a quantity of flour in each car; approving a resolution from the parish of Moncton recommending an amendment to the Act for the Protection of Sheep, so that all dogs not included under the present Act be placed in the existing taxation clause, and be securely confined or tied from sundown to sunrise; approving of the appointment of Mr. W. R. Reek as Secretary for Agriculture, and pledging the farmers of New Brunswick to co-operate with the Department of Agriculture in the policy of encouraging increased production.

QUEBEC DAIRYMEN'S ASSOCIATION

At the annual convention of the Dairymen's Association of the province of Quebec, the following resolutions suggesting amendments to the Dairy Products Act were passed, and the Quebec Department of Agriculture was requested to take these resolutions into serious consideration, and to have such amendments adopted as circumstances justified:—

1. (a) That a regulation be adopted compelling all cheese and butter factories in the province to brand their products before shipping with a brand supplied by the Department of Agriculture.

(b) That such brand include the number of the division and the number of the factory.

(c) That makers refusing to observe this regulation have their license or diploma cancelled, as no control can be kept by the inspectors over the products of such makers.

2. That milk be paid for at the factories according to the percentage of fat, as is already done as regards cream.

3. That the grading of butter and cheese remain compulsory and general after the war, as it is now.

4. That makers be legally authorized to charge a higher and uniform rate for the making of cheese and butter, in order to prevent ruinous competition, and to enable them to have good curing rooms and to make such other improvements as are necessary to improve the quality of dairy products.

5. That pasteurizing cream for the making of butter be made compulsory.

Mr. Gustave Boyer, M.P., was re-elected president, and Mr. O. E. Dalaire, St. Hyacinthe, secretary.

QUEBEC SOCIETY FOR THE PROTECTION OF PLANTS

The annual meeting of the Quebec Society for the Protection of Plants was held at Macdonald College on March 21st. A committee was appointed to draw up a spray calendar to be distributed among the farmers of the province. Professor Lochhead was re-elected president; Rev. Father Leopold of Oka, vice-president; and Professor J. M. Swaine, Macdonald College, secretary.

CHAMPLAIN COUNTY AGRICULTURAL ASSOCIATION

At a meeting of the Champlain Agricultural Association, recently held at St. Stanislas, the following officers were elected for the year 1918: President, Dr. B. Bordeleau, M.P.P., Ste. Thècle; vice-president, Sadoth Tessier, Ste. Anne; agriculturist, J. A. Fortin, St. Stanislas; secretary-treasurer, J. T. Jacob, St. Stanislas.

The following programme was adopted and submitted to the Provincial Council of Agriculture for approval:

1. In order to meet the needs of the members of the different parishes of the county, a second light draft stallion will be purchased, of a breed to be selected at another meeting of the Board.

2. The following competitions will be arranged:

(a) A standing crop competition for fields of at least three acres.

(b) A clover seed growing competition out of the second cutting of clover.

(c) A good farm competition, in parishes where there are members of the association, as required by article 93 of the regulations of the Council of Agriculture of the province.

3. An exhibition of agricultural and industrial products, live stock, domestic products and works of art, will be held in the fall at a date to be selected later by the board of directors.

A seed grain fair was held recently by the association. Although the crops were poor last season, there were about 50 exhibitors and 150 exhibits of grain and seed grain, consisting of wheat, oats, peas, beans, buckwheat, flax, clover, potatoes, corn, etc.

HOWICK-HUNTINGDON AYRSHIRE CLUB

At the annual meeting of the Howick-Huntingdon Ayrshire Club held at Ormstown, Que., it was decided to have a consignment sale of Ayrshires in the spring of 1919, and to hold a free gift sale of live stock at an early date, the proceeds to be divided between the Red Cross and Patriotic funds. The officers, all of whom were re-elected, are as follows: President, Jas. Bryson, Brysonville, Que.; vice-president, R. R. Ness, Howick, Que., secretary-treasurer, Gilbert McMillan, Huntingdon, Que.

BELGIAN DRAFT HORSE BREEDERS' ASSOCIATION

At a meeting of the Belgian Draft Horse Breeders' Association, held at the Parliament Buildings, Quebec, on March 21, resolutions were passed approving the formation of a central association at Ottawa for advancement of the interests of Canadian Breeders' associations, and requesting the railroad companies to establish special rates for the transportation of pure-bred horses.

A proposition to create a Canadian strain of Belgian horses was also discussed and approved. It was decided to ask the Government to make registration compulsory for all Belgian horses.

The following officers were elected: President, M. Paul Tourigny; vice-president, De J. D. Duchesne; secretary-treasurer, M. J. A. Paquet, M.P.P., Quebec.

Mr. H. A. Martinette, was re-elected inspector for the association.

THE OTTAWA AGRICULTURAL CLUB

The annual dinner of the Ottawa Valley Agricultural Alumni Association was held in Ottawa on March 15th. The guest of the association was the Honourable T. A. Crerar, Minister of Agriculture, who gave an address. This organization began in 1911, and was, for a number of years, confined to ex-students of the Ontario Agricultural College located in the vicinity of Ottawa. Later it was broadened to take in ex-students of Macdonald College. At the meeting just held the membership was extended by the following resolution, which was passed unanimously: ' That the name of the organization 'Ottawa Agricultural Alumni Association' be changed to 'Ottawa Agricultural Club', and that it include as eligible for membership all those in the vicinity of Ottawa whose chief business is the advancement of Canadian agriculture". The officers, nominated to represent the chief branches of the Federal Department of Agriculture and local kindred organizations, were as follows: Hon. President, Dr. Jas. Mills, ex-president of the Ontario Agricultural College; president, W. J. Black, Commissioner under THE AGRICULTURAL INSTRUCTION ACT; first vice-president, E. D. Eddy, Chief Seed Inspector; 2nd vice-president, Geo. H. Barr, Chief of the Dairy Division; secretary-treasurer, P. E. Light, Markets Intelligence Division, Live Stock Branch; ex-officio, T. G. Raynor, Seed Inspector, Seed Branch; committee, Geo. Rothwell, Assistant Animal Husbandman, Experimental Farms; F. C. Nunnick, Agriculturist, Commission of Conservation; Dr. C. G. Hewitt, Dominion Entomologist; J. B. Spencer, Editor & Chief, Publications Branch; C. S. McGillivray, Inspector of Canneries, Health of Animals Branch; F. H. Grindley, Assistant Fruit Commissioner; W. D. Jackson, Agricultural Representative, Ontario Department of Agriculture.

ALBERTA PROVINCIAL CATTLE BREEDERS' ASSOCIATION

The annual meeting of the Alberta Provincial Cattle Breeders' Association was held at Edmonton on March 7th, when the following officers were elected: Honorary President, W. F. Stevens, Live Stock Commissioner; president, Angus McDonell, St. Albert; vice-president, W. H. Wallace, Viking; secretary, W. J. Stark, Edmonton.

ALBERTA CATTLE BREEDERS' ANNUAL SALE OF BULLS

The 18th annual auction sale of registered bulls under the auspices of the Alberta Cattle Breeders' Association was held at Calgary, on March 26th to 29th. A total of 856 animals was entered for the sale and 809 offered, of which 792 were sold. The number of contributors was 247, and the number of carloads shipped to the sale 131. Bulls were shipped from 85 stations, and 44 head were lead in from the Calgary district. A table of the receipts this year and last year follows:

	1918			1917		
	No.	Value	Average	No.	Value	Average
Aberdeen-Angus	70	20,795	$297.07	38	$11,540	$303.68
Galloways	3	525	175.00	6	1,105	184.16
Herefords	235	80,715	343.46	157	57,520	366.37
Red Polled	2	425	212.50	1	245	245.00
Shorthorns	387	90,665	234.28	267	66,411	248.73
	697	193,125	277.08	469	136,821	

The above receipts are for bulls one year old and over.

A statement regarding bulls under one year sold at the 1918 sale follows. No bulls under one year old were sold at any sales held previously:

	No.	Value.	Average.
Aberdeen-Angus.....	9	1,685	187.22
Herefords.....	21	6,680	318.10
Shorthorns.....	65	10,885	167.47
Total.....	95	19,250	202.63

Grand total—792 sold for $212,375, average $268.28.

The highest prices reached for each breed were: Aberdeen-Angus $1,250; Herefords $3,200; Shorthorns $1.075. In every case, the highest priced animal was the champion prize winner of the breed.

The bulls were sold to 519 purchasers, and 111 cars went to Alberta points, 4 to British Columbia, 8 to Saskatchewan, and one to Montana. The number of bulls sold to go out of the province was 74. The sellers purchased 63 bulls. The bulls were generally in better condition and of better quality than at previous sales. The Association has now sold 4,782 bulls for $801,875.00, and will hold its next sale of approximately 150 bulls at Lacombe on May 29th. For succeeding sales the secretary and managing director, taking his cue largely from suggestions made at the annual meeting of the Cattle Breeders' Association, recommends that bulls under one year shall not in future be accepted for sale; that judging shall be done in the forenoon, and the sale started at noon the same day, that bulls culled from the sale shall not be paraded in the ring, and that inferior animals be kept at home; that full pedigrees shall be given in the catalogue, and that prize winners shall be sold first and the other entries according to age.

THE ENCOURAGEMENT OF THE PROTECTION OF BIRDS

BY C. G. WATSON, SEC., McILWRAITH ORNITHOLOGICAL CLUB, LONDON, ONT.

While no bird-house competitions have been held in London, Ont., the Ornithological Club has encouraged the placing of nesting boxes about private grounds, and a great many such boxes are to be seen throughout the city. The city some years ago placed a number in Victoria Park, and these, with Springbank, a large national park of about 240 acres, and the Forest City's wealth of trees, offer very favourable nesting opportunities to our feathered friends.

We have been successful in having the Parks Commission erect signs throughout Springbank Park offering a reward of $50.00 for the conviction of anyone shooting or molesting wild life in any way there.

We also secured permission to erect feeding boxes for the birds at Springbank during the past winter, and had eight of these in operation quite successfully, purple finches, goldfinches, etc., spending the winter in unusually large numbers.

Our president, as one of the science teachers at the Collegiate Institute, has done a good deal in the way of encouraging field work amongst the pupils, building of wren boxes, etc.

PROVINCE OF QUEBEC SOCIETY FOR THE PROTECTION OF BIRDS

BY MRS. W. E. L. DYER, SECRETARY, MONTREAL

During the winter we acquired permission to put up bird houses on Mount Royal Park—the various city parks—the crown of Westmount Mountains (owned by McGill University), and the two cemeteries, Protestant and Catholic.

The authorities of these corporations were pleased to meet our wishes in regard to these natural bird sanctuaries, provided the bird-houses would be approved by them in general outlines, and put up under supervision.

The various schools in the city are being interested in the making of these boxes and prizes are being offered for the best results—the boxes are then, to be donated to the society for use in the parks.

The boxes made in Westmount schools will be placed on Westmount Mountains, as it is desired that each individual boy should have a proprietary interest in his own box, and know its location, and, if at all possible, assist in its erection.

The Boy Foresters have been making bird boxes for some years. Their co-operation is secured in the interests of these bird reserves, and the society offered prizes for the bird-houses made by them shown at their annual Hobby Show on April 14th.

The returned soldiers are also making bird houses for this society in connection with their sloyd and carpentering work in the Technical School.

It is hoped from these various sources to get enough boxes to create a good start

in the work of tempting the birds back to our city parks.

The society has gotten out, for the use of schools and others, approved information with dimensions and cuts of the most used bird-houses.

This society was started January 11th, 1917, and has already about 1,000 junior members, who have signed the society's pledge to protect wild life and who wear the society's button. Educational lectures are held monthly for the purpose of educating the public on the great economic benefit of birds as well as for purely æsthetic reasons. During the past year the society has had the honour of having as lecturers—Dr. C. Gordon Hewitt, Dominion Consulting Zoologist; Dr. D. N. Hamilton of Macdonald College; Prof. Arthur Willey of McGill University, and Miss Louise Murphy of Montreal.

A pamphlet, outlining the society's aims and of general interest to bird protectionists and bird lovers is in course of preparation for distribution. The society meets monthly in the Windsor Hotel, Montreal, and is anxious to co-operate in every way possible to secure attention to this most important economic benefit—the protection of our vanishing wild life.

NEW PUBLICATIONS

THE DOMINION DEPARTMENT OF AGRICULTURE

THE ENTOMOLOGICAL BRANCH

Root Maggots and Their Control and *How to Control Locusts or Grasshoppers* are the titles of Crop Protection leaflets No. 4 and 6 issued by the Entomological Branch. Mr. Arthur Gibson, Chief Assistant Entomologist, in charge of Field Crop Investigations, is sole author of the first named leaflet and joint author with Mr. Norman Criddle, Field Officer for Manitoba, of the second. Each leaflet describes the nature and habits of the pests and then details the methods of control.

THE PROVINCIAL DEPARTMENTS OF AGRICULTURE

NOVA SCOTIA

Two Important Vegetable Pests, by W. H. Brittain, Provincial Entomologist. This is an eight-page circular describing the Potato Stem Borer (*Gortyna micacea* Esp.) and the Zebra Caterpillar (*Ceramica picta* Harr), giving the methods of control and illustrating the habits of the pests.

QUEBEC

The report of the provincial Minister of Agriculture on the "Competition of Agricultural Merit, 1917", being the twenty-eighth successive year, makes a book of 129 pages. Not only are full particulars of winners in the competition given and of their prize holdings, but, in nearly every instance, illustrations accompany the details.

ONTARIO

The More Important Fungus and Bacterial Diseases of Vegetables in Ontario, by J. E. Howitt, Professor of Botany, and D. H. Jones, Professor of Bacteriology. The object of this bulletin is to furnish all who are interested in the growing of vegetables with information which will enable them to identify the more common fungus and bacterial diseases of vegetables, and to apply intelligently the treatments which experience has proven to be the most effective in each case.

Wheat and Rye, by C. A. Zavitz, B.S.A., D.Sc., Professor of Field Husbandry and Director of Field Experiments. This is Bulletin No. 261 of the Ontario Agricultural College, and is a complete exposition of both cereals, but especially of wheat, to which 25 of the 30 pages of which the bulletin consists are devoted. The history of wheat and its botanical classification are first dealt with and then sections are devoted to comprehensive treatises on both winter and spring wheat. Five pages are devoted to particulars regarding rye. The explanation is made that the bulletin is submitted to the farmers of Ontario with the expectation that it will prove of real service in increasing the production of essential food materials. Illustrations and tabulated information add to the value of the bulletin.

Spring Wheat, Circular No. 7, by Dr. C. A. Zavitz, Professor of Field Husbandry, Ontario Agricultural College. This is a four-page leaflet giving in summary form much of the matter in Bulletin No. 261, previously noticed, and explaining how and where spring wheat for sowing can be obtained from 50,000 bushels, purchased by the Ontario Department of Agriculture through the Federal Seed Commissioner, at the set price of $2.74 per bushel.

Back-yard Pig Feeding, Circular No. 8, by H. M. King, B.S.A., Associate Professor of Animal Husbandry, Ontario Agricultural College. A second line to the title says back-yard pig feeding is practicable

and profitable in cities, towns and villages. Seven good reasons are given for keeping and feeding a pig, followed by instructions on how best to do so. Advice is also given on arranging the pen and building the house or shed.

Results of Co-operative Experiments with Farm Crops, Sources of Seed and Production of Food Materials: Bulletin 260, Ontario Agricultural College. This is an advance bulletin containing a partial report of the annual meeting of the Experimental Union at the College in January, 1918. Under the four headings,"Results of Co-Operative Experiments in Agriculture", "Sources of Farm Seed Supply for the Province of Ontario", "Root Seed Growing in Canada", and "Practical Suggestions in the Production of Food Materials for the Coming Year", a vast deal of information, contributed by leading authorities on the different subjects, is given in the 56 pages of which the bulletin consists.

MANITOBA

Extension Bulletin No. 22, Asparagus. Part I—Asparagus Culture by J. A. Neilson, B.S.A., Lecturer in Horticulture. Part II—Preparation and Use of Asparagus—by Miss E. M. Eadie, Professor of Household Science.

Our Friends—The Birds is the title of Extension Bulletin No. 23. Many facts are given by Professor E. W. Jackson, Manitoba Agricultural College, regarding birds in their relation to agriculture, especially relative to their value and their food. Some details are also given of the seed-eaters. Illustrations add materially to the interest and value of the bulletin.

BRITISH COLUMBIA

A Directory of Poultry-Breeders in British Columbia has been published as Bulletin No. 7 of the Provincial Poultry Association.

MISCELLANEOUS

A Hand Book for Farmers. Messrs. F. C. Nunnick, B.S.A., Agriculturist, Commission of Conservation, and E. P. Bradt, B.S.A., Agricultural Representative for Dundas County, have collaborated in a hand book for farmers. It contains valuable details about tillage, manures, variety and seed selection, clover and clover seed production, weeds, insect pests, and plant diseases, and miscellaneous farm activities. The hand book is published under the auspices of the Commission of Conservation.

NOTES

For the year 1918 the Department of Agriculture of Prince Edward Island has cancelled all agriculturel exhibitions.

The directors of classical colleges, at a meeting held in Quebec city at the end of April, decided to close the colleges for three months during the busy season to enable the pupils to devote their time to farm work and thus materially assist in increasing production.

Mr. H. Higginbotham has been appointed to succeed Mr. P. P. Woodbridge as secretary of the United Farmers of Alberta. Mr. Higginbotham for the past three years has been a member of the staff of *The Grain Growers' Guide*, published at Winnipeg.

The merchants and business men of Huntsville, in the Muskoka and Parry Sound district of Ontario, have decided to close the stores one day a week during seeding and harvest seasons, in order to allow merchants, office men, and clerks to assist the farmers, or work in their own gardens. This plan has been brought about by consultations between Mr. F. C. Patterson, Agricultural Representative, and the business men of the town.

Mr. A. H. MacLennan, B.S.A., a member of the staff of the Department of Horticulture of the Ontario Agricultural College, has been transferred to the Horticultural Division of the Department of Agriculture at Toronto as vegetable specialist. Mr. MacLennan succeeds Mr. S. C. Johnston, who now occupies the position of director of the Motion Picture Bureau of the Ontario Government.

In the administration of the Contagious Disease of Animals Act, it was necessary recently to fine a man in Alberta for violating the regulations governing mange in cattle. This individual moved a number of cattle which were suspected of being affected with the disease. Prosecution proceedings were taken against him and he was fined $75.00 and costs.

There are 136 agricultural societies in New Brunswick with an average membership of a little better than 62 each, or 8,505 in all. Ten new societies were organized in 1917. The amount received in membership fees totalled $11,225.58, and the grants to the societies from the Provincial Government and under THE AGRICULTURAL INSTRUCTION ACT of the Dominion aggregated $18,000.

Mr. G. A. Williams, Agricultural Representative, Durham County, Ontario, has worked out a scheme for equalizing the contributious for prizes in school fairs and home garden contests. This provides that schools with an enrolment during the months of January and February of less than twelve pupils should contribute $3.00; between twelve and twenty pupils, $5.00; and over twenty, $7.00. These figures are the result of calculations based on prizes won by schools in the county during the past two years.

At the annual meeting of the Montreal Milk Producers' Association, which has a membership of 320, the price of milk for the season of 1918 was fixed at 30c per gallon for May, June, July, and August, and 32c for September, delivered in Montreal. Cream prices were fixed at 60c per pound of butter fat for the first four months of the summer season, and 65c for September. As the area covered by the Association is becoming extensive, it was decided to organize branch associations where there were 20 or more milk or cream producers.

Mr. S. E. Greenway, Director of Agricultural Extension in the province of Saskatchewan, has been advised by the secretaries of more than a score agricultural societies that they will hold ploughing matches during the coming summer. Some of the societies intimated that they will hold several matches within their respective districts. At these meetings the ploughing is done early in the day and the awards made and the remainder of the day is given up to sports and social intercourse. The director is endeavouring to learn of all the ploughing matches that are to be held in the province with a view to working out satisfactory circuits.

The Secretary of the Board of Trade of Sherbrooke, Quebec, has advised THE AGRICULTURAL GAZETTE that a strong campaign is being conducted in that city to have large quantities of food produced on the vacant lands within the city limits. Committees have been put in charge of securing and allotting areas, fertilizing, cultivation, the supplying of seed, supervision, publicity, and the giving of prizes for competition. Organizations such as Boy Scouts, Daughters of the Empire, clubs, and lodges, are undertaking the cultivation of certain tracts of land. The plots will be turned over to the gardeners all ready for seeding. The actual cost of this preparation is being charged to the lot-holders.

Mr. G. R. Green, Agricultural Representative in Oxford County, Ontario, reports that the Woodstock farmers' club transacted business to the extend of $13,000 in twelve months. Encouraged by its success, the club has reorganized and has applied for a charter. Capital is to be raised on the demand note system of $100 for each member.

Mr. M. C. Herner, Professor of Poultry Husbandry at the Manitoba Agricultural College, has pointed out that the note that appeared on page 309 of the March issue concerning him might give a wrong impression. Professor Herner assisted Professor Baker, Head of the Poultry Department of the Saskatoon University, in a poultry section of the live stock and seed grain short course held at the College of Agriculture at Saskatoon. A full day was given to poultry work, Professor Herner giving assistance to Professor Baker in carrying it out.

At a recent publicity meeting of the Montreal Publicity Association, a plan to increase the production of pork was discussed. Acting on a request from the Food Controller, the Association has appointed a committee of three members to study the means of producing pork on a large scale. This committee is composed of Messrs. Eugene Tarte, L. A. Holland, and G. Warren Brown. The committee decided to purchase one hundred and fifty young pigs, which are to be fed on a farm at Dorval, and subsequently turned into pork, ham, and bacon. A manager of an important local bank, and several business men, have promised financial help. The profits, if any, will be divided among the members contributing.

At a conference of the Joint Committee of Commerce and Agriculture attended by fifty leading representatives of business financial, and agricultural interests, held in Regina, Saskatchewan, on March 13 and 14, the following telegram was read from George W. Allan, M.P. for South Winnipeg, who took an active part in the organization of the committee: "Sane thinking at a time of peace gave birth to co-operation between agriculture and commerce in the West through Joint Committee. Patriotism under war conditions will cement this union, intensify its usefulness, and enlarge the scope of its operations. The Joint Committee must carry on and do its bit. We in the West have got together, and the West and the East must get together and play the game."

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Prune, Repair and Rejuvenate those Fruit-Trees, E. W. White, Assistant Horticulturist, page 7.

The Canadian Entomologist, London, Ont., March, 1918.
Popular and Practical Entomology, Norman Criddle, Dominion Entomological Laboratory, Treesbank, Man., page 73.

The Canadian Horticulturist and Bee-keeper, Toronto, Ont., March, 1918.
What Fruit to Plant, Professor J. W. Crow, Ontario Agricultural College, Guelph, page 56.

The Canadian Countryman, Toronto, Ont., March 23, 1918.
Are Farm Management Surveys Worth While, A. Leitch, Farm Manager, Ontario Agricultural College, Guelph, page 359.
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Importance of the Corn Crop in Ontario Agriculture, P. L. Faucher, Corn Specialist, Ontario Department of Agriculture, page 441.

The Saturday Press and Prairie Farm, March 30, 1918.
The Problem of Crop Production. An Address delivered by Professor Bracken before the Short Course Students in Crop Production at the University of Saskatchewan, page 12.

The Canadian Thresherman and Farmer, Winnipeg, March, 1918.
Farm Flocks in War-Time, M. C. Herner, Professor of Poultry Husbandry, Manitoba Agricultural College, Winnipeg, page 40B.

Farm and Ranch Review, Calgary, Alta., March 5, 1918.
Why Breed Shorthorns? G. E. Day, Secretary-Treasurer, Dominion Shorthorn Breeders' Association, page 222.
Mar. 20—System of Ventilation, Professor J. MacGregor Smith, University of Saskatchewan, Saskatoon, page 297.

Farm and Dairy and Rural Home, Toronto, March 28, 1918.
Why Northern Grown Seed Potatoes Increase Yields, Justus Miller, Assistant Commissioner of Agriculture for Ontario, page 332.
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Mar. 28—Swine Feeding Experiments at Lacombe, G. H. Hutton, B.S.A., Superintendent Lacombe Experimental Farm, page 525.

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Mar. 27—New Grasses and Clovers, T. J. Harrison, Professor of Field Husbandry, Manitoba Agricultural College, page 495.

The Grain Growers' Guide, Winnipeg, Man., April 3, 1918.
A World's Fair for Farmers, Professor T. J. Harrison, Manitoba Agricultural College, page 713.

The Journal of Agriculture and Horticulture, Quebec, April, 1918.
Feeding the Sow and Young Litter, E. S. Archibald, Dominion Experimental Farm, page 152.

The Maritime Farmer and Co-operative Dairyman, Sussex, N.B., March 5, 1918.
Bee-keeping and Honey Production in New Brunswick, L. T. Floyd, Provincial Apiarist, page 310.
Mar. 19—The Need for Greater Home Garden Production, A. G. Turney, Provincial Horticulturist, New Brunswick, page 346.

The Nor-West Farmer, Winnipeg, Man., April 5, 1918.
Spring Work on the Land in Manitoba, W. C. McKillican, Brandon Experimental Farm, page 435.

PART V

The International Institute of Agriculture

T. K. Doherty, LL.B., Commissioner

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

988—Are Anopheles of Non-Marshy Districts Capable of Transmitting Malaria?—ROUBAUD, E., in *Comptes Rendus des Séances de l'Académie des Sciences*, Vol. 165, No. 12, pp. 401-403. Paris, September 17, 1917.

In spite of the continuous presence of *Anopheles maculipennis* in certain reclaimed districts of France, such as the Dombes, Sologne, etc., which were previously marshy, malaria has not reappeared to any marked extent. This fact has given rise to the supposition that the extinction of the disease may be connected with a sort of natural immunity of the mosquitoes concerned. Grassi, Schaudinn, and other workers admit the existence of species of mosquitoes naturally immune to malarial infection, which appear to have played an important part in the gradual disappearance of the endemic. It has even been suggested that good results might be obtained by the artificial distribution of these species as a malarial prophylactic.

At the Pasteur Institute at Paris patients under treatment for malaria were bitten by perfectly healthy Anopheles taken in the town, and it was proved that these mosquitoes were thus infected. The experiments were carried out with: 1) *Plasmodium vivax* Gr. and Fel. or var. *tertiana* Lav. (benign-tertian); 2) *Pl. praecox* Gr. and Fel. or var. *parva* Lav. (malignant-tertian).

The author, who was perfectly healthy, allowed himself to be bitten by one of the infected mosquitoes on the 28th August. On the 13th September the fever appeared, preceded a few days previously by exhaustion; the sporazoites (*Plasmodium vivax*) were located in his blood on the 14th September.

It is seen, therefore, that *Anopheles maculipennis* of the Parisian, non-marshy district, is perfectly capable of transmitting malaria, and is in no wise an immune species. It is, indeed, highly improbable that any such species exists.

CROPS AND CULTIVATION

991—Investigations into Soil Efflorescences in Germany.—PUCHNER, H., in *Kolloid-Zeitschrift*, Vol. XX, pt. 5, pp. 209-238. Dresden, May, 1917.

992—The Absorption of Cations and Anions by Soil.—DE DOMINICIS, A., MAMMANO, G., and DIAFERIA, L., in *Annali della Regia Scuola Superiore di Agricoltura in Portici*, 2nd Series, Vol. XIII, p. 26. Portici, 1916. (2 pp. in Institute Bulletin).

993—The Humus Content of the Soil as a Guide to Fertility.—CARR, R. H., in *Soil Science*, Vol. III, No. 6, pp. 515-524, Bibliography of 16 publications. New Brunswick, June, 1917.

994—Ammonia—Fixation in Semi-Arid Soils: Researches in the United States.

MACBETH, J. G., in the *Journal of Agricultural Research*, Vol. IX, No. 5, pp. 141-155. Washington, 1917.

995—Influence of Crop, Season and Water on the Bacterial Activities of the Soil; Experiments Made in Utah, U.S.A.—GREAVES, J. E., STEWART, R., and HIRST, C. T., in *Journal of Agricultural Research*, Vol. IX, No. 9, pp. 293-341. Bibliography of 66 publications. Washington, D.C., 1917.

It is of the utmost importance that the quality and quantity of plant food rendered available during the season should nicely balance that required by the growing plant, for then we have the maximum yield with the minimum loss of soil fertility. Most of the changes which take place in the soil constituents are caused by micro-organisms; the speed with which these transformations take place within a soil is governed, amongst other factors, by the season of the year, the crop, and the water which the soil receives.

The writer carefully examines the literature dealing with the subject, and sets forth the results of his experiments carried out on soil of a sedimentary nature. There were 5 series of 4 plots; one series was fallow, while the others were under lucerne, maize, potatoes and oats respectively. In each of the 5 series, one plot was not irrigated, while the others received a minimum (15 inches), average (25 inches), and maximum (37.5 inches) amount of water, which was applied 5 times in equal quantities. The plots were sampled during the spring (about the middle of April), mid summer (about the end of July), and in the autumn (about October 31 or November 1). The samples were analysed for moisture, nitric nitrogen, number of bacteria developing on synthetic media, and the ammonifying and nitrifying powers.

It was found that during spring and summer the nitric nitrogen is about uniformly distributed throughout the first 6 ft; in soil under lucerne the amount remains relatively small during the different seasons, but is a little larger in autumn than in spring. In this layer the *absolute* amount of nitrates increases with the quantity of water supplied. On the other hand, the *relative* quantity of nitrates, that is to say, the amount bearing a relationship to the water supplied, is greatest where only 15 inches of water are given. In the upper layer of the fallow plot and of those under potatoes, oats, and maize respectively, the relationship of nitrate formation to water-supply is exactly the same as in the case of the lucerne plots.

Large quantities of nitric nitrogen disappeared from the fallow soil during the summer months. This is attributed to the growth of bacteria which transform it into protein substances, and not to denitrification.

The larger applications of water carry much of the nitric nitrogen beyond the sphere of action of the plant, and this accounts for the decrease in crop yield, which is often noted when excessive quantities of irrigation water are applied to the soil.

The application of water to a soil depresses the number of organisms which will develop on synthetic agar in lucerne, oats, and potato soil, but increases them in fallow. The results obtained with maize are irregular. The ammonifying power of all the soils, except the lucerne, was increased by irrigation. Water increased the nitrifying powers of all the soils, except the oat soil. There was a difference of 2° F., in the temperature of the irrigated and non-irrigated soils. This difference in temperature was perceptible to a depth of 4 ft.

The number of organisms is higher in the cropped than in the fallow plots, and this is probably due to the residues left upon the cropped soil.

Naming the soils in order of increasing ammonifying power, we have: lucerne, oats, maize, potato and fallow. By naming them in the order of increasing nitrifying power, they are: fallow, maize, oats, lucerne and potato. The lucerne not only feeds closer upon the nitric nitrogen of the soil than do other crops, but it also increases the nitrifying power of the soil. Hence it would deplete the soil of its nitrogen more rapidly where the entire crop is removed than would other crops.

The use of irrigation water, by increasing the bacterial activities of the soil, renders the nitrogen soluble, and where excessive quantities of water are used, much of the nitrogen is washed from the soil, thus unnecessarily depleting the soil of its nitrogen. This in turn gives diminished crop-yields.

996—Methods for Determining the Reaction of the Soil; Investigations in Denmark.—CHRISTENSEN, H. R., in *Tidskrift for Planteavl*, Vol. 23, pp. 1-83. Bibliography of 33 publications. Copenhagen, 1916. (3 pp. in Institute Bulletin).

997—The Quantitative Estimation of Calcium Carbonate in Determining the Nature of Soils.—PASSERINI, N., in *Bullettino della Societa Botanica Italiana*, Nos. 4-5, pp. 50-52. Florence, April-May, 1917.

999—The Construction of Reservoir Dams in France.—LEVY-SALVADOR, PAUL, in *La Nature*, No. 2295, pp. 177-182. Paris, September 22, 1917. (2 pp. in Institute Bulletin).

In the central massif range of France there is a fair number of stone reservoir-dams, all built of hydraulic lime mortar.

The perfect state of preservation of some of them after fifty years shows what excellent results may be obtained by this method of construction. Although many of the dams recently built in France and abroad, especially in the United States, are made of other material, such as steel, reinforced concrete, or cement, stonework still seems to offer the greatest guarantee of safety for works the rupture of which would entail disastrous consequences. It is only this question which the author studies, explaining the principles to be observed in making a reservoir-dam. As an example the Cher dam is taken. This dam, about 9 miles from Montluçon, is 154 feet high and holds 1060 million cubic feet of water with only 529,640 cubic feet of stone work.

A description of the building of the Cher dam, begun in July 1906, and finished during 1909, is given and may serve as an example for the construction of stone dams.

1000—Blasting Ditches.—MURDOCK, H. E., in *Montana Agricultural College Experiment Station, Circular* No. 55, pp. 63. Bozeman, Montana, February, 1916.

The circular describes the blasting of drainage ditches on the Bozeman Experiment Station farm between the years 1913 and 1915, and gives practical details of the work.

It is particularly in gravelly and rocky soil that ditching is difficult and that blasting may be carried out to advantage.

Preparatory to starting the work all the brushwood is cleared off. Holes are then dug 22 inches apart. Experience showed this distance to be the most satisfactory; if it be less there is unnecessary waste of explosive, if more some of the charges misfire. Two sticks of 60% Hercules dynamite are placed in each hole, which are dug by steel bars 2½ feet long, driven in the earth to within 4 or 6 inches of the surface, and withdrawn either by hand or machine.

To prevent the holes from caving in, tubes made of one inch galvanised iron pipe are inserted and the charge passed in through them. The pipes are then withdrawn. As the holes fill with water no further tamping is necessary. About 25 holes are exploded at once, the middle hole being used as the primer and joined to the others by a waterproof fuse. An electric detonator may be used.

Three men are necessary for the crew. The channel made by the explosion is 2 to 3 feet deep and 5 to 7 feet wide. After blasting, the channel is cleared out by hand. As dynamite freezes very easily, the work must be done at a suitable season.

The following comparative expenses of making open ditches were drawn up from the Station accounts:

Hand dug ditch		$3.35
Blasted ditch	hand labour, inexperienced	3.10
	hand labour, experienced	2.36

Blasting ditches by dynamite has proved both practical and economical under the conditions existing at the Station. No piles of dirt are left along the bank, thus ensuring a good flow of surface water. The figures illustrating the circular show that the ditches may be made very regular, and allow the comparison of work carried out by a ditching machine and that carried out by dynamite.

1002—Experiments in Irrigated Crops in the United States.—I. KNORR, F., Management of Irrigated Land, in *Bulletin of the Agricultural Experiment Station of Nebraska*, Vol. XXVII, Art. IX, *Bulletin* No. 152, 24 pp., 12 tables. Lincoln, Nebraska, June, 1915.—II. HARRIS, F. S., The Irrigation of Potatoes, in *Utah Agricultural Experiment Station, Bulletin* No. 157, 20 pp. Logan, Utah, June 1917. (2 pp. in Institute Bulletin).

1003—Lime on the Farm in New South Wales, Australia.—GUTHRIE, F. B., in *Department of Agriculture, New South Wales, Farmers' Bulletin* No. 115, pp. 31. Sydney, July, 1917.

Instructions of a monographic character upon the different uses of lime in practical agriculture.

After having set forth the advantages of liming, and the lime content of the South Wales soils, the writer considers the different forms in which lime is applied—Carbonate of lime—agricultural, or mild lime (containing about 82 per cent of lime); this is the name given locally to the stone-lime that has not been properly burnt—gas lime—residual lime from acetylene generators—spent lime from tanneries—wood ashes and plant ashes—gypsum—basic slag.

The residual lime from acetylene generators contains from 36.19 to 64.38 per cent of lime. It can be used in a fresh state, while gas lime must be exposed to the air for some time before being applied.

A sample of spent-lime from tanneries contained in addition to an appreciable amount of nitrogen and traces of phosphates and potash, 49.5% of calcium hydrate and 26.0% of calcium carbonate.

Among the Australian ashes analysed, the case of the ash of *Gidgea acacia*(?) is exceptional. This contains 95 per cent of pure calcium carbonate. Gypsum is of great value in neutralizing the carbonate of sodium which renders soil, or water, alkaline and caustic. The writer mentions an experiment in which the alkalinity of a water estimated at 35.28 grains of sodium carbonate per gallon was reduced to one half after 24 hours, and to 10.92 gr. in 6

days, after which the decrease was very gradual.

The writer gives the amount of lime to be used for liming and sets forth the bad effects of lack of lime in the soil, and of its excessive use or misuse. He then deals with the other uses of lime on the farm: in the formation of the compost heap—as a fungicide or insecticide, whether alone, or mixed with other compounds, or in the form of gypsum—for softening water whose hardness is due to the presence of calcium carbonate—for making whitewash—for waterproofing corn-sacks—for making artificial stone.

The writer concludes by expressing his hope that the present transport concessions for agricultural lime will be extended to all forms of lime used for agricultural purposes in Australia.

1004—**The Composition of Army Stable Manure.**—RUSSELL, E. J., (Rothamsted Experimental Station), in *The Journal of the Board of Agriculture*, Vol. XXIII, No. 11, pp. 1053-1055. London, 1917. (2 pp. in Institute Bulletin).

1005—**Value of Duck Manure**—*Mark Lane Express Agricultural Journal*, Vol. 117, No. 4469, p. 495. London, 1916.

1006—**A New Source of Potash in England.**—I. CRANFIELD, HAROLD T., A New Source of Potash, in *The Journal of the Board of Agriculture*, Vol. XXIV, No. 5, pp. 526-530.—II. Blast Furnace Dust, *Ibid.*, p. 182. (2 pp. in Institute Bulletin).

1007—**Production of Nitrates by the United States Government.**—I. Nitrate Supply Committee Recommendations on Synthetic Nitric Acid for the Government with Reports on Various Methods. *The Journal of Industrial and Engineering Chemistry*, Vol. 9, No. 9, pp. 829-841. Easton, Pa., September 1, 1917.—II. Production of Nitrates by the Government. *Science*, N. S., Vol. XLVI, No. 1185, pp. 250-258. Lancaster, Pa., September 14, 1917.

The United States War Department gives an account of its preparations for the production of nitrates in accordance with a report filed by the Nitrate Supply Committee.

The Nitrate Supply Committee, appointed by the U. S. Secretary of War, was under authority of a provision in the national defence act for an investigation "to determine the best, cheapest and most available means for the production of nitrates and other products for munitions of war and useful in the manufacture of fertilizers and other products."

The general recommendations, dated May 11, 1917, of the Nitrate Supply Committee are reported at length.

The Nitrate Supply Committee comprised U. S. Army and Navy officers, representatives of the Bureau of Soils, U. S. Department of Agriculture, of the Bureau of Standards, U. S. Department of Commerce and of the Bureau of Mines, Interior Department, as well as scientific men and engineers.

1008—**The Presence of Arsenic in Hops, in the United States.**—STOCKBERGER, W. W., and COLLINS, W. D., (Food-Investigation Chemist, Bureau of Chemistry), in *U. S. Dept. of Agriculture, Bulletin* No. 568, *Joint Contribution, from the Bureau of Chemistry and the Bureau of Plant Industry, Professional Paper*, 7 pp. Washington, D.C., August 8, 1917.

1009—**The Presence of Nitrites and Ammonia in Diseased Plants.**—I. BONCQUET, P. A., in *The Journal of the American Chemical Society*, Vol. XXXVIII, No. 11, pp. 2572-2576. Easton, Pa., November 1916.—II. BONCQUET, P. A., and BONCQUET, M., *Ibid.*, Vol. XXXIX, No. 9, pp. 2088-2093. Easton, Pa., September 1917. (2 pp. in Institute Bulletin).

1010—**Self-Sterility in Plants.**—MOORE C. W., in *The Journal of Heredity*, Vol. VIII, No. 5, pp. 203-207. Washington, May, 1917. (2 pp. in Institute Bulletin).

1011—**The Behaviour of the Hybrids Avena sativa patula var. Victor × Avena sativa nuda var. inermis.**—ZINN, JACOB, and SURFACE, M. FRANK, in *Journal of Agricultural Research*, Vol. X, No. 6, pp. 293-312. Washington, 1917. (2 pp. in Institute Bulletin).

1012—**Hybrids of Zea Ramosa and Zea tunicata; Experiments Carried out in the United States.**—COLLINS, G. N., in *Journal of Agricultural Research*, Vol. IX, No. 11, pp. 383-395. Bibliography of 9 Publications. 8 plates. Washington, June 1917. (3 pp. in Institute Bulletin).

1013—**The Colour of the Seed in the Descendants of a Natural Hybrid of Two Varieties of Phaseolus vulgaris, in Sweden.**—LUNDBERG, JOHN, and AKERMAN, A., in *Sveriges Utsadesforenings Tidskrift*, Year XXVII, Pt. 3, pp. 115-121. Malmo, 1917. (3 pp. in Institute Bulletin).

1015—**The Improvement of Native Vines by Crossing and Selection in the United States.**—DEARING, CHARLES, in the *Journal of Heredity*, Vol. VIII, No. 9, pp. 409-424. Washington, D.C., 1917. (3 pp. in Institute Bulletin).

1016—Wheat Production in the Argentine. —GIROLA, CARLOS D., in *El Cultivo des trigo en Argentina*, Publicacion des Museo Agricola, pp. 31. Buenos-Aires, 1917.

This pamphlet contains popular instructions for the use of farmers together with observations and data collected by the Author.

Wheat in Argentine covers an area of about 16 to 17¼ millions of acres. These are found exclusively in the co-called "grain district", which includes the provinces of Buenos Aires, Cordoba, Santa Fe, Entre-Rios, San Luis, and the National Pampa Territory. It could, however, be grown much more widely, for the soil of the Provinces of Mendoza, San Juan, La Rioga, Catamarca, etc., and the districts of Rio Negro, Nequen Chubut are well suited to it.

The varieties most commonly grown are:

BEARDED SOFT WHEATS: Barletta; Hungarian; Italian or Lombard; Russian; Rieti; Japanese; Saldomé; Piedmontese.

BEARDLESS SOFT WHEATS: Russian beardless; French or Bordeaux; Touzella.

HARD WHEATS: Candeal; Taganroch; and, much less, Medeah and "Espanol de grano duro."

Japanese wheat is remarkable for its adaptation to soils exhausted by repeated crops of cereals or other plants and by its resistance to drought, but its grain is small.

As a rule wheat is not manured in the Argentine. The average quantity of seed used is 62½ lbs. per acre; the average annual production in normal years is 12 cwt. per acre. The cost of production varies between 90 cts. and $1.12 per cwt.

The diseases to which wheat is most subject in the Argentine are: common rust or "polvillo del trigo" (*Puccinia graminis*); bunt (*Tilletia Tritici*) [*T. Caries*]. *T. Levis*); smut or "carbon" (*Ustilago Tritici*); straw blight or "mal del pie" (*Ophiobolus graminis*).

The insect pests are:—ants; locusts; "isoca comun" (*Leucania unipuncta*); "gusano blanco" (larvae of *Diloboderus abderus*); "palomita" or "alucita" (*Alucita cerealella* = *Sitotroga cerealella*); corn weevil or "gorgojo" (*Calandra granaria*); "gusano blanco" (*Trogosita mauritanica*), etc.

The figures included in the paper illustrate the best varieties of Argentine wheat and the machines generally used for the extensive cultivation of cereals.

1017—Observations on Manitoba Wheat in Algeria in 1917.—THE BROTHERS GAY, in *Bulletin Agricole de l'Algérie-Tunisie-Maroc*, 2nd. Series, Year 23, No. 9, pp. 181-182. Algiers, September, 1917.

(1) See also the original article: CARLOS GIROLA, *The Principal Varieties of Wheat grown in the Argentine Republic*, in Bulletin of Foreign Agricultural Intelligence November, 1915, page 849.

The following observations were made by the brothers Gay on the cultivation of Manitoba wheat at Berrouaghia (Algeria) in 1917.

Date of sowing: 3rd April, 1917; area sown: 15½ acres; quantity of grain sown: 1.045 lbs.; date of harvest: 27th July; yield of grain: 952 cwt.; weight per bushel: 63 lbs.

The wheat was broadcast in a very wet, clay loam, about 67 lbs. of grain per acre being used. The grain was neither very fine nor uniform.

In spite of very unfavourable climatic conditions (particularly violent and continuous sirocco during the flowering and ripening) the 1,045 lbs. of Manitoba wheat sown gave a yield of 952 cwt. of grain. This result is of great interest when compared with the yield of native wheat, and when account is taken of the lateness of sowing (the seed only reached Algiers on the 23rd March) in the Berrouaghia district, where the climate changes suddenly from very hot to very cold.

FORESTRY IN SWEDEN.—AMILON, J. A., in *International Review of the Science and Practice of Agriculture*, Year VIII, No. 11, pp. 1049-1061. Rome, November, 1917.

Without counting the lakes and watercourses, Sweden has an area of over 101-000,000 acres; about 12,000,000 acres are cultivated. The area of the wooded land of Sweden is 55,000,000 acres, or about 54% of the total area of the country. Of all the European countries, Finland alone has a greater proportion of wooded land. The proportion for the whole of Europe is 33%, for western Europe 25% only.

By reason of its differences in latitude and altitude Sweden includes many different vegetation zones determined by the various climatic conditions. The high mountain district, completely bare of forest, includes the northern part of the kingdom. It runs along the western frontier till it reaches, in the south, a latitude of about 62 degrees. To the east of this short district, and almost parallel with it, is that of the birch woods, which form a little band about 19 miles wide in the north, and rather narrower in the south. Below the birch region are the woods of coniferae. These may be divided into the northern and southern halves, separated by the northern limit of the oak. The greater part of this region is covered with scotch fir and spruce. Systematic forestry is now practised in the less accessible northern parts of the country, as well as in the southern parts which are better adapted to cultivation. Only in rare cases in the centre and north of Norrland are there still virgin forests in which hardly a tree has been felled.

At the end of 1914 the public forests of Sweden covered an area of 22,150,000

acres, not counting about 12,850,000 acres above the limit of coniferous trees which are not yet divided between the state and private holders. Forests, the income of which goes to the state, cover an area of 14,932,000 acres, the rest, 7,218,000 acres, being composed of public forests the working of which is either undertaken or controlled by the state, but the profits from which go to the communities, private owners, or endowed institutes.

The working of the public forests and state agricultural estates is directed by a central office—the Royal Estate Office, which controls both forestry and hunting. Since the beginning of 1916 this office has working under it 12 conservators, 118 rangers, 11 forestry engineers and 7 directors of forestry schools, all of whom take part in administration and control.

The private forests are by far the largest, most productive and best situated. In the centre and south of the country they belong to more or less large estates. In the forest districts of the north a large part of the forests is in the hands of societies engaged in the mining or timber industries.

The methods employed for the afforestation of lands which have been cleared or not planted for a long time, and for the improvement of natural regeneration, are very varied, but they might all be facilitated by the removal of the twigs, branches and crowns of trees left on the ground after clearing.

In order to do this, these remains are collected into heaps a yard high and a yard wide, or else into stacks, and, generally, burnt. Especially on land covered with a high, thick growth which threatens to choke the young plants, the remains are often set alight without being collected. In this case care must be taken to ascertain that, on the one hand, the twigs and branches are dry enough to burn, and, on the other hand, that the ground is not dry enough to suffer loss of humus through burning. For these reasons this operation is usually carried out at night in early spring.

In the snowy Norrland, and on pasture land, the remains from clearing are often left on the ground as they protect the plants from damage by snow as well as from the teeth and feet of animals. Some of the twigs are often spread over very dry and poor soils, thus not only decreasing evaporation, but, eventually, by their decomposition, contributing a considerable amount of food-elements.

Where self-sowing is relied on, the ground is prepared by hand or horse hoeing before the seeds fall. If self-sowing cannot be relied on the ground is artificially sown or planted.

Especially in the case of pines reproduction only succeeds with local seed, so that the cones are collected in the district. The Forest Administration, the Commission for the Preservation of Forests, and also private people, have erected establishments for extracting the seed from the cones collected, and many use the most recently perfected methods.

For planting seeds, holes are usually dug 6 x 6 inches to 12 x 12 inches square, and 2 to 3 inches deep, at regular intervals of 1 to 2 yards; the largest are made where vegetation is thick (heather), the smallest, where it is more sparse(heather and pines). In each hole are placed from 8 to 20 seeds, according to their quality and the favourable or unfavourable conditions at the time of germination and sprouting. Sometimes the holes are made of a long rectangular shape 2 x 16 inches; this affords a better protection against the teeth and feet of animals, and against raising caused by frost.

For pines and spruce it is usually necessary to use from 0.15 to 0.9 lbs. per acre, and the total cost of sowing varies from $2 to $5 per acre.

Sowing broadcast and sowing in lines have also been tried, but, as they do not give better results than sowing in holes, and are much more expensive, they have hardly been adopted.

As sowing in holes, when properly carried out, gives very satisfactory plantations and at the same time, is cheap, it is usually preferred to planting, which is more expensive. Preference is, however, given to planting: on dry ground exposed to the sun and wind, where vegetation is very thick, or where there is danger that the young seedlings may be deplaced by frost. On the other hand, planting is also practised to improve insufficient self-sowing or artificial sowing which has done badly, and to propagate spruce in the centre and the south of Sweden.

Nearly all the planting methods common in central Europe and in France have been tested in Sweden, and, as many of them were found suitable, it was unnecessary to experiment on special methods for Sweden. Pines are usually put in the ground when 2 or 3 years old, spruce when 2, 3 or 4 years old.

In intensive forestry the growth of plantations of a certain size is facilitated by removing undesirable self-sown trees, such as birch, alder, aspen, etc., by cutting the excessively luxuriant growth which covers the ground, by clearing the plantations by the removal of plants harmful to their neighbours, and which, at an early date, show unsatisfactory progress.

Attempts have been made to determine whether the annual felling in Sweden is equal or inferior to the annual growth by calculating the annual yield with the total annual consumption (in the country and exported). In this way it has been estimated that the total annual consumption of

timber amounts to 1,329,000,000 cubic feet, while the total annual production is 1,236,000,000 cubic feet, the excess of felling over growth being thus 93,000,000 cubic feet.

There is, therefore, no need to fear a failure or necessary decrease in the amount of raw material supplied to the timber trade which is of such great commercial importance to Sweden. On the one hand, the production of the forests can surely be increased, on the other hand, it is possible to reduce very considerably the wood requirements of the country. As the means of communication in the north of Sweden increase and improve, greater and greater stretches of woodland may be subjected to rational forestry methods, so that, not only will growth be increased, but it will be possible to utilize trees hitherto unsaleable. The continual rise in the price of wood would nesessitate a restriction of its use, which, up to the present, has been excessive On the other hand, in the manufacture of iron, part of the charcoal used is being gradually replaced by "white-coal" (electricity produced by water-power). These two means of economy will together place a considerable amount of wood at the disposition of the export trade, so that the development of this trade, which has hitherto been so rapid and so advantageous to Sweden, may be assured in the future.

The State Forestry Research Station was founded in 1902. In 1913 it had an income of 62,400 crowns. In 1915 it moved into large premises close to the Experimentalfaltet, near Stockholm. This station, which includes a forestry department and a scientific department, is under the same management as the High School for Forestry. The results of its work are published in the *"Communications of the State Forestry Research Station,"* of which, up to 1916 12 volumes amounting to 2500 pages had appeared. It also publishes pamphlets or short papers on special subjects.

In 1916, a special sub-department was founded to study certain questions bearing on regeneration in the forests of Norrland. The work is to extend over 15 years, and the expenses are estimated at 230,000 crowns ($61,640).

Up till quite recently the State forestry schools were the *Institute of Forestry*, founded in 1828 to train administrative officials, and the *Schools of Forestry*, where supervisors were trained.

Later in 1912, it was decided to change the Institute of Forestry into the *High School for Forestry*, which, besides training administrative officials, should also study the development of rational forestry science. It holds: (a) a "Iagmastare" (rangers or conservators) course, preceded by a preparatory course; (b) a course for training agents for private forestry (conservators).

The *Forestry Schools*, seven in number, are divided among the various districts of Sweden. Each is administered by a director, aided by a forest guard, who also controls the State forests set apart for the instruction of students.

Each school usually has 20 pupils, all of whom receive free instruction and board, and about half of whom also hold studentships of 250 crowns ($67).

The courses, which last from the 1st October to the 15th September of the following year, aim at giving the students:—(a) the scientific knowledge which forms the basis of forestry; (b) skill in the most important forest work; (c) the ability to direct this work.

1030—**Nursery Practice in the National Forests of the United States.**—TILLOTSON, C. R., in *United States Department of Agriculture Bulletin* No. 479, *Contribution from the Forest Service, Professional Paper*, 86 pp. Washington, 1917.

Each year about 10 million forest-tree seedlings or transplants are required for the reforestation operations in the National Forests of the United States. The paper analysed gives the rules to be followed in order to keep forest-tree nurseries in a good condition and to produce plants of suitable size and species, of superior quality and ready to be supplied when required. The writer first describes the factors influencing the selection of a nursery site, and passes on to the questions of the size and arrangement of nurseries—outfit, nursery operations, packing and shipping, diseases and injuries, use of fertilizers.

He finally deals with the cost operations and gives the following figures showing some of the actual costs of past nursery operations.

	Cost per thousand
Growing 1 year stock	$0.33— $1.50
Care of 2 year stock	0.06— 0.50
Transplanting stock	0.77— 2.04
Care of transplants first year	0.18— 1.03
Digging, packing and shipping of stock	0.74— 2.43

1031—**The Utilisation of Ash in the United States.**—STERRETT, W. D., in *United States Department of Agriculture, Bulletin* No. 523, *Contribution from the Forest Service, Professional Paper*, p. 52. Washington, D.C., June 29, 1917.

Ash is one of the leading commercial hardwoods of the United States. Its importance is due to the intrinsic qualities of the wood, for the quantity cut annually, which is from 200 to 300 million feet, amounts to from 2.5 to 3 per cent, of the hardwood lumber output, and to less than 1 per cent. of the total cut of all species.

The bulletin analysed deals with the use of the different species of American ash, and indicates the methods by which owners may utilize their ash timber profitably.

It also gives an account of the properties of ash wood.

There are 18 species of ash native to the United States, but 98 per cent. of the ash lumber produced is from 3 species: white ash (*Fraxinus americana* L.), black ash (*F. nigra* Marsh), and green ash (*F. pennsylvanica*, var. *lanceolata* Sarg.). The species making up the remaining 2 per cent are Oregon ash (*F. oregona* Nutt.), blue ash (*F. quadrangulata* Mich.), Biltmore ash (*F. biltmoreana* Beadl.), pumpkin ash (*F. profunda* Bush.), and red ash (*F. pennsylvanica* Marsh.). All these species have good cultural possibilities and are considered more important silviculturally than commercially.

Ash is the second most important wood used in aeroplanes. The great bulk of the wood used for this purpose in the United States in spruce, but ash is especially suited for propeller blades, either alone, or in combination with other woods. American ash has supplanted European ash (from the Baltic region) in English shipbuilding (rafters, oars, capstans, bars, etc.). Export dealers pay from $30 to $40 per 1000 board ft.

Ash timber is extremely valuable for special uses and a number of articles (handles, butter tubs, vehicles and refrigerators) are made of it. As the supply of standing ash timber is becoming limited, the commercial growing of this tree is necessary to provide for future demands.

LIVE STOCK AND BREEDING

1032—**Studies in Forage Poisoning.**—GRAHAM, R., and HIMMELBERGER, L. R., in *Journal of the American Veterinary Medical Association*, Vol. LI, No. 2, pp. 164-187. Ithaca, N.Y., May 1917.

During the course of experimental studies in connection with a definite outbreak of forage poisoning, wherein an oat hay proved to be quite uniformly poisonous to horses and mules, various types of microorganisms were isolated from the forage. A spore forming, Gram negative, aerobic bacillus, designated in this paper as 0-1 and 0-1 culture, proved to be pathogenic when administered to horses and mules, less so for cattle, sheep and goats, while guinea pigs, rabbits and white mice were apparently immune. A bacillus possessing characters similar to 0-1 designated in this paper as N-1 and N-1 culture, was isolated from a silage in a remote outbreak of forage poisoning among cattle.

It is contributive to the writers' knowledge of this outbreak that sterile filtrates of the bacillus described in this paper, subsequent to daily intravenous injection in some experimental horses, proved pathogenic and capable of exciting clinical manifestations somewhat analogous to those in animals originally affected as the result of feeding on the oat hay, i.e., increased respiration, partial paresis of the pharyngeal muscles and the muscles of the intestinal wall, incoordination, prostration and death. Some literature regarding the etiology of forage poisoning is quoted.

1033—**Sheep poisoned by Western Golden-Rod (Solidago spectabilis), in U.S.A.**—LOCKETT, S., in the *Journal of the American Veterinary Medical Association*, Vol. 51, No. 2, pp. 214-221. Ithaca, N.Y., May, 1917.

It would appear from this brief study that western golden-rod (*Solidago spectabilis*), a forage plant sometimes found in sheep-pastures in the west of the United States, possesses definite nerve-poisoning properties, both in its natural green condition and when cured in hay. The symptoms produced by this plant in sheep which have eaten it may be acute, subacute or chronic, according to the amount eaten. Five hundred grammes, eaten in 8 hours, produced, within 23 hours, a severe type of poisoning in a 6 to 7 months lamb. Suitable doses of chloral hydrate seem to be an efficacious antidote. Strychnine sulphate, although not tested by the author, seems to be suitable for chronic cases.

1036—**Rinderpest in Swine; Experiments upon its Transmission from Cattle and Carabaos to Swine and Vice Versa.**—BOYNTON, WILLIAM HUTCHINS, in *Philippine Agricultural Review*, No. 9, p. 288. Manila, September 1916: reproduced in: *The Philippine Journal of Science*, Vol. XI, Sect. B., No. 5, pp. 215-265. Manila, September 1916. (2 pp. in Institute Bulletin).

1038—**Some Aspects of the Physiology of Mammary Secretion.**—HILL, REUBEN I., in *Journal of the American Veterinary Medical Association*, Vol. LI, No. 5, pp. 642-654. Ithaca, N.Y., August 1917.

1039—**Utilisation of Farm Wastes in Feeding Live-Stock in the United States.**—RAY, S. H., in *United States Department of Agriculture, Farmers' Bulletin* No. 873. Washington, D.C., August 1917.

The unprecedented demand for grain for human consumption makes it imperative

that only those feeds be used for live stock which are not needed for human food.

More than one-third of the total production of grain straw in the United States is not being used to advantage and, of this amount, one half is an absolute loss. Of the 245 million tons of corn stover produced annually in the United States it is estimated that only 81.5% is fed to stock and that at least 35% of this amount is lost through wasteful methods of feeding.

During the past years large quantities of cottonseed meal have been used for direct fertilizing, six of the Southeastern States having used in 1914 nearly 1 million tons for such purposes. This meal is worth from $30 to $40 a ton for feeding cattle, and about 25% of its fertilizing value is lost when it is so used.

This bulletin indicates methods whereby these wastes may be eliminated, the herds and flocks economically maintained, and the amount of grain used for the feeding of live stock reduced to the minimum.

1041—**Selecting Dairy Bulls by Performance.**—CARROLL, W. E., in *Utah Agricultural College Experiment Station Bulletin* 153, pp. 1-20. Logan, Utah, April 1917. (2 pp. in Institute Bulletin).

1043—**Silage for Beef Production.**—STARR, CH. G., in *The Breeders' Gazette*, Vol. LXXII, No. 11, p. 374. Chicago, September 13, 1917. (2 pp. in Institute Bulletin).

1045—**The Outlook for Farm Sheep Raising in the United States.**—MARSHALL, F. R., and MILLIN, R. B., in *Farmers' Bulletin* No. 840 *of the United States Department of Agriculture*, p. 1-24. Washington, D.C., July 1917. (2 pp. in Institute Bulletin).

1046—**The Model Garbage-Disposal Piggery belonging to Worcester, Massachusetts, U.S.A.**—BONNET, FREDERIC, JR., in *Engineering News-Record*, Vol. 79, No. 9, pp. 396-400. New York, August 30, 1917. (2 pp. in Institute Bulletin).

1047—**Protein Feeds for Laying Hens.**—KEMPSTER, H. L., in *University of Missouri College of Agriculture, Agricultural Station Circular* 82, pp. 1-12. Columbia, Missouri, June 1917.

1048—**The Feed Cost of Egg Production; Experiments in U.S.A.**—LAMON, H. M., and LEE, A. R., in *United States Department of Agriculture, Bulletin* No. 561, pp. 42. Washington, D.C., August 18, 1917. (2 pp. in Institute Bulletin).

FARM ENGINEERING

1051—**Trials of Agricultural Tractors at Noisy-le-Grand, France, in 1917.**—RINGELMANN, MAX, in *Feuille d'Information du Ministère de l'Agriculture*, Year 22, No. 31, pp. 3-6. Paris, July 31, 1917.

Twenty-seven machines took part in the trials at Noisy-le-Grand, 7 being of French, 1 of Italian, and 15 of American construction.

The published report only deals with 9 tractors; the writer will shortly publish the results of the trials of the other machines.

1052—**The Annual Work of a Tractor in France.**—RINGELMANN, MAX, in *Bulletin de la Société d'encouragement pour l'Industrie Nationale*, Vol. 128, No. 4, pp. 126-129. Paris, July-August, 1917. (2 pp. in Institute Bulletin).

1053—**Internal Combustion Farm Drainage Machines.**—*Engineering*, Vol. CIV, No. 2696, p. 228 and pp. 237-238. London, August 31, 1917.

1054—**Harvesting with Tractors: Trials at Grignon, France, in 1917.**—BERTHAULT, P., in *Journal d'Agriculture pratique*, Year 81, No. 18, pp. 344-345. Paris, September 6, 1917.

1056—**The Ventilation of Hay-Ricks.**—MANRIN, G., in the *Journal d'Agriculture pratique*, Year 81, No. 18, p. 347. Paris, September 6, 1917.

1058—**Fuel Alcohol in Australia.**—*The Engineer*, Vol. CXXIV, No. 3222, pp. 278-279. London, September 28, 1917.

The Commonwealth Advisory Council of Science and Industry in Australia appointed a special Committee to investigate the whole question of alcohol and engines. The 1st report of this Committee deals with the construction of an alcohol engine, the supply of alcohol and the denaturation process.

Alcohol engines are already made in America, England, France, and particularly in Germany. Any petrol engine of the ordinary types can be run on alcohol without material change in its construction, but the consumption of fuel per brake H. P. is about 50 per cent greater than in the case of petrol. It appears, however, that the consumption of alcohol per brake H.P. in a specially designed alcohol engine will not exceed in volume the consumption of petrol in a petrol engine. The main alterations necessary in petrol engines to fit them to work on alcohol are: 1) an increased

compression; 2) a pre-heating of either the fuel, or the air, or the mixture of air and fuel; 3) an increase in the area of the fuel jets and fuel supply pipes. In order to start an alcohol engine, the carburetter must be pre-heated, or else a small amount of petrol used. When a temperature sufficient to vaporise the fuel is attained, the alcohol can be gradually turned into the carburetter and the pre-heating of the fuel maintained by the exhaust gases.

The advantages of alcohol are: the products of combustion are practically odourless and free from smoke; the risks in manipulation are much less than when petrol is employed; there are many theoretical chemical and physical reasons why alcohol should yield superior results; there is no danger of pre-ignition under high compression; alcohol is more homogeneous than other fuels; alcohol can be produced in largely increased quantities in Australia.

As alcohol is more efficient in engines of low piston speed and long stroke, the Committee have decided to devote their attention to the design and manufacture of stationary engines.

The problem of distribution of alcohol is not likely to be so serious in the case of stationary engines as for the general adoption of the spirit for motor cars.

The supply of alcohol is the most difficult question, for even if the whole available supply of molasses in Australia were used for distillation, only about 4 million gallons of alcohol could be produced per annum, whereas the annual importations of petrol are about 17 million gallons. About 50,000 tons of molasses are annually produced in Australia of which only a little more than 1/5 is now used for making alcohol. The price of methyl alcohol produced from molasses is about 42 cents per gallon. It appears unlikely that any considerable quantity of alcohol can be manufactured in Australia from either raw, or waste, substances such as waste wood, straw, or waste fruit; cereals or industrial plants such as potatoes and beets might, however, be used.

Various authorities have proposed that alcohol should be used as a fuel in admixture with other materials such as benzine, ether or acetylene. The main advantage from such an admixture would be that the existing types of engines could be started without difficulty. A new fuel called "Natalite" is formed by a patented process in which the ether and alcohol are manufactured together in the form of a mixture, thus obviating the necessity for first producing the alcohol, and then manufacturing the ether from it. The Committee are making enquiries with a view to the production in Australia of suitable materials to be used as an admixture with alcohol, and as to the efficiency of the various admixtures. The Committee suggest cooperation with the Imperial Motor Transport Council, London, for the purpose of obtaining a denaturant for alcohol which will be generally acceptable throughout the British Empire.

RURAL ECONOMICS

1061—**A Survey of Beet-Producing Districts in Minnesota.**—PECK, F. W., in *The University of Minnesota Agricultural Experiment Station, Bulletin* No. 154, pp. 1-36. University Farm, St. Paul, Minn. February, 1917. (3 pp. in Institute Bulletin).

AGRICULTURAL INDUSTRIES

1067—**The Degree of Bolting: Food Value and Digestibility of Bread, Better Utilisation of Wheat.**—I. LAPICQUE, LOUIS, in *Comptes rendus des Séances de l'Académie des Sciences*, Vol. 165, No. 13, pp. 413-415. Paris, September 24, 1917.—II. BERTRAND, GABRIEL, *Ibid.*, Vol. 165, No. 14, pp. 438-440. Paris, October 1, 1917. (2 pp. in Institute Bulletin).

1068—**Method for Estimating Bran in Flour and Bread.**—LEGENDRE, R., in *Annales des falsifications et des fraudes*, Year 10, Nos. 105-106, pp. 293-296. Paris, July-August, 1917.

1069—**The Use of Brewers' Yeast in Bread Making.**—BAKER, J., in the *Journal of the Society of Chemical Industry*, Vol. 36, No. 14, pp. 836-839. London, July 31, 1917, and in *Brasserie et Malterie*, Year 7, No. 13, pp. 198-203. Nancy, September 20, 1917.

1070—**The Use of Calcium Glucosates in Bread-Making.**—LE ROY, G. A., in

Comptes Rendus des Séances de l'Académie des Sciences, Vol. 165, No. 13, p. 416. Paris, September 24, 1917.

Calcium glucosates may advantageously be used in the place of lime-water in order to improve, from the point of view of taste, food value and keeping quality, bread made with flour of a high bolting percentage, such as the 85% flours compulsory in France at the present time.

The glucosates are prepared by the digestion, in the cold, of an aqueous solution of commercial glucose (free from the traces of arsenic sometimes found in these products) with milk of lime. After filtration a clear solution of glucosates is obtained which, according to the respective proportions used, contains 1 part of calcium to every 1 or 2 parts of glucose. As these solutions may be made fairly concentrated, they are easier to use in bread-making than lime-water, the aqueous solution of which can only contain about 1 gramme of calcium per litre.

In his experiments, the Author used for 100 kg. of 85% flour kneaded with the usual quantities of water, yeast and common salt, quantities of glucosate solution representing 100 grm. of glucose and 50 grm. of calcium. This corresponds to about 1 grm. of glucose and 0.5 grm. of calcium per kg. of bread made.

The bread thus made was of a better quality than that made with lime-water under the same conditions. Fermentation, which appears to be slightly retarded with lime-water, seems, on the contrary, to be accelerated by the glucosate.

1074—**The Sterilization of Milk by the Lecomte Method; Tests made in Holland.**—I. *In en Uitvoer*, Year 2, No. 30, pp. 646-647. Amsterdam, July 25, 1917.—II. *Nederlandsche Weekblad voor Guivelbereiding en Veeteelt*, Year 23, No. 19, p. 1 Doetlinchem, August 7, 1917.

1076—**Cooling Milk on the Farm.**—HUNZIKER, O. F., MILLS, H. C., and SWITZER, H. B., in *Indiana Station Bulletin* No. 188, pp. 1087-1118, figs. 16. Lafayette, Indiana, 1916: *Summarized in Experiment Station Record U. S. Department of Agriculture*, Vol. 35, No. 9, pp. 874-875. Washington, D.C., 1917.

1077—**Causes of Variation in Cream Tests.**—WIANCKO, T. A. F., in *The Agricultural Journal of the Department of Agriculture of Victoria, B.C.*, Vol. 2, No. 5, pp. 86, 95, 98. Victoria, British Columbia, July 1917. (4 pp. in Institute Bulletin).

1079—**Chemical Changes Observed in Silage in the United States.**—I. DOX, A. W., and PLAISANCE, G. P. in *The Journal of the American Chemical Society*, Vol. XXXIX, No. 9, pp. 2078-2087. Easton, Pa., September 1917.—II. PLAISANCE, G. P., (Id.). *Ibid.*, pp. 2087-2088.

1080—**Live Stock Market Review in the United States for 1916.**—NELSON, W. L., in *Missouri State Board of Agriculture, Monthly Bulletin*, Vol. XV, No. V, pp. 1-24. Columbia, Mo., May 1917.

PLANT DISEASES

1084—**Fungi, Insects and Animals Injurious to Cultivated Plants, Observed in Denmark in 1916.**—LIND, J., ROSTRUP, S., and KOLPIN, *R. F.*, in *Tidskrift for Planteavl*, Vol. 24, Pt. 2, pp. 229-254. Copenhagen, 1917. (2 pp. in Institute Bulletin).

1086—**Soil Fungi Injurious to Cultivated Plants in the New York Botanical Gardens.**—SEAVER, F. J., in *Journal of the New York Botanical Gardens*, Vol. XVIII, No. 212, pp. 186-188. Lancaster ter, Pa., 1917.

1087—**Over-Wintering of the Apple-Scab Fungus, Venturia inequalis, in Canada.**—FRASER, W. P., in *Science*, New Series, Vol. XLVI, No. 1186, pp. 280-282. Lancaster, Pa., 1917.

Though it is generally known that the scab disease of the apple caused by the fungus *Venturia inequalis* sometimes attacks the young twigs of susceptible varieties of the apple, yet not much has been published on this phase of the disease in North America.

Morse and Darrows have shown that the conidia of this fungus survived the winter on apple twigs and germinated readily in the spring. They found no evidence, however, that the mycelium exists during the winter as a living stroma and produces conidia in the spring. Wallace also reviews the literature on the persistence of the stroma on the twigs and the hibernation of the conidia, and is convinced that twig infection is not of common occurrence, and that the conidia cannot withstand winter temperatures.

The writer's attention was first called to scab disease on the young shoots of the apple in the autumn of 1915, when a number of badly diseased twigs of a McIntosh apple tree were sent for determination by Dr. E. W. Henderson, of Mansonville

(Quebec). The twigs were defoliated for several inches from the tips and the leaves that remained below showed a very severe attack of scab. The twigs were severely injured, many of them being in a dying condition. The bark was studded with the pustules of the scab disease and abundant conidia were present. Another collection was sent by Dr. Henderson a few weeks later, but many of the twigs were now dead and few conidia remained.

Another collection of diseased twigs was received about April 1, from Prof. Shaw, collected at Truro Agricultural College, N.S., also from a McIntosh tree. Many of these twigs were killed back several inches, while abundant pustules of the scab were present in both dead and living bark.

The affected twigs showed the characteristics described by Morse and Darrows. The bark was more or less thickly studded with light brown spots which examination showed to be blister-like areas due to the death and pushing out of the epidermis of the twigs. Many of these light-brown areas were roundish, or oval, with a dark centre. A number, however, lacked the dark central area. Pieces of the diseased bark were removed, embedded in paraffin, and sectioned, and the sections and diseased twigs examined. A well developed stroma was present, with many conidia beneath the raised epidermis. The dark centre was composed chiefly of the conidiophores of the fungus, the exposed conidia having fallen away.

Dr. Henderson and Prof. Shaw were asked to forward diseased twigs collected about blossoming time. The collection from Prof. Shaw was received about June 1st. A few inches of the tips of some of the twigs were dead, but the bark of the living parts and of the living twigs contained many scattered pustules of the apple-scab actively producing conidia, the pustules being olive-green from the abundant conidia. The dead parts of the twigs were thickly covered with scab pustules from the previous season, but the stroma were dead, or not producing conidia.

Fresh conidia, placed in hanging drops of distilled water, germinated as freely and vigorously as conidia obtained a short time later from the young leaves of an apple in the orchard. Pieces of the bark containing live pustules were fixed, embedded in paraffin, and sectioned. The stroma was very well developed, reaching a maximum thickness of 200 u, while the maximum thickness of the stroma on the fruit was about 55 u. It was also evident that the stroma was actively producing conidia at the time of fixation.

In 1915, Mr. A. G. Turney described the scab as being troublesome in the twigs of susceptible varieties, and states that in one orchard all the twigs of the previous year's growth of the Fameuse were covered with scab spots. He also found the amount of scab on the fruit was much reduced by trimming off the diseased twigs early in the spring. He had previously failed to control scab in this orchard by spraying. Mr Turney states, in a letter to the writer, that the scab is quite common in the coastal regions as a twig infestation, and it may be found also in almost any orchard inland, but rarely so bad as to be a serious hindrance to growth.

Prof. Shaw has informed the writer that he found severe twig injury from scab in several different regions in Nova Scotia. The twigs collected at Mansonville, Quebec, at blossoming time by Dr. Henderson did not show any living pustules, but as few of them had been cut back into the living wood, the negative evidence was not satisfactory.

The twigs that had been received from Truro, N.S., about April 1st were left about 8 weeks in the laboratory under ordinary conditions. Conidia were then taken from the scabbed areas and were tested in hanging drops of distilled water for germination. A small percentage was found to germinate. A second test gave the same result. The spores were taken from beneath the blistered bark, so that they had a certain amount of protection from the cold and from drying.

The writer is convinced from these experiments and observations that, in certain regions near the coast, apple scab may winter on the twigs of susceptible varieties such as "Fameuse" and McIntosh as a dormant stroma and produce abundant conidia in the spring. He also confirms Morse and Darrow's conclusion that, under certain conditions, and with certain varieties of apple, diseased twigs and rain may be an important factor in the propagation and spread of the disease.

J. S. Dash, who has devoted some time at Quebec to the study of apple scab, collected scabby apples early in the spring that had lain under the snow all the winter, and found that about 5 to 10 per cent of the conidia germinated.

On November 27, 1916, the writer collected scabby apples that had remained under the trees after their fall without protection of any kind. During late autumn, and early winter, the temperature fell below the freezing point 15 times, rising above it during the day.

There were 2 periods of severe frost followed by mild weather, the minimum temperature of the first being 11° F., and of the second (November 26) being 1° F. Conidia were abundant on the scab spots and these were placed in hanging drops of distilled water. The spores germinated vigorously and freely, and in 24 hours showed many germ tubes over 100 u in length.

More than 26 per cent of the conidia placed in hanging drops of distilled water

germinated. Only those with well-developed germ-tubes were counted. There could be no doubt whatever that the germ tubes had developed while in the water.

It would seem from these observations, that the conidia are more resistant to low temperatures than is generally supposed. The writer hopes to carry on further experiments along this line during the winter and spring.

1096—**Bacterium Pruni, Injurious to Peach and Plum Trees in the United States.**—ROBERTS, JOHN W., in *United States Department of Agriculture, Bulletin* 543, pp. 1-7. Washington, D.C., 1917.

INJURIOUS INSECTS

1108—**Mites Attacking Orchard and Field Crops in Utah, United States.**—DOANE, R. W., in *Science*, New Series, Vol. XLVI, No. 1182, p. 192. Lancaster, Pa., 1917.

During the summers of 1915 and 1916, certain mites were found to be particularly abundant and destructive to grain in Utah.

The most important of these was the common *Tetranychus bimaculatus* Harvey, Which Ewing believes to be the same as *T. telarius* Linn., which, as has already been pointed out, is an important pest on a surprisingly large number of crops. In 1916, it was so abundant in orchards that many cherry trees were completely defoliated before the end of August, and apricot, pear, plum and apple trees were only a little less seriously affected.

Raspberry and currant bushes suffered severely, some of them losing all their leaves.

Peas, beans, tomatoes and other kinds of kitchen-garden produce showed more or less injury in all stages of their development. In one field of sugar beets, the writer found many leaves drying and turning brown on account of the attacks of this mite.

The loss of the foliage of many ornamental plants, while not of so much economic importance, was very annoying.

Maize probably suffered more than any other field crop. In many fields practically every plant suffered the loss of some of its leaves, and in other places all the leaves turned brown and became thoroughly dry because of the presence of myriads of mites on their lower surfaces. The parts of the fields where the soil was lighter and drier usually suffered most, but no parts seemed to be immune from the attacks of this pest. The suckers and lower leaves were the first to be attacked and to show brown spots or streaks. When the trouble went no further it was of but little economic importance, but when the upper leaves were attacked and practically all destroyed, the plant withered and was not even good for fodder.

Many wheat fields also sustained considerable losses due to the attacks of the same mite. The wheat plants would be usually attacked a short time before the head burst from beneath the sheath, and when the infestation was bad, the leaves would become dry and brown at the point of attack and the portion of the leaf beyond this would droop and dry out. Often all the leaves were affected in this way, and the heads, if they developed at all, were small and poorly filled.

Earlier in the season, while the wheat plants were much smaller, they were often attacked by two other species of mite. One of these is the well-known clover mite, *Bryobia pratensis*, while the other, which is known as the jumping mite, was first named *Tetranychus longipes* by Banks who now places it with two others in a new genus, *Tetranobia*.

In fields where *T. longipes* is abundant, the leaves turn distinctly grey, and many of them become so dry, that the growth of the plant is seriously affected.

Both *B. pratensis* and *Tetranobia longipes* were found destructively abundant not only on wheat, but on barley, oats, and many wild grasses.

THE CALIFORNIA FEDERATION OF FARMERS' CO-OPERATIVE MARKETING ASSOCIATIONS

At a metting held last October in the offices of the State Market Director in San Francisco the final organization was effected of the California Federation of Farmers' Co-operative Marketing Associations. The associations which joined it were the California Prune and Apricot Growers, the California Associated Olive Growers, the California Peach Growers, the California Associated Raisin Company, the Central California Berry-growers' Association, the Sebastopol Apple Growers'

Union, the Poultry Producers of Central California and the Poultry Producers of Southern California. Several associations are still considering the advisability of joining and it is expected that some of them will decide in favour of doing so. They are the Rice Association, the Dairy Association, the Almond Exchange, the Walnut Association, the California Fruit Exchange and the California Fruit Growers' Exchange. The Market Director states that the Citrus Exchange wishes to keep in touch with the federation but to remain outside it for the present.

The Market Director intimates that the following are the objects of the federation, which is managed by an executive committee:

"To secure co-operation on all problems of common interest.

"To secure an interchange of thoughts, ideas and experiences.

"To secure collective data on forms of organization and the dissemination of information relative to laws proposed and adopted, opinions and judgments of courts, commissions and tribunals involving the scope and limitation of the activities of co-operative marketing associations.

"To develop plans for the further elimination of waste in the cost of distribution of products.

"The joint employment of brokers or salaried agents at Eastern marketing points.

"The joint employment of an all-year-round sales organization for the American home markets for the various California farm products, in their respective seasons, to be handled through the established channels or otherwise.

"The joint employment of demonstration organizations to aid, encourage and educate the retail dealers throughout the country to specialize on California food products.

"Joint effort in national publicity and educational advertising.

"Development of foreign markets by the joint creation of foreign-sales organizations.

"To suggest and carry out plans for more favourable State and Federal legislation in the proper interest of California farm products.

"Favourable Federal tariffs affecting California farm products and joint opposition against the enactment of possible harmful or unfair tariffs.

"To develop plans for the collective purchase and production of supplies used by all or several of the associations.

"To develop plans for co-operation in securing proper transportation and proper transportation rates and facilities.

"To develop plans for securing financial accommodations in the primary financial markets at the lowest possible interest rates.

"To develop plans for creating and maintaining a labour bureau or other methods for handling the labour problems of farmers and marketing associations.

"To suggest and do any and all proper things which, at any time or place, may be advantageous and beneficial to co-operative marketing associations in general and to the member associations in particular."

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the December number of the International Review of Agricultural Economics. Persons interested in any of the articles in this list may obtain the original Bulletin on application to the Institute Branch, so long as the supply for distribution is not exhausted:

AGRICULTURAL STATISTICS

CONDITION OF THE NEW CEREAL CROPS

According to the March number of the International Crop Report, the area sown to winter wheat was for the sum of the European countries brought under review, a greater one than in the previous season, and further that this increase is far from being negligible. In Denmark, where 141,000 acres were sown, the increase is 2.4 %, in France the increase is 7.5% or 790,000 acres, with an aggregate area of 11,359,000 acres winter sown in 1917. In England, Scotland and Luxemburg, with areas of much less importance, the additions were respectively 15%, 21.8%, and 4.8%. Spain is alone in reporting a decrease; the winter sowings have taken place on an area of 9,672,000 acres, which is less by 5.6% or 573,000 acres than the corresponding area in the previous year.

In Asia, winter sowings were considerably larger. In British India they took place over an extent of 33,911,000 acres as regards wheat, against 30,924,000 acres in the previous year, affording an increase of 9.7%. In Japan the advance was 18% with an area of 1,457,000 acres of winter wheat. Finally in Tunis the increase reaches 13.2%, winter wheat being sown on 1,483,000 acres as compared with 1,310,000 in 1916-17.

As regards crop conditions, speaking generally, it may be affirmed that the season has been favourable so far, having been noted for fine dry and mostly mild weather. According to the reports furnished by the various agricultural administrations with respect to the state of the crops on March 1st and February 1st, 1918, they were good in Spain, France and Great Britain, fairly good in Switzerland, average in Ireland, Italy and Egypt and poor in Japan.

This bulletin also includes the latest information to hand as regards the crops of 1917-18 in the Southern hemisphere. The wheat crop of Uruguay is now estimated at 12,861,000 bushels or 238.6% of the crop of 1916-17, an increase of 7,450,000 bushels, and 191.6% of the average (1911-12 to 1915-16), an increase of 6,150,000 bushels. The Australian wheat crop is estimated at 122,586,000 bushels, or 80.6% of the crop 1916-17, a decrease of 30,000,000 bushels, and 130.0% of the average yield, an increase of 28,000,000.

CROP PROSPECTS IN THE UNITED KINGDOM

(Summarized from "The Statist", London, April 6th.)

Some preliminary official observations as to agricultural conditions and prospects in the United Kingdom were recently issued. The weather has generally been fine, though rain was somewhat too plentiful in many districts in the North of England. The mildness of February induced many farmers to plough more land than usual, since the ground was not in the wet, saggy condition usual at that time of the year. Agricultural labour has been very scarce, particularly on this side of the Channel, and it was very difficult to get land turned early.

The crop reporters indicate that the area under winter wheat will probably show an improvement. The mild weather of the last few months has been favourable to condition. Winter wheat seems to have been put in on a more extensive scale than hitherto in Ireland. In some places fear is expressed that it has developed too rapidly and is now too forward for the time of the year. Taken all around, conditions are much better than at this period last year, when the prolonged frosts and snows had inflicted much damage to the crop.

Spring-sown wheat and oats are more common in the British Isles, and the sowings are usually completed by the end of March or of the first fortnight in April. The weather for the past few weeks has been very propitious for making seed-beds, as it was possible to work the soil thoroughly. The alternation of rain and sunshine provided the moisture and the warmth which are necessary to successful germination. Farmers who have planted their seed in ground that has been at all well prepared should receive a bumper return if all goes well between now and the harvest. It is not at present possible to estimate the area under the different crops, wheat, oats, and barley, but reports from most districts indicate that they will show an increase at the expense of the area under clovers and rotatory grasses. In many cases a second cereal crop is being sown, and it is here that we see the strongest justification for the insistence of the Boards of Agriculture on the breaking up even of fine-quality pasture land.

The recent news in regard to conditions in agricultural Russia is particularly bad. According to the Central Committee of Economic Organization, set up by the present Russian Government, the disturbances following on the political upheaval have been so severe and widespread that the total crop area this year will be only 30% of the average.

UNITED STATES APRIL CROP REPORT

According to the April report of the United States Department of Agriculture winter wheat production in the United States this year will be about 560,000,000 bushels. The forecast indicates an increase of 142,000,000 bushels of winter wheat over last year's winter crop, which was 418,000,000 bushels. Assuming the spring wheat crop will yield the same ratio of increase, there will be a total crop of 850,000,000, or an increase of about 200,000,000 bushels over last year, when the entire crop was estimated at 651,000,000. The condition of the crop on April 1st was 78.6% of a normal.

Rye acreage last autumn showed a 36 per cent increase over the previous year, with 6,119,000 acres planted. The condition of the crop on April 1st was 85.8 per cent of a normal and the forecast of production made at that time was 86,000,000 bushels. Last year's production was 60,145,000 bushels. This is an increase of 26,000,000 in the prospective rye crop, making a total prospective increase over last year of about 225,000,000 bushels of bread grains.

BROMHALL'S FOREIGN CROP CABLE, APRIL 16TH

United Kingdom.—Weather has been good and winter crops as a result have been making rapid progress with conditions very favourable. Sowing continues on an enlarged scale, and much spring corn has already been seeded. Farmers are also busy with barley and oats. Native offerings are gradually increasing.

Scandinavian Countries.—Crop conditions fair and weather is now more favourable. Supplies are very moderate and arrivals of foreign sorts small.

Algeria.—Weather has been cold and dry, but the crop outlook is fair and a good area has been planted. Recent rains have been reported, and these will be very beneficial.

Balkan States.—Reports are good and weather continues favourable. Sowing of corn is under way, with prospects maintained and outlook satisfactory.

Russia.—Weather is still reported as being cold, which is having a tendency to retard sowing operations. Prospects are unsatisfactory. Crop advices are conflicting.

Italy.—Crop conditions continue to be reported as favourable with weather good. Some coldness, and rain were experienced, but this did no damage, and the young crops present a very favourable appearance. It is expected that the spring wheat acreage will be larger. Supplies are more or less scanty, but the outlook is more hopeful.

Spain.—Weather conditions are said to be generally favourable for crops as fair rains have been reported, which were beneficial. Supplies are coming forward more regularly.

North Africa.—Prospects are now generally favourable as a result of good precipitation.

PUBLICATIONS WANTED

The International Institute Library, Dept. of Agriculture, Ottawa, Canada, requires the following publications to complete files. Donations of any of them will be much appreciated.

B. C. Dept. of Agriculture, Bulletins 1 to 6, 9, 10, 13 to 19, 23, 47.

B. C. Dept. of Agriculture, Agricultural Department Circular 3.

B. C. Dept. of Agriculture, Live Stock Branch, Circular bulletins 9, 16, 17.

Canada, Health of Animals Branch, Farmers' Bulletins 3 & 6 (1899).

N. B. Dept. of Agriculture, Soils and Crops Div. Leaflet 1; Soils and Crops Div. Circs. 1 & 2; Horticultural Div. Bulletin 1.

N. S. Dept. of Agriculture, Bulletins 1 & 2.

Ontario Agricultural College, Bulletins 1-99.

Saskatchewan, Dept. of Agriculture, Bulletins 1, 3, 4, 5, 8.

International Agricultural Institute. Bulletin des renseignements agricoles et des maladies des plantes, Nov. & Dec. 1910 (French edition).

International Agricultural Institute, Bulletin des institutions économiques et sociales, Dec. 1910 (French edition).

Vol. 5, No. 6 June, 1918

DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

The Agricultural Gazette

of Canada

EDITOR: J. B. SPENCER, B.S.A.

Issued by direction of

THE HON. THOS. ALEXANDER CRERAR

Minister of Agriculture

OTTAWA

GOVERNMENT PRINTING BUREAU

1918

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THE INTERNATIONAL INSTITUTE OF AGRICULTURE

The Agricultural Gazette

OF CANADA

VOL. V JUNE, 1918 No. 6

THE AGRICULTURAL GAZETTE of Canada is published monthly, in English and in French, by the Dominion Department of Agriculture. It is not intended for general circulation. A limited number of copies, however, are available to subscribers at $1.00 per annum, or 10 cents per copy.

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THE DISTRIBUTION OF PURE-BRED MALES

THE live stock of Canada, numbering in 1917, 13,526,219 and valued at a billion dollars, is the right arm of her agriculture, and yet we have much to learn of the value of the improved sire, and until we learn more of that lesson we shall sacrifice much in feed and effort. The farm survey carried on last year by the Ontario Department of Agriculture in Caledon township, and reported in THE AGRICULTURAL GAZETTE for May, showed that of the sires used only about twenty-three per cent were pure-bred. The study included horses, cattle, sheep, and swine, and showed that only in draught horses were no grade sires patronized. It is fair to assume that a similar survey would reveal a corresponding state of affairs in most of the advanced sections of Canada, and in many places a much greater use of unimproved blood.

In critical times like the present, the selection and proper use of good sires become more urgent and the elimination of grade sires as far as practicable more important. No less an authority than the late Amos Cruickshank once remarked that the bull is often ninety per cent of the herd, while Mr. John Gosling, another live stock sage, has stated that "the bull is half the herd, and if he is a bad one he is all of it."

It was a realization of the value of the pure-bred sire that led the Minister of Agriculture and the Live Stock Commissioner to inaugurate and pursue the policy providing pure-bred males for the use of societies in outlying districts. This service, which was established five years ago, has made available to farmers in districts scattered from coast to coast upwards of 150 stallions, 2,000 bulls, 1,600 rams, and 450 boars. Nor is this work confined to the federal Department, as the provinces are active in pursuing policies of organized distribution. The stories of their efforts, which are published in Part II of this number, reveal a hopeful future for the industry.

Another agency that indicates progress in the industry is the registration of pedigrees. The number recorded in 1917 was 61,322, which is fifty per cent higher than for the twelve-month period five years ago, and never in the history of pedigree registration has the National Live Stock Records organization been so busy as it has been in 1918.

THE CULTIVATION OF FLAX

IN the House of Commons on April 29th, the member for East Middlesex introduced a motion having for its object the increased cultivation of flax in Canada. Dealing with the subject, after the member for East Middlesex had explained his motion, the Honourable the Minister of Agriculture said in regard thereto:

There is no doubt whatever that our soil and climate are admirably adapted to the growing of flax for fibre purposes. That has been proven by years of successful growing in certain localities in which in the earlier days of the country's development the settlers found it necessary to grow flax in order to supply themselves with a good deal of the clothing they required. Impressed with the importance of the industry in Canada, the Department of Agriculture several years ago undertook certain experimental work in respect to it. That experimental work covered practically the whole development of the industry from the growing of the flax to the manufacture into twines. In carrying on this work the Department have grown experimental plots of flax in practically all of the experimental farms and stations in Eastern Canada. They have found that it can be grown very successfully, and I believe that the records show that the Gaspe peninsula produces perhaps the best quality of fibre grown in Canada. Flax has also been grown in Western Canada. It cannot, however, be grown so successfully there for fibre purposes; the climate appears somewhat against it.

The experimental farms have carried the work further. They have, on a small scale, quite an up-to-date set of machinery for carrying on the various operations of preparing fibre from the straw. In that way we are endeavouring to ascertain, first, the district from which the best fibre can be secured, and, second, the relative cost of turning it into the finished article in each district. That work will be of great advantage to the farmers of Canada who will be growing this flax later on.

That the minds of our farmers have been turned to the growth of this plant for fibre purposes is evidenced by the fact that the acreage planted for fibre purposes is steadily increasing. In Western Canada we have grown flax in quite a large way for seed. The flax crop of Western Canada has run in yield of bushels from fifteen to twenty million per annum, and the results have been very satisfactory.

Experiments have for several years been carried on with the ripened straw that results after threshing out the seed. This straw is ripened, and it has never been considered of any practical value for fibre purposes. Experiments, however, have proven beyond any question of doubt that it can be converted into twines. I have in my office several samples of twine that have been manufactured in the city of Regina from fibre taken from flax straw. The product varies from fine hard twine, quite suitable for sewing harness and that sort of work, to coarser twine suitable for replacing ordinary binder-twine.

Last year the crop of flax straw in Western Canada amounted to about 1,500,000 tons. Experiments have shown that each ton of flax straw will produce 270 pounds of twine in its various forms. If all that flax straw were converted into twine, it would produce something over 300,000,000 pounds of twine. Canada annually uses something like 60,000,000 pounds of binder-twine. Our source of supply is from two countries, the Philippine Islands and the province of Yucatan, in Mexico, and if those sources of supply for the raw material the manila, and the sisal, were cut off, it would leave the farmers of Canada, particularly those of Western Canada, where they are engaged in grain growing on such a large scale, in a bad position. Consequently it is a matter of the very greatest importance to consider how this at present wasted material can be utilized to ensure an adequate supply of twine to bind our crops. And if we can convert waste material into useful product, we are simply getting that much further ahead in an economic way. That phase of the question, in my judgment, is one of very great importance.

If we survey the whole field again we shall find that probably the successful growing of flax for fibre purposes in Canada depends upon the cheapness of the labour we can secure. If we can replace manual labour by mechanical power, by the discovery and development of machines that will pull the flax, we certainly have all the natural facilities for a splendid development of this industry.

REGULATIONS REGARDING MIGRATORY BIRDS

ADOPTED BY ORDER-IN-COUNCIL UNDER THE MIGRATORY BIRDS CONVENTION ACT

IN THE AGRICULTURAL GAZETTE, Vol. 3, No. 12, December, 1916, pages 1032-1036, an account was given of the international convention for the protection of migratory birds in the United States and Canada. The convention was put into effect by the passage of the Migratory Birds Convention Act, which was assented to on August 29th, 1917. Under the provisions of Section 4 of this Act, Regulations were passed by Order-in-Council on April 23rd for the protection of migratory game, migratory insectivorous, and migratory game birds which inhabit Canada during the whole or any part of the year.

Special attention is directed to Regulation 3, which affords permanent protection to migratory insectivorous birds. These birds constitute one of the most important natural checks on the increase of insect pests, and their protection is, therefore, of special importance, as a means of aiding increased production by securing increased crop protection.

The Regulations, which follow, prohibit spring shooting, which has been an important factor in the reduction of our migratory wild fowl and other game birds:—

Definition.

1. In these regulations, unless the context otherwise requires:—

(*a*) "Migratory game birds" means the following:

Anatidæ or waterfowl, including brant, wild ducks, geese and swans;

Gruidæ or cranes, including little brown sandhill and whooping cranes;

Rallidæ or rails, including coots, gallinules and sora and other rails;

Limicolæ or shore-birds, including avocets, curlew, dowitcheres, godwits, knots, oyster catchers, phalaropes, plovers, sandpipers, snipe, stilts surf birds, turnstones, willet, woodcock, and yellow-legs;

Columbidæ or pigeons, including doves and wild pigeons;

(*b*) "migratory insectivorous birds" means the following:—

Bobolinks, catbirds, chickadees, cuckoos, flickers, fly-catchers, grosbeaks, humming birds, kinglets, martins, meadowlarks, nighthawks, or bull bats, nuthatches, orioles, robins, shrikes, swallows, swifts, tanagers, titmice, thrushes, vireos, warblers, waxwings, whippoorwill, woodpeckers, and wrens, and all other perching birds which feed entirely or chiefly on insects;

(*c*) "migratory non-game birds" means the following:—

Auks, aucklets, bittern, fumars, gannets, grebes, guillemots, gulls, herons jaegars, loons, murres, petrels, puffins, shearwaters, and terns.

Close Seasons:

2. No person shall kill, capture, injure, take, molest, sell or offer for sale any migratory game birds during the following periods:

Ducks, Geese, Brant or Rails.

In Prince Edward Island, New Brunswick, Quebec, Ontario, Alberta, British Columbia, (northern district), North-west Territories and Yukon Territories,
December 15 to August 31, both days inclusive.

In Manitoba:—
December 1 to September 14, both days inclusive.

In Nova Scotia, Saskatchewan and British Columbia (south-eastern district):—

January 1 to September 14, both days inclusive.

In British Columbia (south-western district):—

January 15 to September 30, both days inclusive.

Shorebirds or Waders, including only the following:

Woodcock, wilson or jack snipe, black-breasted and golden plover, and the greater and lesser yellow legs:—

In Prince Edward Island, Nova Scotia, New Brunswick, and in the counties of Saguenay, Rimouski, Gaspe and Bonaventure in Quebec:

December 1 to August 14, both days inclusive,

Except that on woodcock and wilson or jack snipe the closed season in Prince Edward Island and New Brunswick shall be from December 1 to September 14, and in Nova Scotia from December 15 to August 31, both days inclusive.

In Quebec, other than the aforementioned maritime counties, Ontario, Alberta, British Columbia (northern district), North-west Territories and Yukon Territory;

December 15 to August 31, both days inclusive,

Except that on woodcock and wilson or jack snipe, the close season in Ontario shall be from November 15 to October 14, both days inclusive.

In Manitoba:

December 1 to September 14, both days inclusive.

In Saskatchewan and British Columbia (south-eastern district):

January 1 to September 14, both days inclusive.

In British Columbia (south-western district):

January 15 to September 30, both days inclusive.

Provided, however, that:

Indians and Eskimos may take scoters or "Siwash Ducks" for food at any time of the year, but scoters so taken shall not be sold.

In this or any other regulation the southern limit of the northern district of British Columbia shall be, west to east, a line running by way of the middle of Dean Channel, Dean River, Entiako River, Nechako River and the Fraser River from Fort George to Yellowhead Pass; and the line of division between the south-eastern and the south-western districts of British Columbia shall be the summit of the Cascade Range as defined by the British Columbia Interpretation Act, Revised Statutes, 1911.

Permanent Protection of Insectivorous Birds.

3. The killing, capturing, taking, injuring, or molesting of migratory insectivorous birds, their eggs, or nests, is prohibited throughout the year, except as hereinafter provided.

Protection of Migratory Non-game Birds.

4. The killing, taking, injuring, capturing or molesting of migratory non-game birds or their eggs or nests, except as herein or hereinafter provided, is prohibited throughout the year; Provided, however, that Indians and Eskimos may take at any season auks, auklets, guillemots, murres and puffins and their eggs for human food and their skins for clothing, but birds and eggs taken in virtue of this exemption shall not be sold or offered for sale or otherwise traded.

Close Season for Ten Years on Certain Migratory Game Birds.

5. A close season shall continue until the first day of January, 1928, on the following migratory game birds: band-tailed pigeons, little brown, sandhill and whooping cranes, swans, curlew and all shore birds (except the black-breasted and golden plover, wilson or jack snipe, woodcock, and the greater and lesser yellowlegs. In the province of British Columbia during such period the close season on cranes, swans, and curlew, shall be made by the proper authorities of that province within the general dates and limitations elsewhere prescribed in these regulations for the respective groups to which these birds belong, or greater restrictions on the hunting of these birds shall be made should the aforementioned authorities deem such further restrictions desirable as provided by Article III of the Convention between His Majesty and the United States of America, scheduled to chapter 18, 7-8 George V.

Close Season for Five Years on Wood Duck and Eider Duck.

6. A close season shall continue until the first day of January, 1923, on the wood duck and eider duck, except that in the province of British Columbia, the wood duck shall be protected by such special means or regulations as the proper authorities of that province may deem appropriate, as provided by the convention referred to in clause 5.

Prohibition of Taking Eggs of Migratory Birds.

7. The taking of the nests or eggs of migratory game, migratory insectivorous or migratory non-game birds is prohibited except as otherwise provided in the regulations.

Permits for Taking Eggs for Scientific and Propagating Purposes.

8. Migratory game, migratory insectivorous or migratory non-game birds or parts thereof or their eggs or nests may be taken,

shipped, transported or possessed for scientific or propagating purposes, but only on the issue of a permit by the Minister or by any person duly authorized by him. Such a permit shall terminate at the end of the calendar year in which it shall have been issued, it shall not be transferable and shall be revocable at the discretion of the Minister.

Such permits may, upon application, be granted to recognized museums, or scientific societies, and to any person furnishing written testimonials from two well-known ornithologists.

Applications for permits for propagating purposes shall be accompanied by a statement giving:

(1) The species of birds or eggs that it is desired to take,

(2) the number,

(3) the place at which the birds or eggs are to be taken.

Any package in which such migratory game, migratory insectivorous or migratory non-game birds, or parts thereof, or their eggs or nests are shipped or transported for scientific or propagating purposes shall be clearly marked on the outside with the number of the permit, the name and address of the shipper and an accurate statement of the contents.

No transportation company shall accept for transportation any package containing eggs, nests, or parts of migratory game, migratory insectivorous or migratory non-game birds unless such package shall be marked as hereinbefore required, and shipment of the same through the mail is prohibited, unless marked as aforesaid.

Prohibition of Shipment of Migratory Birds During Close Seasons Prohibited.

9. The shipment or export of migratory game, migratory insectivorous, or migratory non-game birds or their eggs from any province during the close season in such provinces is prohibited, except for scientific or propagating purposes, and traffic between Canada and the United States in any such birds, or their eggs captured, killed, taken or shipped at any time contrary to the laws of the Province or State in which the same are captured, killed, taken or shipped, is likewise prohibited.

International Shipments of Migratory Birds shall be plainly labelled.

10. No person shall ship or offer for shipment from Canada to the United States any package containing migratory game, migratory insectivorous or migratory non-game birds, or any parts thereof, or their eggs, unless such package shall have the name and address of the shipper and an accurate statement of the contents clearly marked on the outside of such package.

No transportation company shall accept for transportation to the United States, any packages of migratory game, migratory insectivorous or migratory non-game birds, or any parts thereof, or their eggs, unless such packages bear the name and address of the shipper and an accurate statement of the contents, and shipment of the same through the mails is prohibited, unless marked as aforesaid.

Permits to Kill Migratory Birds When Injurious:

11. If any of the migratory game, migratory insectivorous or migratory non-game birds should under extraordinary conditions become seriously injurious to agricultural, fishing or other interests in any particular locality the Minister may issue permits to kill such birds so long as they shall continue to be injurious. Applications for such permits shall include a full statement describing:

(1) the species and an estimate of the numbers of birds committing the damage,

(2) the nature and extent of the damage,

(3) the extent of the agricultural or other interests threatened or involved.

Such permits shall be revocable at the discretion of the Minister. On the expiration of the permit the person to whom it is issued shall furnish to the Minister a written report showing the number of birds killed, the dates upon which they were killed and the disposition made of the dead birds.

No birds killed under such permits shall be shipped, sold, or offered for sale.

Introduction of Foreign Species of Migratory Birds Without Consent Prohibited.

12. No person or organization shall introduce for the purpose of sport or acclimatization any species of migratory birds without the consent of the Minister in writing.

PART I

Dominion Department of Agriculture

THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF HORTICULTURE

EUROPEAN OR VINIFERA GRAPES GROWN IN THE OPEN AT OTTAWA

BY W. T. MACOUN, DOMINION HORTICULTURIST

THE European or Vinifera grapes have been very little grown in Canada. The experience in the Eastern States in attempting to grow them was so discouraging, that, doubtless, the old settlers in the province of Ontario did not feel very enthusiastic about trying them, and as new, vigorous, and hardy varieties of American origin began to be introduced in the early part of the 19th century, there was little inducement to test them. The European grapes must be covered with soil in winter, but, apart from that, they are treated much as the American varieties. They are not recommended to be grown commercially, but for home use only. The oldest record of the successful cultivation of a European grape vine in eastern Canada that we have is that of a vine in the garden of a citizen of Perth, Ont., which is said to have been introduced from Italy nearly ninety years ago. This is an early green grape of the Sweetwater group. This variety is now growing at the Central Farm. The first experience with the European or Vinifera grapes at this farm was in 1900, when cuttings of a variety called "Bonne Madame" were obtained from Mr. D. Matheson, Ottawa, Ont. This variety was obtained by Mr. Matheson from a Roman Catholic institution in Montreal, and it was supposed to have come from Italy. It also is of the Sweetwater group. Two vines of this grape were planted in the vineyard in Ottawa in 1902, and the first fruit was produced in 1905. This variety was found to be one of the earliest ripening sorts in the vineyard, and has continued to be so.

As it was thought that there might be other Vinifera grapes which would ripen at Ottawa, a number of varieties were imported from France and Germany in 1909, and the following is a list of these with notes as to whether they ripen at Ottawa or not:—

Black Alicante.—Does not ripen.

Black Hamburg (Frankenthal).—Does not ripen.

Bonne Madame.—Ripened every year until recently when old vines were destroyed, and the new ones are not in bearing.

Buckland Sweetwater.—Ripens in some seasons.

Chasselas Dore de Fontainebleau (Weisser Gutedel).—Nearly ripens, ripens in some seasons.

Chasselas Gros Coulard.—Ripens in some seasons.

Chasselas Rose Royale.—Does not ripen.

Chasselas Rouge (Roter Gutedel).—Ripens in some seasons.

Chasselas Vibert.—Nearly ripens.

Chasselas Violet.—Nearly ripens.

Foster White Seeding.—Nearly ripens.

Früher Blauer Burgunder.—Does not ripen.

Früher Leipziger.—Ripens in some seasons.

Früher Roter Malvasier.—Does not ripen.

Gamay de Juillet.—Ripens very early, but is very small and not desirable for eating.

Grandiska.—Does not ripen.

Gromier du Cantal.—Does not ripen.

Gros Colman (Dodrelabi).—Does not ripen.
Gros Dore.—Does not ripen.
Lignan Blanc.
Liebert.—Nearly ripens.
Madeleine Angevine.
Madeleine Royale.—Ripens in some seasons.
Muscat Noir.—Does not ripen.
Pearl of Casaba.—Ripens very early.
Peuse (Malaga).—Does not ripen.
Portugais Oben.
Precoce de Malingre.—Ripens in some seasons.
Sauvignon Jaune.

In ad ition to the above a number of varieties were imported from France more recently, none of which have fruited. The best and most promising variety for parts of Canada where the season is as short as at Ottawa is the Pearl of Casaba, a Hungarian variety. Not only is this very early, but it is of good quality and one which is strongly recommended for trial. Following is a description of the fruit:—

Pearl of Casaba: Bunch, length, 5 inches, breadth, 3 inches; form compact; shoulder slightly shouldered; berry, size medium; form round; colour, yellowish green; bloom thin; skin moderately thick, moderately tough; seeds few, usually two, often none; flesh tender, juicy; flavour sweet, sprightly, muscat-like, good; quality good; use, dessert; season very early; evidently not a good keeper. General notes: A very early European grape of good quality.

THE HEALTH OF ANIMALS BRANCH

GARBAGE FEEDING AND HOG CHOLERA

BY FREDERICK TORRANCE, B.A., D.V.S., VETERINARY DIRECTOR GENERAL

THE records of the Health of Animals Branch show that a very close connection exists between garbage feeding and hog cholera. In fact nine-tenths of the outbreaks of this disease in Canada are due to this cause alone. The infective material consists in scraps of uncooked pork, such as rinds, trimmings of meat or fat. Experiments have proved that any such material is extremely dangerous if it comes from a hog slaughtered in the early stages of the disease, and, as such hogs cannot be always detected by meat inspection, there is a constant danger of infective pork. Cooking destroys the infection, and the Department requires that garbage must be cooked before feeding it to hogs. (See Regulation 88¾ of the Animal Contagious Diseases Act given in THE AGRICULTURAL GAZETTE for April, page 350.)

Licenses to feed garbage are only issued to those who have the equipment for properly cooking the garbage and who agree to do so. Under this arrangement we have licensed several hundred garbage feeders, chiefly in the vicinity of cities and towns, and our system of inspection enables us to get early information of the appearance of disease. From the standpoint of protection against disease, the license system has worked well and has reduced our losses to a very great extent.

Recently there has been a demand for another system of protection against disease, namely, by rendering the hogs immune to hog cholera by the double method of inoculation. While this method has dangers of its own, it has been decided to apply it under certain restrictions. These are briefly as follows: The premises must be licensed and situated favourably for the control of the disease should it appear. The owner must agree to observe our regulations, to pay the cost of the serum and virus used, to stand the loss, if any is incurred, as a result of the inoculation, and to sell pigs only for immediate slaughter. The sale of breeding animals to go back to the farm will not be permitted. This is a new departure in the Health of Animals Branch and must be looked upon as a tentative measure, liable to be changed or abrogated if found unsatisfactory.

THE ENTOMOLOGICAL BRANCH

SOME BLOOD-SUCKING FLIES OF SASKATCHEWAN

BY A. E. CAMERON, M.A., D.Sc., TECHNICAL ASSISTANT, ENTOMOLOGICAL BRANCH, DEPARTMENT OF AGRICULTURE

INTRODUCTION

LAST summer (1917) the author in co-operation with Dr. S. Hadwen of the Health of Animals Branch, Department of Agriculture, made a preliminary survey of the blood-sucking flies affecting stock and man in the vicinity of Saskatoon. Because of other important investigations occupying their attention, including the study of bot-flies, and so-called "Swamp Fever," which causes serious losses among horses, the time allotted to the survey was necessarily limited. It is, therefore, proposed to discuss tentatively only a few of the more frequently occurring forms that were encountered within a radius of 50 miles of the city of Saskatoon, Sask. Inasmuch as the environmental conditions existing in this area are fairly representative of those throughout the southern half of the province, the remarks that follow will be found to be more or less applicable to the whole of this region, where wooded bluffs are relatively few and far between. In the northern territory, as yet unexplored by the author, it is not unlikely that in the more sheltered wooded districts, more favourable environmental conditions will prove such as to have an important bearing on the constitution of the fauna of blood-sucking flies, with a probable consequent greater fertility in species numbers. It could not but be remarked that the area studied yielded a surprising paucity of forms especially of horse-flies, although in actual numbers their dominance could not be denied.

Attention was principally paid to the three families known as the Culicidae or Mosquitoes, the Simuliidae or Black-flies and the Tabanidae or Horse-flies, all of which have aquatic larvae.

MOSQUITOES*

Until Knab published his paper "Observations on the Mosquitoes of Saskatchewan," Smithsonian Miscellaneous Collections, Vol. 50, pt. 4, 1908, pp. 540-547, very little was known about the prairie species or their habits. There still remains much to be learned. The great majority of the species of the prairie region of the northwest belong to the genus *Aedes*. These typically northern forms develop in the melting snow-water of early spring.

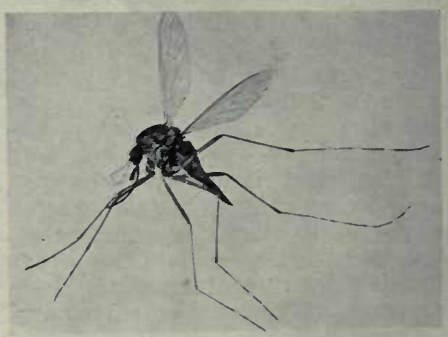

FIG. 1.—This mosquito, *Aedes fletcheri*, is commonly encountered on the prairie during the summer months. When disturbed from its resting place among the grass it will readily attack human beings and stock. Enlarged. (original).

To some, the great abundance of the prairie mosquitoes has presented a puzzling question because of the

* The author desires to express his thanks to Dr. H. G. Dyar of the Smithsonian Institution, Washington, D.C., for kindly identifying the species of mosquitoes.

comparative scarcity of water—essential to mosquito breeding—on the prairies during the summer months. There is only a single annual brood of prairie mosquitoes, and the adults are apparently long lived. The eggs are laid in the late summer on the ground, where they remain until the following spring, when they readily hatch into "wrigglers" in the water produced from the melting snow. Many sloughs persist well into the summer, but frequent investigation during July and August failed to reveal the presence of larvae in these stagnant waters, the first and only generation having departed earlier. Knab, however, found the larvae in large numbers in alkali swamps and ditches in May and June (1907). In one or two instances *Aedes canadensis* Theob. and *Aedes sansoni* D. and K. were particularly prevalent in the immediate vicinity of these sloughs during July. Peculiar to swampy creeks and ravines opening into the Saskatchewan river, one finds *Aedes mimesis* Dyar, *Aedes vexans* Meig., and *Aedes aestivalis* Dyar, all of which are more or less persistent in their attacks on man. *A. canadensis* and *A. sansoni* were occasionally encountered in large swarms when disturbed from their shaded resting places among the grasses in these ravines.

The most widely distributed species on the prairies are *Aedes spenceri* Theob., *Aedes fletcheri* Coq. (Fig. 1) and *Aedes curriei* Coq. The first two are very prevalent around Saskatoon, and it is principally due to their vicious habits that the existence of the prairie inhabitants is rendered almost intolerable at times. They are rarely to be encountered in the towns, although they enter the porches of houses on the outskirts and attack the occupants. Their attacks on stock are equally troublesome, and the provision of protective fly-nets on horses is a wise precaution now generally adopted.

From the nature of the life-history facts here outlined, it will be readily imagined how difficult is the problem of mosquito control on the prairies. None of the species appear to undertake long migratory flights, so that the problem is more or less a local one, but a local one of immense size. Undoubtedly, much could be accomplished in the vicinity of townships by oiling the temporary pools of the early spring wherever larvae are found. The judicious application of kerosene, crude oils of paraffin and asphaltum base will provide a surface film which will readily kill the larvae by suffocation as well as by their toxic properties. An alternative method, which has been employed in anti-mosquito work with great effect, is the application of a preparation known as "larvacide" manufactured according to the following formula*:—

Resin	150 to 200 lbs.
Soda (caustic)	30 lbs.
Carbolic acid	150 gals.

The product readily emulsifies in water, but, unfortunately, brackish or alkali waters render it inert. Combined with its marked toxicity it has the advantage of cheapness, a fact which makes it preferable to the more expensive kerosene oil.

Sloughs near towns might be filled up with refuse wherever possible, the work to be accomplished during the summer and fall in preparation for the thawing of the following spring.

BLACK-FLIES

The virulence of the bite which the species of this family are capable of inflicting is in inverse ratio to their size. In different parts of the continent they are known variously as "buffalo-gnats," "turkey-gnats," and "sand-flies," but the designation of black-flies is by far the most suitable in that it is not so narrow in its content as the others, each of

* Le Prince, J. A., and Orenstein, A.J., Mosquito Control in Panama, New York, 1916, p. 174.

which emphasises one particular habit of a single or limited number of species.

In the early stages of their life-histories black-flies are aquatic, and their gregarious, greenish-gray larvae (Fig. 2) are to be found attached to stones in the rapids of streams and rivers. They maintain their position in spite of the current by means of a suctorial disk at the posterior end of their body, and by means of the peculiarly adapted head-fans they contrive to sweep minute vegetable organisms such as diatoms and desmids into their mouths. Should they, by any chance, become dislodged from the security of their position, they have the power of secreting from the mouth, a silk-thread. By fixing it to a stationary object, the chances of their being washed downstream before they encounter another suitable anchorage are considerably decreased.

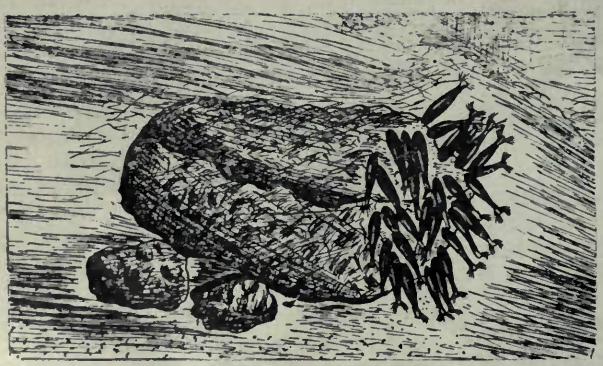

FIG. 2.—Larvae of black-fly, *Simulium similis* Mall., attached to the surface of a stone in the bed of a rapid stream. About natural size. (Original).

Before pupating the larva spins a closely woven slipper-shaped cocoon, open anteriorly. It is securely fixed to the stones, and the thread-like breathing filaments are exposed.

The velvety black flies lay their eggs on the exposed surfaces of stones or weeds, and some penetrate beneath the surface to deposit their eggs on the water-washed surface of stones. The whole life-history occupies a period of about six weeks.

We were able to witness how intense is the annoyance and injury inflicted on cattle by the persistent and tenacious attacks by myriads of these black-flies. At the beginning of July the species most abundant was *Simulium similis* Mall. (Fig. 3). On the evening of July 4 some cows staked out on the prairie in close proximity to the Saskatchewan river and not more than two miles from Saskatoon, were observed to be straining on their tethers and lowing pitiably. A closer view revealed the presence of dense swarms of this species, which extended all round the animals for at least eight to ten yards. The animals were very restless, and a close examination revealed the fact that on their forequarters, abdomen, and udders the flies were congregated in dense masses and were distended with blood. On these regions the skin was broken and blood oozed from innumerable punctures. The flies were also entering the nostrils, ears, and eyes.

The damage caused by black-flies results from their painful bites and the loss of blood which ensues. They have frequently been guilty of inflicting extensive losses among live-stock, but so far have not been incriminated as vectors of disease-causing organisms. At Duck Lake in Saskatchewan it was stated on good authority that in 1913 about 100 head of cattle died from the attacks of black-flies. The first swarms are generally in evidence about the beginning of June, and the infestations may recur at intervals as late as September and October. One witness testified to the pungent, mustard-like taste of the flies.

The Saskatchewan river, the only apparently suitable water for the breeding of black-flies (Fig. 4), is six

miles distant from Duck Lake, and there is little doubt but that the flies either voluntarily or compulsorily undertake migratory flights which

FIG. 3.—Adult black-fly, *Simulium similis* Mall., a troublesome pest of cattle and horses on the prairie and often causing the death of the animal attacked. (Modified after Lugger).

ward off the flies from the animals by the resulting dense smoke, around which they congregate for protection, or to dress their coats with some disagreeable preparation of oil or grease. Fish oil alone or in combination with other materials is one of the best repellants. A mixture* consisting of three parts of fish oil and one part kerosene spread over sores gives excellent results. In smearing animals with the various strong-smelling oils care should be taken not to use machine oil or other powerful oils, the repeated application of which tends to remove the hair. The dressing should be renewed once a day in the fly season.

The most satisfactory method of control would be to kill the larvae in the streams, but in large rivers the difficulty of making any extensive application of toxic substances is

FIG. 4.—A reach of the Saskatchewan river, near Saskatoon, showing a rapid where the larvæ of black-flies are to be found attached to the surface of water-washed stones. (Original).

carry them long distances from their places of breeding. Probably they are assisted in this by mild, favouring breezes.

At the present time the only measure of control that commends itself is either to burn "smudges" which many farmers do and thus

out of the question. Further, the danger to stock and human beings, who may use the treated water, must be duly emphasized. In some experiments recently carried out with

*Washburn, F. L., Diptera, of Minnesota, Bulletin, No. 93, Agr. Exper. Stat. Univ. Minn., 1905, pp. 75-76.

Phinotas oil* in streams, it was observed that a film of oil may be found upon stones 48 hours after application, and the black-fly larvae may be killed one-eighth of a mile below the point of application.

A small stream, which drains a swampy area and debouches into the Saskatchewan river about 3 miles south of Saskatoon, was found to contain the larvae of three different kinds of black-fly, and in this particular instance treatment with Phinotas oil would have supplied the necessary remedy.

HORSE-FLIES

The flies belonging to this family are also variously known as breeze-flies, clegs and deer-flies. The name, however, by which the larger horse-flies of the prairies are most generally known is "bull-dogs," which conveys some idea of their pertinacious biting habits. The adults frequent marshy places and are commonly encountered in the vicinity of sloughs in large numbers. Here they lay their eggs on the leaves of aquatic plants, and the larvae inhabit the muddy bottoms and margins of these ponds. The larvae are carnivorous, preying upon slugs, worms, and the larvae of other insects, whilst in captivity they do not hesitate to devour their own kind.

The most commonly occurring species in the environment of Saskatoon is *Tabanus septentrionalis* Loew, (Fig. 5), which is extremely variable in its colouration and size. It was our experience that this species displayed a marked tendency to seek shade. When an automobile with the cover up was stationed near a slough they swarmed around it in large numbers, circling it in rapid flight and finally entering and resting on the roof, or on the mud-guards and sides outside. By the same token, they were often found at rest on the outside walls of dwelling-houses and inside on the windows, associated with *Tabanus illotus* O.S. and *Tabanus hirtulus* Bigot. In lesser numbers *Tabanus phaenops* O.S., *Tabanus rhombicus* O.S., *Tabanus cantonis* Marten, and *Tabanus eristatus* also occurred.

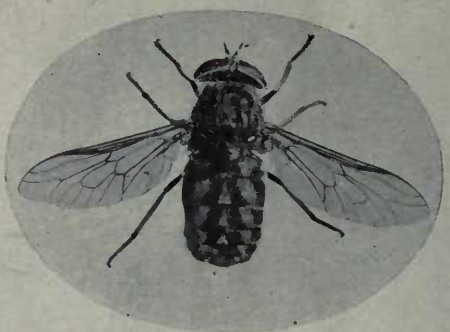

FIG. 5.—A common prairie "bull-dog" fly, *Tabanus septentrionalis*, prevalent in the vicinity of slough, and persistent in its attacks on horses and cattle (Original).

None of these species were found to be aggressive in their attitude to human beings, but they were persistent in their attacks on horses and cattle grazing on the prairies. The provision of fly-nets for horses at work is ample protection against these flies.

Of the genus *Chrysops*, all of which have pictured wings, *Chrysops moerens* Walk. (Fig. 6) and *Chrysops fulvaster* O.S. were the only two species found during the summer. Around the sloughs near Dundurn the former was very common. In the grass at the margins of these sloughs, they were readily disturbed as one walked along and they were not slow to attack human beings. The latter was only encountered in low swampy ground and was taken in large numbers. It does not hesitate to attack those who intrude in its preserves.

The delicate, grayish-black breeze-fly *Haematopota americana* O.S., with grayish pictured wings, is occasion-

* Phinotas oil is a preparation made by the Phinotas Chemical Company of New York and is a powerful larvicide. The great objection to its use is that fish also succumb to its poisonous properties. (Smith, J. B., Mosquitoes of New Jersey, Trenton, N.J., 1904, pp. 128, 129).

ally found around horses and readily settles on people in the vicinity. In its flight it makes very little noise and is very quiet and unobtrusive as it settles to bite.

For those horse flies which attack the ears of horses nets will be found useful as a protection. In cases where the eyes are also attacked, the ears and skin about the eyes may be smeared with the following repellent solution as recommended in Bull. No. 93, Agr. Exper. Station, Univ. Minn.. 1905:—Pine tar one gallon; kerosene, or fish oil, or crude carbolic acid one quart; powdered sulphur two pounds. This mixture, also, applied to wounds made by barbed wire or otherwise, will ward off those flies which might be disposed to lay their eggs therein.

FIG. 6.—The breeze-fly or deer-fly, *Chrysops oerens* commonly occurring near sloughs and attacking human beings and live stock. In its flight it makes less noise than the "bull-dog" fly. (Original.)

In Russia, Portchinsky* has taken advantage of the habits of horse-flies of concentrating in large numbers in damp places and near pools at which they drink. He found that during the heat of the day the flies rapidly skim the surface of the water in order to drink, only the underside of their bodies touching the water. Very good results were obtained by pouring kerosene on the surface of these pools of stagnant water and it was found that these "pools of death," as he called them, soon became covered with the dead bodies of horse-flies which frequented them. Contact with the kerosene, which adhered to their bodies, rapidly poisoned or suffocated the flies. The author advocates the use of "pools of death" in pastures where cattle graze, but they should always be securely fenced off.

In Canada, Mr. Norman Criddle, Field Officer of the Entomological Branch, made independent observations and experiments in 1914 and 1916 in Manitoba similar to those of Portchinsky in Russia. In 1914 he noticed the habits which horse-flies display of making rapid, skimming flights along the surface of exposed water. Like the Russian author, too, he found that the great majority of the flies that thus behaved were males, only a very small percentage of females coming to drink at open water. In experiments covering a period of 5 days in a pool but one square metre in surface area, Portchinsky counted in all 1,967 horse-flies of which only 14 per cent were females.

My thanks are due to Professor J. S. Hine, Ohio State University, who kindly confirmed the identification of some of the specimens of horse-flies and also named others about which there was some uncertainty. I am also indebted to Professor T. N. Willing, University of Saskatchewan, Saskatoon, Sask., for the loan of the photograph for figure No. 4.

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* Portchinsky, L. Tabanidæ and the Simplest Methods of Destroying them. Memoirs of the Bureau of Entomology of the Scientific Committee of the Central Board of Land Administration and Agriculture, Petrograd, vol. ii, No. 8, 1915. Abstract in Rev. App. Entom. Ser. B., vol. III, 1915, pp. 195-196, 1916.

Dr. L. O. Howard, Bureau of Entomology, Washington, D.C., was the first to attract attention to Portchinsky's discovery in "A Remedy for Gadflies: Portchinsky's Recent Discovery in Russia, with some American Observations." This was published in Bulletin No. 20, Division of Entomology. United States Department of Agriculture, 1899. The Russian author had previously published an account of his findings this same year.

THE DAIRY AND COLD STORAGE BRANCH

THE DAIRY PRODUCE COMMISSION

IN Volume IV, and on page 754, of THE AGRICULTURAL GAZETTE, an account is given of the organization of the Cheese Commission, consisting for Canada of two members, namely, Messrs, Jas. Alexander, exporter of Montreal, J. A. Ruddick, Dairy and Cold Storage Commissioner for the Dominion, appointed by the Minister of Agriculture, and Jas. McGowan, of London, England, and in the number of THE GAZETTE for March (Vol. V), pages 242 to 244, details are given of the work of the Commission from the time of its appointment to the end of the year, 1917. The Cheese Commission, as it formerly existed, has been succeeded by the Dairy Produce Commission, an organization constituted as follows: Mr. Arthur J. Mills, representing the British Ministry of Food; Mr. J. A. Ruddick, representing the Dominion Department of Agriculture; Dr. James W. Robertson, representing the Canada Food Board; Messrs. Jas. Donaldson, A. Gerin, and Jas. Alexander, representing the producers and the trade. At a meeting of the newly organized commission held in Montreal it was announced that the Commission had been authorized to act for the British Ministry of Food in connection with the exportable surplus of Canadian cheese, condensed milk, and butter of the make of the season of 1918.

The price agreed to for cheese, as compared with an average of 21¾c. per lb. in 1917, is 23c. per lb. for No. 1 grade, f.o.b. steamer at Montreal; 22½c. per lb. for No. 2 grade, and 22c. for No. 3 grade.

A committee was appointed to work out the question of a relative price for condensed milk, and the price of butter will be arranged as soon as there is a surplus available for export.

The advantages of the arrangement to the cheese industry of Canada, representing an estimated value of $40,000,000, were shown and explained in the article on the work of the Cheese Commission in the March GAZETTE previously referred to. It was mentioned at the meeting that at the present time the allied buyers are being offered United States cheese of this season's make at 22c., f.o.b. New York.

BUTTER-FAT COMPETITIONS

BY C. F. WHITLEY, IN CHARGE OF DAIRY RECORDS

FOR two years Butter Fat Competitions have been carried out jointly by the Scotsburn Creamery and the Scotsburn Dairy Record Centre at Scotsburn, N.S. In addition to open classes for which four prizes were offered a number of specials were provided by individual farmers and business men. Special trophies were awarded for the highest producing cows from pure-bred sires and for cows showing the greatest average persistency in production of fat during the year. There was also a prize for the school, a scholar of which presented the best essay on dairying. At the end of the season reports were sent to each of the competitors showing the average amount of butter fat given by the cows of his herd and recommending the course to be followed for its improvement. A similar competition will be held this year.

THE LIVE STOCK BRANCH

THE CARLOT POLICY FOR THE CURRENT YEAR

THE carlot policy conducted by the Live Stock Branch of the Dominion, inaugurated in 1916, is being conducted this year with some slight changes in the conditions that have governed in the last two years. Under the policy, the Branch still pays the reasonable travelling expenses of a farmer residing in Canada, or his authorized agent, who purchases one or more carloads of breeding stock of cattle, sheep, or hogs. The policy is confined to purchases of female breeding stock, or of feeding and stocker cattle, made at any of the stockyards in Western Canada at which a representative of the Live Stock Branch is located. When the stock is purchased for speculative purposes, no assistance is rendered. A carlot must consist of not less than 20 head of cattle, 40 sheep, or 40 hogs. In a mixed shipment, two sheep or two hogs are accepted as equivalent to one head of cattle. An intending purchaser, to take advantage of the policy, must formally apply to the representative of the branch at his nearest stockyard before commencing to purchase, and he will be given a certificate authorizing assistance. Expenses will be allowed covering railway transportation from the home of the purchaser to the stockyard at which the purchase is made, also hotel expenses for a reasonable time. Parties purchasing female breeding stock under the terms of the carlot policy who comply with the terms of the free freight policy of the branch, are entitled to the benefit of both policies on one shipment. The representative of the branch acts in an advisory capacity to the purchaser if so desired, but the actual purchasing must be done by the buyer himself, or by his authorized agent. The representatives of the Branch at the different stock-yards are D. M. Johnson, St. Boniface, Man.; E. W. Jones, Calgary, Alta.; and C. E. Bain, Edmonton, Alta.

BOYS' AND GIRLS' COMPETITIONS

THE Calf and Pig Competitions for Boys and Girls held in 1917 under the supervision of the Live Stock Branch, in co-operation with the Canadian Bankers' Association, will be repeated this year. The rules and regulations are practically the same as given in Vol. IV of THE AGRICULTURAL GAZETTE, page 766, with the additional suggestion, that, in districts in which there are school fairs, the prizes should be there awarded, unless, preferably, they should be awarded at the fall fair. A receipted statement must be forwarded to the Secretary of the Canadian Bankers' Association, Montreal, not later than December 15th. In Class 2, the description of pigs eligible for entry, instead of reading as in 1917, "Bacon type, Pure Bred or Grade," this year reads "Pure bred or Grade." The exhibitors must all be under 17 years of age. The calves and pigs entered in the competition must have been fed at least six weeks prior to being shown by the boys and girls who exhibit them.

THE SEED BRANCH

SEED INSPECTION AND SEED TESTING IN APRIL

BY J. R. DYMOND, B.A., SEED ANALYST

THAT much preventible loss is caused by the unwitting use of dead or impure seed must be the conclusion of any one who goes through the records of the test made on samples of seed received from farmers and merchants at the seed laboratory.

A red clover sample recently received from a retail merchant was suspected of being low in vitality, and was submitted to germination test. The test showed that only 8 per cent of the seed was capable of germination even under the favourable conditions provided in a germinating chamber.

One of the seed inspectors not long ago found a lot of 8 bags of alsike in the possession of a retailer. The seed had not yet been offered for sale, but was apparently held for that purpose. A germination test of it showed that only 10 per cent of the seed was vital. It is probable that had there been no seed inspection and seed testing service, these lots of seed would have been used for seeding. Nothing but crop failure could result from the use of such seed.

Another inspector found a dealer selling as seed, oats containing 934 noxious weed seeds per pound as follows: Western false flax, 96; stickseed, 2; wild oats, 368; stinkweed, 2; ball mustard, 448; wild mustard, 2; hare's-ear mustard, 16. Only 55% of this grain was found to be vital.

That many lots of seed as foul with impurities and as low in vitality as the lots mentioned are sown each year by farmers who do not suspect any defect in it, is not to be doubted. The only way to be certain of the quality of seed one intends to use is by means of a proper purity and vitality test.

During the month of April 1959 samples of seed were tested for farmers, merchants, and others at the Ottawa laboratory; of these 665 were sent by farmers.

The following table gives the number of samples of the different kinds of seeds for which grades are provided, received from farmers, merchants, and institutions, and also the number of samples belonging to the various grades:—

	Timothy	Red Clover	Alsike	Alfalfa	Mixture
Samples received	458	409	182	23	78
Received from farmers	180	117	56	5	37
" " merchants	272	284	124	17	39
" " institutions	6	8	2	1	2
Grading No. 1	51	79	23	9	4
" No. 2	168	115	52	9	32
" No. 3	96	116	46	3	16
" rejected	136	88	59	—	24
Other reports	2	6	1	1	—

The results of the germination tests reported during the month are summarized in the following table:—

	Wheat	Oats	Barley	Corn	Peas	Beans	Mangels
Samples reported	132	46	42	207	17	29	19
Average per cent germination	93.3	90.1	91.4	55.8	92.5	77	62.2
Number germinating up to standard of good seed	98	153	22	32	12	17	2
Number germinating below ⅔ standard of good seed	2	16	....	99	....	5	7

PART II
Provincial Departments of Agriculture

THE DISTRIBUTION OF MALE ANIMALS

The quality of the live stock in Canada has undoubtedly been much improved as a result of governmental assistance and organization, both federal and provincial, in the distribution of pure-bred male animals. As the system governing this work varies in the different provinces, it was considered desirable to publish in The Agricultural Gazette, as far as possible, the course being pursued by each province in this direction. In order to secure uniform statements for comparative study, it was suggested that the information desired be given under the following heads:

1. A brief history of the movement.
2. The organization that exists in the provinces for this work.
3. The connection between the Department and the organizations, with the assistance granted to each, with conditions for securing assistance.
4. The method of selecting and supplying the animals, including arrangements for exchange.
5. To what extent, if any, is community breeding encouraged, that is, the confinement of a breed to a district.
6. The extent of the distribution for a single year or a series of years.
7. The modifications that have been decided upon or are being considered for this year.

NOVA SCOTIA

BY F. L. FULLER, SUPERINTENDENT OF AGRICULTURAL SOCIETIES

PRIOR to the year 1864 the agricultural affairs of the province were under the management of a body of men called the Central Board of Agriculture. Under this board a number of agricultural organizations received Government aid for importation of live stock, improved farm machinery, new and improved varieties of seeds, and for holding shows and exhibitions.

HISTORY OF THE IMPROVEMENT

During that year our agricultural Acts were amended in order to provide for the appointment of a Secretary for Agriculture. The duty of this appointee was to promote the agricultural affairs of the province in general, with a special view to increasing the efficiency of our agricultural organizations. Under the amended Act agricultural societies could be formed in any section of the province where not less than forty members were secured who subscribed not less than $1.00 each. These organizations received regular annual grants in proportion to the amount subscribed. All existing agricultural organizations were allowed to participate in the grant, providing they complied with the

conditions. At the close of that year there were thirty-seven societies, having a membership of 1,744 and a total subscription of $1,860.00, and receiving a total provincial grant of $3,010.00. This arrangement continued until 1893, when there were 81 societies with 4,068 members and $5,050.00 subscribed with a grant of $6,310.00. In that year the Acts were again amended, admitting agricultural societies with 25 members, providing the amount subscribed was not less than $40.00, and the grant was increased to $8,000.00 per year. This annual grant remained fixed until the year 1898, when it was increased to $10,000.00 per annum.

In the year 1907 the offices of Secretary for Agriculture and Principal of the College of Agriculture were combined, and in order to give more assistance to agricultural societies a Superintendent of agricultural societies was appointed. At that time there were 160 agricultural societies in the province with a membership of 7,849, subscribing $15,000.00. At the present time there are 271 agricultural societies with 10,974 members and $22,407.00 subscribed.

Recent changes in the agricultural Acts which have had a tendency to popularize the movement are:

(a) Allowing 15 (or more) members to form an organization, providing the subscriptions are not less than $40.00;

(b) Granting each agricultural society $40.00 out of the amount provided, and dividing the balance ratably among the societies which subscribe more than $40.00;

(c) Confining the expenditure of the society funds to the purchasing of pure-bred live stock or holding exhibitions;

(d) The withholding of $1,000.00 from the total grant (now $1,500.00) for the purpose of aiding societies that have the misfortune to lose animals through accident or disease;

(e) Giving a bonus to agricultural societies constructing a paddock for exercising their bulls;

(f) Placing an Act on our statute books making it illegal for any person to offer for public service any unregistered sire within the boundaries of an agricultural society;

(g) A personal interest in each agricultural society with inspection as often as possible.

ATTITUDE OF THE AGRICULTURAL SOCIETIES

Considered briefly the other information desired may be given as follows:

Agricultural societies are the only organizations in our province receiving direct assistance for the improvement of live stock. The policy of the Department is to encourage in every possible way the improvement of our animals. Large importations have been made and the animals sold at auction under bonds to be kept in the province. Liberal grants are given to exhibitions. High class animals from the college herd are sold at reasonable prices.

Agricultural societies through the superintendent are responsible to the Department of Agriculture. In order to qualify for the grant societies must make an annual subscription list "duly attested to" containing at least fifteen names and an amount not less than $40.00. They must also submit annually a copy of their financial statement giving all the items of receipt and expenditure. The superintendent may withhold the grant on account of any irregularities. The grant may also be withheld where animals purchased by societies are not of a sufficiently high quality. Applications for organization of new societies must receive the approval of the Lieutenant-Governor-in-Council.

While the selection of animals lies with the societies the superintendent, on request, makes selections "free of charge." A list of all pure-bred animals for sale is always obtainable

from the superintendent. Where exchanges are desired, the superintendent furnishes records of breeding, records of production of ancestors, and a report on the character of the offspring of the sires it is desired to exchange.

Community breeding is proving very successful. In several sections we have groups of agricultural societies that keep one breed and have agreed to exchange all sires of proven merit.

There are about four hundred bulls owned by agricultural societies in the province, about one-third of which are replaced or exchanged each year. There are also a large number of boars and rams owned by the societies.

Beginning this year arrangements are being made for the granting of $25.00 to agricultural societies constructing a paddock adjoining a stable, or containing a shed where a "box-stall" is provided, so that the animal can run in and out at will, summer or winter.

A measure is now under consideration which will undoubtedly receive the sanction of our Legislature, authorizing the Superintendent of Agricultural Societies to withhold the grant from agricultural societies which change from one breed of sires to another without the consent of the Department of Agriculture.

NEW BRUNSWICK

BY THOS. HETHERINGTON, B.S.A., SUPERINTENDENT OF LIVE STOCK

IN February, 1915, the provincial Department of Agriculture inaugurated a scheme for the purchase and distribution of pure-bred bulls and cows. This was the first comprehensive attempt made to encourage the use of pure-bred sires. Various efforts had been made to encourage in a small way the use of pure-bred males and females, but without any appreciable response on the part of the farmers, and, the schemes being local in nature, did not leave any particular impress on the native stock of the province as a whole. The present system of bonusing, i.e., that which began in 1915, with modifications, practically covers the entire province and the results are just becoming apparent in the younger stock.

ORGANIZATIONS

At the present time there are 145 agricultural societies in operation in New Brunswick, and the number is increasing each year. It is to these farmers' organizations that the provincial Department of Agriculture distributes bonus money for the encouragement of the use of pure-bred bulls.

BONUS REGULATIONS

Following is an outline of the regulations governing the bonusing of pure-bred bulls:—

1. The stock shall be bought and sold under the direction of an agricultural society.
2. Societies shall notify the Department before purchasing animals in order to receive the bonus on such stock.
3. Animals shall be bought subject to the approval of an officer of the Department and must be bought subject to the tuberculin test. Preference will be given to animals from dams having satisfactory performance records. No animal under one year of age shall be eligible for a bonus.
4. Animals purchased with the aid of the Department shall be kept for the use of the members of that society only. The society shall make all arrangements for caring for the animal and shall agree to buy only bulls of the same breed and use them in that locality for a period of at least ten years.

5. Assistance will not be given to more than two breeds in any one society. The breeds selected shall be determined by a majority vote of the members of the society at a regular or special meeting and shall be subject to the approval of the Department of Agriculture. Notice of the vote to be taken shall be given to each member at least one week prior to the meeting.
6. No society shall receive a bonus on more than five bulls in any one year.
7. The Department shall be notified if a society wishes to dispose of one of these animals, and shall be given a thirty days' option to purchase.
8. Under the above regulations the Department shall pay an initial bonus of 20 per cent on animals costing more than $50. A bonus shall not be paid on animals costing less than $50. Additional yearly bonus of 10 per cent of the cost of the animals shall be paid for each year the bull is kept for breeding purposes, provided it is kept in satisfactory condition and passes an animal inspection.
9. These regulations shall be considered as in force from February 1st, 1918, and shall cancel all other regulations.

FORM OF APPLICATION

Following is the application form for the bonus on pure-bred cattle that has to be filled up and forwarded to the Department:

APPLICATION FORM FOR BONUS ON PURE-BRED CATTLE

Society.....Number.....
Breed.....Registration Number.....
Registration Name.....
Breeder.....Address.....
Purchase Price.....Date Purchased.....
Name of Person Keeping Animal.....
Address.....
Nearest R. R. Station.....
Certified by.....
President.....Secretary.....
Purchase was authorized at the regular meeting of the Society held on.....
Secretary.....
First bonus received when.....
Second " " " .....
Third " " " .....
Inspection made.....
Inspector.....

SELECTION AND SUPPLY

The method adopted of selecting, supplying, and arranging for exchange is as follows—Agricultural societies wishing to secure a pure-bred bull must notify the Live Stock Division. This Division keeps in close touch with all the breeders of the province, also those of adjoining provinces, and in this way when an application comes in for an animal, the Live Stock Division is in a position to recommend certain animals; likewise the Live Stock Division keeps in touch with the agricultural societies, and, when a society is finished with an animal, arrangements can be made to have it transferred to another district. We have considerable difficulty to prevail on agricultural societies to purchase aged bulls; however this discrimination is becoming less and less apparent each year. As far as possible we try to purchase from New Brunswick breeders, but we do not hesitate to import stock from other provinces when the New Brunswick stock is not up to the standard. The number of breeders in this province is limited, consequently we have to depend to a greater or lesser extent upon outside sources.

COMMUNITY BREEDING

Community breeding in New Brunswick has not made the advance its importance would justify, however at the present time we are making a special feature of this work. This year about twenty swine breeders' clubs have been organized in the province. These clubs are established in districts, and will gradually extend to adjoining districts, and in this way practical demonstration in community breeding is given. Next year we plan to add sheep, and, later on, possibly cattle.

EXTENT OF DISTRIBUTION

In the year 1916, 40 pure-bred animals were bonused by the provincial Department, consisting of 16 Shorthorns, 15 Ayrshires, and 9 Holsteins. In 1917 bonuses were granted to 77 pure-bred animals, consisting of 30 Shorthorns, 33 Ayrshires, and 14 Holsteins. Judging from present indications the number of animals bonused for 1918, as com-

pared with 1917, will be practically double.

FUTURE PLANS

Modifications planned for and being considered:—(a) The Live Stock Division is arranging for a dispersal sale of pure-bred males, bulls, rams, and boars in the fall of 1918 in the city of Fredericton; the provincial Government pays the freight on stock consigned to this sale. (b) Next year we hope to be able to take advantage of the federal assistance re the bonus of stallions. With this in view we are getting in touch with all the promising districts, with a view to co-operating with the federal Department.

QUEBEC

BY OCTAVE LESSARD, SECRETARY OF THE COUNCIL OF AGRICULTURE

THE Quebec Department of Agriculture, always anxious to increase agricultural production has seized every opportunity to encourage the farmers to produce to the limit of their capacity; but the farmers have been specially advised to breed good live stock, in order to continually improve their herds. This was the main object of the farmers' clubs organization.

In 1893, an Act was adopted, authorizing the organization, in each parish of the province, of a farmers' club, to which an annual grant would be given, and this practical move, which was to give a new impulse to the breeding of good breeding animals, increase the number of herds, and improve their quality, was fully appreciated by the farmers. Special attention was given to cattle, and this contributed, to a large entent, to the progress of dairying.

Through the close supervision exercised, the Department is able to judge of the progress of the clubs, and prevent possible mistakes. Each year a detailed report is forwarded to the Minister, who checks the accuracy of the same, and classes it accordingly. The programme of work is also submitted for approval to the Minister, who may grant, as he sees fit, sufficient financial assistance to enable the clubs to purchase good breeding animals, or to take care of those which they already have.

THE DEPARTMENT'S ASSISTANCE

The Department now helps the Live Stock Associations, which purchase, in the province or elsewhere, superior breeding animals which are later sold by auction to the farmers' clubs, or to private farmers, after being examined by competent inspectors and declared healthy and fit for breeding. Cattle are always tested with tuberculine, in order to protect the herd against tuberculosis. Farmers and clubs are strongly urged to keep the same breed, provided the animals are satisfactory, and are considered quite fit for breeding. Over $60,000 are spent every year by the clubs for the purchase and maintenance of breeding animals.

In order to supervise the breeding operations, inspectors are appointed by the Minister, and these inspectors visit occasionally the herds of the various parishes, and give, as required, advice to the farmers and to the keepers of male animals belonging to the clubs. The object of such visits and instructions is to eliminate the defects which too often appear in the various methods of breeding. These inspectors make a report of their visits, and if it is found that the caretakers do not treat as they should the animals in their charge, notice is given to the

Board of Directors to see that the advice given is closely followed. If such instructions remain unheeded by the caretaker, the Minister orders the club to hand over these animals to some other caretaker. Again, if it is observed that these animals are unfit for breeding, they are slaughtered for meat.

Such inspectors are chosen amongst competent men, in ever-increasing number. They do a good part of the work which district representatives have to do, regarding the supervision of herds and the selection of breeding animals in the counties where there are no such representatives.

BREEDING ANIMALS KEPT BY CLUBS

The following table shows the breeds and number of breeding animals kept by the farmers' clubs during the year 1916:—

CATTLE		PIGS		SHEEP	
Ayrshires	723	Chesters	325	Lincolns	16
Holsteins	122	Tamworths	12	Leicesters	335
French-Canadians	54	Berkshires	30	Shropshires	52
Shorthorn	136	Yorkshires	377	Oxford Downs	60
Jerseys	5	Poland Chinas	3	Cotswolds	25
Herefords	6			Hampshires	11
				Dorsets	3

The practical methods followed by the clubs have been a great object lesson for farmers. Private enterprise has been stimulated, and there are now in the province of Quebec a fairly large number of very good breeding animals in cattle, pigs, and sheep. The Department of Agriculture helps such private enterprise by sending, upon request, a veterinian to examine such animals and test those of the bovine species with tuberculin.

INCREASING PORK PRODUCTION

The Department spares no effort to encourage production in a general way, but just now a special effort is being made to increase the production of pork. A few hundred sows, served by registered Yorkshire boars, have been recently purchased by the Department. They will be sold to farmers who desire to raise more pigs. The Department considers itself well repaid for its trouble by seeing the farmers eagerly accepting its suggestions, and taking up the active work which is required of them: to draw as much as possible from the soil in order to give an anxious world the food of which there is a growing scarcity.

ONTARIO

BY W. BERT ROADHOUSE, DEPUTY MINISTER OF AGRICULTURE

IN 1912 the Ontario Department of Agriculture adopted a plan for the distribution of pure-bred sires in districts in New Ontario. It was felt that this would be an effective means of improving the stock in the newer sections, and that in this way a decided benefit would be conferred, not only upon the individual settlers, but on the district as well. In order to secure the co-operation of the farmers concerned, it was decided that male animals would only be placed with local Live Stock Improvement Associations, which were to be organized with a membership of ten or more, and which were to undertake the management and the maintenance of the stock supplied. The plan proved to

be most acceptable, and in all upwards of 25 of these local associations were organized and received pure-bred sires of all classes—horses, cattle, sheep, and swine.

After the plan had been in operation for a little over a year, the Live Stock Commissioner for Canada adopted the idea and proceeded to draw up regulations for its application throughout the various sparsely settled parts of the Dominion. As it was obviously undesirable that the same work should be carried on by both federal and provincial Governments, this Department entered into an arrangement with the Live Stock Commissioner for Canada by which the associations which had been organized and the stock held were incorporated in the general federal scheme. Since that time the Department has not carried on work of this nature. On a few occasions, however, a carload of pure-bred stock has been shipped to points in New Ontario and sold direct to the settlers.

MANITOBA

BY J. H. EVANS, DEPUTY MINISTER OF AGRICULTURE

RELATIVE to the distribution of male animals in the province of Manitoba, this work has been carried on entirely under the Live Stock Branch of the Dominion Department of Agriculture. The only assistance which the provincial Department of Agriculture has rendered has been in bringing buyer and seller together. This work has been carried on to a considerable degree. Provision also was made in the new Agricultural Societies Act, whereby groups can receive assistance for importing and owning pure-bred live stock; that is an agricultural society can own sires for the use of their members under the provisions of the new Agricultural Societies Act and receive assistance from our own Department.

SASKATCHEWAN

BY A. M. SHAW, B.S.A., LIVE STOCK COMMISSIONER

THE distribution of pure-bred sires and also female cattle was first taken over by the Saskatchewan Department of Agriculture in 1913. Owing to the large demand there appeared to be for live stock in general, an Act known as "The Live Stock Purchase and Sale Act" was passed in December, 1913, providing for the expenditure of $500,000 for the purchase of live stock for distribution among Saskatchewan farmers. Fifty thousand dollars of this amount was to be expended annually for ten years. Under this policy cattle, sheep, and swine were sold to *bona fidé* Saskatchewan farmers on credit terms. Horses are not handled under this Act.

In accordance with the regulations governing the Live Stock Purchase and Sale Act, farmers wishing to secure stock on credit terms have to fill out an application form stating the number and kind of stock required, also giving some information with regard to their farming operations and their ability to care for this stock. Each applicant requires the recommendation of one of the local farmers' organizations. Pure-bred bulls can thus be purchased on a quarter-cash basis. Rams and boars

are supplied on a half cash basis, the balance is covered by lien notes bearing interest at 6 per cent and falling due in two payments, one-half the end of the current year and one-half the end of the succeeding 12 months.

The live stock purchasing agent of this Department secures the necessary animals to fill orders as they are received. When possible these are purchased in the province, but it is occasionally found necessary to import car-loads from outside. All expenses incurred in purchasing and shipping have to be added to the cost of the stock supplied.

Since the Act has been in force the following bulls have been supplied to farmers, most of which have been sold on credit terms:

1914	41 bulls
1915	84 "
1916	150 bulls
1917	170 "

Also about one hundred rams and a few boars.

The Saskatchewan cattle, horse, sheep, and swine breeders' associations have been holding annual sales of pure-bred stock under the auspices of this Department for several years. These associations all obtain an annual grant to assist them in this work. These sales afford the farmers of the province a central market for the purchase and sale of their registered stock. Many of the pure-bred sires purchased at these sales are secured on credit terms through this Department under the Live Stock Purchase and Sale Act.

Since these association sales have been organized, about 1,000 bulls, 475 rams, and 140 boars have changed hands.

ALBERTA

BY JAS. McCAIG, M.A., EDITOR OF PUBLICATIONS

THE Department of Agriculture for Alberta does not distribute male animals to associations of farmers. The development of the pure-bred stock industry has been quite rapid in the province, and there is now available a supply of good males in all kinds of live, stock including horses, cattle, sheep and swine from our own breeders. Activity in the establishment of breeding herds of cattle is so great at the present time, however, that a good many males and females, also of the beef breeds, have been brought in, chiefly from Ontario. The increase in cattle stock within the past eighteen months has been very rapid. Apart from these conditions due to the war, we expect that our own flocks and herds will supply the demand for male animals, and these are available to those requiring them on the ordinary commercial basis on which other requirements are obtained.

The Department, however, has for the past two seasons organized the credit resources of settlers to the extent of guaranteeing loans for the purchase of both male and female stock by small co-operative associations of farmers. The provincial demonstration farms produce a considerable surplus of male animals in cattle, sheep, and swine, which are available for purchase at reasonable rates to farmers.

THE KEEPING OF PIGS IN URBAN CENTRES

In furtherance of the movement for increased production, much attention has been turned towards the raising of hogs, not alone on the farm, but in the neighbourhood of city and town dwellings. In carrying out this policy it has been necessary to pay special attention to the requirements of sanitation. There are federal and provincial enactments that govern in the premises, and in addition many municipalities have laws and regulations of their own. These laws and regulations refer to the surroundings, and, especially, to the feeding of garbage. As a subject of wide importance to the welfare of the entire community, it was thought advisable that the different sections of the country should be informed of each other's course. In the following series of articles efforts have been made to provide such general enlightenment.

NOVA SCOTIA

BY W. H. HATTIE, M.D., PROVINCIAL HEALTH OFFICER

I HAVE to say that our Public Health Act does not contain anything with reference to the keeping of pigs in centres of population. This matter is controlled by regulations made by various local boards of health. When I have been asked relative to modification of any of these local regulations, I have expressed the opinion that every possible concession should be made short of anything which might constitute a real menace or a nuisance.

QUEBEC

BY ELZEARD PELLETIER, SECRETARY DIRECTOR, SUPERIOR BOARD OF HEALTH

NEITHER the Act nor the by-laws prohibit "the keeping of pigs in centres of populations." Article 44 of the bylaws only requires that they be well kept.

ONTARIO

BY JOHN W. S. McCULLOUGH, M.D., CHIEF OFFICER, PROVINCIAL BOARD OF HEALTH

IN regard to the keeping of swine sub-section 20 of section 115 of the Public Health Act provides "Swine shall not be kept within the limits of the municipality, except in pens, with floors kept free from standing water, and regularly cleansed and disinfected, and distant at least one hundred feet from any dwelling-house, school house, or church."

MANITOBA

BY A. J. DOUGLAS, MEDICAL HEALTH OFFICER, WINNIPEG

THE Public Health Act of the province of Manitoba provides that no person shall erect, continue to use, or maintain a building, structure, or place for the exercise of a trade, employment, or business, or for the keeping or feeding of animals, which by occasioning noxious exhalations or offensive smell becomes injurious to the comfort or health of individuals or of the public. The Act does not specifically mention pigs, which, of course, it is intended shall be covered. It is not contemplated that any change shall be made in either the Public Health Act of Manitoba, or the city of Winnipeg bylaw, with a view to facilitating the keeping of hogs in the city of Winnipeg. Negotiations have been entered into by the Winnipeg city council with a firm who intend to establish a sorting plant at the city garbage incinerator, and to make use of all garbage and other refuse collected.

BY M. S. FRASER, M.D., SECRETARY, MANITOBA BOARD OF HEALTH

THE question of the Public Health Act in this province in relation to the subject of keeping pigs in centres of population has not been placed before the Board of Health as a body. To others who have brought the matter to my attention I have given what I believe to be the opinion of the Board in this matter.

The keeping of pigs in centres of population is a matter left to the discretion of the municipalities concerned. No action is contemplated by the Board of Health, unless a nuisance is created. In the latter event, of course, action would require to be taken, as the creation of a nuisance would mean insanitary conditions which would be a menace to health and especially to child life where ever such a nuisance existed.

I have suggested that, with the propaganda for the increase of production in pigs, there should also be the definite information given that they can be kept without being a nuisance, and, therefore, should not in any way be contrary to the provisions of the Public Health Act.

SASKATCHEWAN

BY M. M. SEYMOUR, M.D., COMMISSIONER OF PUBLIC HEALTH

THE production of hogs is a matter which is causing a great deal of agitation, and, no doubt, there is occasion for raising them in much larger numbers, if bacon, ham, lard, etc., are to be supplied in adequate quantities, not only to our troops, but also for home consumption.

No doubt, some of those who have taken up this particular subject, and have advocated that every family should raise a pig, have done so without considering under what conditions they should be kept, as to housing and feeding.

All recognize the necessity for greater production, but not all have requisite accommodation or the means to successfully breed, raise, and feed with success or profit.

Some misconception exists as to

where such animals can be kept, and many expressions are voiced that the provincial regulations prohibit their keeping in cities, towns, and villages, thereby acting as a deterrent to the success of the food production movement.

This is entirely wrong, as a reading of the requirements of the regulations of the Bureau of Public Health will show.

The clauses of the regulations relating to the keeping of hogs are as follows:—

> The keeping of swine or hogs shall be prohibited within the limits of any city, town or village, unless in pens not nearer than fifty (50) yards from any dwelling house.
>
> Pens to have floors kept free from standing water, and regularly cleansed and disinfected.
>
> No hog pens shall be permitted in any cow or other stable.

These provisions are considered advisable to prevent the creating of a nuisance which might otherwise detrimentally affect the health of residents.

CIVIC REGULATIONS

Another matter vitally affecting the public health is the feeding to hogs of hotel, restaurant, and other table wastes, the value of which as food for hogs is recognized, but the use of which is controlled by a bulletin of the bureau.

The bulletin, re feeding of waste food to swine, reads as follows:—

> In order to control and regulate the practice of collecting, removing, and feeding hotel, restaurant, and other table wastes to swine, it is desirable that the conditions under which the local Medical Health Officers shall sanction the use of such material be defined.
>
> As disease may be contracted by the feeding of certain waste products, containing germs of disease, or in a state of putrefaction, certain restrictions must necessarily be imposed to insure that only materials in a sound and fresh state be permitted to be removed and fed.
>
> With this object, and to prevent needless waste of valuable food products, the use of such may be permitted for food to swine, if collected, stored and fed within twenty-four (24) hours after being discarded from the table or kitchen and boiled for thirty (30) minutes. The waste food shall be collected and stored in covered receptacles, and kept under the care of parties who own it, until it is taken or removed by the party who has a permit so to do.
>
> No slops or swill of any nature whatever may be mixed with such material, as liquids hasten the process of putrefaction, and produce gases which are dangerous and offensive, nor shall tin cans be permitted.
>
> Parties wishing to use such material as feed for swine, must have the written consent of the local Medical Health Officer to do so, and any infringement of the conditions he may require will cancel the privilege, in which case the material will be treated as household waste and removed to the nuisance ground.

IN THE CITY OF SASKATOON

BY ARTHUR WILSON, MEDICAL HEALTH OFFICER, AND W. H. OOME, CITY VETERINARY INSPECTOR, SASKATOON

SASKATOON, Saskatchewan, is one of the cities that has a by-law regarding the collection and treating of garbage for the feeding of swine that has proven workable. By its provision the city charges each collector a $25 permit fee and inspects his premises twice a month. The Veterinary Director General's Branch also licenses and inspects these places and sees that they are kept in a sanitary condition for the hogs.

This municipality has co-operated without any friction in regard to this matter with the Dominion Veterinary General's Branch. There are from 500 to 800 hogs fed all the time, and during three months there were over 400 hogs fattened upon boiled garb-

age mixed with a small amount of grain and sold from both places. A conservative estimate would at least be 1,600 hogs fattened and marketed during 1917. This is quite an addition to the bacon supply for the year from one small city, and all from garbage formerly removed to the nuisance ground at the city's expense.

The advantage of this method of feeding boiled garbage to hogs as it is carried out in our city are:—

(*a*) The method is easily adopted by the City Council. The business is kept under strict control by the Health Department, and the conditions are such that there is no danger to public health.

(*b*) The Council invests no money. They receive the permit fees and have their garbage removed from hotels, restaurants, boarding houses, markets and other food places at no cost to the ratepayers.

(*c*) There is practically no danger of hog cholera as long as the city authorities strictly supervise the boiling and warn the proprietor of the piggery that he will receive no compensation for the slaughter of hogs with hog cholera due to his careless method of boiling the food, or the feeding of raw garbage.

(*d*) The system is clean, sanitary, and gives satisfaction to the restaurant and hotel men, because clean garbage cans must be left conveniently in their kitchens for the garbage.

(*e*) The business is profitable. Men are not only anxious to get into the business but are very willing to comply with the bylaw. They will, in protection of their business, report persons who may be removing garbage without a permit.

In Saskatoon the feeding of boiled garbage to hogs according to the by-law which follows has proven eminently successful, and if this method were to be put into effect in every town and city in Canada (which could very easily be done), the hog production could be very greatly increased this summer:—

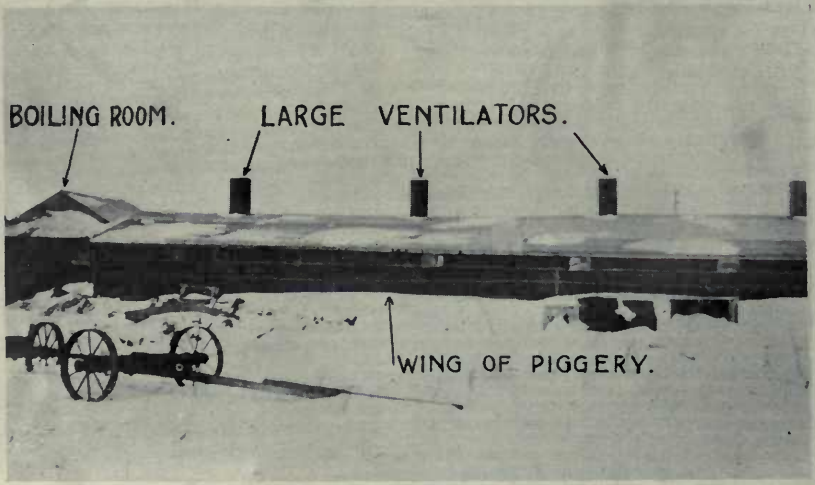
THE BY-LAW

For the purpose of this by-law the word "garbage" shall be deemed to mean any animal or vegetable refuse from food which has been prepared or intended for human consumption.

Every permit holder shall furnish each hotel, boarding house or restaurant from which he removes garbage with sufficient metallic cans of a type approved by the Medical Health Officer, and having the name of the permit holder painted thereon for the reception of all such garbage.

All such garbage cans shall be kept inside the kitchen of the hotel, restaurant or boarding house, and when full the permit holder shall cause them to be replaced by clean cans and removed therefrom bodily and conveyed to the place of boiling hereinafter mentioned.

All garbage collected as aforesaid shall be removed to some place outside the city



PIGGERY AND FOOD-BOILING ROOM, SASKATOON

and there boiled for thirty minutes, after which the same may be fed to swine or other animals.

When boiled the garbage shall be so kept as to prevent contamination until actually fed.

All vessels and utensils used in connection with the collection, boiling, storing or handling of garbage shall be kept in a clean state.

No unboiled garbage shall be allowed to accumulate on the premises where the boiling takes place, but all garbage shall be treated immediately after it is received. Any residue or waste shall be removed from the premises immediately.

After the contents of any can used for collecting garbage has been removed the can shall be immediately washed out with hot water.

All vessels used in transporting garbage from hotels, boarding houses or restaurants to the place of boiling shall be washed out and disinfected as frequently as the Medical Health Officer or Sanitary Inspector may deem necessary.

Any place where hogs are kept and fed on garbage which has been collected in the city of Saskatoon shall be open at any time for inspection by any authorized official of the City Health Department.

ALBERTA

BY T. J. NORMAN, M.D., PROVINCIAL MEDICAL OFFICER OF HEALTH

SECTION 130 of the Health Act reads as follows:—

No person shall keep any hog within the limits of any city, town, or village without the written permission of the local Board.

This provision does not in practice prevent the keeping of pigs in centres of population, but it does place upon those keeping them the necessity of maintaining their quarters in a sanitary condition. Unless this is done the local Board have the power to withdraw the privilege of keeping hogs. In my opinion health boards in this province are willing to allow the keeping of hogs provided they are kept under sanitary conditions.

BRITISH COLUMBIA

BY H. E. YOUNG, SECRETARY OF THE PROVINCIAL BOARD OF HEALTH

THE sanitary regulations adopted by the Provincial Board of Health provide, by Section 44, that no hog shall be kept, except in pens, and at a distance of at least one hundred feet from any highway house, well, or stream. It shall be lawful for the Local Board, Medical Health Officer, or Provincial Sanitary Inspector, to limit the number of hogs kept in any pen or enclosure, or to increase the isolation distance to five hundred feet, if found necessary, to prevent the said hog-pen or enclosure becoming a nuisance or menace to the public health. The floors of any hog-pen or stable, must be constructed of material impervious to water, kept free of standing pools, liquids, manure or refuse, said manure or refuse must be disposed of in such a way as not to become a nuisance or menace to the public health.

This regulation applies to the province at large with the exception of city municipalities. In the city municipalities by-laws are passed dealing with health matters locally, and these by-laws are subject to the approval of the Board of Health. In the matter of keeping of pigs, the Department has been appealed to, since the suggestions of the Food Controller were made public, in reference to the raising of pigs, and the attitude taken by the Department has been that of leniency and the raising of pigs encouraged, subject to sanitary methods and the approval of local officers.

RECENT AGRICULTURAL LEGISLATION

NEW BRUNSWICK

AT the session of the New Brunswick Legislature which closed on April 26th, a bill was passed repealing the Stallion Act of 1903, amended 1905 and 1916, and substituting another Act varying in some particulars. The differences between the two measures are comprised in Sections 6, 12, and 17, and in sub-sections 2 and 3 of Section 15. Section 6 of the new Act requires all certificates of enrolment to be surrendered on or before the 31st day of December in the calendar year for the purpose of renewal on the payment of an additional fee, the fee required being for first inspection $2, and for each subsequent inspection $1. Section 12 provides that in cases of stallions found on inspection to be unworthy as to breed, type or conformation, the certificate can be withheld. Section 17 states that stallion owners will be notified as to the date and place of inspection, and must have the stallions at the examining point named in the notice at the time and upon the date specified. Failing this, the owner will have to pay all costs incurred for subsequent inspection.

GRADE STALLIONS

Sub-Section 2 of Section 15 permits accredited grade stallions, or cross-breeds, to continue their routes after an accredited pure-bred stallion of a breed approved by the Minister of Agriculture has been available, but the fees charged by the owner of such pure-bred must be satisfactory to the Minister of Agriculture and the fees charged by the grade stallion, or cross-bred, must be identical with those charged for the service of the pure-bred. Failure to comply with this sub-section involves liability for a penalty of not more than $50 or less than $25. Sub-section 3 of the same section provides that a special certificate may be granted to the owner of any stallion in districts which are without stallion service because of the Stallion Act.

ENCOURAGEMENT OF THE SHEEP INDUSTRY

Another Act was adopted by the Legislature which provides for the purchase and sale of sheep. This measure authorizes the Lieutenant-Governor-in-Council, on the recommendation of the Minister of Agriculture, to purchase such a number of sheep for breeding purposes as may be considered necessary, but not to incur an expenditure exceeding $50,000. This money is to be paid out of the revenues of the province and to be returned from the sale of the sheep. The Lieutenant-Governor-in-Council may also guarantee the payment of any advance made to a farmer by any chartered bank within the province up to an amount equal to two-thirds of the selling price of not more than twenty-one sheep. Such sheep are to be resold by the Minister of Agriculture at such times and under such terms and conditions as to their being kept within the province, and otherwise, as may be determined by the Lieutenant-Governor-in-Council.

THE OBJECT AIMED AT

Referring to the sheep bill the Secretary of Agriculture states that it is the intention to make an arrangement with the chartered banks, whereby all orders for breeding sheep will be placed with the local

managers. The farmer will pay down one-third when he receives the sheep and will give his note for the balance. The banker is to decide who is worthy of credit. It is not intended that any man shall secure more than twenty-one sheep upon credit under this Act. The $50,000 is to be used as a rolling fund. In this way it is hoped to build up the sheep industry, for which New Brunswick is suited. If several hundred of the best ewe lambs in the Maritime Provinces can be prevented from going to market in the fall, the Secretary feels that something will have been accomplished.

ONE VOTE FOR ONE MAN

The Dairy Act, under which the cheese and butter companies are incorporated, was amended, in order that shareholders would have one vote only, whereas previously it was one vote on every share that was not in default for any call.

APPROPRIATIONS FOR AGRICULTURE

The following is the estimated expenditure on account of Agriculture for 1918, exclusive of funds derived from grants under THE AGRICULTURAL INSTRUCTION ACT of the Dominion:

Grants to societies	$19,000.00
Minister's office, salaries and contingencies	10,916.66
Miscellaneous and insurance	500.00
Butter and cheese factories	5,500.00
Maritime Stock Breeders' Association	200.00
Encouragement of horticulture	1,200.00
Encouragement of stock raising and encouragement of dairying	6,400.00
Bonus to mud dredges for fertilizer	1,700.00
Encouragement to poultry raisers	1,000.00
Standing crop competitions and seed fairs	5,200.00
Brown tail moth and other insects, extermination of	3,300.00
Limerock crusher and power	500.00
Bonus to wheat mills	5,000.00
Exhibitions	2,000.00
Farm Settlement Board	700.00
*Greater production	50,000.00
Provincial Organizer food control	1,800.00
†Purchase of seed	105,000.00
Total	$219,916.66

* This item includes $25,000 special grant made to the province by the federal Government.

† It is estimated that the proceeds from the sale of seed will reach the same amount.

Included in the estimates for the Department of Education are:

Manual training and household science teachers	$4,300
Manual training and household science equipment	6,000
Consolidated schools	5,000
Total	$15,300

NOVA SCOTIA

BY J. G. ARCHIBALD, B.S.A., DEPARTMENT OF CHEMISTRY

FOUR bills having an important bearing on improved agriculture in our province, have just been passed by the Provincial Legislature.

STALLION ENROLMENT

(1) An Act respecting Stallion enrolment. There have been several Acts prior to this one, all of which are now consolidated and amended into it. The essence of the Act is that all stallions must be enrolled in one of three classes — pure-bred, grade, or scrub. Formerly the scrub was designated by a milder term — cross-bred. Now that such animals have been classified where they really belong, it is hoped that the measure will prove of material assistance in ridding the province of what has been, and is, a serious menace to horse improvement. Clause 14 of the Act, which states that "no charge made for the service of any stallion not enrolled under the provisions of this Act shall be recoverable by any action or proceedings", is worthy of special mention.

SHEEP PROTECTION

(2) An Act to amend the Sheep Protection Act. For many years the two leading features of the Sheep Protection Act have been:

(a) Permission to shoot, under any circumstances any dog caught worrying sheep.

(b) Imposition of a dog tax at the option of municipalities. This was done in only two instances and with good results.

The features of the new Act are:

(a) Compulsory taxation—$1 for every dog, $5 for every unspayed bitch.

(b) An indemnifying fund in all incorporated towns and cities as well as in all municipalities.

AGRICULTURAL SOCIETIES CHANGE OF BREEDS

(3) An Act respecting Change of Breeds of Stock by Agricultural Societies. The principal source of service from pure-bred bulls is through the agricultural societies, of which there are 276 in the province, 12 new ones having been organized this year. The weakest spot heretofore has been the tendency to change breeds. This piece of legislation is designed to guard against such poor policy in future. Clause 3, which gives the Superintendent of Agricultural Societies power to cancel the annual grant of any society following such a practice without his consent and without very valid reasons, is the most important in the Act.

INCREASED PRODUCTION

(4) An Act to Encourage the growing of Wheat and other Cereals. This provides a special appropriation of $25,000, to be used from time to time in giving assistance to the building of cereal mills in parts of the province not now supplied, and in effecting distribution of seed wheat and other grains.

APPROPRIATIONS FOR AGRICULTURE

The estimates for the Department of Agriculture for the current year are allotted as follows:

Agricultural Societies.....	$15,000.00
Agriculture, general.....	38,000.00
Agricultural College and Farm	37,000.00
Total..	$90,000 00

This is an increase of $5000 over the allotment for 1917. Of this increase $3,000 goes to the college and farm and $2,000 to general agriculture.

The following special appropriations have been made:

$25,000 for the encouragement of the growing of wheat and other cereals.

$3,000, with this appropriation a run-out farm situated near the Agricultural College was purchased. This property is to be reserved for working solely with tractor power, and will be used as a basis for securing data from the results of tractor work and the use of artificial fertilizers.

$100,000 for increased production measures. This appropriation was made by an order-in-council. A large part of it will be refunded from the sale of fertilizer and tractors, so that the net expenditure will about equal the grant of $30,000 made to the province by the federal Government.

ALBERTA

THREE Acts of direct agricultural interest were adopted at the recent session of the Alberta Legislature.

MUNICIPAL DISTRICTS SEED GRAIN ACT

The Municipal Districts' Seed Grain Act gives municipalities power to borrow money on the guarantee of the province for the purchase of seed grain to be supplied to resident owners and tenants on patented lands, the loan to the latter not to exceed $300 in value for each quarter section. The interest charged is not to exceed that paid by the municipal district, and the debt is to be secured by a lien on the crop and on the land. If the declaration note is not paid by the 31st December, it rests with the secretary of the municipality to enforce the lien by distress or suit.

THE SEED GRAIN ACT, 1918

The Seed Grain Act, 1918, is almost identical with the Seed Grain Act of 1917, and provides that the Provincial Treasurer, or the Minister of Agriculture, can authorize any person to advance seed grain, or any chartered bank to advance money for the purchase of seed grain, to owners or occupiers of patented lands other than in municipal districts, or to the wives or other representatives of owners who are on active military or naval service, and the Provincial Treasurer or any chartered bank, or individual, advancing seed grain, or money for the purchase of the same, is entitled to take security by promissory note, real estate mortgage, or chattel mortgage. Penalties are provided for persons making use of seed grain, or the money advanced for its purchase, for any other purpose than that for which it was obtained.

THE DAIRYMEN'S ACT

Amendments to the Dairymen's Act give the Minister of Agriculture power to issue licenses to creameries, cream stations, cheese factories, and to testers of milk and cream, in such form and for such a term as may by regulations approved by Order-in-Council be provided. No creamery, cream station, or cheese factory can carry on business after the expiration of a month after the regulations provided have been duly approved and published without such license, the fee for which is $5. No person can operate a cream-testing apparatus after the first day of June, 1918, without securing a license, for which the fee is $2. Before such license is granted, the applicant may be required to pass a satisfactory examination, and to prove by actual demonstration that he is competent and qualified to properly use a cream tester. Any association, corporation, company, person, or firm, engaged in the business of buying milk, cream, or butter fat for the purpose of manufacturing which discrimin-

ates in the price paid in different places, except on account of the difference of grade or quality, will be termed guilty of unfair discrimination, and, on conviction, becomes liable to a penalty of not less than $50 or more than $500. It is provided that competition may be met by equal prices without being subject to penalty. The Minister is authorized to make regulations defining grade descriptions and standards of dairy products, and to specify the conditions upon which the Department's butter and cheese grading service may be made available to operators of creameries and cheese factories.

THE FARM MACHINERY ACT

An amendment to the Farm Machinery Act was adopted setting forth that, notwithstanding anything contained in any contract or agreement, there shall be implied in any such contract or agreement for the sale of farm machinery (whether under seal, written or oral), a warranty to the effect that all repair parts in adequate quantities for the said machinery are kept, and will be kept, by the vendor for the period of ten years from the date of said agreement, and may be obtained at the place of business of the agent of the vendor, who is nearest to the purchaser, or at some well advertised point in the province; provided that the keeping of a stock of the necessary repairs as aforesaid on hand at one well advertised place of business in the province for the year 1918, and at two places of business at least 150 miles apart in the province for every year thereafter by the manufacturers or general provincial distributor of said farm machinery, shall be deemed to be a compliance by a vendor within the terms of the contract or agreement as set out in this section.

ALLOTMENTS FOR AGRICULTURE

Following are the allotments for agriculture for the year ending December 31, 1918:

Civil Government	$ 45,480.00
Expenditure under Agriculture Society Ordinance, including grants to Exhibition Associations at Edmonton and Calgary of $5,000 each	105,000.00
To provide for expenses of official judges at agricultural exhibitions	8,500.00
To promote the work of Live Stock and Agricultural Institutes and short course schools	12,000.00
To promote and encourage the production of pure seed grain and provincial seed grain	6,000.00
Administration and operation of Demonstration Farms	66,000.00
Live Stock Encouragement Act	16,000.00
Destruction of Grey or Timber Wolves and Coyotes and Protection of Game	27,000.00
Destruction of noxious weeds	25,000.00
Stock inspection	12,000.00
To provide for expenditure in connection with brands and publication of official Brand Book	12,500.00
Administration of Stallion Act	10,000.00
Collection and compilation of Medical, Agricultural, Industrial and other Statistics	3,500.00
To promote and encourage dairy work	38,594.60
Operation of Schools of Agriculture	20,000.00
Agriculture and Special Statistics	26,810.70
Miscellaneous grants to shows, breeders' associations, etc	17,100.00
Total	$451,485.30

The foregoing are chargeable to income.

The following items are chargeable to capital account:

Purchase and equipment of Demonstration Farms	4,000.00
To assist creameries not exceeding $1,500 to each creamery	4,500.00
To provide for advances under Elevator Act	200,000.00

PARTIAL ESTIMATES FOR 1919

The following are estimates of expenditure from January 1, 1919, up to the date of final passage of the estimates for the fiscal year ending December 31, 1919.

Agricultural statistics chargeable to income	$170,000.00
Agricultural statistics chargeable to capital account	3,000.00

ESTIMATED REVENUE

The following revenue is expected:

Fees: Game licenses, sale of estray animals and other fees	$2',850.00
Repayment account of seed grain	1,500.00
Repayment loans to creameries	1,000.00
Demonstration Farms	45,000.00
Poultry Breeding Plant	2,000.00
Registration of threshing machines	3,000.00
Brands	25,000.00
Stock inspections	18,000.00
Live Stock Encouragement Act	5,000.00
Enrolment of Stallions	15,000.00
Dominion Government Grant re Greater Production movement	25,000.00
Total	$168,350.00

BRITISH COLUMBIA

AT the recent session of the British Columbia Legislature three measures relating to agriculture were adopted, viz., an amendment to the Pound District Act, an Act respecting Seed-Grain, and an Act for the Protection of Seed. The Pound District Act provides that when an animal impounded cannot be sold, it can be destroyed, and that if the expenses incurred by the pound-keeper are not met by the proceeds of any sale, the deficit shall be paid out of the Consolidated Revenue Fund.

THE SEED-GRAIN ACT

The Act respecting Seed-Grain, to be known as "The Seed-Grain Act," provides that the Minister of Agriculture, may from time to time, purchase and distribute seed grain required, and necessary in his opinion to enable owners or occupiers of land to seed their lands. The amount so expended must not exceed the sum of $50,000 in any one year, and is to be derived from the Consolidated Revenue fund. Applications for seed grain must be made to the Minister, or some appointee of his. Promissory notes are to be given for the seed, and are to be made payable on a date to be fixed by the Minister at a rate of interest not exceeding seven per cent. The Minister can take such proceedings as he thinks proper for the settlement of promissory notes. Persons who do not use all the seed grain for the purpose set forth in their application, and otherwise dispose of it without the consent of the Minister, are subject to a fine of not less than $10 nor more than $250. Any person who has served in the present war in the military or naval forces of His Majesty, or any member of the family of any person who has served, or is serving, in the forces, can be supplied with seed grain on such terms and conditions as the circumstances justify according to the opinion of the Minister without security.

THE SEED PROTECTION ACT

The Act for the Protection of Seed to be known as "The Seed Protection Act," provides for the appointment of a Seed Commissioner and for the appointment of inspectors when considered necessary. A book is required to be kept in the Department of Agriculture to be called the "Register of Seed Crops," wherein is to be entered the location and area,

name of variety, strain, etc., of each seed-crop grown, with the names and addresses of the growers. Persons desiring to grow any seed crop must make application to the Seed Commissioner for registration thereof, such application to be in writing, containing all information necessary for registration. Upon receipt of the application, the Seed Commissioner is to submit the same to the Minister with a full report thereon. When the applications are approved permits may be issued for the period of one year and be renewable. No person can grow a seed crop without being in possession of a valid and unexpired permit in a prescribed form. Persons violating the provisions of the Act are subject to a fine not exceeding $100, and in default of payment to imprisonment for a period not exceeding thirty days. Plants of the crops listed not grown for seed purposes, but allowed to grow and flower, are to be treated as noxious weeds as provided in the "Noxious Weeds Act." The seed crop includes mangels, beets, sugar-beets, spinach, chard, swedes, turnips, radishes, kohlrabi, kale, rape, cabbage, cauliflowers, broccoli, carrots, parsnips, celery, parsley, onions, leeks, and corn. No prosecution or destruction of plants or seed crops can take place without the written consent of the Minister. Seed production areas can be established by order-in-council.

APPROPRIATIONS FOR AGRICULTURE

The appropriations for agriculture for the year ending March 31, 1919, are as follows:

Minister's office	$9,920.00
General office	39,979.00
Horticultural Branch	41,492.00
Live Stock Branch	38,793.00
Compensation for tubercular cattle	20,000.00
Agricultural associations, etc	15,000.00
Farmers' institutes	10,000.00
Women's institutes	6,000.00
Bee-keepers' association	250.00
Dairymen's association	1,500.00
Entomological societies	250.00
Fruit growers' association	3,000.00
Goat breeders' association	500.00
Poultry association	1,500.00
Stock breeders' association	1,500.00
Flockmasters' association	500.00
Seed growers' association	1,000.00
Operation of Frondeg Farm	25,000.00
Collection of agricultural statistics	1,500.00
Board of horticulture	500.00
Department exhibits	500.00
Grants to British Columbia students	1,000.00
Total	$219,684.00

PRIZES AT FAIRS FOR NON-PRODUCTIVE LIVE STOCK

NOVA SCOTIA

BY F. L. FULLER, SUPERINTENDENT OF AGRICULTURAL SOCIETIES AND EXHIBITIONS

IN this province the offering of prizes for non-productive live stock at exhibitions is practically non-existent. As our provincial exhibition buildings were destroyed by the accident at Halifax, there will be no provincial show held in the province this year.

The chief educational feature of the local fairs is the school exhibits. At many of our fairs, exhibits prepared by the Agricultural College are displayed, showing the advantages of using improved seed, proper methods of cultivation, and of spray-

QUEBEC

THE managements of all the large exhibitions in the province of Quebec are arranging this year to encourage the actual farmers, more than amateurs, by offering higher prizes for the useful classes of production and general utility, and the "midways," if they are not entirely suppressed, will be considerably diminished, in accordance with the desire of the Department of Agriculture.

ONTARIO

BY J. LOCKIE WILSON, SUPERINTENDENT OF AGRICULTURAL SOCIETIES

In looking over the prize list of the different agricultural societies there are very few non-productive classes of live stock that receive prizes. The majority of societies confine themselves in the poultry classes to the utility breeds.

SASKATCHEWAN

BY S. E. GREENWAY, DIRECTOR EXTENSION DEPARTMENT

THE larger exhibitions in Saskatchewan this year are eliminating to the fullest extent the non-productive classes of live stock. This matter, which has often been up for discussion, has never had the convincing evidence which is furnished in times like these of the wastefulness of the non-producer. The smaller societies have never made their exhibitions a clearing-house for this kind of stock. The man who is usually among the exhibitors at the smaller fairs did not need to be shown. There never has been enough money offered to tempt him to keep the stuff around him. This is true of all kinds of live stock and poultry. In the matter of poultry, the poultry shows have been gradually cutting off the purely fancy breeds for years.

In the matter of the general educational aspect of the exhibition, I am still convinced that the policy pursued in this province for the last eight or ten years is sound. Some latitude has been allowed fair managements, except in the matter of games of chance or other shows tainted with immorality. These have always been disallowed. Apart from that, what the public ask for, and pay for, they should in a measure be given. This takes into account all kinds of standards, and there are many, and some exceedingly low. I have always urged the directors of the agricultural societies to keep their activities a little above the standard asked for by the public, adding from time to time new educational features, and eliminating the ones that pander solely to the sporting instinct. I have tried, and have succeeded in a measure that has been gratifying to me, to keep the idea before them that exhibitions must in time represent the highest manifestation of rural civilization, that eventually every citizen will recognize in it an opportunity to show what he is contributing to the highest welfare of his community, and this for no prize or reward other than the pleasure which comes with the consciousness that he is making a real contribution to the welfare of his fellows.

ALBERTA

THE prize list committee of the Calgary Industrial Exhibition at a recent meeting authorized the following changes in the prize list for the 1918 exhibition

(1) That dry-mares be eliminated from the pure bred class, except in sections for heavy draughts, roadsters, carriage horses, or saddle horses.

(2) That in the beef breeds of the cattle the only sections provided for females shall be cows, three years or over, with calf by side or under one year if the calf is weaned it must be registered and the cow only judged.

(3) In the herd class for beef breeds the cow three years or over must have been shown in the individual class for a cow three years or over with calf by side.

(4) The prizes in each class of cattle will be uniform for aged animals and young stock alike. Five prizes are offered for each individual class, and four prizes for each herd or progeny class.

(5) Ewe, two shears or over, to be eligible to compete, must have with her a lamb of calendar year. Any aged ewe which cannot show under this classification can be shown for fat ewe or wether.

Last year the poultry lists were considerably reduced by the cutting out of many of the fancy breeds. The poultry prize list has not yet been considered in detail, but it is expected that still further reduction will be made by which the exhibition classes will be practically limited to the utility breeds.

BRITISH COLUMBIA

BY WM. E. SCOTT, DEPUTY MINISTER OF AGRICULTURE

EVERY effort will be made, through agricultural associations holding fairs, to feature the productive classes, and to cut out prizes for non-producing classes such as fancy breeds of poultry. I cannot give you any definite information as to what will be done by the various fairs, but the general tendency will be to offer prizes for the classes which will, to the largest extent possible, encourage the production of these lines of stock and general farm crops. Educational work will be featured at as many of our fairs as possible by means of exhibits from this Department, and also by means of similar exhibits staged by the provincial university and the Dominion experimental farms. The general slogan in all our fairs will be "Contribute towards victory by increasing production."

AGRICULTURAL COLLEGE CLUBS

ONTARIO

BY S. H. GANDIER, SECRETARY AND REGISTRAR

THERE have been organized at the Ontario Agricultural College by the student body, clubs devoted to the study of special branches of work. These include the Cosmopolitan club, the Live Stock club, the Apiculture club, the Horticulture club, the Poultry club, and the Biology club.

The Cosmopolitan club has for its object a better understanding of the political, economic, and literary problems of the different countries, and the cultivation of social intercourse among the students at the college. It holds entertainments for its members.

The Live Stock club was formed in December, 1917. Its objects are to help its members to become better acquainted with the science and principles of live stock breeding and raising; to keep members in touch with all Government work in the development and aid of the live stock industry; to gain a comprehensive knowledge of the leading breeds of live stock, both by judging and lecture work, and to uphold the importance of the live stock industry in its relation to other branches of agriculture. The club is holding a special series of meetings to be addressed by the leading men of the live stock industry.

The Apiculture club was formed in 1910. Its principal work is to give students specially interested in bee-keeping an opportunity to study the science of bee-keeping more thoroughly than is possible in the regular course of lectures. Specialist bee-keepers are called upon to address the club at its meetings.

The Horticulture club was started in 1908. It discusses both practical and scientific problems of vegetable and fruit growing. The special object is to help those taking the horticultural option, to arouse the interest of others, and generally promote horticulture within the college. Competitions in fruit and vegetable judging are held. Lectures are secured from prominent horticulturists engaged in experimental and commercial horticulture.

The Poultry club, organized in 1908, aims to supplement the poultry course as provided by the college curriculum. It encourages its members to regard poultry keeping as a business, to increase the circulation of the best poultry literature, including magazines. The club conducts practical judging classes among the students, thereby enabling them to get a more thorough knowledge of the different breeds, and to distinguish vigour and utility characteristics in birds. Poultry men of outstanding reputation are called upon to address the club. A practical demonstration in egg candling was held in February this year, when each member of the club had the opportunity of candling eggs from incubators on both the 9th and 14th day of hatching, as well as candling and dividing fresh eggs into the different grades of the market classification.

The Biology club differs from the others in not being so highly organized, inasmuch as it has neither president, secretary, nor other officers; not does it collect membership fees. The members meet about twice a month, usually at the home of a member of the faculty, where a paper is read by some member of the club who has full charge of the

meeting for that occasion. The aim of the club is to promote an interest in biological topics which may not be discussed in the regular way in the class room. The life and works of some of the great biologists have formed the principal basis of study during the present college year.

MANITOBA

BY V. W. JACKSON, PROFESSOR OF BOTANY AND BIOLOGY

I believe the only club that has been formed at the Manitoba Agricultural College is the "Naturalists' Club." This was formed in 1913, and ran for three years, breaking up when most of the officers and members had gone overseas. At that time the president was Mr. H. E. Hallwright and the secretary, Mr. D. A. Brown, Deloraine.

No doubt this club will be reformed on return to normal conditions as much interest was taken in it at the time. The object of the Naturalists' Club was the dicussion of bird migrations, bird arrivals, and nature study in general, each of the members being expected to report the results of his summer's observations and to give papers on biological topics.

GARDEN, FIELD CROP, AND ORCHARD COMPETITIONS

ONTARIO

THE Ontario Vegetable Growers' Association is this year conducting two competitions, one for gardens, and the other for field crops. The regulations for the garden competition state that each garden must contain not less than three acres and that they will be judged twice during the season, the first judging not later than July 10th, and the second judging not later than August 10th. An entry fee of $1 will be charged. There will be five prizes running from $30 down. Judges will be supplied free of charge by the provincial Department of Agriculture.

The field crop competitions will be conducted in onions, celery, tomatoes, cabbage, early potatoes, and musk melons. The cabbage and potatoes will be judged not later than July 10th, and the celery, melons, onions, and tomatoes about August 10th.

The province for both competitions will be divided into four districts as follows:—

1. Ottawa, Kingston, Belleville.
2. Toronto, Welland, Clinton and Louth.
3. London, St. Thomas, Stratford, Brantford.
4. Blackwell, Sarnia, Tecumseh, Sarnia Independent.

The plots entered for the field crop competition must consist of not less than one-quarter of an acre; there must be ten entries in each class of vegetables named from each district; members can compete in any, or all, of the six crops mentioned; the entrance fee is $1 for each crop; judges will be supplied by the Provincial Department of Agriculture; the prizes, six in number, range from $20 down; special prizes

will be offered at the Toronto, Ottawa, Kingston, and London fairs open to prize winners in the different districts. Express charges on these exhibits will be paid by the provincial Government. Only vegetables from the plot entered in the competition can contend for the special prizes at the fairs mentioned.

BRITISH COLUMBIA

THE Horticultural Branch of the Provincial Department of Agriculture has issued rules and regulations for an Orchard and Truck Competition and also for a City and Farm Garden Competition. The rules and regulations for both competitions provide that all farmers' institutes and other organizations desiring to organize these competitions must notify the Provincial Horticulturist at Victoria. The fields or plots entered for the first-named competition must be clearly defined and there must not be less than 10 *bona fide* entries for each kind of crop from any one organization, and no competitor can compete for prizes offered by more than one organization. At least $30 must be offered in prizes for each kind of crop. The competition is divided into seven classes, one for bearing orchards, another for young orchards, a third for bearing strawberries, a fourth for bearing raspberries, and a fifth, sixth and seventh for tomatoes, onions, and celery.

In the City and Farm Garden Competitions 10 *bona fide* entries are also required in each competition, but extra prizes can be given if this number is exceeded. Gardens may be not less than 1,000 square feet in area. If required, the Department will supply the services of assistant horticulturists. The judges will visit the gardens three times, or as often as possible, during the season. The Department will supply one judge. There must be at least $30 offered in prizes for each competition, and, this amount being offered, in each instance will be supplemented by a grant of $25 from the Department. The score card calls for 20 points for quantity and value of crop, quality of crop, assortment as to range of season, variety and kind, industry, enterprise, and skill, and cleanness and neatness. The local fall exhibition societies have been requested by the Department to offer special prizes for collections of vegetables grown by competitors.

NOVA SCOTIA

AGRICULTURAL INSTRUCTION ACTIVITIES

BY J. G. ARCHIBALD, B.S.A., DEPARTMENT OF CHEMISTRY

THE Nova Scotia Department of Agriculture has made a determined effort to insure that the necessary supplies for increased production are available in the province this year. In the main it has been regarded as sound policy not to interfere with existing methods of distribution, such as co-operative farmers' associations and the regular trade. Hence with regard to seed the policy has been restricted to a guarantee against loss on unsold surplus to those dealers and associations who made application for supplies of seed grain.

As a result upwards of 30,000 bushels of seed oats and 8,000 bushels of seed wheat have been brought in and distributed. These additional supplies added to those of the regular trade have proved adequate for the country's needs. With fertilizers the question has been somewhat different. It was ascertained early in the year that existing firms were not in a position to bring in all of the necessary supply. Consequently an extra reserve supply of 2,500 to 3,000 tons was purchased, and this has been largely disposed of, mostly to farmers' co-operative associations and to dealers unable to obtain their usual supplies, but who agreed to assist in the distribution of this reserve supply at a moderate profit.

Practically all the supply of bean seed referred to in our last month's résumé, has been disposed of, largely in districts where beans have not been grown before.

A big interest is still maintained in the tractors and all are doing satisfactory work. A machine of the "caterpillar" type, hitherto not shown in the province, was demonstrated at the Agricultural College farm on Thursday, May 2nd. It did good work with both plough and road grader.

The labour question is the one big element which the Department is not in a position to better materially. At this date it is not possible to estimate to just what extent the situation will interfere with the plans for increased production.

SHEEP EXPERT FOR THE PROVINCE

Mr. S. A. Logan, of Amherst, one of the most prominent sheep and cattle breeders in Eastern Canada, at one time farm manager at the N.S. Agricultural College, has been appointed Sheep Expert for the province. Mr. Logan is at present devoting most of his time to the organization of the co-operative wool marketing system in conjunction with the Live Stock Branch of the federal Department of Agriculture at Ottawa. He is also endeavouring to work out a scheme for the conservation of the ewe lambs which heretofore have gone to the butcher; also by meetings and like measures to stimulate this industry for which Nova Scotia is so well adapted.

ONTARIO

IDLE LAND BEING PUT TO WORK

BY C. F. BAILEY, B.S.A., ASSISTANT DEPUTY MINISTER OF AGRICULTURE

FOR some months past there has been considerable attention given to the question of cultivating idle land adjacent to towns and cities throughout the province. A number of agriculturists met in Toronto some time ago to study this question, and the committee reported favourably on the idea of cultivating large tracts of land in the West, but were unanimous in the opinion that land adjacent to Toronto and Montreal could not be cultivated except at a considerable loss. However, in view of the feed shortage and the urgent call from England for flax fibre and flax seed, the Ontario Government has taken over 100 acres of land near the city of Toronto to be devoted to flax and sown to fall wheat, when the flax is harvested. Three tractors, two pair of horses, and all necessary implements have been purchased, and the work is progressing satisfactorily. Accurate account of all costs is being kept of this undertaking, and, if it proves to be at all feasible to cultivate land in this way, a much larger area will probably be taken over another year.

AGRICULTURAL REPRESENTATIVE NOTES

The county Board of Agriculture of Brant county has offered $15 as prizes to junior farmers in that county for next year's stock-judging team. The prizes will be granted on condition that the boys come within the first five in the judging at the Ontario winter fair.

Mr. R. A. Finn, Agricultural Representative for Middlesex county, reports that the Holstein club organized by him a year ago has held its first sale of fifty head of registered cattle. While few of the cows held official records, the fifty head averaged about $200 each.

The Agricultural Representatives of Ontario are using motion picture films in connection with their work. At a meeting of the Napanee Poultry Association, live birds consisting of White Wyandottes and Barred Rocks, were judged, and then Mr. Curran, the Agricultural Representative, displayed three reels of poultry films showing incubating, rearing, and killing chickens.

The farmers' club movement is developing rapidly in the province. In many of the counties the Agricultural Representatives find it comparatively easy to organize these institutions. Mr. N. C. McKay, of Bruce county, reports having organized three clubs within one week in the month of April. Several of the clubs in that county, he reports, have co-operated in shipping cattle and hogs to market.

As an evidence of the useful character of the Agricultural Representatives' office, Mr. A. P. McVannel, Representative in Prince Edward county, furnishes a list of matters on

which he was consulted within one week, as follows: Spraying materials and outfits; poultry diseases and their treatment; purchasing of feed and seed grain; the submitting of samples of wheat and beans for exchange and for tests; the procuring of eggs for school fair purposes; cattle vaccine; the growing of Soja beans for green food; dairy records; lime as a fertilizer; tractor operation; the securing of farm help, and other matters.

The Farmers' Co-operative Association in Lennox and Addington county has, through the Agricultural Representative, placed a minimum order of twelve tons of binder twine. This order, it is expected, will save the farmers about $500 in the cost of the twine.

To encourage junior farmers in Wentworth county, who are taking part in the Acre Profit Competition, two business men are granting money prizes each for the best bushel of wheat grown by a member of the junior farmers' organization in his respective district.

The County Council in the Rainy River District, in order to assist in increasing hog production, has offered to furnish wire fencing to farmers who desire to try the pasturing of hogs this year. The Council is also ready to furnish money to farmers who need help to purchase concentrated hog feed.

It is estimated by Mr. R. H. Clemens, Agricultural Representative for Wellington county, that, as a result of the hog production campaign about 5,000 extra brood sows will be kept in Wellington county this year. Mr. Clemens further estimates that if these sows produce two litters of seven pigs each, and the pigs are kept until they weigh 200 pounds, 7,000 tons, or half a ship load, of extra pork will be provided in this county alone, within a year.

With the idea to secure a supply of young pigs for the boys and girls in the district of Kenora, nineteen brood sows, the mothers of the prospective pigs, have been purchased and placed with the farmers of the district. The agricultural society has offered $50 in prizes for pigs that will be exhibited by children at the annual exhibition to be held in August.

The school garden should be first placed in the school grounds and then at the homes of the school children. A school garden that does not surely increase the home gardens is not worth a moment's consideration. Better home gardening should follow school gardening, in the same way that better accountancy in the counting house follows arithmetic in the class room. There should be a school garden at every school house in the land, however small that garden may be. It may be a green house on the roof, it may be a lawn in the front of the school, or it may be a vegetable plot beside the school. The work that is not good enough for teacher to do is not good enough for pupil to do. To plant a garden at school and not properly take care of it may justly be termed an educational tragedy.—*Out Door Education, April.*

SASKATCHEWAN

OBSERVATIONS ON SWINE FEEDING

BY W. H. J. TISDALE, PROFESSOR OF ANIMAL HUSBANDRY, SASKATCHEWAN UNIVERSITY

VERY few definite figures are as yet available in connection with the swine-feeding experiments carried on thus far at the university, and anything contained in this short summary will be mostly in the way of observation upon these experiments up to date.

For growing pigs the concentrated by-product (shorts) has formed the bulk of the ration used, ranging from one-half to two-thirds mixed with finely ground oats. It has proven highly satisfactory as a bone and tissue builder, particularly when used in conjunction with some good forage crop. It has been found to give best results when mixed half and half with finely ground oats. A small amount of tankage has been used with good results; also a quantity of red-dog flour and a fine oat flour termed Rock River feed. The two latter are not available, however, at the present time.

The shorts mentioned are decreased somewhat as the pigs attain the age of four months, their place in the ration being taken by oats and barley. We are also trying out wheat screenings consisting largely of wild buckwheat and other weed seeds with a fair proportion of cracked and shrunken wheat. This when finely ground is of great value when not fed too heavily and chiefly in the fattening period.

VALUE OF GREEN FEED

Green feed has been used very extensively during the past two seasons with both growing and fattening pigs with excellent results. The cost of 100 lb. gain has been materially lessened by the inclusion of some pasture crop in the ration, and, furthermore, the pigs have also been in a stronger, more thrifty condition when handled in this way. Winter rye sown the previous September has given the earliest green feed in the spring, followed closely by a cereal mixture of peas, oats, and barley, and finishing up with rape. Observations thus far have led to the conclusion that these pasture crops are more suited to the growing stage than the fattening period, though they can be used for both. Pigs confined more closely, and given a heavier grain ration from 5½ to 7 months of age, have been turned on the market more economically than those running continuously on the pasture, and with less grain until 7 months old.

Skim milk and whey have not been used at all in connection with our swine-feeding work, as they are not available. For the young pigs previous to weaning, and for some time after weaning, the shorts and finely ground oats are simply made into a slop form with water.

USE OF THE SELF-FEEDER

The self-feeder is rapidly finding a place, and though it has been tried out for only one season, its worth has been proven over the old method of trough feeding, particularly when used in the paddocks sown to pasture crops. The saving of labour was perhaps the most commendable feature noted, but it was also quite evident that the self-fed pigs gained more rapidly and more economically by consuming a larger daily ration. The pigs handled in this way last year were ready to turn on the

market three to four weeks earlier than those fed three times a day in the trough. Further definite data will be obtained this year in connection with this important phase of swine feeding. Observation has also proven quite decidedly that the self-feeder cannot be utilized in feeding brood sows. They fatten too rapidly to give the best results at farrowing time.

Various systems of handling the breeding stock have been tried out with the idea of ascertaining whether or not it is advisable to keep sows after they have raised one or two litters. Many claim that new stock should be purchased each season. This may be true when the sows become so large and clumsy that they kill most of the litter the first two or three days, but the cost of carrying them over from one litter to another cannot very well be made an excuse if economy is practised in their care and feeding.

THE BROOD SOWS

From 20 to 30 brood sows have been carried over in excellent condition on the university farm. After the pigs are weaned, the sows are allowed to roam the summer-fallow, getting all the water they need, but with very little grain. In the fall they have free access to all the stubble fields, where they pick up a good living for five or six weeks from what would otherwise be wasted. About December 1st they are placed in one of these fields permanently for the winter with a straw stack as shelter. Garbage from the university residence is utilized for the winter feeding of these sows, and during the past winter it cut the grain ration by at least one-half. Twenty-five sows ranging in age from 1 to 4 years, and in weight from 300 to 600 lb., receiving garbage every other day, were given an average of 2½ lb. of oat chop per day. They came through in excellent breeding condition and 13 of them have already farrowed with an average of 8 pigs to the litter. It will be seen from this that the cost of carrying these sows for 9 or 10 months does not amount to a great deal. Of course it applies more to pure-bred sows, where a number of the pigs raised are sold for breeding purposes. The same would perhaps not hold good in the case of grade sows where the litter is raised as a straight market proposition.

BRITISH COLUMBIA

CO-OPERATIVE VARIETY TESTS

IN 1917 the Department of Agriculture of British Columbia began a system of the co-operative testing, of varieties of field crops including cereals, potatoes, corn, flax, and sugar beets. So satisfactory were the results of the first year's work that it is being continued. Owing to the scarcity of certain seeds experimenters of last year have been asked by the Department to share their supplies of seed with others who wish to join the movement.

The seed sent out this spring has been confined to potatoes, corn, and flax. The potato seed samples are of selected from Gold Coin, Carman No. 1, Netted Gem, and Eureka. The corn samples are of one pound each of two varieties, Nothwest Dent and Minnesota No. 13. Both fibre and seed flax are being encouraged. Five pound samples of seed of each are being provided for those desirous of testing this crop.

As in former years, the Department is distributing alfalfa nitroculture in sufficient quantities to inoculate sixty pounds of seed. A small fee is charged for these samples. Applications for seed reach the Department through the secretaries

PART III

Junior Agriculture

DEMONSTRATIONS, COMPETITIONS, AND CLASS-ROOM STUDIES IN RURAL LIFE FOR BOYS AND GIRLS

SUMMER SCHOOLS FOR TEACHERS

NEW BRUNSWICK

THE fifth annual session of the New Brunswick Rural Science schools for teachers will open in the Fisher Vocational school at Woodstock and in the Agricultural School building at Sussex on July 10th, and close on August 7th. Second-year students will be examined on the books required to be read as part of the winter reading and experimental course.

Classes will be found in 1, Physical Nature and Environment; 2, Chemistry of Soil, Plants and Animals; 3, Nature Study of Animals; 4, Plant Study and School Gardening; 5, Method of Instruction with Correlation of Subjects, and the regulations and rules governing this study in the public schools. Trained instructors will be in charge of the several divisions of the course in each school. Specialists in various lines are also expected to give addresses from time to time during the course. Teachers holding provincial licenses who are actually engaging in the public school service of the province are eligible for admission. The usual bonus, twenty dollars, will be paid to every teacher whose work at the school is satisfactory and that during the first school year subsequent to such attendance teaches nature study and agriculture with school gardening in the public schools.

The full course requires attendance for two years. On satisfactory completion of such course a certificate of competency signed by the Minister of Agriculture and Chief Superintendent of Education, will be granted. First year students whose work at the school is satisfactory may undertake instruction in nature study with school gardening in their schools, so as to receive grants. Transportation from homes of students to the school will be paid by the Department, provided receipts for money actually paid for such transportation to the school are handed in to the office of the Director before the close of the session.

QUEBEC

MACDONALD COLLEGE

A SUMMER course in rural sociology will be held at Macdonald College from August 5th to 16th. It is expected that Mr. E. R. Groves, Professor of Rural Sociology of New Hampshire State College, and Dr. Wilson, Professorof Sociology of Cornell University, will assist in this course.

ONTARIO

BY J. B. DANDENO, Ph.D., INSPECTOR OF ELEMENTARY AGRICULTURAL CLASSES

IN 1918 and thereafter all public and separate school inspectors who have rural schools in their inspectorates will be required to take the courses provided at the O.A.C. Guelph, leading to an intermediate certificate in agriculture. These courses are given in two consecutive summer sessions of five weeks each, commencing on July 2nd. Hereafter, no one will be qualified for appointment as inspector who has not an intermediate certificate in agriculture.

The object in requiring inspectors to take these courses is to equip them to inspect intelligently the classes undergoing instruction in agriculture, and the better to understand the farmer's view point and his problems. An inspector is, or should be, a leader in education, and he should be able to inspire both teacher and pupils with a knowledge of, and with a love for, the best things of rural life. Many of the inspectors have been brought up on the farm, but, like most farm boys, saw little more than the drudgery of farm life, and, consequently hastened to leave the farm at the first opportunity. There is more than drudgery in farm life and farm work, and it is expected that the inspectors, through these courses, will secure some of the knowledge and spirit which will enable them to hold their own, and more, even in the discussion of the principles of agriculture with the progressive farmer himself. The boy from such a farm home will naturally look up to the inspector with more sympathetic admiration when he knows that the inspector knows what he knows. And this influence may have, here and there, the effect of creating a liking in the boy's mind for farm life, and may be the deciding factor to inspire the boy to educate himself for the farm.

MANITOBA

BY R. FLETCHER, M.A., DEPUTY MINISTER OF EDUCATION

A COURSE in agriculture will be given at our Agricultural College, opening July 8th and closing August 16th. This is the regular summer course by which teachers are enabled to cover a portion of the work for the B.S.A. degree during vacations.

Teachers holding first class or second class professional certificates may complete certain work in three summer courses, after which they will be admitted to the fourth year in the B.S.A. course. They will thus be able to complete their degree work in two winter sessions. We hope to meet the demand for teachers of agriculture in our schools by this plan. We cannot take raw graduates from an agricultural college and certificate them without normal training, as the training in the method of teaching is as essential to success in this as in any other lines of work taught in the schools.

We have a similar course covering three summers of six weeks each at the agricultural college for women with first class or second class professional standing. This course enables them to qualify as teachers of domestic science in the elementary schools. Credit is given for the work covered in this course in the regular course leading to the degree of Bachelor of Home Economics.

A third course opened on May 20th and runs four weeks. This course

is open to the students from the provincial normal school, and any other teachers who wish to get instruction in elementary science, school gardening, woodwork, household science, household art, live stock, and field crops.

A fourth course commences July 22nd, and also runs for four weeks. This course is open to the second normal class.

A fifth course is known as the Rural Ministers' Short Course, and opens July 30th. The subjects taken up will be: rural church problems, the community club movement, production.

COURSE IN TECHNICAL EDUCATION

In addition to the courses given at the Manitoba Agricultural College, the Department of Education conducts a summer school for teachers at the Kelvin Technical High School, Winnipeg. The course occupies from July 2nd to August 3rd, and includes classes in blacksmithing, clay modelling and pottery, drawing, basketry, household arts, printing, wood carving, physical instruction, and other subjects. This course is open to all teachers in the province.

Progress certificates are issued yearly. The certificate of the first year entitles the student to the grant offered by the Department on the recommendation of the inspector of the district in which the student is employed. The complete three years' course qualifies the successful students who hold second class professional standing as instructor of the subject mastered.

SASKATCHEWAN

BY F. W. BATES, DIRECTOR OF SCHOOL AGRICULTURE

THERE is little change in our summer school arrangements from those of previous years excepting that all formal agriculture is taken in one summer. One session is being devoted to nature study, another to school gardening and a third to elementary science with an introduction to agriculture, any two of which prepare for the special diploma issued by the Department of Education. Our summer school is conducted as a regular part of the university work. It consists of a six weeks' course, beginning with July 1st. The first session of the summer school was held at the University of Saskatchewan in 1914. For three years the Department of Education assumed responsibility for its direction and support. Last year at the request of the Department, the University took over the management of the school, the Department continuing its support of the courses for teachers. Last year also for the first time the University offered classes leading to a degree. The courses for teachers are intended to stimulate instruction in agriculture, household science, nature study, art and elementary science in the schools of the province. Students who pass the senior matriculation may in three summer and two winter sessions complete the work required for the B.A. or B.Sc. degree. Arrangements are made regarding railway fares and residence of students. Classes are going on all the time for the benefit of returned soldiers who are continually coming and going. They are given courses specially in agricultural engineering and agriculture.

ALBERTA

THE sixth summer school for teachers will be held at the University of Alberta in Edmonton, from July 2nd to August 3rd. During the previous five summers a total of 1,160 teachers completed courses at these schools. During the past three years, the attendance each year has been over 300. Up to the present, 562 teachers have completed one or more courses in agriculture, 389 one or more courses in nature study, 209 in household science, and 97 in household management. Admission to the summer school is granted to those who hold at least a second class interim certificate, and upon whose work the inspector has given a favourable report. The Department of Education pays the railway fare to and from Edmonton for those teachers attending from points within the province. If students double up, board and room cost $30 a piece for the session. In the case of a student who desires to have a separate room the charge is $35. The courses for high-school teachers will begin at the same time as the other courses, and will continue for the five weeks of the session, but with a special line of agricultural studies. In former years a course was held for teachers from Great Britain and the United States in January and February. This year the course will be given at the same time as the summer school for Canadian teachers.

SPECIAL COURSE FOR INSPECTORS

In the summer of 1914, a special course was provided at the summer school for teachers for the school inspectors of the province. Owing to assignment to other duties a number were then unable to attend. In order to give those who did not take the special course in 1914, as well as any new inspectors who have been appointed, an opportunity to get in touch with the organization of the summer school, and the instruction being given by the teachers in attendance, the Minister of Education has directed that a special course be organized for them this year. The work of the inspectors will be under the immediate leadership of the Director of the summer school. A special feature of the course will be the consideration of problems relating to the inspection and supervision of schools.

BRITISH COLUMBIA

OWING to the serious economic conditions which exist in the province of British Columbia, and also with a view to leaving all teachers entirely free to engage in agricultural work during the coming summer, it has been decided by the educational authorities to forego the summer school for teachers for this year. The teachers of the province are being advised of the great need of all possible assistance being given in connection with agricultural and horticultural work and they are urged to do everything they possibly can to help along the work of increased production.

RECEPTACLES FOR SCHOOL FAIR EXHIBITS

The school fair having become an established fact in every province, the time has now come to consider in what manner the interest can be best maintained and the attractiveness increased. The school fair must progress, or take on that commonplace character which leads to decay. The fairs, which being under thedirection of the Agricultural Representatives, are in large measure supported by funds derived from grants made under THE AGRICULTURAL INSTRUCTION ACT of the Dominion, have beyond cavil established their value, first, as an educational factor, and secondly, as an inspiration to a desirable spirit of emulation But the material is not all that must be striven for in the training of the young. The more a love for pleasing arrangement and method is fostered and encouraged in our boys and girls, the broader and higher minded will be their outlook upon life. With these thoughts in mind, and with a view to helping in their realization, the following articles from different points in the country have been brought together:

NOVA SCOTIA

BY L. A. DeWOLFE, B.A., DIRECTOR RURAL SCIENCE SCHOOLS

PAPER plates are the only receptacles we supply for children's exhibits of vegetables. Vegetables too large for plates are laid directly on the paper-covered tables.

Our prize list calls for only half-dozens each of potatoes, carrots, parsnips, etc. Plates accommodate these very well. Small beets go on plates. As we call for only four beets, if they are large we stack them—three on the bottom and one on top. Pumpkins, squash, etc., lie singly on the table. Grain in the sheaf is hung on the wall.

We try to borrow show-cases in which to exhibit home-cooking. We have seen cooking protected from thieves by chicken-wire; but that does not protect it from dust. We do not yet provide receptacles for poultry, though it would be well if we could do so. You see, therefore, that we supply no equipment except paper plates.

QUEBEC

BY J. EGBERT McOUAT, B.S.A., DEMONSTRATOR TO RURAL SCHOOLS

IT would appear that the practice of providing receptacles for school fair exhibits should vary very much with the circumstances under which the fair is held. If the demonstrator, or other official, in charge has only one or two fairs for which he is responsible, he can naturally put more time and thought upon preparation for holding them than if he is burdened with a series of fairs held one after the other.

In the latter case it is almost impossible to arrange to carry a great deal of equipment from place to place, especially when the circuit takes in large fairs. Under circumstances where a demonstrator has only a few fairs to hold, the outlay for a complete supply of receptacles is almost too great to be justifiable.

This difficulty could, of course, be partially overcome by co-operation among those holding fairs, but as all the school fairs are held within a very limited time, it is hard to arrange to

keep dates far enough apart to arrange for a transfer of such equipment from district to district.

It has not been our practice, nor that of the four provincial demonstrators with whom we co-operate, to provide receptacles to any large extent for school fair exhibits. Some of the reasons for this policy have already been mentioned. We are, perhaps, fortunate in being able to secure, as a rule, a suitable building and also a good supply of tables on which to place the exhibits.

TABLES AND PLATES

We try to have these tables covered with good clean paper, and in most cases the exhibits are placed on them directly without using any receptacle except when it is absolutely necessary. Paper plates are used for exhibits of tomatoes. This is the only receptacle which is regularly provided. The pecks of potatoes are placed in neat piles on the tables or stands, and the entry ticket placed on top. All the potatoes are thus in full view, judging can be more easily done, and the exhibit is uniform in appearance.

No receptacles are needed of course for sheaves of grain or corn. These are either stood along the wall or else laid on the tables. Pupils exhibiting threshed grains provide their own receptacles—generally a glass jar or small bag. More uniformity in the particular class is needed, but it is hard to decide upon a receptacle which every exhibitor may be able to provide. Ears of corn are also laid neatly in rows and each particular section kept in one place.

POULTRY AND COOPS

In the case of poultry the coops or boxes are provided by the children. In order to produce uniformity in the size and shape of the crates, directions are issued by the Poultry Department, Macdonald College, telling each pupil who received eggs how to make a suitable box in which to show their birds. Although these directions are not always closely followed, they have produced a great improvement in the appearance of the poultry exhibits at all fairs.

Children exhibiting flowers are expected to provide their own receptacles. Although some exhibitors are quite careless and bring salmon cans, or other unattractive containers, the majority bring vases of a suitable character.

Exhibits of cooking, such as cake or bread are removed from the pans, placed directly on the tables and then covered with netting. Canned fruit and vegetables are shown in standard jars.

The provision of receptacles, where needed, is left almost altogether to the child. This course is followed chiefly because of circumstances already outlined. The extensive use of receptacles may be advantageous under certain conditions, but so far as our work is concerned we have not yet seen our way clear to adopt this policy.

SOME STATISTICS

The number of children who are taking part in the school fair work this year shows an increase of over 50 percent. Last year seeds and eggs were distributed to 4,893 children. This year the figures total approximately 7,750, an increase of 2,857 in the number of pupils taking care of material. The following list gives an idea of the amounts of different materials being used by the boys and girls taking part in this work:—

Eggs	891	settings
Barley	157	lots
Grain corn	413	"
Oats	307	"
Swedes	495	"
Wheat	471	"
Beans	796	"
Beets	280	"
Flowers	1141	"
Potatoes	1388	"
Sweet corn	819	"
Tomatoes	593	"

Some time ago we predicted that new fairs would be held at several centres, and this prediction has been realized in every instance except one. New English fairs will be held at Bury, Aylmer, Waterloo, Ayer's Cliff and Quyon, and there will be new French fairs at Beauharnois, St. Chrysostome, Compton Village and Lake Megantic. This means that thirty co-operative fairs will be held this year as compared with twenty-one last season.

In districts where new fairs have been arranged by the demonstrators the school boards have loyally supported the movement by making grants towards the funds of the fair.

ONTARIO

BY R. S. DUNCAN, B.S.A., AGRICULTURAL REPRESENTATIVE SUPERVISOR

WITHOUT question there is room for advancement in the matter of arranging and displaying exhibits at rural school fairs. To what extent it is practicable to provide receptacles for such exhibits is a matter upon which there may be a great diversity of opinion. In many districts efforts have been put forth to induce the pupils to show the products from their plots in some uniform receptacle, and to have the teachers and school fair directors arrange them in the tent or building in an attractive and tasteful manner. Unfortunately, however, little thought is given to this feature of display, which is pleasing to the eye, and exhibits are shown in a heterogeneous lot of containers, such as old grain bags, cotton sacks, bran sacks, soap boxes, baskets, gallon measures, and boxes of all sizes and shapes. The writer remembers distinctly attending a school fair where exhibits were displayed in uniform receptacles, and pride was evidently taken in the matter of arrangement. Flowers, girls' sewing and baking, art, collections of nature objects were artistically arranged; potatoes were shown in baskets decorated with tissue paper, grain was displayed in glass quart jars, sheaves of grain were tied neatly with red and blue ribbon, and other exhibits were arranged and displayed in good taste. This naturally left a good impression and indicated pride in having things shown to good advantage.

I would consider it practicable to provide good tables, which should be covered with white paper and the sides draped with white cheesecloth or cotton. Paper or wooden plates should be provided for displays of fruit such as apples, pears, and plums, and for baking such as biscuits and cookies.

Until a few years ago poultry was brought to the fair and exhibited in almost every size and style of coop imaginable. In a great many cases the birds were cramped, and it was not only difficult for the judge to make his awards, but from an educational standpoint those interested could not see the chickens to advantage. Instructions were given to the pupils to make a certain size and style of chicken coop, but, unfortunately, they did not follow such directions in making their coops, and it was indeed difficult to get a proper look at the pullets and cockerels raised by the boys and girls. Individual wire poultry or exhibition coops might be supplied to a very great advantage. These are not costly and can be obtained at almost any poultry supply house. The chickens may then be brought to the fair in any box or coop and transferred to the wire exhibition coops, where one has an excellent opportunity of comparing the different birds on exhibition.

As to the receptacles recommended,

permit me to suggest that potatoes might be displayed in baskets of a uniform size and style of box large enough to hold a peck. Where a dozen potatoes are shown a small pan of a certain size might prove the best receptacle. Bags are objectionable, not only from the judges', but from the onlookers' standpoint. Grains, such as oats, barley, and wheat, also peas and beans, might be exhibited in glass quart jars, which give one an excellent opportunity of seeing the quality of seed, in gallon measures or in cotton bags of a uniform size. It would be very desirable to have all pupils use one or other of these containers in order to have some uniformity.

Roots such as mangels and turnips are usually displayed to advantage on the floor, or if space permits on the tables provided for such purposes. Corn should be husked and braided in order that none of the ears of one exhibit might be mislaid. The vegetables such as beets, carrots, onions and parsnips may be shown to best advantage by having them displayed on the table, each entry by itself. Paper and wooden plates are recommended for fruit and cooking. In most instances, however, cakes and pies are shown on china or pie plates brought from the exhibitor's home.

As for poultry, nothing can surpass the wire exhibition coop. These coops are collapsible and easily handled.

It should be borne in mind that a certain space in the tent, or building, should be reserved for each section on the prize list, and all exhibits of one section or class should be put together. This not only makes it easier for the judges when making their decisions, but it is advisable from the spectator's standpoint, in that they are able to compare one exhibit with another.

The Ontario Department of Agriculture furnishes each Agricultural Representative with 50 collapsible exhibition poultry coops, which are taken around to the school fair as part of the regular equipment. In addition to these coops, wooden or paper plates are the only other receptacles provided.

BY M. H. WINTER, B.S.A., AGRICULTURAL REPRESENTATIVE, RENFREW COUNTY

LAST fall at my school fairs I used paper plates for eggs, apples, cooked articles, etc. For grain we used tin dishes holding about two quarts. The tables for the potatoes were marked off with inch square slats, which keep each lot in its own particular space. Roots, grain in sheaf, etc., are just shown on level tables.

Each representative is left to arrange these exhibits as best suits him. I believe, however, most of the boys just show their exhibits on the tables in receptacles brought by the children. I find that using pie-plates and the small tin dishes make the exhibit much more uniform, and more easily dealt with by the judges.

BY G. R. GREEN, B.S.A., AGRICULTURAL REPRESENTATIVE, OXFORD

REGARDING receptacles for school fair exhibits, I might say that our plan is practically the same as that used in other parts of Ontario for this work, as far as we are aware.

The chicken coops in use are steel wire, collapsible, one-piece units, and are very suitable and convenient for this work.

For displaying other exhibits, we use fourteen one-piece tables, 10 feet long, 2½ feet wide, and about 2½ feet high. These are placed

around the outside wall, and down the centre of the tent, and are very handy and easily put up, and not too cumbersome when moving. Potatoes are shown on the tables, in either dozen or half dozen lots, in crates which may be folded when not in use, and with spaces large enough to hold only the required number for the exhibit. Other material, such as roots, grain, etc., are exhibited on these tables in whatever receptacles they happen to be in when brought to the fair. Home cooking is also displayed in the same way, being exhibited only on the tables.

As far as I know, there is no definite plan outlined for this work, but, I have reason to believe, that the Representatives in Ontario follow pretty much the same plan.

BY R. A. FINN, B.S.A., AGRICULTURAL REPRESENTATIVE, MIDDLESEX CO.

THE Department of Agriculture, through the Agricultural Representative's office, provides a tent or tents, tables, and wire chicken coops. The tables are 10 feet long and 3 feet wide and 3 feet high. Each county has 50 of these tables. The exhibits, potatoes and other vegetables, etc., are placed directly on the tables in racks made from strips of wood one inch square, placed so as to give space of about one foot square to each exhibit. Two of these racks fit on one table, providing for 30 exhibits. The racks are made so as to fold up for easy transportation. Bunting is tacked around the table, reaching the ground. This adds to the attractiveness of the tent, and hides the baskets and boxes brought by the exhibitors and placed beneath the tables. The wire coops for the chickens have no bottoms, and stand on the ground. These also fold up and are taken from fair to fair.

BY E. K. HAMPSON, B.S.A., AGRICULTURAL REPRESENTATIVE, WELLAND

REGARDING receptacles for school fair exhibits our method of dealing therewith is briefly as follows: A large tent is erected and a number of tables, usually about sixteen, are placed along the sides and in the middle of the tent. The legs of the tables are hinged so that they can be put together fairly well for shipping. The only method of displaying is the placing of exhibits on these tables, after first covering them with paper. The centre tables are used for flowers, fruit, and confectionery, and by using various packing boxes, etc., suitably covered with coloured paper or cheese cloth, we have been able to make the centre attractive. There is, however, a need for better arrangements in this respect, and tables should be made strong enough to withstand the amount of shipping and teaming to which they are subjected. It would be a good idea if a detailed plan were given for the construction of suitable tables. Some of the tables have not legs, but are placed upon supports, and this is not very satisfactory. We lack, particularly, suitable arrangements for displaying drawing, writing and nature study exhibits. Probably a folding screen might be arranged to show these to better advantage.

BY E. P. BRADT, B.S.A., AGRICULTURAL REPRESENTATIVE, DUNDAS

WE have supplied us standard steel coops for the exhibition of poultry at our fairs. These are collapsible and fifty of them make up in a small space for shipment. This coop is very satisfactory for the exhibit of poultry, the fifty can be made up in a few minutes and can be set out on the grass in any corner of the field. The poultry show off to good advantage in these coops.

With regard to our method of exhibiting potatoes, roots, grain, home cooking, manual training, nature study exhibits, etc., I may say that we use tables 12 feet long by 3 feet wide. We put these around the outside of the tent, leaving a space at the doorway for entrance. We also put two rows of tables adjoining each other through the centre of the tent. This gives us a fairly large table space and makes it possible to show to fairly good advantage all the products that are brought in for exhibition. It would be somewhat difficult to arrange any other system that would be readily transportable from one section to another. I have always felt that it would show off the exhibits to much better advantage if some system could be used whereby the exhibits could be placed on a platform built up in the form of steps. This, however, would make a cumbersome equipment to move, and in our school fair work we have to consider these items, as school fairs are frequently held on consecutive days during the week, and it is necessary to move from one fair to another in a short space of time.

We always cover these tables with a cheap grade of felt paper. The exhibits show off to much better advantage where this is done. The Ontario Department authorized the construction of tables of this kind two or three years ago. They work out fairly well, and have the advantage, as I mentioned before, of being easily transported.

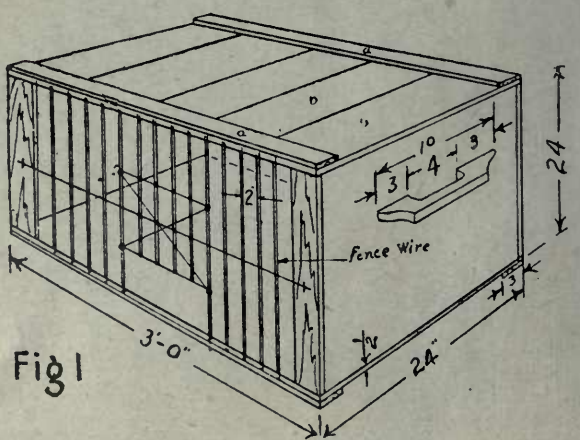
MANITOBA

BY S. T. NEWTON, SUPERINTENDENT OF EXTENSION SERVICE

DURING the past two years considerable improvement has been made in the method of exhibiting the various products at both the agricultural society and boys' and girls' club fairs.

Slower progress was made in the method of exhibiting poultry than in any other class, due mainly to the fact that children were encouraged to exhibit their whole flock, and the standard coops were not large enough. As a consequence, packing boxes, often too shallow, were improvised.

This year an effort is being made to have only two sized exhibit coops



COOPS 24 X 24 X 36 RECOMMENDED FOR SIX BIRDS

used, the standard coop 24 x 24 x 24 inches for one, two, or three birds, and a coop 24 x 24 x 36 inches for a pen of six.

Fig. 1 illustrates the larger coop recommended. It is closed in on all sides except the front, and is intended to be made of such material as can be found on the average farm. Ordinary fence wire is used on the front, and the cleats a.a. serve the double purpose of keeping the wires in place and holding together the several pieces out of which the top and bottom are made. A sliding door in the front enables the judge to make a more thorough inspection of the birds. The judge allows 10 per cent. of the number of points for the coop.

In gardening, the number of vegetables in each class exhibited is limited to one dozen. This permits a couple of picnic plates to be used with a half dozen vegetables on each. For potatoes, each contestant secures a shallow box large enough to hold the dozen potatoes in a single layer. The bottom of the box is padded with soft paper, and the lower half of each potato is wrapped in tissue paper.

Now that a large number of the boys are entering the grain growing competitions, it has been found of advantage to give definite instructions to the competitors as to the best methods to follow in planning for a good display. Figures 2 and 3, taken at the recent Soil Products Exhibition, illustrate two different methods. In Fig 2, the cabinet is divided into bins each 2 x 8 x 36 inches, and is a very attractive method of showing any kind of grain. The glass fronts are fitted in grooves so that they may be taken out when it is necessary to remove the grain. A small receptacle at the bottom of the glass permits enough of the same kind of grain to be within reach to

FIG. 2.—ONE SIDE OF SIX GLASS FRONT CABINETS USED BY THE EXTENSION SERVICE IN MANITOBA IN EXHIBITING SEED GRAIN

satisfy the curiosity of the casual visitor, while the main body of the grain remains unmixed. Each bin holds a half bushel. Figure 3 illustrates a slight improvement on the old method. Each sack holds a little over half a bushel, and as it has a square bottom, a group can be arranged very readily.

In exhibiting bread, cakes, etc., a big effort has been made to have all exhibits under glass. Where this is not possible, mosquito netting is used, and serves at least to keep the flies at a respectable distance.

In exhibiting sewing it has been found of advantage to use standard-sized cardboard mounts 22 x 28 inches. These are laced in pairs, and have the advantage that they fold together like a portfolio, and when opened out fill a space 28 x 45 inches, which is as much as can be viewed satisfactorily on the average wall.

FIG. 3.—SACKS USED BY THE EXTENSION SERVICE, MANITOBA DEPARTMENT OF AGRICULTURE AT THE SOIL PRODUCTS EXHIBITION

SASKATCHEWAN

BY FRED. W. BATES, M.Sc., DIRECTOR OF SCHOOL AGRICULTURE

WE have made no departmental effort to have receptacles provided for school fair exhibits, as we consider this to be a matter for local enterprise. The only assistance that can be given is good advice, as it is quite out of the range of possibility to provide receptacles for the local fairs, and as we do not give any financial aid to school fairs the matter cannot be regulated through grants.

General observation of the efforts made at the various fairs shows a great variety of method in handling the exhibits. Where only six potatoes

and less than six other vegetables are required, the exhibit can be shown satisfactorily on plates. Where large quantities are shown, a shallow box seems best, as it makes the work of the judges much easier, and at the same time displays the exhibit effectively. The use of bags is to be deprecated. Threshed grain show best in glass jars, while poultry should be in crates with woven wire fronts. Cooking can be placed with good effect on plates or in shallow tins.

Two points should always be borne in mind in making an exhibit for school fair purposes, viz., convenience in judging and accessibility. The judging must, as a rule, be done in a minimum of time, and, therefore, every effort should be made to simplify this operation.

One of the chief functions of the school fair is to place before the public the work of the pupils. Everything possible should be done to make the exhibits readily accessible to public inspection, so that the work may be examined without difficulty. When these considerations are definitely before the fair committee, the matter of receptacles will adjust itself without any attempt on the part of the department of Government concerned to standardize this phase of the school fair work.

ALBERTA

BY JAS. McCAIG, M.A., EDITOR OF PUBLICATIONS

IT should be practicable to provide receptacles for the containing of school exhibits.

As potatoes are usually exhibited to the amount of a peck, a shallow box of suitable size should be used.

Other vegetables, as they are shown in number of about three to six, might be displayed on the tables without being contained in any receptacle.

Threshed grain, if not over two quarts, might be exhibited in sauce dishes. It can be better saved in sealers, but is not so well seen.

Standard poultry exhibition crates might be used of sufficient size to meet the number of birds exhibited.

The home cooking should be displayed on suitable tables, and the school work hung up. These receptacles should be made by the pupils of the school, each one according to standard type.

BRITISH COLUMBIA

BY J. W. GIBSON, M.A., DIRECTOR OF ELEMENTARY AGRICULTURAL EDUCATION

IT has always appeared to me that where school fairs are held in conjunction with agricultural society fairs, the exhibition authorities should provide suitable receptacles for the display of fruits, vegetables, and flowers. There is no doubt that uniform receptacles would greatly improve the appearance of the exhibits. For potatoes and vegetables small wooden measures holding approximately half a bushel would be satisfactory. For samples of grain glass jars are probably best. For exhibits such as home cooking inexpensive delph plates or even paper plates might serve.

We have not yet made any move to supply such receptacles in connection with our school fairs in this province. The onus of supplying suitable receptacles has always been placed on the schools taking part in such fairs, as the awards take into consideration arrangement and general appearance of exhibits. As suitable containers of uniform material or design affect the appearance of the exhibits to quite a degree, it is always in the interests of the competitors that they provide such receptacles.

A MUNICIPAL AGRICULTURAL SCHOOL

NOVA SCOTIA

BY L. A. DeWOLFE, B.A., DIRECTOR RURAL SCIENCE SCHOOLS

MR. Kennedy's municipal agricultural proposition is excellent. Though public opinion is not yet ready for it, these times of change in methods and opinions will make such a school possible. We are in the midst of political, social and religious revolution. How natural, therefore, will be educational revolution.

Public opinion is not our most serious bar to orogress. Public opinion can be moulded by strong leaders. Our teachers lack enthusiasm and leadership. The teacher who can assume the proper leadership will sooner or later prove herself worthy of a proper salary. When the proper teacher takes command the salary will adjust itself and the municipal agricultural school will be possible.

ONTARIO

BY J. B. DANDENO, Ph.D. (HARV.), INSPECTOR OF ELEMENTARY AGRICULTURAL CLASSES

TWO articles by Mr. A. Kennedy, Inspector of Schools for Saskatchewan, the one in the January number and the other in the April number of THE GAZETTE, deal with a matter of considerable interest to those concerned with agricultural education, and consequently warrant the setting forth of some comment from a different angle.

If a municipality, or government, had the right to decide for the individual what vocation he should follow and if it concluded that it would be best for the individual, and for the state, to have large numbers of young men adopt the occupation of agriculture or horticulture, or some branch of either, then there might be some justification for the establishment of municipal agricultural high schools. But no government of a democratic people should assume, or would assume, such a position. Theoretically, perhaps, such schools may be all right. The only difficulty—and it is an all important one—is that pupils in sufficient numbers could not be secured. I speak from the view point of the Ontario boy, and from Ontario conditions. In fact that position has been abundantly proven in several of the states, notably Wisconsin, which had eight county agricultural schools and has abandoned practically all of them.

As I have already stated, boys would not be attracted to such a school, the chief reason being that the course in such school does not lead anywhere except back to the farm, or, perhaps, to the agricultural college. It is quite true that a pupil who attended such a school might desire to go back to a farm, but at the age at which a boy usually enters the high school he expects to pursue a course of study that *may* lead him elsewhere than back to the farm, if he desires later on. Moreover, the function of any high school should be to enlarge the vision of the pupil and provide him with a course of study broad enough to open up to him, to some extent, the doors to

several vocations. Agriculture should, of course, be one of these. The high school has no right to decide for a boy that he should go back to the farm, but the boy has a right to expect that the high school will give him a course of study which will prepare him for, and give him some knowledge of rural occupations as well as of city occupations. Our high schools have not done this, but they are rapidly developing in now actually high schools offering the usual courses preparatory to college and university. They still carry on good courses in agriculture with a very much improved attendance. Such schools are now performing an important function in the state, for, as a matter of fact, they are sending more boys back to the farm than they did when they were municipal agricultural schools.

When Mr. Kennedy states:

AGRICULTURAL CLASS AT WORK, ROPE SPLICING, NEW LISKEARD CONTINUATION SCHOOL

this direction in Ontario at the present time.

The schools referred to in Wisconsin were opened up as municipal agricultural schools, but the authorities found that, excepting for short courses, the attendance was very meagre, and various devices were used, but without much success, to attract boys to these schools. The attendance could not be secured, so these schools changed their curriculum in such a way that they are

"There is no good reason why two or more types of secondary schools should not flourish side by side," he does not at all represent the situation in Ontario. One high school is all a municipality can support, either with respect to pupils or financially, in all municipalities of Ontario, excepting such cities as Toronto or Hamilton. There is not sufficient population or money in the rural and semi-urban communities. From my knowledge of the conditions, I should

think that as the population is much more scattered in Saskatchewan, two or more types of secondary schools side by side would be an exceedingly extravagant situation. Most municipalities in Ontario find one high school a sufficient burden.

However, there is no doubt that all high schools will be obliged to modify their courses of study in the near future to meet the needs of the rural communities. The Department of Education in Ontario has made provision for the introduction of agriculture as an optional subject into the secondary schools. Twenty-three such schools have undertaken this work, and so far with pronounced success.

The two supposed objections set up against the municipal agricultural school, and answered by Mr. Kennedy himself, are really no objections at all, at least not in Ontario. He is doubtless correct when he says that the high school system has failed to attract farmer boys who expect to go back to the farm. But where a high school offers a suitable course in agriculture that charge against the high school vanishes. The illustrations here given show something of the work of our agricultural high schools.

The chief objections to a municipal agricultural secondary school as proposed by Mr. Kennedy are not those mentioned by him, but are as follows:—

(1) Abnormal expenditure required to provide, as he says, two or more types of secondary schools side by side.

(2) Impossibility of securing attendance, excepting for short courses.

(3) Unless a boy is possessed of considerable means, such school leads only to the position of a farm hand

TESTING MILK FOR BUTTER FAT WITH BABCOCK TESTER; AGRICULTURAL CLASS AT WORK
THIS CLASS CARRIES ON THE ORDINARY HIGH SCHOOL WORK ALONG WITH AGRICULTURE

This third objection, probably involving also the second, is the most important, and it is unsurmountable. Farming requires considerable capital, consequently, unless a young man is able to buy or rent a farm and provide stock and implements, he sees no way of entering upon this occupation, excepting as a hired man, and this is not a very attractive outlook. It is far otherwise with respect to the industries or commercial enterprises. Ten young men would prefer to enter a factory or commercial office for weekly wages for one who would prefer the occupation of hired man, or farm hand, and, in the main, this latter is what the municipal agricultural school would lead to.

MANITOBA

BY S. E. LANG, INSPECTOR OF HIGH SCHOOLS

MR. KENNEDY'S articles in THE AGRICULTURAL GAZETTE (Vol. V., pp. 82 and 385) on the municipal agricultural school have attracted considerable attention and comment. His idea is to link up the municipal high school with the municipal offices and the agricultural society plant, the educational activities of the school to be directed by an elected board of seven men and women with an appointed secretary-treasurer, whose duties would include that of district organizer and agricultural representative. There is a quarter section of land to be used as a site for practical demonstrations of agriculture, and also to produce revenue for the school. It will provide also a twenty-acre field for athletic and fair grounds. Mr. Kennedy's plan apparently contemplates something of the nature of a part-time boarding school. At any rate, he says that "such a school would be within reach of the homes of the youths so that the parents would not hesitate to send the boys and the girls for a considerable portion of the week," and, further on, the principal is to direct "the reading and study during the evening hours."

DIFFICULTIES TO BE SURMOUNTED

I may mention a few difficulties which will, possibly, have already been carefully considered by Mr. Kennedy.

If the school is to be conducted as a day school it will involve the problem of conveyance of pupils who live at a distance from the school. This would, no doubt, prove an expensive feature. In making up his budget, Mr. Kennedy should put down $45 per annum for each pupil to be transported. It is an open question as to whether the boarding-school idea will fit in with our domestic arrangements and habits in this country. It remains to be seen whether the parents concerned will endorse an educational scheme involving a breach in the family circle for four nights a week. Parents in this country generally cherish a deep-seated prejudice in favour of keeping children of high school age under the parental roof.

REVENUE AND STAFF

How is the quarter section to "provide a very considerable portion of the revenue required for the operation of the school"? The principal of the school is expected to direct the farm work. In this he will have the advice and co-operation of the secretary-manager. They will both have their hands full. The secretary-manager will be extremely busy with boys' and girls' clubs, contests, and fairs, the organization and direction of short courses, the visitation of farms in the district for the purpose of giving advice and assistance, and the work of truant officer

as well. Men of the type required are available. They are not numerous, but they can be secured.

THE PRINCIPAL

It would be more difficult to secure a principal of the kind required. Men can be secured who can manage and teach a school with great success. Men can be secured who can operate a real farm at a profit. But the men who combine both of these functions in their individual persons are far from numerous. There is, indeed, much to be said in favour of a rural high school under the direction of a principal provided with a comfortable residence and a few acres of ground for cultivation. It would be a long step toward that permanency of tenure and service which is so greatly to be desired.

It will be necessary to make out a concrete programme of study and work for the rural high school. This is a task which has caused a good deal of heart-searching. I hope Mr. Kennedy will in a future article give us the benefit of his conclusions on this subject. Up to the present time the "consolidated" school has not succeeded in developing a new type of rural education, such as was freely prophesied for it a few years ago. The new rural high school will justify its existence by the character and distinctive quality of the education and training it offers to its patrons.

COMPETITIONS AT SCHOOL AND SUMMER FAIRS

ONTARIO

MR. E. K. HAMPSON, Agricultural Representative for Welland County, Ontario, reports that the principal of the Welland Business College is offering six weeks', four weeks', and two weeks' courses at the business college as first, second, and third prizes to pupils taking part in the school fair, who are in the senior fourth class. The competition will cover the work done in drawing, penmanship, and the writing of essays.

SASKATCHEWAN

WITH a view to stimulating an interest in the different phases of agricultural pursuits among the boys and girls of the Arcola, Saskatchewan, district, the Arcola Agricultural Society, in co-operation with individuals and local banks, are offering special inducements to be competed for at the summer fair. Competitions will include calves raised and shown by boys; boy herdmanship; pairs of pigs raised by boys or girls; milking competition for boys or girls; cattle judging; collections of vegetables; essays on tree culture; school garden and other topics. From three to ten prizes will be awarded in each competition. These run from $14 to $5 for the first prize, and from $2 to $1 for the lowest.

THE FARM BOYS' CAMP

THE Farm Boys' Camp, which has been successfully conducted for the last three years as an outstanding educational feature of the provincial exhibition at Regina, has been planned for this year. The provincial university has the matter in hand, and has arranged for a programme that will include agricultural instruction by way of addresses and judging competitions on live stock, identification competitions of weeds, demonstrations on poultry, and addresses on live stock; special efficiency courses, including practical demonstrations of first aid methods; talks on personal hygiene and kindred subjects and on leadership; organized recreation, consisting of physical drill, organized ball games, singing, etc.; assisting with the live stock parade, and a special course of lectures for the supervisors, including talks on boy leadership. In choosing the teams at the judging competitions societies are asked to select boys who have won prizes in similar competitions. It is proposed, as soon as the entries for the camp are received, to visit all the societies sending teams and to put on a preparatory course for the boys. Boys attending the camp will be required to qualify by excelling in boys' club work or other competitions. An attempt will also be made to enlist the services of boys following attendance at the camp in some junior work in their community which will maintain their interest in the knowledge they have acquired.

ALBERTA

BY J. M. McCAIG, M.A., EDITOR OF PUBLICATIONS

THE Department will continue its school fair work this year on about the same lines as last year. E. S. Hopkins, instructor in science in the Vermilion School of Agriculture, is in charge of the work. Free vegetable and flower seeds and potatoes will be distributed to the schools, and fairs will be held in the fall. Some increase in the number of centres will be necessary this year, but it is not the policy of the Department under present conditions to employ many men in this work. The outside force of the Department is practically all taken up with the sole and definite work of increasing farm production, and it is engaging all of the men who were in school fair work last year. A few fairs that were making a beginning under school auspices will be taken care of by the Department of Agriculture with the school inspectors giving some assistance where required.

NEW BRUNSWICK

WAR GARDENING

THE *Educational Review*, of New Brunswick, in the April number addresses an appeal to teachers from an official of the Department of Education on the subject of "War Gardening":—

"The Allies expect every Canadian teacher to do her duty by having a 'War Garden' at her school. Of course you are going to 'Do Your Bit.'

"Now, how to go about it. That depends on your aim. Up to the present year, we have always considered the school garden a laboratory, where the children planted a bit of this and a little of that in various soils, and at different periods of the season. The work of enemy plotters—cabbage worms, black rust, potato bug—was observed and various fertilizers used. Finally came the gathering of the crops and the school fair, after which the produce was disposed of in various ways. The knowledge gained from experimenting has been the main object striven for, while the actual quantity of vegetables raised has been a minor part of the project.

"In the field of biology, when an organ is no longer needed to perform its special work, it immediately makes use of a function until then more or less undeveloped and takes upon itself a new duty. So it is with our school gardens this year. The garden of 1918 is a 'War Garden.' Its function has changed. Hence, experimentation, once the main aim, is still carried on slightly, but is made subservient to the once least considered but now all essential matter—the actual amount of vegetables grown.

"Our aim, then, is to grow as many vegetables as the children can care for, with as little waste of ground, energy and seeds as possible.

"If you are an experienced gardener, try raising some vegetable new to our diet but considered suitable to the climate. If you are an amateur, keep to the well-known vegetables, or inexperience and over-enthusiasm will mean waste.

"Begin immediately. Do your gardening on paper. Have few paths and have long rows. It saves space and cultivation is easier."

ONTARIO

NIGHT CLASSES IN HOUSEHOLD SCIENCE

BY J. W. STARK, B.S.A., AGRICULTURAL REPRESENTATIVE, PEEL COUNTY

AT the beginning of April, I received a letter from the secretary of the Alton Junior Institute asking me if I could meet a deputation of their institute at a farmers' meeting that I was to address at Alton. On the night of the meeting, I found that they wished to make application for a short course in Domestic Science for January, 1919. This was a long way ahead, and I thought that there was no time like the present in which we should know about foods and have the best instruction in their use and in cooking and canning. After the girls had presented their case for the class to be held in January, I asked them if they thought they could get ready in ten days to begin their class on the 8th of April. This took them by surprise, but they said they would be glad to have it at that time, but did not know that it was possible to have it so soon. The next day I arranged with Mr. G. A. Putnam, Superintendent of Women's Institutes, to have an instructor sent out to begin on the date mentioned.

The junior institute consists of

girls who work in offices and factories, school teachers, and farmers' daughters. They were forced to have night classes, and we arranged for them to meet at 7.30 and conclude at 10. The average attendance at these classes was 31, and the girls gave a general invitation to the members of the senior women's institute. The course of instruction was about the same as the regular two weeks' course of ten lectures in Food Values and Cooking, as given by the regular demonstrators under the Institutes Branch, but I had special attention given to home canning with a view to organizing canning teams later on. The class concluded on April 19th.

There was a little difficulty at first in securing a suitable hall for the demonstration, but one was finally arranged and the girls got the coal-oil stove, tables, and the other necessary equipment from among their own members, and they supplied such materials as milk, butter, fruit, etc., in the same way.

I believe one of the indirect results in this particular case was the securing of a public hall for the village. One of the local men donated an old church for the use of the meetings in the village if the local people would agree to put the building in repair. This was announced on the day the class concluded.

I believe these night classes in Food Values and Cooking and Canning are very useful, and this is a line that could profitably be extended throughout Canada this year. The people in Alton were highly pleased with the whole programme, and I have no doubt much direct benefit in the matter of use of foods will result.

A SCHOOL GARDEN PRODUCTION ENTERPRISE

PRINCIPAL YOUNG, of the Central School in Guelph, Ontario, last year carried out a school garden scheme that was productive of excellent results. The school was asked to take charge of the cultivation of a lot of 1½ acres owned by the Board of Education. On the first of May, the Central Agricultural Society was organized with two teachers and eight pupils as members. Regulations were drawn up providing that all work done must be under the supervision of an officer; that all expenses of cultivation and seed were to be paid for out of the crop; that the proceeds should be divided according to the hours of work done by each, a boy's work to count the same as a man's; that a correct time sheet should be kept of each person's work and entered up for each day; that each member find his own cultivation tools. The club engaged a man to plough, disc, and harrow the plot, all the other work being done by the members of the club. Ten bags of seed potatoes, consisting of four bags of Delaware, two of Green Mountain, and four of White Star, were purchased at $4 a bag. The seed was cut and planted by the members at different dates on one acre of the ground. The remaining one-half acre was planted with twenty pounds of white pea beans. On account of the moist weather in June, the hoeing was difficult and discouraging.

THE PRODUCTS AND PROFIT

Towards the end of June a hoeing match was held, at which prizes were offered for the best hoed rows. Forty boys participated in this competition, and were afterwards treated to ice cream and coffee. The potatoes and beans were hoed from four to five times. Paris green and fungicide were applied as required. The harvesting commenced on the 8th of September and continued until the

end of October. Two hundred bags of potatoes were produced and sold at the rate of $1.25 a bag, or 30c a basket, and delivered on the "cash and carry system." The beans were threshed with the old-fashioned flail on evenings and Saturdays. The beans were cleaned through a fanning mill, and twelve bags of crop were secured. Sixteen bushels of the best were sold at $9 a bushel. The potatoes brought $252.40, and the beans $144. The expenses amounted to $74, which left $322.40 to be divided according to the work done, which occupied 1,288 hours.

A small percentage of the boys dropped out during the season. These were paid for the work that they did. The field was ploughed in the autumn to be again cropped this year.

THIS YEAR'S PROGRAMME

The crop this year will include Irish Cobbler potatoes, beans, and Danvers onions. In order to give as many boys as possible a chance to work, plans have been made to take drafts in turn from six of the highest rooms—Jr. IV. to Sr. III. These classes receive elementary lessons in agriculture. The boys will be paid weekly for their work at the rate of 15 cents per hour.

MANITOBA

DEMONSTRATION FIELD, BRANDON NORMAL SCHOOL

BY T. J. HARRISON, B.S.A., PROFESSOR OF FIELD HUSBANDRY, AGRICULTURAL COLLEGE

THE students attending the Winnipeg normal school must spend at least one month in the study of agriculture at the Agricultural College. The students at the Brandon normal school were not able to take part in this specia. agricultural course. Mr. B. J. Hales, the principal at Brandon, was desirous of having his pupils take up this work, and for the last few years has made arrangements to have the agricultural teachers from the Manitoba Agricultural College give a series of lectures at the normal school.

In connection with the field husbandry and dairy work there was some handicap because of lack of equipment and material. In an endeavour to overcome this the Department of Education has placed in the school a complete dairy equipment, and the Department of Agriculture, Department of Education, and the Agricultural College have co-operated in preparing a ten-acre demonstration field adjacent to the school.

The arrangement has been as follows:—The Department of Education to supply the land; the Department of Agriculture, the cultivation; and the Agricultural College, the seed. The supervision of the field is under the Department of Field Husbandry at the College. The idea of the demonstration field is to demonstrate the more common varieties of grain, and forage crops, so that the students may become familiar with these under field conditions. There is also a number of less common crops, which are frequently foisted upon farmers at ridiculously high prices with considerable loss to the farmers, the idea being to give the teacher an idea of these crops so that she may, in her sphere as leader in her district, prevent this exploitation.

The crops which will be demonstrated are as follows:

CEREALS—

Uncommon types of Wheat—Einkorn, Speltz, Emmer, Club, Alaska, Durum, and Polish.

. *Common Varieties of Wheat*—Red Fife, Marquis, Kitchener, Red Bobs, Prelude, Pioneer, and Minnesota 169.

Oat Types—Black Victor, Gold Rain, Abundance, Green Russian.

Oat Varieties—Banner, Victory, Alsasman, Orloff.

Barley—Duck Bill, Canadian Thorpe, Swedish Chevalier, Eclipse O.A.C. 21, Success, White Hulless, Mensury, Manchurian, Silver King.

Flax—Premost, Long Stem, Golden.

Rye—Spring, Fall.

FIELD ROOTS—

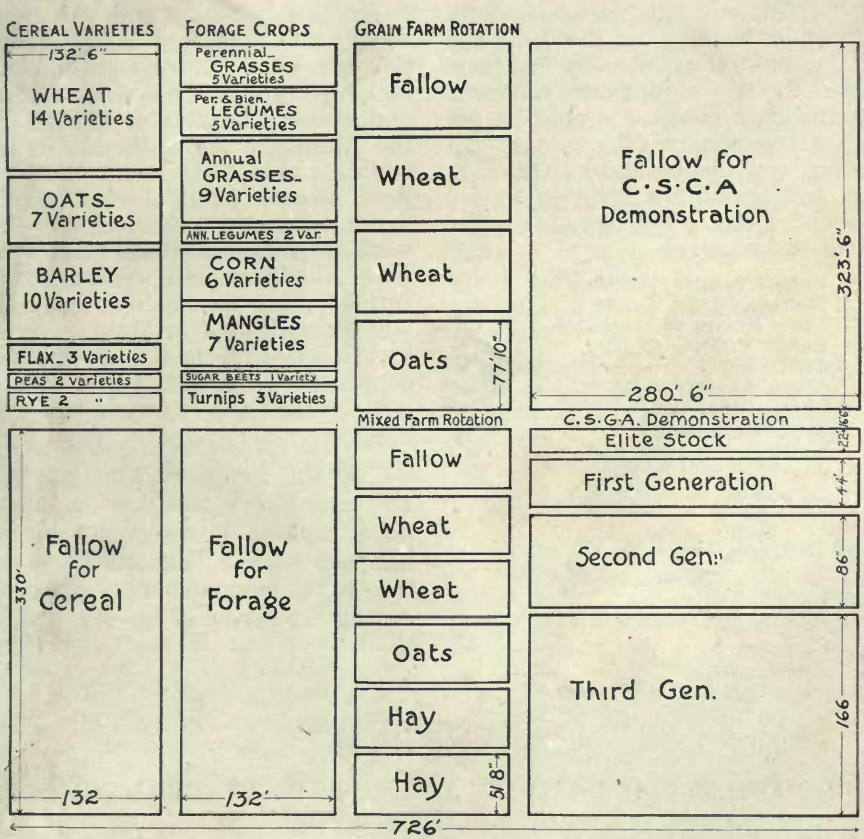
Mangels—Long Red, Intermediate Red, Globe Red, Long Yellow, Intermediate Yellow, Globe Yellow, Tankard Yellow.

Swede Turnips—Perfection, Bangholm, Jumbo, Common Turnip, Yellow Aberdeen, Devonshire, Graystone, Pomeranian.

Sugar Beets—Klein Wanzelben, Danish Improved.

Carrots—White Belgian, Ox Heart, Red Surrey

There is also a demonstration of



DEMONSTRATION FIELD, NORMAL SCHOOL, BRANDON, MANITOBA

FORAGE CROPS—

Perennial Grasses—Western Rye, Brome, Timothy, Meadow Fescue, Red Top.

Perennial and Biennial Legumes—Alfalfa, Alsike Clover, White Dutch Clover, Red Clover, Sweet Clover.

Grasses, Annual—Sudan, Common Millet, Hungarian Millet, German Millet, Hog Millet, Siberian Millet, Early Fortune Millet.

Corn—Long Fellow, Northwestern Dent, Minnesota 13, Gehu, Quebec 28, Improved Squaw.

grain growing and mixed farming rotations. The grain growing rotation is as follows:

1st Summerfallow	3rd Wheat
2nd Wheat	4th Oats and barley

The mixed farming rotation is as follows:—

1st Wheat	4th Hay
2nd Wheat	5th Hay
3rd Oats and barley seeded down.	6th Fallow or corn

There is then a demonstration on how seed improvement work may be carried on under Canadian Seed Growing Association rules. Head selections will be made and the different generations of registered seed sown. In connection with this demonstration a portion of the land will be given to potato improvement work.

DAIRY EQUIPMENT AT BRANDON NORMAL SCHOOL

BY B. J. HALES, PRINCIPAL

FOR the instruction of teachers in training at the Brandon normal school there has been added to the equipment sufficient apparatus to enable the class to get full instruction in milk and cream testing, cow testing and butter making, and perhaps a little in simple cheese making. Following is a list of the apparatus:—

4 Eureka Sanitary Churns, No. 1.
4 Shotgun Cream Cans.
4 Lever Butter Workers, No. 2.
4 Butter Printers. No. 2.
½ doz. Dairy Thermometers, No. 5720.
1 Mann's Acid Test.
4 Cream Stirrers.
1 Test Bottle Bath.
2 10-Bottle Babcock Testers.
3 doz. 17-6 c.c. Pipettes.
3 " 18 c.c. "
½ " 9 c.c. "
5 " Milk Bottles.
2 " Cream Bottles.
1 " 17.5 Acid Measures.
1 Lactometer.
1 Burette and Stand 500 c.c.

We have done the milk and cream testing for several years, but only this year have had the equipment for making butter. This work is done under the extension department of the Manitoba Agricultural College, and this year is to be in charge of Prof. Brown, head of the dairying department in that institution. The work started immediately after the Easter holidays and was carried on through the balance of April and will be continued in May. We had had to put it off until somewhat late in order to secure a supply of milk, as it is a rather scarce article this year.

We have a laboratory that we use for general purposes, that has both gas and water and also a tarazza floor, making it quite suitable for dairying work. This will be turned over to the man in charge of the work during the period of his sojourn.

ALBERTA

CIVIC AND SOCIAL TRAINING IN THE AGRICULTURAL SCHOOLS

BY J. McCAIG, M.A., EDITOR OF PUBLICATIONS

AT a meeting of the instructors of the provincial schools of agriculture and officials of the Department of Agriculture for Alberta, held in Edmonton on March 30th and April 1st, some interesting changes were made in the courses for the schools.

THE PROFESSIONAL EFFICIENCY IDEA

People within the province who are able to take advantage of the training afforded by the schools, as well as those who have looked into their work from outside, fully appreciate the good results coming from the education in agriculture provided with the directness and definiteness of method conceived by the Minister of Agriculture in these schools. During the school year just completed, about 350 students were in attendance, in spite of the scarcity of boys and men on the farms, and the

heavy drafts on the attendance of the schools themselves, made by the enlistment of students in the armies of the allies. The courses in the schools take account of strictly professional or trade results in agriculture. The work consists of agronomy, animal husbandry, veterinary science, mechanics, poultry, dairying, horticulture, farm management, farm bookkeeping, and domestic science in the first place; the sciences such as chemistry, physics, botany, entomology, and bacteriology in the second place, with the addition of farm mathematics and English, the latter itself being perhaps considered necessary as an instrumental study in relation to the others rather than a study for literary improvement or enjoyment.

THE CONJUNCTIVE NATURE

The changes that have been made are changes that take account of something more than personal efficiency. While it may be considered reasonably well established that a systematic course of training in an applied science cannot be taken without resulting in very desirable disciplinary or even moral results, such as industry, application, concentration, control, and a desire for progressive improvement, no system of teaching can be considered complete that does not take account of the conjunctive and community nature of the student, as well as of his or her personal efficiency. Included in the former interest would be such matters as a knowledge of the functions of the state, the development of aptitude for community and social service and the development of a sense of obligation with respect to both of these.

These claims are finding expression in the introduction of new branches of study in the courses of the agricultural schools. For example in the first year the subject of civics has been added for both boys and girls. This will simply be a brief study of such matters as the community idea, the services furnished by such organizations as the Local Improvement District, the Municipality, the provincial Government, the federal Government, and also the duties and privileges of citizenship in relation to these. It is expected that the result will be a realization of the character of the state as a vital organism. The method of approach will be wholly through concrete materials and critical "close-to-home" discussion.

The training of the second year boys is to be broadened by the addition of a very elementary type of rural economics, which will include such matters as a study of the setting of agriculture among the great industries, the returns from agriculture as a business, its independence from being partly self-sufficing and its dependence on seasonal changes. It will be studied likewise as a mode of life as well as a business. The factors of production, the special types of farm enterprises, different kinds of tenure, etc., will likewise be taken up. The subject of economics in its characteristics form is singularly divorced from things, but it will have to change its guise to get down into the companionship of other studies that have been elementarized to become a part of the school experience of youths. This course will be closely related to the farm management course.

SOCIAL ORGANIZATION

On the side of the girls it is likewise recognized that the aim of education is not simply technical training for an occupation. The name for the new interest being established on behalf of the girls is called rural organization. It might perhaps have been called rural sociology, but the method of approach is intended to be quite concrete, and the teaching will deal with the phenomena of country life and constitutions both as they are found and as they

should be. It is a discussion of social experiences, not abstract propositions or principles. The organization of this body of material is intended to bring the girls to a realization that community services are not simply casual, but are the result of inherent conjunctive and social impulses. The course as laid out is explained to be for the purpose of discussing ways of realizing on the institutional and social resources of the country, to develop a broader human and social sense, and to develop leadership in improving organizations. The topics include the study of the resources of the school in relation to attendance, consolidation, sanitation, medical inspection, and children's clubs. The church is dealt with in a similar way. Then voluntary organizations, as the institutes, Red Cross, mothers' clubs, etc., are discussed and, finally, the co-operative associations for production, buying and selling, etc.

The agricultural schools have sounded a new note, at least in their own practice, but there are reasons for expecting that the work will succeed. The adolescent period is the one in which the social and community impulses emerge, and hence in which they should be met or developed instead of being allowed to become atrophied by disuse. Likewise it is the case that the province of Alberta has displayed a wonderful susceptibility to co-operative activities of all kinds, and there is no doubt that the study of community services will meet with a lively response among the young men and young women.

CALF-FEEDING COMPETITION

AT the Edmonton spring show, held April 2nd to 6th, the calf-feeding competition for boys and girls was a prominent feature. Sixty-one calves of 1917 were shown by boys and girls between the ages of nine and seventeen years in competition for $1,200 in prizes and

JUDGING IN THE CALF-FEEDING COMPETITION AT THE EDMONTON, ALTA., SPRING SHOW, 1918

a number of valuable specials. Following are the rules of the competition:—

1. Open to boys or girls over nine and under seventeen years of age.
2. Animals entered must be steers or grade heifers calved in 1917.
3. Competitors must have fed, cared for and fitted the animals from the 21st of January, 1918, and must personally exhibit the animal in the show ring at the Edmonton Spring Show, April 2-6, 1918, when judged or paraded.
4. One or more entries may be made from one family or farm, but each competitor can only make one entry.

THE ABERDEEN-ANGUS STEER, WITH WHICH W. A. DAY, A TEN-YEAR-OLD LAD, WON THE FIRST PRIZE IN THE CALF-FEEDING COMPETITION AT THE EDMONTON, ALTA., SPRING SHOW, 1918

5. In making entry, the name, address and date of birth of the competitor must be furnished.
6. The date of birth of the animal entered, name of sire, and breed, must be given.
7. Parents', guardians or employers must certify that the boy or girl making entry is over nine and under seventeen years of age, at the Edmonton Spring Show, April 2-6, 1918, and must also certify to the age of the animal exhibited.

The prizes in the regular class were fifteen in number, ranging from $110 to $20. Twenty-six special prizes were also given, consisting of money ranging from $75 to $5, and awards in watches and other goods. In the awards, calves of the Angus breed won first, second, and third place. Herefords stood fourth and eighth, and Shorthorns fifth, sixth, and seventh.

In consequence of the success achieved in the calf-feeding competition, it has been decided to have a similar competition for swine at the Edmonton summer exhibition, when $300 will be distributed in twelve prizes, ranging from $65 down. The competitors must be boys or girls resident in Canada, and between 9 and 17 years of age. Prizes aggregating $400 will also be given at the summer fair for the care and feeding of foals, divided equally between light and heavy horses, and open to boys and girls of the same age.

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications, and Notes

HOW TEACHERS OF AGRICULTURE ARE TRAINED IN THE UNITED STATES

BY DR. CHESTER D. JARVIS, B.S.A., SPECIALIST IN AGRICULTURAL EDUCATION, U.S. BUREAU OF EDUCATION, WASHINGTON, FORMERLY OF THE ONTARIO AGRICULTURAL COLLEGE STAFF

AGRICULTURAL education in the United States, as a federal enterprise, had its beginning in the passing by Congress of the so-called "Land-grant Act" of 1862, which grants to the several states an amount of land the income from which may be used for the "endowment, support, and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts."

As a result of this legislation, and subsequent Acts augmenting the original grant, there has been established in each of the 50 states and territories a state college of agriculture.

In the early days these colleges functioned largely as secondary schools, preparing men for the occupation of farming. It soon became apparent, however, that in order to exert the widest possible influence in the development of the agricultural industry, and a more wholesome country life, the colleges should devote more attention to training men and women for rural leadership. It was necessary, therefore, to raise the standards of admission and graduation, for students who were preparing to become teachers, investigators, writers, and expert agriculturists. The colleges at the same time continued to offer secondary courses for the benefit of students who were preparing for farm life.

As a result of the activity of the colleges in preparing leaders there has been a gradual development of secondary agricultural schools and of agricultural courses in high schools. With this development has come a realization that in the future the high schools will be expected to assume the responsibility for the training of technical farmers, and that the colleges, in order to meet the demand, will need to devote more attention to the preparation of teachers of agriculture for the secondary schools.

SCARCITY OF EFFICIENT TEACHERS

In response to a growing belief that better opportunities for instruction in agriculture should be provided for boys of high school age, many of the states have made provision for the establishment of secondary agricultural schools, or of agricultural courses in established high schools This has resulted in an unprecedented demand for teachers, and, owing to the limited supply, many untrained and unqualified teachers have been employed. It frequently happened that the schools engaged agricultural college graduates who were without educational training, without teaching experience, and often without, or with very little practical farm experience. In some cases agricultural instruction has been offered by teachers of science, or of other subjects, who have had no agricultural training. As would naturally be expected such instruction oftentimes failed to meet the expectations of an exacting agricultural constituency.

Undoubtedly the practice of using deficient teachers has had a retarding effect upon the development of secondary agricultural education. Not only has it hampered the cause of agricultural education, but the practice has resulted in a great economic loss, as shown by the human product. Furthermore there has been an unappreciated loss in the wasted talents of thousands of young instructors, in both high school and college, who have been turned loose in a classroom without special training for, or guidance in, their chosen careers.

CONGRESSIONAL LEGISLATION

The general belief that the agricultural colleges should devote more attention to the professional preparation of teachers was expressed in 1907, when Congress, in the Nelson amendment to the agriculture appropriation bill, which increased the annual appropriation for the support of the colleges of agriculture, stipulated that "said colleges may use a portion of this money for providing courses for the special preparation of instructors for teaching the elements of agriculture and the mechanic arts." This legislation has been interpreted to mean that federal funds may be used by the colleges for furnishing professional instruction, or teacher-training courses, in addition to that contained in their general agriculture curricula.

The trend of public opinion toward a better system of preparing teachers is shown also in the teacher-training provision in the vocational education act, or the so-called "Smith-Hughes Act," the provisions of which, and its relation to The Agricultural Instruction Act of Canada, were explained in The Agricultural Gazette of March last.

PRESENT STATUS OF TEACHER TRAINING

A recent investigation made for the U. S. Bureau of Education shows that the agricultural colleges in 40 of the 48 states offer special four-year curricula for the training of agricultural teachers. Since this investigation was completed the colleges in the remaining states have established such curricula in order to participate in the benefits of the vocational education act. Thirty-four of the colleges report a total of 859 students registered in 1916-17 for the teacher-training course in agriculture. The same colleges reported that 513 students in 1916 graduated with professional training in agricultural education. Of this number 299 were known to be engaged in teaching or supervising agriculture in the schools.

Of the 40 colleges offering teacher-training curricula 38 require at least 14 standard high school units, or approximately four years' work, for entrance. In addition to this, 32 of the colleges require at least two years of collegiate work before registration for the special education work.

The opportunity for teacher-training in some colleges consists in following one of the regular major options of the agricultural curriculum, which provides for the carrying of enough elective work in education to meet the state requirements for certification. In other colleges, students may follow the regular curriculum for the first two or three years, and then select agricultural education as their major option or subject for specialization. In still other colleges an entirely independent curriculum in agricultural education is offered. In a few cases the students may follow the regular curriculum of the department of education and select agriculture as their subject for specialization.

REQUIREMENTS FOR GRADUATION

The requirements for graduation generally are stated in terms of semester hours. A semester hour represents the work of one hour a week of recitation, or its equivalent in the laboratory, each week for one semester of 18 weeks. The total requirements for graduation range from 120 to 217 semester hours with a medium requirement of 142 hours. The amount of required work in the various groups of subjects varies greatly, but the average requirement is about as follows: technical subjects 50 semester hours; science subjects 40 semester hours; professional subjects (education) 18 semester hours; other non-technical subjects 22 semester hours; elective work 5 semester hours.

Twenty-nine of the colleges claim that practice teaching is required in their teacher-training curricula. In some cases the facilities for practice teaching are inadequate and consist in occasional teaching "short course" students at the college. In most cases, however, the colleges either through co-operation with local schools, or by the maintenance of special training schools, offer satisfactory facilities for such work In almost all cases the colleges, in addition to their requirements in practice teaching, maintain required courses in special methods of teaching agriculture.

In at least 16 of the colleges an approved amount of recent farm experience, either before or after entering college is required. In general the equivalent of one year's experience is required, but two summers' work on a farm usually satisfies this requirement.

GENERAL REQUIREMENTS AND RECOMMENDATIONS

(1) As a general principle it should be the function of the college to train teachers of agriculture for secondary schools, just as it is the function of the normal school to train teachers for the elementary and rural schools.

(2) The requirements for admission to the teacher-training curricula should include four years of high school work, two years of collegiate work, and at least one uninterrupted year of recent farm experience.

(3) The required work for graduation should be distributed among the various groups of subjects about as follows: technical subjects 35 per cent; science subjects 30 per cent; educational subjects (including practice teaching) 15 per cent; other non-technical subjects 20 per cent.

(4) Among other non-technical courses required for graduation should be included strong courses in rural economics and sociology.

(5) The professional training should include, in addition to certain general courses in education, a special course in methods of teaching agriculture, and a course in practice teaching under normal conditions.

(6) The work of supervision of agricultural teaching in the schools should be closely associated with the college from which the teachers come. Such a plan furnishes an opportunity for the colleges to continue the work of instruction after the teachers enter the service.

THE COLUMBINE AS A NATIONAL FLOWER

The following recommendation has been made by the committee, comprising Messrs. W. G. Scott, chairman, F. L. Skinner, and F. W. Broderick, appointed, on the selection of a national flower, at the last annual meeting of the Manitoba Horticultural and Forestry Association, held in Winnipeg, February 21st and 22nd, 1918:

"We, as a committee appointed on the selection of a flower for a Canadian national emblem, do recommend that the Columbine or Aquilegia be chosen. The fact that the Columbine is native to many parts of Canada, and that it is a plant capable of easy culture, has assisted us in arriving at this conclusion".

ASSOCIATIONS AND SOCIETIES

CANADIAN COUNCIL OF AGRICULTURE

The Canadian Council of Agriculture, of which body the officers for the current year were given in THE AGRICULTURAL GAZETTE for April, has adopted a constitution setting forth that the objects of the Council shall be:

(*a*) To encourage the farm population of the Dominion to organize for the study of educational, economic, social and political problems having a bearing on the happiness and material prosperity of the people.

(*b*) To constitute in itself a medium through which the various organizations in membership may act collectively where their common interests are concerned.

(*c*) To establish a bureau for the collecting and disseminating of statistics and other information bearing on rural welfare.

(*d*) To provide unity of action on matters of common interest to the organizations in membership and to formulate demands for legislation and present the same to the Parliament of Canada.

(*e*) To investigate methods of taxation for providing national revenue and to disseminate the information thus secured through farmers' organizations.

The Council is to consist of the executive (or their appointees) not more than five (5) in number, of the Manitoba Grain Growers' Association, Saskatchewan Grain Growers' Association, United Farmers of Alberta, Alberta Co-operative Elevator Company, Grain Growers' Grain Company, United Farmers' Co-operative of Ontario, United Farmers of Ontario, *Grain Growers' Guide*, Saskatchewan Co-operative Elevator Company, and any other provincial wide farmers' organizations that may be admitted into membership by a majority vote of those present at any regularly constituted meeting of the council, provided that notice of application for admission has been given by the secretary in writing to each of the members not less than thirty (30) days prior to such meeting.

The executive committee is to consist of a president, vice-president, secretary-treasurer and two members of the Council, to be elected at the annual meeting.

Ten members representing not less than five organizations are to constitute a quorum for the transaction of business at an annual or special meeting. A lesser number of representatives may adjourn the meeting. The Council is to hold meetings at least twice a year.

The time and place of meeting are to be fixed by the president, provided, however, that a meeting must be called when requested by any three organizations having membership in the Council.

Each shareholder organization in membership is required to pay an annual fee of ten cents per shareholder, with a minimum of one hundred dollars, and each other organization in membership is required to pay an annual fee of not less than one hundred dollars. The necessary travelling expenses of representatives when attending meetings of the Council will be paid by the Council.

UNITED FARMERS OF NEW BRUNSWICK

About 1,000 of the leading farmers of the counties of Carleton, York, and Victoria, N.B., attended a convention at Woodstock, on April 23rd, the object being to organize the United Farmers of New Brunswick. Mr. J. J. Morrison, of Arthur, Secretary of the Ontario branch of the United Farmers, was present to help in the organization. Half a dozen resolutions were adopted as follows: Requesting that the provincial Public Works Department pay for breaking open and snow ploughing all winter roads; asking that all dealers in mill feeds be licensed and compelled to sell at lawful prices; declaring the convention was in hearty accord with the movement for greater production; recommending that two experienced farmers be appointed on the Railway Commission; resolving to nominate experienced farmers in every rural constituency in future elections in the province, and recommending that an abattoir be established at St. John. The following officers were elected: President, C. L. Smith, Woodstock; first vice-president, T. W. Caldwell, Florenceville; second vice-president, A. Chapman, Pinder; executive, Judson Corey, Kincardine; John Fulton, Wicklow; A. A. H. Margison, Centreville; Chas. R. Enman, Killowen, and John Young, Glasgow; organizer, C. L. Smith, Woodstock, N.B.

DECORATION DAY PROPOSED

BY GEORGE DOUGLAS, SECRETARY, THE GARDENERS' AND FLORISTS' ASSOCIATION OF ONTARIO

At a regular meeting of the Gardeners' and Florists' Association of Ontario held on April 16th, the subject of choosing a flower to become the national flower for the Dominion of Canada was discussed. The following resolutions were passed:—

1. That the maple leaf shall be our National Emblem to be used in the Coat of Arms and all seals and crests of the Dominion.

2. That this Association expresses the view that no one flower will be a success on the graves of our heroes in France and Flanders.

3. That this Association request that the provinces of the Dominion be asked to choose a flower for their emblem, these flowers to be planted on the graves of our heroes both in Canada and abroad.

4. That this Association recommend to the Government of the Dominion that the day peace is declared, that day be known as Decoration Day in everlasting memory of our heroes who fell for liberty.

MANITOBA HORTICULTURAL AND FORESTRY ASSOCIATION

STANDARD FOR JUDGING VEGETABLES

The Manitoba Horticultural and Forestry Association at their latest annual meeting adopted the standard for judging vegetables herewith given. The committee that gave the standard its final revision consisted of Mr. F. W. Brodrick, Professor of Horticulture at the Manitoba Agricultural College, Mr. W. T. Macoun, Dominion Horticulturist, and Mr. S. R. Henderson, a prominent horticulturist of Manitoba.

THE STANDARD

Asparagus.—Shoots should be thick, of medium length (8″ to 9″) uniform in thickness, tender, and free from rust and insect pests. Long shoots are liable to be weedy and tough.

Beans.—Broad Beans—Straight, broad, well-formed pods filled with large tender beans. Free from disease; String Beans—Pods would be long, straight, moderately broad, tender, and free from disease. Pods should be uniform. Colour according to variety.

Beets.—Long—Should be medium in size, smooth and free from side roots, gradually tapering from crown to tip, and firm in texture. Cross-section cuttings should show fine dark red, tender flesh, free from white lines. Top small and compact. Roots should be uniform; Round—Medium in size, firm, with smooth round shape gradually tapering to a fine terminal root. Flesh should be tender, firm, fine, and of a dark red color. Roots should be uniform.

Cabbage.—Early—Generally round or heart-shaped; the head should have fair size, be heavy, firm, hard, and free from insect injury or disease. Late—Heads round or slightly flattened in shape, with a dense formation of dark green outer leaves, and inside leaves of a cream colour. Specimens should be heavy and have firm texture. Red—Slightly conical or round in shape, dark red in colour, texture firm and solid, with good weight. Savoy—Round and slightly flattened; leaves close and compact, of a dark green colour with a fine curl—good weight.

Carrots.—Long—Roots should be long, straight and smooth without any green at the crown; have a small compact top, be free from side roots, and gradually taper from crown to tip. Texture, tender and crisp. Heart, small with a large outer ring. Roots should be uniform; Medium—Medium length, straight, free from side roots and gradually tapering to a blunt tip. Skin smooth. Cross-sections should show a small core and a large outer ring. Flesh should be tender and have a rich flavour. Roots should be uniform.

Cauliflower.—Head, large in size with a dense formation of flower, pure white in colour and without small leaves in the head. Shape, round horizontally, with a nice, even, curving crown. Cauliflower should be exhibited with a few of the lower leaves attached.

Citron.—Large, well-rounded, heavy specimens, finely mottled and well-coloured throughout.

Celery.—Bunch, composed of several long, well bleached stems of medium diameter, free from rust and rot, with a crisp texture, and rich nutty flavour. Leaves, straight and even. Heart, large.

Corn.—Sweet—Cobs should have fair size and be well developed, with straight, even rows, well filled out at base and tassel end. The kernels should be tender, juicy and sweet. Ears should be uniform.

Cucumbers.—Indoor—Should be long, smooth, with size well carried out towards the ends. Dark green in colour; heavy. Outdoor—Specimens should be smooth in form, straight, of medium length, with thickness carried well out towards the ends; of a dark green colour and heavy weight. Specimens should be uniform.

Lettuce.—Cabbage—Heads should be large, well-rounded, compact, composed of crisp, sweet leaves, free from any discolouration. Cos—Conical in shape with straight upright growing leaves, well bleached and crisp, and with a firm heart.

Onions.—Large—Shape, globular or flat, according to variety; globular shape preferred. Should be smooth and even in form, of good weight, and have a small well-ripened neck, with solid firm texture, especially at the base of the neck; Pickling—Should range from ½" to ¾" in diameter, be uniform in size and shape, clean, firm and white in color. Specimens should be uniform.

Parsley.—Head, large and bushy with numerous, finely curled, dark green leaves, which should be crisp and free from discoloration of any kind.

Parsnips.—Roots should be of medium length, broad at top with a nicely hollowed crown, gradually tapering from crown to tip, smooth and straight, skin free from rust, firm in texture, and have a small core.

Peas.—Pods long and straight, dark green in colour and well-filled with large sweet-flavoured, tender peas. Samples should be uniform in size and colour, and not over-ripe.

Potatoes.—Specimens should have uniformity in size, with smooth even shape, firm, solid flesh, fine and white in colour, and be clean, and free from disease of any kind. Potatoes with shallow eyes are preferred to those with deep eyes.

Pumpkin.—Round or oblong in shape, symmetrical, large, thin-skinned, closely ribbed, firm in texture and heavy; with deep yellow or creamy yellow colour according to variety.

Rhubarb.—Stalks, medium in diameter, long, straight and tender; with uniform colour and mildly acid flavour.

Radish.—Summer and Winter—Medium size, smooth, even form, free from insect damage and side roots; firm texture and mild flavour. Cross-sections should show solid fine white flesh. Specimens should be uniform.

Salsify.—A good type resembles a well formed parsnip, broad at top, smooth and straight, gradually tapering to tip, free from side roots, texture firm and crisp, skin light brown in colour. Flesh should have a milky appearance when cut, and a small core.

Spinach.—Specimens should be large with heavy foliage; broad, dark green, tender leaves, free from disease and insect injury.

Squash.—Winter—Should be large, heavy and firm in texture, with colour and shape according to variety. Should not be over ripe.

Vegetable Marrow.—Large size, oblong in form, smooth and even, with uniform thickness and good weight. Texture firm and not over-ripe. Colour varies from a creamy yellow to a mottled green.

Tomatoes.—Medium in size with an even, well-rounded shape, smooth, fine well-coloured skin, firm texture, good weight and a small eye. Not over-ripe. Blossom end should be left on sample. Colour varies according to variety—may be pink, bright red, or yellow. Specimens should be uniform.

Turnips.—Medium size with smooth symmetrical form, free from side roots, firm in texture, and heavy. Cross-sections should show fine, firm, evenly coloured flesh. Colour varies from white to light yellow.

Relative to the foregoing standard of vegetables, Mr. O. J. Robb, Olericulturist at the Horticultural Experiment Station, Vineland, Ont., expressed the opinion that the standard is very complete and fills a want regarding the judging of vegetables. Mr. Robb adds that he notices there is no mention of melons in this list and has furnished the following:—

Melons.—Medium in size according to variety, heavy uniform netting on outside, not over ripe and flesh either green or pink, deep flesh, firm, crisp and sweet. Thin rind. Specimens to be uniform.

EDMONTON SPRING SHOW AND BULL SALE

The first week in April was devoted in Edmonton to the annual holding of the Edmonton spring horse show and bull sale. In regard to the latter, 115 Shorthorns were sold at an average price of $234.26, 17 Herefords at an average of $217.65, 8 Aberdeen-Angus at $225.63, and 1 Holstein at $135, making a total of 141 bulls sold at an average of $231.06, and bringing a total of $32,580. The bull which sold for the highest price was the Shorthorn Iron Lad, 89098, sired by Iron Duke 76260, consigned from Vegreville. The champion bull of the show, Sir Irwin, by Roan Chief, sold for $500. A horse sale was also held, being the first in connection with the show. One Belgian sold for $450, 3 Clydesdales for $3,985, and a Suffolk Punch for $285. The outstanding price was $2,000 paid for the Clydesdale Cumberland Seal 14769, being the highest price ever paid for a Clydesdale sold at public auction in the West.

In regard to the horse show, the directors adopted the policy of eliminating the show classes as much as possible in favour of the utility classes. There were 228 exhibitors this year, compared with 145 last spring. There were 1,010 animals stabled on the grounds, against 839 in 1917.

BUTTER COMPETITION IN BRITISH COLUMBIA

The British Columbia Dairymen's Association has arranged for the holding of a season's butter competition extending over a period of five months. The exhibits will consist of one 14-lb. box of butter solid pack (salted) to be made between the 1st and 15th of each month and sent to cold storage not later than the 20th of each month to be held there until judged at the end of the season. Detailed records of each churning of butter from which the exhibit is made will be kept for purposes of reference and comparison. An opportunity will be afforded at the close of the competition to all interested to make a study and comparison of the exhibits. The competition is divided into five classes, one for each month. The association will award to the exhibitors receiving the highest average score (1) a gold medal or gold watch valued at $40; (2) a silver medal valued at $20; (3) solid gold cuff links valued at $12.50. The money for the prizes to be awarded has been contributed by different firms and makes a total, besides specials, of $250. No exhibitor will be entitled to a prize who does not answer the questions required in connection with the "history sheet" for each churning represented in the several exhibits made by him. The butter will be judged on the following points:—

Flavour	45
Texture	25
Salting	10
Colour	10
Package	10

WESTERN CANADA IRRIGATION ASSOCIATION

The next annual meeting of the Western Canada Irrigation Association will be held at Nelson, B.C., toward the end of July. Mr. Robert J. C. Stead, Calgary, the acting secretary, announces that the exact date has not yet been fixed.

NEW PUBLICATIONS

THE DOMINION DEPARTMENT OF AGRICULTURE

THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF ECONOMIC FIBRE PRODUCTION

Grow Flax for Fibre, Special Circular No. 20, is a four-page leaflet showing the importance of increasing the production of flax in Canada and giving a few cultural hints.

THE DIVISION OF HORTICULTURE

Vegetable Gardening at Home and on Vacant Lots, by W. T. Macoun, Dominion Horticulturist. This is 12-page circular No. 14, of the Horticultural Division, and is intended as a guide for the amateur gardener. It deals with the preparation of the soil, arrangement of the garden, the varieties of vegetables it is advisable to cultivate, and the protection of the plants from insects and disease.

The Potato in Canada; its Cultivation and Varieties. In consequence of the widespread demand for the bulletin with this title noticed in THE AGRICULTURAL GAZETTE for April, page 407, a popular edition of 16 pages has been issued. It contains in condensed form practically all the information supplied in the first instance, including a list of varieties recommended for different districts in each of the provinces.

THE ENTOMOLOGICAL BRANCH

Crop Protection Leaflets.—Four more of these leaflets have been issued by the Entomological Branch as follows: "Cutworms and Their Control," "Prevent White Grub Injury," and "The Pea Weevil," all by Arthur Gibson, Chief Assistant Entomologist, in charge of Field Crop Insect Investigations, and "Arsenate of Lime," by George E. Saunders, Dominion Entomological Laboratory, Annapolis Royal, N.S.

THE PROVINCIAL DEPARTMENTS OF AGRICULTURE

NEW BRUNSWICK

The Annual Report of the Director of the Elementary Agricultural Education Division of the New Brunswick Department of Agriculture for the year ending October 31st, 1917, goes into full particulars, with statistics of attendance, of the records of the pupils for the year. It deals generously with the progress made in school and home gardening.

QUEBEC

The Provincial Department of Agriculture has issued a series of circulars dealing with "Brood Hens and Chickens", "White Diarrhoea in Chickens" and "Grain Economy in the Poultry House". The last mentioned suggests rations appropriate to these war times. Bulletin No. 55 on "Poultry Raising in Towns and Villages", also issued by the Department, gives diagrams and descriptions of cheap and convenient buildings for poultry raising as well as some advice on the selection of birds. A leaflet deals with the "Means of Fighting Caterpillars of Various Kinds".

ONTARIO

The 12th Annual Report of the Horticultural Societies, 1917. This report makes a blue book of 112 pages with numerous illustrations, and gives a verbatim report of the 12th annual conference held at Toronto, November 21st and 22nd. It contains a series of articles by recognized authorities on amateur gardening and the cultivation of various plants.

War-Time Foods and Cooking, Circular No. 11, Women's Institutes. This is a 32-page circular giving recipes and information regarding the preparation of foods becoming to the times.

Variety of Farm Crops, by Dr. C. A. Zavitz, Professor of Field Husbandry, Ontario Agricultural College, Guelph, is the title of a four-page leaflet giving a brief, summarized description of the various crops grown in Ontario.

Sugar Beets, by C. A. Zavitz, B.S.A., D.Sc., Professor of Field Husbandry, Director of Field Experiments, and A. W. Mason, B.S.A., Assistant Experimentalist, is Bulletin 262 of the Ontario Agricultural College, and deals with the market that exists for sugar beet products. It also describes the varieties of sugar beets and the methods of cultivation.

Agricultural Societies' Report, 1917. This report of 126 pages contains the results of competitions in standing field crops and prize winning grain at Winter Fairs and at Toronto and Ottawa exhibitions in 1917. It also contains instructions to judges.

Mr. Geo. A. Putnam, Superintendent of Women's Institutes, has prepared a booklet of eight pages for the use of the Junior Women's Institutes of Ontario, that points out the conditions, uses, and advantages of the Institutes to girls.

Elementary Agricultural Classes, Report of the Inspector for 1917. This report makes a blue book of 60 pages. It gives a summarized account, with plentiful illustrations, of all the classes throughout the province. An introductory note states that agriculture as a regular subject of the public school curriculum is proceeding rapidly all over Ontario.

Summer Courses and Examinations.—The syllabus of summer courses and examinations for certificates covers a wide field, including agriculture, horticulture, art, manual training, household science, vocal music, physical culture, commercial subjects, kindergarten subjects, auxiliary classes and French.

MANITOBA

The Provincial Department of Agriculture has issued a circular regarding the "Marketing of The Manitoba Wool Crop for the Season of 1918." It sets forth that the Department will act as agents for the farmers up to July 10th and receive the wool delivered in Winnipeg, where it will be weighed, sorted and graded under the supervision of graders supplied by the federal Department of Agriculture. The wool will then be sold.

Hatching, Brooding, Rearing, and Feeding Chicks, is a 16-page bulletin issued by the Provincial Department of Agriculture, and written by Professor Herner of the Agricultural College. Professor Herner commences before the egg is made, and shows how a little care in selecting the right hens would improve the strain. Photographic cuts are given of freak eggs and other peculiarities of poultry. Hens and incubators are discussed, and the questions of brooding and feeding are fully gone into.

Extension Bulletins Numbers 25 and 26, published as a part of the Manitoba Farmers' Library Series, deal with gophers and squirrels and flax-growing. Mr. V. W. Jackson, professor of biology, is the author of the bulletin on "Gophers and Squirrels," and also of a supplement on "Wood Ticks and Other Ticks.' The bulletin is liberally illustrated, and goes fully into the subject.

The bulletin on 'Flax-Growing" has been compiled by the Field Husbandry staff of the provincial Agricultural College and contains information on every point relative to the cultivation of the plant.

BRITISH COLUMBIA

Silage Aids Production, by R. J. Ferris, Silo Demonstrator. This is a twelve-page bulletin showing the progress the silo has made in the province, and describing, with illustrations, its uses, construction, and advantages.

The Report of the Director of Elementary Agricultural Education and Summer School for Teachers for 1916-17, has been reprinted from the Public Schools Report in an illustrated pamphlet of 24 pages, containing details regarding the different schools and short courses.

Boys' and Girls' Competitions. Bulletin No. 78 of the Live Stock Branch of the provincial Department of Agriculture gives the complete results of the different competitions, as well as the rules and regulations governing them.

MISCELLANEOUS

Reconstruction. Under this heading the Department of Soldiers' Civil Re-establishment, has issued a pamphlet dealing with the economical aspect of the situation as affecting returned soldiers, and explaining the various vocations in which they can be employed.

Canadian Society for the Protection of Birds. The report of the secretary and acting treasurer for the year beginning 1916-1917, published in pamphlet form, gives the proceedings of the third annual meeting with illustrations.

The agricultural section of the Organization of Resources Committee of Ontario has published a 16-page pamphlet entitled, "Why Waste Your Garbage." It comprises a report by the commission appointed by the agricultural section to investigate the feeding of town and city garbage to swine. The main contribution is made by Mr. Justus Miller, B.S.A., Assistant Commissioner of Agriculture for Ontario.

The Dominion Shorthorn Breeders' Association, under the secretaryship of Professor G. E. Day, has issued a series of leaflets giving reasons why the Shorthorn for beef and dual purpose should be especially bred.

The Determination of the Moisture-Content of Flour, by Frank T. Shutt, D.Sc., Dominion Chemist, and P. J. Moloney, M.A. A paper read dealing with this subject at the May meeting 1917, of the Royal Society of Canada, has been published in separate pamphlet form in Series III, Volume II, of the transactions of the society. It records the results of work undertaken in the laboratories of the Dominion Experimental Farms in the weekly determination of the moisture content of a number of flour samples.

NOTES

Beginning the first of July, the College of Agriculture of the University of British Columbia will commence a three-months' short course for returned soldiers.

The Parks Superintendent of Victoria B.C., has been given instructions to prosecute a vigorous campaign against crows. They are said to have played havoc among chickens, and to have driven practically every other bird out of the parks.

Mr. W. J. Reid, B.S.A. Director of Agricultural Instruction, Department of Agriculture, Prince Edward Island, and Mr. J. E. McLarty, of the Rural Science Department, Prince of Wales College, Charlottetown, have resigned from their respective offices to take up farming in Western Canada.

Canada was one of the last countries to adopt the daylight saving policy. The day following the passing of the law in Canada Spain enacted a similar measure. The plan is observed in the United States and most of the European countries, including England, France, Italy, Germany and Austria-Hungary.

Speaking recently at a meeting of he juvenile agriculturists of Brooklands and Weston, Mr. J. H. Evans, Deputy Minister of Agriculture for Manitoba, stated that engaged in the greater production movement in Manitoba there were 25,000 members of the Boys' and Girls' Clubs, an increase of 9,000 over last year, and of these 25,000, upwards of 50 percent were children whose parents are of foreign extraction.

Miss Hazel McCain of Florenceville, N.B., has been appointed Supervisor of the Women's Institutes for the province of New Brunswick to take the place of Miss Hazel Winter, who recently resigned. Miss McCain holds a superior teacher's license in New Brunswick and is a graduate of the Lilian-Massey School, Toronto. Recently she was engaged by the Military Hospitals Commission as Dietitian in their clearing depot, Quebec.

In the fall of the year 1818, or a hundred years ago, the Quebec Agricultural Society held a cattle show and ploughing match at which the following prizes, among others, were given: For the best stallion of the genuine Canadian breed of any age, £10;

to the person raising the greatest weight of wheat per arpent, £20; to the farmer and others inventing the best, simplest and least expensive machine for threshing wheat, or other small grains, £6; to the ploughmen performing the best work with the least amount of labour, £5.

In his annual report Mr. J. Lockie Wilson, Superintendent of Horticultural Societies of Ontario, says that 1917 was the banner year of the society. This organization has now a paid membership of upwards of 18,000 and new societies are continually applying for incorporation. Mr. Wilson adds that thousands of bushels of valuable gardening products have been produced through the efforts of these societies, whose motto is, "Cultivate every foot of ground, so that our great alliance for freedom's cause may be maintained."

The Dominion Club, a men's association recently formed in connection with Dominion Church, Montreal, has undertaken the cultivation of a large tract of land in Westmount. Plans were made to secure seeds and plants at a minimum of cost, and to adopt a uniform style for the arrangement of the lots, which were 25 ft. by 50 ft. The production of potatoes on a community plan has also been taken up, and what was formerly a part of the Westmount golf links has been put under cultivation. The members of the club participating in the production work were assessed $10 each to meet the cost of seed and such labour as was required.

The superintendent of the Toronto Vacant Lots Cultivation Association, Mr. Geo. Baldwin, F.R.H.S., announced recently that they had approaching 1,750 vacant lots under cultivation. The movement in Toronto started in 1914, when seventy-five vacant lots were put under cultivation. In 1915, there were 120, and, in 1917, 826. The Association prepares the land, and charges the cultivator $2 for seed. This year 150 soldiers and soldiers' wives, who get everything free, are cultivating lots. According to Mr. Baldwin, the yield of the lots averaged last year about $40 each, although several had yielded products the actual value of which reached $130. Many women are cultivating gardens, as are members of church associations and pupils of schools. The staffs of the hospitals are bending their energies to the raising of vegetables for the consumption required at those institutions. Members of the West End Young Men's Christian Association have fifty acres under cultivation.

In a series of short courses carried on by the University of British Columbia for returned soldiers, forty-four returned men took the course in fruit growing, and forty-eight in agronomy and animal husbandry. For a later course in agriculture and farm work that will begin on the first of July, the Military Hospitals Commission is contributing a grant of $3,000. The course will be three months in length, with provision for extension to six months. Requests for short courses in poultry keeping, vegetable gardening, apiculture, and dairying, have also been made by returned men.

The Health Committee of the Winnipeg City Council have suggested that the following recommendations be embodied in a bylaw: That no dairyman who fails to obtain 350 points out of a possible 500 on the city score card be granted a license to sell milk; that milk coming from any dairy scoring less than 350 shall be pasteurized; that any dairyman who neglects to report a case of sickness occurring on his premises, whether of an infectious or non-infectious character, shall have his license cancelled; that any licensed dairymen purchasing milk from any other than a licensed dairyman shall have his license cancelled; that no license shall be granted where the dairy premises are situated on less than three acres of land; that action be taken by the city to obtain from the provincial Government such legislation as may be required to bring dairies supplying the city under the Dominion regulations relating to tuberculosis.

The Lincoln Greater Production Company has been formed to farm some of the 3,000 acres of vacant land in the vicinity of St. Catherines. The company has been organized under the Joint Stock Companies' Act with a capital of $25,000. The business men are very favourably impressed. A retired farmer has been engaged as manager at $100 a month and his expenses while farming operations are going on. Working in conjunction with the farm manager is an advisory committee of five successful farmers and the Agricultural Representative, who will assist and advise the manager and pass on all accounts to be rendered for payment. The manager has a car which is used as a light livery truck, and also a Fordson tractor with supplementary ploughs, discs, harrows, seeders, etc., totalling in value the sum of $2,000. The company has 25 acres under spring wheat, 15 acres of oats, and 10 of flax, and expects to put in 200 or 300 acres of fall wheat. Any rentals paid so far have not exceeded $3 per acre, plus taxes, the use of much of the land being donated.

INDEX TO PERIODICAL LITERATURE

PART V

The International Institute of Agriculture

T. K. Doherty, LL.B., Commissioner

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty nternational Institute Commissioner, Department of Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

1110—**Decree of the Minister of Agriculture Creating a Service of Agricultural Material in France.**—*Journal officiel de la République Française*, Year 49, No. 281, p. 8166. Paris, October 16, 1917.

Under date of October 15, 1917, the French Minister for Agriculture has published the following decree:

Art. 1.—A Service of agricultural material is instituted at the Ministry for Agriculture (Direction of Agriculture, Office for agricultural information).

Art. 2.—This Service has the function of providing material, particularly machinery, instruments and products required for agriculture.

It promotes the formation of industrial, commercial and agricultural groupings to facilitate production, exportation, distribution, sale and purchase and puts these associations into connection with manufacturers and industrial and commercial associations.

It provides for a just distribution of metals between makers and controls the prices, so as to avoid large increases.

Art. 3.—The head of the office for agricultural information, sent by the Minister of Agriculture as delegate to the Commission for metals and war manufactures, directs the Service for agricultural materials. He signs the correspondence of the Service and gives endorsements and permits. The questions prepared by the Service, which should be approved by the Minister, are signed by him and presented to the Director of Agriculture.

Art. 4.—The Director of Agriculture is responsible for carrying out this decree.

1112—**Agricultural Development in South Africa.**—In *The Board of Trade Journal*, Vol. XLVIII, No. 1086, pp. 627-630. London, September 20, 1917. (2 pp. in Institute Bulletin).

1113—**Studies of Food Utilisation: the Utilisation of Carbohydrate on Relatively High and Relatively Low Cereal Diets** — ZENTMIRE, ZELMA and FOWLER, CHESTER C., in the *Journal of Biological Chemistry*, Vol. XXXII, No. 1, pp. 77-85, bibliography of 25 publications. Baltimore, October, 1917.

This study was carried out at the Laboratory of Physiological Chemistry of the Iowa State College, in order to ascertain how much, if any, difference occurs in the utilisation by the organism of cereal protein and cereal carbohydarte when ingested in varying amounts in the form of thoroughly cooked "cream of wheat". The article analysed gives the results relating to the carbohydrates.

The experiment lasted 3 weeks, divided as follows; 5 days of lower cereal diet; 5 days of higher cereal diet; 2 days each of nitrogen-free lower, and higher starch diets; preliminary and intermediate periods of 2 days each in which a simple mixed diet was ingested. To the cream of wheat and the starch pudding were added only small quantities of milk, sugar and butter.

The cereal and starch were boiled a few minutes on the stove, then placed in a large fireless cooker overnight.

In all cases the lower diet was equal to half the higher diet.

The results obtained led to the following conclusions:

1) The utilization of total carbohydrates of a diet consisting largely of cereal is above 99 per cent.

2) The carbohydrate is as completely utilized with one quantity as another of cereal in the diet, even when the cereal is taken in larger amounts than are found in the average dietary.

3) Monotony and unpalatability of diet have little or no effect upon the ultimate utilisation.

CROPS AND CULTIVATION

1114—**Relation of the Water-Retaining Capacity of a Soil to its Hygroscopic Coefficient.**—ALWAY, F. J., and MCDOLE G. R., in the *Journal of Agricultural Research*, Vol. IX, No. 2, pp. 27-71, bibliography of 25 publications. Washington, 1917. (2 pp. in Institute Bulletin).

1115—**On the Supposed Relative Unilateral Impoverishment of the Soil in Nitrogen, Phosphoric Acid and Potassium by Various Crops; Action of the Root System of the Plants.**—MODESTOV, A., in *Agricultural Gazette*, No. 8 (176), pp. 174-176. Petrograd, February 25, 1917.

It is generally admitted that various crops impoverish the soil in nitrogen, phosphoric acid and potassium in various proportions. This has led to distinctions being made in this respect between different groups of plants; for example, cereals are considered particularly exacting in nitrogen and phosphoric acid, whereas tubers demand much potassium, etc. These considerations are included in the principles of crop rotation.

The author acknowledges that the various cultivated plants extract fertilizing elements from the soil in different proportions, but, on the basis of calculations concerning the average yields of the various crops (wheat, oats, beet, potato, buckwheat, clover, etc.), he concludes that the *total* quantities of nitrogen and phosphoric acid extracted from the soil by these plants are *almost equal*, so that it is not possible to admit a relative unilateral impoverishment in these two elements by the different crops. On the other hand, there are differences in the total quantities of *potassium* extracted by the crops.

These conclusions, based on elementary calculations, clash with the present theory of crop-rotation.

How then is it possible to explain the fact that, with crop rotation, a given plant, wheat for eaxmple, gives higher yields with continuous cropping? Thus, in the experimental fields at Poltawa (Russia), wheat following after wheat yielded 8¼ cwt. per acre, whereas, following on plants which extract the same quantity of nitrogen and phosphoric acid, it yielded from 9½ to 11 cwt. of grain per acre. The potassium has not been taken into consideration, because wheat requires but little, and it was precisely after crops demanding much potassium (beets, potatoes, buckwheat, etc.) that it gave the highest yields. In this case it is impossible to talk of a *minimum* of potassium resulting from a relative unilateral improverishmnet. It is clear that here the rotation of the crops has no importance.

If indeed this increased yield of wheat does not depend on rotation (in the sense either of a relative unilateral improverishment or enrichment), what is the probable cause of the decreased yields given by continuous cropping of the same plant and the increased yields obtained by rotation? The author believes it may be accounted for by the following causes:

1) T*otal quantity of moisture extracted from the soil by various crops.* It must be noted that root crops, which extract 1.6 times more moisture from the soil than wheat, cannot, in this respect, have any beneficial influence on the following wheat crop, rather they will have deprived it of water in advance.

2) *Physical condition of the soil.* This is more favourable to nitrification and the accumulation of moisture in the case of hoed crops than in that of wheat. It is to the better physical condition in which hoed plants leave the soil that their beneficial influence on the following crops must be attributed rather than to the different requirements of the crops in fertilizing elements.

3) *Differences in the root system of the plants cultivated.* If, for example, beets and oats are compared from this point of view there is reason to believe that the point of contact of the roots with the soil particles differs in the two plants. On the other hand, the principal parts of the roots of oats and beets develop in different layers of the soil. The author believes this difference in the position of the root system of the plants grown is the real cause of the favourable action of crop rotation.

Attention is also drawn to the different dissolving capacity of roots of various plants and to De Candolle's theory of poisoning of the soil. Finally the author points out the necessity of examining the prevailing theory of soil "fatigue", which attributes this fatigue to a relative unilateral impoverishment of the soil in nitrogen, phosporic acid and potassium in plants which are cropped continuously, for, as has been seen, this impoverishment cannot be sufficiently great to be of practical importance.

1116—**The Effect of Soil Reaction on the Availability of Ammonium Sulphate.**—COOK, R. C., and ALLISON, F. E., in *Soil Science*, Vol. III, No. 5, pp. 487-498. New Brunswick, N.Y., 1917.

1117—**Livestock and the Maintenance of Organic Matter in the Soil.**—FIPPIN, E. O., in the *Journal of the American Society of Agronomy*, Vol. 9, No. 3, pp. 97-105. Lancaster, Pa., 1917.

1118—**Soil Constituents Which Inhibit the Action of Plant Toxins.**—TRUOG, E., and SYKORA, J., in *Soil Science*, Vol. III, No. 4, pp. 333-352, bibliography of 48 publications. New Brunswick, N.Y., April, 1917. (1 page in Institute Bulletin).

1120—**Variations in the Chemical Composition of Soils in the United States.**—ROBINSON, W. O., STEINKOENIG, L. A., and TRY, W. H., in *United States Department of Agriculture, Bulletin* No. 515, *Contribution from the Bureau of Soils*. Washington, 1917.

1121—**Studies on Soil Colloids in the United States.**—I. WOLKOFF, M. I., Flocculation of Soil Colloidal Solutions, in *Soil Science*, Vol. I, No. 6, pp. 585-601, fig. 3, bibliography of 43 publications. New Brunswick, N.J., 1916. II. IDEM, Influence of Colloids on Electrical Conductivity of Salts, Vol. III, No. 5, p. 423-430, tables III, bibliography of 9 publications. New Brunswick, 1917.

1122—**On the Physiology and Biology of Nitrogen-Fixing Bacteria.**—OMELIANSKY V. L., in the *Archives des sciences biologiques de Pétrograd*, Vol. XIX, No. 3, pp. 209-227, 1916; summary by SAZERAC, R., in the *Bulletin de l'Institut Pasteur*, Vol. XV, No. 5, pp. 133-134. Paris, 1917. (1).

1123—**New Method for the Estimation of "Zeolitic" Silicic Acids in Soils.**—GUEDROITZ, G., in *Review of Experimental Agronomy dedicated to the memory of* P. S. KOSSOVITCH, Vol. XVII, No. 5, pp. 400-407. Petrograd, 1916.

1125—**Irrigation and Manuring Studies; The Effect of Varying Quantities of Irrigation Water and Manure on the Growth and Yield of Corn.**—HARRIES, F. S., and PITTMAN, D. W., in *Utah Agricultural College Experiment Station, Bulletin* No. 154, pp. 29, figs. 14. Logan, Utah, April, 1917.

1126—**Comparative Value of Legumes as Green Manure.**—JOHNSON, MAXWELL O., THOMPSON, ALICE R., and SAHR, C. A., in *Hawaii Agricultural Experiment Station, Honolulu, Press Bulletin*, No. 52, 14 pp. 6 fig. Honolulu, February 24, 1917. (2 pp. in Institute Bulletin).

1127—**Studies of Leguminous Plants as Green Manure.**—GANGULEE, N.; in *The Poona Agricultural College Magazine* Vol. VIII, No. 3, pp. 141-156. Poona, 1917. (2 pp. in Institute Bulletin).

1128—**Potassium Chloride from Mother Liquor in Manufacture of Sea-Salt.**—NISHIMURA, T., in *Kogyo-Kwagaku-Zasshi*, Vol. XX, pp. 587-624, 1917; abstract in *Journal of the Society of Chemical Industry*, Vol. XXXVI, No. 19, p. 1046. London, October 15, 1917.

1133—**Environment of Seeds and Crop Production.**—HALSTED, BYRON D., and OWEN, EARLE J., in *The Plant World*, Vol. 20, No. 9, pp. 294-297. Baltimore, September, 1917. (2 pp. in Institute Bulletin).

1134—**Studies of the Phosphorus and Potassium Requirements of the Barley Plant During its Different Periods of Growth.**—PEMBER, F. R., in *Agricultural Experiment Station of the Rhode Island State College, Bulletin* 169, pp. 50, Kingston, R.I., U.S.A., 1917. (2 pp. in Institute Bulletin).

1135—**Daily Variation of Water and Dry Matter in the Leaves of Maize and the Sorghums.**—MILLER, E. C., in *The Journal of Agricultural Research*, Vol. X, No. 1, pp. 11-45. Washington, D.C., July 2, 1917. (3 pp. in Institute Bulletin).

1142—**The Improvement of Hops by Crossing and Selection.**—SALMON, E. C., in the *Journal of the Institute of Brewing*, Vol. XXIII, No. 2, pp. 60-82. London, 1917. (2 pp. in Institute Bulletin).

1143—**Experiments in Crossing Varieties of Tomato in the United States.**—JONES, DONALD F., in *The American Naturalist*, Vol. LI, No. 610, pp. 608-621. New York, 1917. (3 pp. in Institute Bulletin).

1144—**Sugar Beet Seeds, in France.**—SAILLARD, EMILE, in *Comptes rendus des Séances de l'Académie des Sciences*, Vol. 165, No. 16, pp. 508-510. Paris, October 15, 1917.

Before the war, over 10 million pounds of sugar beet seeds were used annually in France; 4-5ths of these came from abroad, especially from Germany.

During the 10 years 1904-1913, the author carried out cultural experiments with a view to comparing the French varieties with the best German varieties. In 1915 he came to the following conclusions: "In 1905 the best French varieties produced less sugar per acre (about 125 lbs. less) and had a lower sugar content (0.9% less). At the present time they yield as much, and sometimes more, sugar per acre and are not more than 0.3 to 0.4 % inferior in sugar content. It is, therefore, possible to produce in France seeds equal to those which came from Germany".

In 1916 and 1917, practically only Russian and French seed was used in France, particularly Russian seed.

(1) See also Bulletin of Foreign Agricultural Intelligence, Dec. 1916, No. 731.

Owing to lack of labour the author has been unable to continue his comparative experiments, but has continued to follow the development of the beet harvest, as he has done every year since 1901. He summarises the results of his studies as follows:

1) Sugar beets have been practically as rich in 1916 and 1917 as in the 10 years previous to the war. The yield of sugar per acre has, perhaps, been a little lower, but it should be noted that cultural conditions have been less favourable owing to the insufficiency of manuring and tillage, both applied too late.

2) During the 10 years (1904-1913), the sugar content per week, per acre or per root was highest at the beginning of September (507½ lbs. per acre, 7.95 grammes per root). During the two years 1916 and 1917, this maximum was a little later.

The figures quoted refer to good crops and exceed the current averages.

1145—**The Cultivation of Wheat by Early Sowing and Hilling-up.**—DEVAUX, H., in *Comptes rendus des Séances de l'Académie d'Agriculture de France*, Vol. 3, No. 31, pp. 910-913. Paris, October 17, 1917. (1 page in Institute Bulletin).

1146—**Cultural Experiments with Different Varieties of Wheat at Ultuna, Sweden.** NILSSON, GEORG, in *Sveriges Utsadesforenings Tidskrift*, Year XXVII, Pt. 3, pp. 122-135. Malmo, 1917. (2 pp. in Institute Bulletin).

1147—**Cultural Experiments with Different Varieties of Wheat at the Ostergotland Agricultural Experiment Station, Sweden**—SUNDELIN, GUSTAV, in *Sveriges Utsadeforenings Tidskrift*, Year XXVII, Pt. 3 pp. 136-153. Malmo, 1917. (2 pp. in Institute Bulletin).

1148—**Red Fife Wheat in the South-West of France.**—PERICHON, A., in the *Journal d'Agriculture pratique*, Year 81, New Series, Vol. 20, Nol 22, pp. 426-427. Paris, November 1, 1917.

1149—**The Most Favourable Times for Sowing Wheat and Rye at Alnarp, Sweden.**—FORSBERG, L., in *Tidskrift for Landtman*, Year 38, No. 35, pp. 583-589. Lund, 1917.

1150—**Cultural Experiments with Different Varieties of Oats in Norway.**—KNUT, WIK, in *27de Aarsberetning (for 1915-1916) om Norges landbrukshoiskobes Akerceksforsok*, Christiania, 1917.

This paper gives the results of cultural experiments made in 1915 and 1916 with 40 varieties of oats, amongst which were largely represented the best types created at Svalof, which have rapidly spread throughout the Scandinavian countries.

1153—**Effect of Removing Blossom on Yield of Potatoes.**—*The Gardeners' Chronicle*, Vol. LXII, No. 1610, p. 178. London, November 3, 1917.

Among the experiments carried out during the present year by Messrs. Sutton & Sons at Reading, those relating to the effect of the removal of the blossoms on the yield of potatoes are of special interest.

A table in the Institute Bulletin gives the results in detail and from it will be seen that, in five out of seven plots experimented upon, picking of the blossoms resulted in an increased yield, and that the average increase was by no means negligible, amounting to 215 lbs. or an increase of 5 per cent.

1156—**The Sugar Beet in the La Plata District (Argentine and Uruguay).**—PING, N. J., in *Anales de la Sociedad rural Argentina*, Year LII, Vol. 41, No. 6, pp. 460-462. Buenos-Aires, August, 1917. (1 page in Institute Bulletin).

1157—**The Irrigation of Sugar Beets.**—HARRIS, F. S., in *Utah Agricultural Experiment Station, Bulletin* No. 156, pp. 24. Logan, Utah, June, 1917. (2 pp. in Institute Bulletin).

In the United States the beet sugar industry has proved to be most successful and has found its greatest development under irrigation ; in fact, most of the sugar beets of the country are now produced with the aid of irrrigation water. The expense of raising an acre of beets is, however, so great that every condition should be as favourable as possible in order to prevent losses. Unless the soil and moisture conditions are favourable it is impossible to get a crop of sugar beets sufficiently large to pay the cost of production. The cost of raising an acre of grain is relatively low, and if the crop is poor the loss is slight; with beets the farmer cannot afford to have a failure. These conditions make it especially desirable to understand the water requirements of the sugar beet plant.

The writer reviews the literature on the irrigation of beets with reference to twenty works by various authors.

When the beets were watered each week during the growing season, one inch of water weekly gave a higher yield than did more than this quantity; but when one irrigation was given it was most effective when applied at the time the beets averaged about two inches in diameter.

Irrigating the land after the seed was planted and before the plants were up reduced the yield below that where no irrigation water was applied. The least desirable time to apply water after the plants had begun to grow was just before the beets were ripe. When the water was applied at the proper time, two or three irrigations of five inches each gave practi-

cally as good results as where more water was used.

Proportionately more tops were produced by the high and the later irrigations than by the opposite conditions. The percentage sugar and the purity were higher in the irrigated than in the non-irrigated beets, except where the irrigation water was added very late. The highest percentage of sugar resulted from irrigation water applied when the beets were about two inches in diameter.

Contrary to popular opinion, the length of beets was not increased by delaying the time of applying the first irrigation. The percentage of forked beets bore no consistent relationship to the amount of irrigation water applied. Irrigation water affected the average size of beets in practically the same manner that it affected the total yield.

To sum up, sugar beets do not require large quantities of irrigation water if it is properly applied, but they are sensitive as to the time it is given.

1163—**Experiments in the Cultivation of Medicinal Plants at the Agricultural Station of Bezentchuk, Russia, in 1916.**—KOULTCHITZKY, I. in *The Agricultural Gazette*, No. 3, pp. 71-73; No. 4, pp. 94-96; No. 5, pp. 119-121. Petrograd 1917. (1 page in Institute Bulletin).

1167—**Fruit Nomenclature (Fourth Conference of the Pomological Committee of Australia, 1917.**—)PESCOTT, E. E., in *The Agricultural Gazette of New South Wales*, Vol. XXVIII, No. 8, pp. 578-590. Sydney, August, 1917. (2 pp. in Institute Bulletin).

1173—**Reforestation on the National Forests of the United States.**—TILLOTSON, C. R., in *United States Department of Agriculture, Bulletin* No. 475, *Contribution from the Forest Service, Professional Paper*, pp. 63. Washington, May 2, 1917.

The Bulletin analysed is a revised edition of a preceding one (No. 98 by W. T. Cox), but it has been brought up to date as regards the results of the reforestation work of the Forest Service in the United States and the methods at present employed.

In the United States National Forests there are about 5,600,000 acres to be reforested. The greater part of this area consists of land where former forests have been entirely destroyed by recurring fires. The complete restocking of the area now denuded, or sparsely timbered, will increase the annual wood production at least 3,000,000,000 feet. For this reason, reforestation is an essential feature of National Forest Administration.

The bulletin analysed contains a description of the methods of collecting and preparing forest seed.

The following data, which are of considerable practical interest, are obtained from the various tables given.

	Trees per acre	Seed per acre	Net cost per pound
	—	lbs.	—
Douglas fir	10	35.00	$0.66—1.36
Western yellow pine (*P. ponderosa* Law)	5	30.00	0.41—0.67
Lodgepole pine (*P. murrayana* Engelm)	40	8.00	1.70—2.00
White pine (*P. strobus* L.)	7	7.00	2.43—2.83
Norway pine (*P. resinosa* Ait.)	5	4.00	2.63—3.19
Engelmann Spruce (*Picea engelmanni* Engelm.)	12	12.00	1.00—2.41
Sugar pine (*Pinus lambertiana* Dougl.)	8	89.60	0.50—0.65

Of a total area of 124,732 acres covered up to June 30, 1915, 84,320 acres were seeded directly and 40,412 acres were planted.

The writer describes the methods of sowing and planting adopted, gives the figures, the rules to be observed, and the relative cost per tree, region and method.

1174—**Forest Products of Canada.**—I. BATES, J. S. (Superintendent of the Forest Product Laboratories of Canada) and LEE, H. N. (in Charge of Timber Physics), Canadian Woods for Structural Timbers, in *Department of the Interior, Canada, Forestry Branch, Bulletin* No. 59, 44 pp. Ottawa, 1917.—II. Forest Products of Canada, 1916, Pulpwood, *Ibid., Bulletin* No. 62-*b*, 12 pp. Ottawa, 1917.

1175—**Mechanical Properties of Woods Grown in the United States.**—NEWLIN, J. A., and WILSON, T. R. C., in *United States Department of Agriculture, Bulletin* No. 556, *Contribution from the Forest Service, Professional Paper*, 47 pp., bibliographical index. Washington, September 15, 1917.

The increasing scarcity of many species of timber which had become more or less standard in various wood-using industries, is opening the field for other species; hence it is necessary to have definite information and data which render it possible to compare the properties of a known species with those of any other.

The publication analysed gives practical data that can serve as a basis for: 1) the comparison of the different species; 2) the selection of species suitable for special requirements; 3) the compilation of reliable figures for tests of the resistance of the various woods.

The data are based upon about 130,000

tests (of 126 different woods) carried out by the Forest Products Laboratory, which is maintained by the United States Forest Service with the co-operation of the University of Wisconsin. It is planned to continue the series of tests until all species of wood which are important, or which give promise of becoming so, have been included. The data are given in 2 series of tables, one for green wood and the other for air-dry wood. The scope and method of experiments are first set forth, together with a definition of the terms used.

1176—**Yields from the Destructive Distillation of Certain Hard-Woods in the United States.**—PALMER, R. C., in *United States Department of Agriculture, Bulletin* No. 508, *Contribution from the Forest Service*, Professional Paper, 8 pp. Washington, 1917.

LIVE STOCK AND BREEDING

1180—**The Susceptibility of the Prairie Dog to Rabies.**—WALTERS, GEORGE, in *Journal of the American Veterinary Medical Association*, Vol. 41, New Series, Vol. 4, No. 5, pp. 702-704. Ithaca, N.Y., August, 1917.

1181—**The Chicken Mite (Dermanyssus gallinae); Its life History and Habits.**—WOOD, H. P., in *U.S. Department of Agriculture, Bulletin* No. 553, 14 pp. Washington, August, 1917. (2 pp. in Institute Bulletin).

1182—**Studies on the Metabolism of Fats in the United States.**—I. LYMAN, J. F., The Utilization of Palmitic Acid, Glyceryl Palmitate, and Ethyl Palmitate by the Dog, in *The Journal of Biological Chemistry*, Vol. XXXII, No. 1, pp. 7-11. Baltimore, October, 1917.—II. LYMAN, J. F., The Effect of Feeding Free Palmitic Acid, Glyceryl Palmitate and Ethyl Palmitate on the Depot Fat in the White Rat. *Ibid.*, pp. 13-16.

1184—**A Comparative Study of the Feeding of Cattle and Pigs with Regard to Meat-Production.**—GOUIN, A., and ANDOUARD, P., in *Le Genie Civil*, Vol. LXXI, No. 40, pp. 157-158. Paris, September 8, 1917. (2 pp. in Institute Bulletin).

1187—**The Abderhalden Test for Pregnancy in Animals.**—ZELL, C. A., in *Journal of the American Veterinary Medical Association*, Vol. III, New Series, Vol. V, No. 1, pp. 39-47. Ithaca, N.Y., October, 1917. (2 pp. in Institute Bulletin).

1189—**Prospects for American Purebreds.**—WENTWORTH, E. N., in *The Field Illustrated*, Vol. XXVII, No. 3, pp. 182-183 and 212. New York, March, 1917.

The pure bred animals of America, according to the writer's estimate, represent only 2.46 per cent of the American live stock industry, as shown by the following table.

Kind of Stock	Total Number in U.S. (Jan. 1, 1916)	Total Number Pure Breds (Jan. 1, 1916)		Per Cent Pure Breds
		Registered	Unregistered	
Horses	21,166,000	171,200	14,340	0.88
Beef cattle	38,453,000	812,000	243,600	2.69
Dairy cattle	21,998,000	567,000	170,000	3.36
Sheep	49,162,000	354,000	141,600	1.07
Swine	68,047,000	1,220,000	1,220,000	3.58
Total	199,826,000	3,124,200	1,789,540	2.46

These pure bred animals constitute the foundation stock. Each has been improved to perform a certain function better than the average of its species, and its value is measured by the degree to which it can transmit this performance to its offspring. Pure bred males are of two classes: those whose function will be to sire only market animals, and those whose function will be to sire more seed stock. As far as numbers are concerned the first class is predominant, although constructive breeding, even the future of breeds themselves, depends on the few reserved for the second purpose. Approximately 90 to 95 per cent of males are included in the first class, draft horses alone excepted, while only 5 to 10 per cent belong to the second. In fact this restriction is so great, that only 3 to 5 per cent of all registered animals living four or five generations ago are enumerated in modern pedigrees. There are therfore two types of livestock men in America: the constructive breeders and the producers. If the pure breds America has to-day can supply the necessary sires for the production herds, as well as the necessary seed stock, the demand will be fulfilled. As a matter of fact, this demand is not supplied at present, witness the exceptional auction prices of the last

few years. Hence a healthy growth in the number of pure breds may be expected. Seed stock will still be needed and there will be room for thousands of additional breeders. Provided that the stockman is not a speculator, there is no business in which future success is more certain; 2.46 per cent of pure breds where 5 to 7 per cent may be necessary is a margin of surety for years to come for all careful and conservative American breeders.

1190—**The Rehabilitation of the Milking Shorthorn in the United States.**—WEIS, P., in *The Breeder's Gazette*, Vol. LXXII, No. 12, pp. 324-326. Chicago, September 20, 1917.

It is a significant fact that the controversy about the Milking Shorthorn breed ceased almost simultaneously with the beginning of the rise in beef prices. Until two years ago even authorities on the dual-purpose question believed quite generally that the breed would be confined to the east and northwest of the United States and to the general farmer. But when the first volume of the Milking Shorthorn Yearbook was compiled by the American Shorthorn Breeders' Association two years ago the fact was revealed that the breed was not confined to those parts of the country only but was beginning to make friends everywhere. Today the call for breeding stock is almost as strong in the south as in the north.

There is no doubt that if breeders of Milking Shorthorns would have followed the policies of breeders of dairy cattle in advertising their breed by the creation of a number of phenomenal milk records, progress would have been made more rapidly. That this would have been possible is shown by the attainment of a number of high records such as Rose of Glenside's 18,075 pounds of milk in a year, and others, but breeders of the dual purpose Shorthorn are laying more stress on the attainment of moderate long distance records under ordinary farm conditions rather than on the attainment of short-time phenomenal records made under the most favourable conditions.

At the close of 1916 the Record of Merit list for the breed contained the names of 427 animals. Of this number 99 cows have made more than 10,000 lbs of milk a year, and 278 well over 8,000 and under 10,000 lbs. During this year a large number of Shorthorn cows has been put under official test and there will be a perceptible increase of animals with authentical milk records at the end of 1917.

There were about 260 breeders of milking Shorthorns at the beginning of 1917 distributed over 33 states, and indications are that the year will close with well above 300 breeders in every State of the Union.

The first public sale of milking Shorthorns was held in America in March, 1916; an average of $562 was realized on 54 head. The second sale resulted in an average of $751. Prevailing prices for dual-purpose Shorthorns are a fair reflection of the rapidly increasing demand for this kind of stock.

If breeders keep up their efforts toward a still better and more beautiful animal, their ultimate success in the complete rehabilitation of the breed will be but a matter of a few years.

1191—**The 15th Egg-Laying Test at Hawkesbury Agricultural College, New South Wales, April 1, 1916.—March 31, 1917.**—ROSS, G. D., and HADLINGTON, JAS., in *Department of Agriculture, New South Wales, Farmers' Bulletin* No. 114, pp. 21. Sydney, July, 1917. (2 pp. in Institute Bulletin).

1200—**The Possibility of Breeding the Walrus (Trichechus latirostris) for Meat Production in the United States.**—*The Journal of Heredity*, Vol. VIII, No. 8, pp. 339-345. Washington, 1917. (1 page in Institute Bulletin.)

1201—**Skunk Breeding in the United States.**—*The Journal of Heredity*, Vol. VIII, No. 10, pp. 452-454. Washington, October, 1917.

The skunk has hitherto been regarded as a noxious pest, a destroyer of birds and their eggs and as the agent of frequent depredations on the hen-roost. Now, however, it is being recognized as one of man's valuable allies, not only because it destroys many animals which are injurious to agriculture, but also on account of its increasing value as a fur-producer. More than a dozen of the States have already passed laws protecting the skunk, and probably their example will be followed by other States. Already more than 500 persons are engaged in various parts of the United States in breeding skunks, either selling the skins to furriers or disposing of the live animals to others who wish to start fur farms, which are very remunerative.

Skunks are commercially divided into 2 general classes; the spotted and the striped. The first is small and its skin is not so highly prized. When this pelt is put on the market, it is generally called "civet". The second type of skunk produces a pure black pelt (which is the most valuable) or else skins ranging through the intermediate graduations to pure white. Ordinary raw skins are worth from $3 to $6 apiece.

Mr. Detlefsen, of the Department of Genetics, University of Illinois, has found a number of mutations which are valuable for their types of fur and he is breeding these and making a study of colour inheritance in the skunk. Some breeders state that they have already been able, by several generations of careful selection, to procure pure black animals which appear to breed true to type.

The principal objection to skunk fur is its strong smell which it is often practically impossible to remove, although gasoline is of value, as a deodorant, while chloride of lime works very effectually. The scent is ejected by the animal from two oval sacs situated just below the tail. Most skunk breeders remove these scent glands when the animal is quite young by means of a simple operation. One breeder, however, declares that when skunks are reared in captivity and treated with kindness, they no longer throw their scent and therefore any operation is unnecessary. Skunks are easily tamed. The females breed once a year, generally in the early spring. They have 6 to 12 young in a litter. The animal is adult at 6 months old.

FARM ENGINEERING

1202—**Electric Ploughing.**—DELAMARRE, A., in *Revue Générale de l'Electricité*, Vol. I, No. 18, pp. 691-700, figs. 14. Paris, May 5, 1917. (3 pp. in Institute Bulletin).

1203—**The Choice of the Type of Agricultural Tractor Suited to French Conditions**—DE PONCINS, A., in *La Vie Agricole et Rurale*, Year 7, No. 40, pp. 237-244. Paris, October 6, 1917. (3 pp. in Institute Bulletin).

Drying Plants.—In *Weekly News Letter*, United States Department of Agriculture, Washington, April 10, 1918.

Establishment by municipalities from municipal funds of drying plants for fruits and vegetables where conditions are favourable is referred to in Farmers' Bulletin 916. "A Successful Community Drying Plant", published by the United States Department of Agriculture.

In municipal plants, the bulletin says, the work should be supervised by the city council or other town authorities. If the plant is not a municipal plant, it is best to place it under the guidance of some association already in existence, such as a civic improvement club, commercial club, home-garden club, or a special community club organized for the purpose.

As an example of a club that can be formed for the purpose the bulletin tells of one community that has a drying plant and in which a special community club of approximately 60 farmers has been organized primarily to look after the operation of the drying plant. The officers—president, vice-president, secretary, and treasurer—constitute the executive committee and are entrusted with power to act. A simple form of constitution and by-laws has been adopted and meetings of the club are held monthly or oftener, usually at the drying plant, which is in this instance in a room of a church building.

Municipal or government owned drying plants have been in successful operation in European countries for years. Such plants provide village communities with a convenient and simple method of drying all sorts of produce of the home garden and orchard, as well as the vegetables and fruits shipped to the community, which might be allowed to go to waste at the stores and market places. The drying plant described in the bulletin follows closely the specifications of a community plant at Lincoln, Nebraska, and 11 others in that general section, all of which were successfully operated during the summer and fall of 1917.

The advantage to the busy farmer's wife in the country community can not be overestimated, says the Bulletin. Her work is heaviest in the summer when vegetables and fruits must be saved for winter use. The establishment of a community drying plant at a consolidated school, country church, or centrally located farm home would offer a great relief from heavy kitchen duties.

The drying plant described in the bulletin uses an adaptation of the electric fan process of drying. A stream of dry air is caused to flow continuously over the products being dried. The humidity of the air, the method of preparation of the vegetables, and the velocity of the air current have much to do with the rapidity of drying. It is a utilization of the same principle by which wind will dry roads after a rain or by which damp clothes hung in a breeze will dry much more quickly than those hung in quiet air. Another feature of the drying plant described is that instead of the air being forced across the vegetables it is drawn across them. Laboratory tests indicate that drying is considerably accelerated when the suction method is used, although the force method will dry satisfactorily and is used in at least one Nebraska plant. The bulletin says that such a plant should be operated without expert help and by power easily available and can be built complete for $250 or less. Plans and specifications for building such a plant are given in the bulletin.

The most important feature to watch in the construction of a drying plant of this type is the fan. The main point to keep in mind is to get one that will move a sufficient quantity of air. If the fan will move air fast enough for the suction to hold a piece of cardboard or other material 1 foot square and weighing 8 ounces against the wire

screen at the intake end, the drying will proceed satisfactorily. Any type of fan can be used, and among those that have been found efficient are an old ensilage cutter blower fan, a separator fan used on a blower threshing machine, and a fan which has been discarded by a planing mill after use there in drawing sawdust and shavings from the planing machines. The fan may be operated by an electric motor of from 2 to 5 horsepower, or by a gasoline engine of similar power.

Nebraska's experience with community drying indicates that ordinarily a better coloured and better flavoured product is obtained if no artificial heat is applied. Even in arid countries, however, and always in humid countries, it is best to have equipment for heating. This will be needed when the air contains much moisture. An effective method of heating the air is by the use of a hot-water radiator at the intake end of the drier.

Fruits and vegetables meant for the drier should be prepared by cleaning as for table use. After cleaning they should be sliced thin. The slicing process may be hastened by use of a slicing machine.

After a sufficient amount of moisture apparently has been removed, it is well to keep the product for several days in a large container that can be protected by either a cloth cover or a wire screen. After a few days, if there are no indications of moisture collecting on the dried product, it should be placed in pans in the oven or exposed to the sun or air currents for a few hours and then packed in permanent containers. The enemies of dried fruits and vegetables are moisture, insects, and rodents, and successful storing will depend on protection against them.

1204—**Attachment for Adapting a Motor-car to Agricultural Traction.**—*Scientific American*, Vol. CXVII, No. 11, pp. 196, New York, September 15, 1917. (1 page in Institute Bulletin).

1205—**Rick Drying by Machinery.**—*The Implement and Machinery Review*, Vol. 43, No. 510, p. 608. London, October 1, 1917.

1206—**Electricity Applied to the Threshing and Drying of Cereals, in Italy.**)—TARCHETTI, A., in *Il Giornale di Risicoltura*, Year 7, No. 18, pp. 229-234. Vercelli, September 30, 1917. (1 page in Institute Bulletin).

1209—**Apparatus for Determining the Water Content of Cheese.**—I. TROY, H. C., in *Hoard's Dairyman*, Vol. LIV, No. 1, p. 4. Fort Atkinson, Wisconsin, July 27, 1917.—II. *The Journal of Agriculture*, Vol. XXI, No. 3, pp. 41. Quebec, Canada, September 15, 1917. (1 page in Institute Bulletin).

1212—**The Construction of Pit Silos (1) in the United States.**—PRYSE, METCALFE, T. and SCOTT, GEORGE, A., in *United States Department of Agriculture, Farmers' Bulletin*, No. 825 pp. 14. Washington, 1917.

Pit silos are becoming common in many sections of the Great Plains region of the United States, where wooden silos, weaken rapidly owing to the peculiar weather conditions obtaining there. The farmer with the help of his ordinary farm hands can construct a pit silo fairly cheaply.

The site chosen should be a firm, well drained soil. The cylindrical type is the one usually chosen. The depth of the silo depends on the quantity of silage to be stored, but rarely exceeds 36 feet. The walls are plastered about one inch thick with mortar made of one part cement and 2 or 2½ parts of clean, sharp sand. The bottom is left bare. A concrete curb is made before digging the pit, a 4 feet wall being afterwards built on it; concrete, brick, tile blocks, etc., may be used. A hoisting apparatus is mounted over the silo to provide for easy and rapid removal of the silage.

The bulletin summarised describes the construction of these silos, the method of digging out the soil, the choice of site; it indicates the dimensions, (2 tables) and gives details regarding filling, removing the silage for feeding, cautions against poisonous gases in the silo and the construction of a cover. A number of figures clearly illustrate the information given. At the end of the bulletin a list is given of all the bulletins previously published by the U.S. Department of Agriculture with regard to silage and the construction of silos.

(1) See also Bulletin of Foreign Agricultural Intelligence, August, 1916, No. 333.

AGRICULTURAL INDUSTRIES

1223—**On the Formation of "Eyes" in Emmenthal Cheese.**—CLARK, W. M., in *Journal of Dairy Science*, Vol. 1, No. 2, pp. 85-113. Baltimore, U.S.A., July, 1917.

1227—**The Handling and Storage of Apples in the Pacific North West.**—RAMSEY, H. J., MCKAY, A. W., MARKELL, E. L., and BIRD, H. S., in *U. S. Department of Agriculture, Bulletin* No. 587, 32 pp. Washington, September 8, 1917.

During the seasons 1911-1912 to 1914-1915, inclusive, extensive investigations were conducted by the United States De-

partment of Agriculture to determine those factors which are of the greatest importance to the successful cold storage of the apples of the Pacific Northwest. For this purpose, apples were secured from the various more important apple-growing sections of Washington, Oregon, Idaho and Montana.

The experiments conducted at 32° F (0° C.) storage showed: A wide range in the cold-storage keeping qualities of different varieties, depending upon the decay, skin blemish, texture changes, etc., which they develop.

A 2-weeks' delay between the picking and storage of apples often greatly reduces their keeping properties through more rapid ripening and the development of scald, Jonathan spot, scab (due to *Venturia inaequalis* and V. *pomi*) and decay.

A temperature of 32° F will keep apples longer and in better condition than will a 35° F temperarure, the difference in favour of the former increasing with the time in storage.

Immature picking results in severe scald and early decay of apples in storage.

The storage of over-mature apples is equally bad, or worse, than the storage of immature apples, resulting in more rapid deterioration than with those picked and stored at proper maturity.

Well-coloured portions of the skin seldom, if ever, develop scald.

Carelessness in handling is responsible for considerable decay of apples in storage, and freedom from bruises and skin abrasions is fundamental to successful storage.

Apples from orchards badly infected with northwestern anthracnose are likely to decay early in their storage life.

In conclusion, it is pointed out that successful cold storage of apples is as much the result of the treatment they receive before being placed in cold storage, as of the conditions and temperatures under which they are kept in storage. The responsibility rests as much with the producer and handling organizations as with the cold-storage warehousemen.

1228—**Report of the Committee on Statistics of Milk and Cream Regulations of the Official Dairy Instructors' Association of the United States.**—In the *Journal of Dairy Science*, Vol. I, No. 1, pp. 45-83. Baltimore, U.S.A., May, 1917.

This survey of the milk and cream regulations of the cities and towns of the United States, includes 194 headings and subheadings pertaining to laws and ordinances designed to regulate the production, care and sale of milk and cream and presents a mass of statistics of particular interest to all persons interested in this problem.

The order in which the different arguments are discussed is the following: Permits of licenses; Chemical composition; Bacteria; Temperature; Specific gravity; Conditions which render Milk Unsalable; Parturition; Tuberculin testing of cows; Stables; Stable Yards; Water Supply; Milkers; Milk house; Milk utensils; The Scoring of Dairy Farms; City Milk Plants; Delivery waggons; Labeling and sale; Penalties.

Out of this survey of milk and cream regulations of the cities and towns and states of the United States, the committee has concluded that:

1) there is a great and urgent need that the definite information now available should be placed in the hands of those who are responsible for the laws and ordinances governing the production, transportation, handling and sale of milk; and

2) there is a great and urgent need for further research and study on the part of dairy investigators of some of the problems involved in the production and handling of milk.

PLANT DISEASES

1229—**Experiments on Potato Leaf Curl, in France.**—BLANCHARD and PERRET, in *Comptes rendus des Séances de l'Académie d'Agriculture de France*, Vol. III, No. 31, pp. 894-895. Paris, 1917.

The experiments, carried out in 1914 in the Department of the Loire, do not permit the cause of this disease to be diagnosed with certainty. At the most they prove that, if there be parasitism, infection takes place neither through the soil nor through the skin of the tuber. The investigations must be continued another year.

Numerous observations made on extensive crops seem to point to the fact that leaf curl is a purely physiological disease. The disease appears to show a kind of degeneration in certain varieties of potatoes, due to excessively prolonged asexual reproduction, too frequent replanting in the same soil, cultivation in soils containing sufficient potassium but too little nitrogen (the element which favours the development of the leaves). It seems to prove that the plant is suffering from nitrogen starvation, or rather, that it has difficulty in assimilating this element.

From a practical point of view it should be noted:—

1) That all varieties are not equally subject to the disease;

2) That all plants of the same variety are not equally attacked;

3) That fresh seed and nitrogenous manure diminish the disease.

Therefore, until an efficacious remedy is found, it is advisable:—

1) To grow the most resistant varieties in each district ("Violette d'Auvergne", "Andrés", Fluck géante", "Saucisse rouge", in the central Massif district);

2) to renew the seed potatoes frequently; in the Loire district especially, seed potatoes introduced in large quantities from the west, have given the growers entire satisfaction;

3) to select, at harvest times, good varieties; in other words, to choose the spring seed potatoes from the most productive and strongest plants;

4) to give the plantation a minimum of 220 cwt. of well prepared farmyard manure;

5) to apply the nitrogen treatments late.

Copper treatment, so efficacious against mildew, has no effect on leaf curl.

1231—**The "Little Leaf" Disease of the Vine in California.**—BIOLETTI, FREDERIC T., and BONNET, LEON, in the *Journal of Agricultural Research*, Vol. VIII, No. 10, pp. 381-397. Washington, D.C., 1917. (1 page in Institute Bulletin).

1232—**Plant Diseases Recently Observed for the First Time in Canada.**—GUSSOW, H. T., in *Science*, New Series, Vol. XLVI, No. 1189, p. 362. Lancaster, Pa. 1917.

1241—**Fusarium coeruleum the Cause of the Dry Rot of the Potato Tuber in the British Isles.**—PETHYBRIDGE, GEORGE H., and LAFFERTY, H. A., in *The Scientific Proceedings of the Royal Dublin Society*, Vol. XV. (New Series), No. 21, pp. 193-222, Plates VI-VII. Dublin, 1917.

The dry-rot of the potato tuber which commonly occurs in the British Isles is caused by *Fusarium coeruleum* (Lib.) Sacc. The 2 species, *F. oxysporum* Schlecht and *F. trichothecioides* Woll., which are largely responsible for a somewhat similar type of rot in certain parts of the United States of America, have not been met with in this connection up to the present in the British Isles.

On a single occasion, *F. arthrosporioides* Sherb. was found, and proved to be capable of causing a dry-rot of the potato tuber. Further research may perhaps show that this, and possibly some other species of *Fusarium*, are occasionally responsible for the production of dry-rot in Britain.

F. coeruleum does not produce hadromycosis of the potato plant, nor does it kill the latter by attacking its roots. It can destroy tomato fruits, but does not attack onions, mangels, carrots, parsnips or apples.

Infection frequently occurs through mechanical wounds, such as those caused by implements, by bruising and by breaking off the sprouts. It may occur also through scab spots (*Oospora Scabies*). Wounds, however, are not essential, for infection can take place through the lenticels, eyes, or young sprouts of uninjured tubers.

Potatoes become more susceptible to infection as they become more mature, hence the rot is more prevalent during the latter than during the earlier period of storage. Some varieties of potato (Eclipse, Windsor Castle and Epicure) are more resistant to infection than others.

Affected tubers cannot be cured, and the application of sulphur or lime for preventing infection or retarding the rot, is of no practical value.

1246—**The Discovery of Urediniae of Cronartium Ribicola on Stems of Ribes hirtellum in Maine, United States.**—POSEY, G. B., GRAVATT, G. F., COLLEY, R. H., in *Science*, New Series, Vol. XLVI, No. 1187, pp. 314-315. Lancaster, Pa., 1917.

1247—**The Treatment of Mildew of the Peach Tree (Oidium leucoconium).**—SAVASTANO, L., in *R. Stazione sperimentale di Agrumicoltura e Frutticoltura, Acireale, Bollettino*, No. 31, pp. 1-2. Acireale, 1917.

Oidium leucoconium Desm. develops regularly each year in the orchards of western Sicily.

The young peach trees sometimes do not lose their leaves in winter and the extremities of the twigs remain green and tender, so that the fungus not only hibernates in them, but also prepares the summer reproduction.

Peach mildew is not serious in itself, since only the ends of the twigs are attacked; but the persistent disease, renewed each year, shortens the life of the tree and compromises the bearing of fruit.

Of the remedies, potassium sulphate and lime-sulphur mixture scorch the plant. The author's experiments of 1916 showed sulphur to be preferable. The use of sulphur in this case is only efficacious if applied before the mildew has a definite hold on the plant; the sulphur treatment must be repeated each time a new attack by the parasite is to be feared. Sulphur, moreover, is beneficial to the growth of the tree.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the January number of the International Review of Agricultural Economics. Persons interested in any of the articles in this list may obtain the original bulletin on application to the Institute Branch, so long as the supply for distribution is not exhausted.

AGRICULTURAL STATISTICS

WHEAT CROP OF 1917

AREA SOWN TO WINTER CEREALS, AND RECENT CONDITIONS

BY T. K. DOHERTY, L.L.B.

The wheat harvests, which begin in the Northern Hemisphere with the crop of India, terminate in the following December and January for the countries of the Southern Hemisphere. Official returns to the International Institute of Agriculture for 1917 have been recently made by Australasia, Argentina, and Uruguay, so that in Table "A" there is presented, for the countries open to the world's commerce, a nearly complete statement of the production for the calendar year 1917. The figures for the countries not open to the world's commerce are, except for the five-year averages, and as qualified in the notes, mere rough estimates. In the Southern Hemisphere, although the harvest runs into the next calendar year, the crops are referred to the year in which the harvest is generally begun.

In addition to the pre-war five-year average, which the Institute have published heretofore, there appears the five-year average 1911-15.

There follows in Table "B" the world's wheat acreage for the same periods, covering a small number of countries. Table "C" gives areas in winter cereals for 1917-18.

TABLE A

WORLD'S PRODUCTION OF WHEAT

COUNTRIES OPEN TO THE WORLD'S COMMERCE

COUNTRIES	1917	1916	Five Years' Average, 1911-15	Five Years' Average, 1909-13
	Bushels	Bushels	Bushels	Bushels
United States	650,828,000	636,318,000	806,361,000	686,694,000
Canada	233,743,000	262,781,000	248,325,000	197,118,000
Mexico (a)	8,480,000	8,000,000	8,480,000	8,480,000
Argentina	218,628,000	70,225,000	160,996,000	147,071,000
Chili (a)	12,000,000	12,000,000	14,000,000	14,000,000
Uruguay	12,860,000	5,390,000	6,714,000	6,519,000
France	144,151,000	204,910,000	271,607,000	317,639,000
Great Britain and Ireland	64,321,000	59,775,000	62,954,000	59,640,000
Italy	140,001,000	176,531,000	182,576,000	183,336,000
Denmark	4,300,000	6,026,000	6,238,000	5,344,000
Norway	241,000	305,000	296,000	306,000
Sweden	6,371,000	8,979,000	8,610,000	7,769,000
Netherlands	3,452,000	4,586,000	5,737,000	4,896,000
Switzerland	4,556,000	3,821,000	3,497,000	3,314,000
Spain	142,676,000	152,330,000	125,214,000	130,447,000
Portugal (a)	7,440,000	8,000,000	7,440,000	7,440,000
Greece (a)	4,000,000	8,000,000	4,320,000	4,320,000
Cyprus and Malta (a)	2,400,000	2,400,000	2,400,000	2,400,000
Algeria	28,980,000	29,152,000	34,513,000	34,998,000
Egypt	29,835,000	36,543,000	35,180,000	34,814,000
Tunis	6,963,000	5,512,000	6,224,000	6,230,000
Union of South Africa	8,833,000	4,790,000	6,520,000	6,520,000
India	379,232,000	318,005,000	360,550,000	359,035,000
Japan	32,727,000	28,307,000	24,669,000	24,166,000
Australia	122,584,000	152,088,000	94,297,000	90,499,000
New Zealand	6,276,000	5,030,000	6,405,000	7,070,000
Totals	2,276,378,000	2,209,804,000	2,494,123,000	2,350,065,000

COUNTRIES NOT OPEN TO THE WORLD'S COMMERCE

COUNTRIES	1917	1916	Five Years' Average 1911-15	Five Years' Average 1909-13
	Bushels	Bushels	Bushels	Bushels
Belgium (b)	9,000,000	11,917,000	14,500,000	14,896,000
Austria (b)	36,500,000	48,672,000	55,580,000	60,840,000
Hungary	135,000,000	135,717,000	159,923,000	169,646,000
Germany (b)	91,000,000	121,696,000	153,668,000	152,120,000
Bulgaria	(c) 34,000,000	33,951,000	43,987,000	42,440,000
Herzegovina and Bosnia (b)	1,500,000	2,048,000	2,300,000	2,560,000
Poland	39,000,000	52,000,000	52,000,000	65,000,000
Russia-in-Europe	(c) 550,000,000	595,425,000	624,620,000	624,620,000
Russia-in-Asia	(c) 86,000,000	86,812,000	112,068,000	151,142,000
Roumania	(c) 70,000,000	78,521,000	81,070,000	87,793,000
Serbia (b)	8,000,000	10,880,000	12,000,000	13,800,000
Persia (a)	13,600,000	13,600,000	13,600,000	13,600,000
Total	1,073,600,000	1,191,239,000	1,325,316,000	1,398,457,000
World's total	3,349,978,000	3,401,043,000	3,819,439,000	3,748,522,000

NOTE:—The above figures are official except where otherwise indicated.

(a) From Broomhall's Corn Trade News.

(b) For 1916, 20 per cent and for 1917, 40 per cent deducted from the pre-war five year average. For details concerning the basis of these estimates, see note "g" under the "World's Wheat Production" table in THE AGRICULTURAL GAZETTE of September, 1917 (page 841).

(c) Estimated from condition reports.

Table "A".—Here the figures of production are, for the Northern Hemisphere, except for a few slight changes, the same as those mentioned in THE AGRICULTURAL GAZETTE for January, 1918 (pp. 109-112), but the data for the Southern Hemisphere, which were at that time only roughly estimated, are now presented as official. The forecast of 210,000,000 bushels for Argentina compares with the official 218,628,000, and 115,000,000 bushels estimated then for Australia now becomes 122,564,000.

In Table "A", setting aside the unreliable data referring to the Central European Empires, the total production for 1917 is 66,574,000 bushels larger, or 3% more than for 1916; 217,745,000 bushels, or 9% less than the average of the five years 1911-15; 73,687,000 bushels, or 3% less than the average of the five years 1909-13. The total figures for the Central Empires and the aggregate figures for the world's production, comprising the totals of the Central Empires, may be of interest and considered as a fairly reasonable guess but should not be relied upon. The data for Russia-in-Europe are official except for 1917.

TABLE B

WORLD'S WHEAT ACREAGE

COUNTRIES	1917	1916	Five Years' Average, 1911-15	Five Years' Average, 1909-13
	Acres	Acres	Acres	Acres
United States	45,941,000	52,316,000	51,911,000	47,495,000
Canada	14,756,000	15,370,000	11,616,000	10,532,000
Argentina	17,876,000	16,089,000	16,455,000	16,052,000
Uruguay	1,014,000	780,000	852,000	791,000
France	10,439,000	12,430,000	14,625,000	16,161,000
Great Britain and Ireland	2,103,000	2,052,000	1,990,000	1,868,000
Italy	10,557,000	11,679,000	11,900,000	11,723,000
Denmark	131,000	152,000	133,000	114,000
Norway	14,000	14,000	14,000	12,000
Sweden	329,000	307,000	272,000	255,000
Netherlands	122,000	134,000	147,000	138,000
Switzerland	139,000	124,000	106,000	104,000
Spain	10,340,000	10,148,000	9,739,000	9,548,000
Egypt	1,116,000	1,447,000	1,373,000	1,315,000
Tunis	1,310,000	1,482,000	1,338,000	1,310,000
Union of South Africa	925,000	755,000	737,000	744,000
India	32,940,000	30,480,000	30,537,000	29,218,000
Japan	1,458,000	1,302,000	1,205,000	1,196,000
Australia	9,857,000	11,530,000	9,238,000	7,603,000
New Zealand	294,000	219,000	218,000	242,000
Totals	161,661,000	168,810,000	164,406,000	156,421,000

Table "B" Acreage.—The acreage figures are not available for Mexico, Chili, Portugal, Greece, Cyprus and Malta, Algeria, or for the countries mentioned in the second part of Table "A." The total acreage of the remaining countries shown in this table compares with the total production of the same countries as follows, the corresponding production percentages being in parenthesis. Acreage of 1917, 4% less than 1916 (production 3% more); 2% less than 1911-15 (production 9% less); 3% more than 1909-13 (production 3% less). As compared with 1916, the increase of acreage in Argentina and India are more than offset by the notable decreases in the United States, Canada, France, Italy, and Australia. There is not, however, a corresponding decrease in production in the United States, where an area smaller by 6,375,000 acres produced a crop nearly 15,000,000 bushels larger, while an increase in Argentina of only 1,787,000 acres produced over 148,000,000 bushels more. These comparisons are interesting, showing, as they do, what a large crop may be harvested this season on this continent with the increased acreage of the United States in winter wheat, and the prospective increase in spring wheat acreage of both the United States and Canada

TABLE C

AREAS SOWN TO WINTER CEREALS IN THE NORTHERN HEMISPHERE, 1917-18

COUNTRIES	1917-18	1916-17	Increase (+) or Decrease (—)
	Acres	Acres	Acres
WHEAT:			
Denmark	141,000	138,000	+ 3,000
Spain	9,937,000	10,134,000	— 197,000
France	11,360,000	10,569,000	+ 791,000
Scotland	67,000	55,000	+ 12,000
Luxemburg	23,000	22,000	+ 1,000
Canada (a)	349,000	725,000	— 376,000
United States (a)	36,392,000	27,430,000	+ 8,962,000
India	34,470,000	30,924,000	+ 3,546,000
Japan	1,458,000	1,236,000	+ 222,000
Tunis	1,483,000	1,310,000	+ 173,000
Totals	95,680,000	82,543,000	+ 13,137,000
RYE:			
Denmark	537,000	455,000	+ 82,000
Spain	1,977,000	1,829,000	+ 148,000
France	1,955,000	2,046,000	— 91,000
Luxemburg	16,000	17,000	— 1,000
United States	6,119,000	4,214,000	+ 1,905,000
Totals	10,604,000	8,561,000	+ 2,043,000
BARLEY:			
Spain	4,143,000	3,839,000	+ 304,000
France	249,000	270,000	— 21,000
Japan	2,721,000	2,738,000	— 17,000
Tunis	1,154,000	1,038,000	+ 116,000
Totals	8,267,000	7,885,000	+ 382,000
OATS:			
Spain	1,434,000	1,168,000	+ 266,000
France	1,711,000	1,608,000	+ 103,000
Tunis	148,000	124,000	+ 24,000
Totals	3,293,000	2,900,000	+ 393,000

(a) Winter-killed areas deducted.

Table "C"—Area of Winter Cereals.—The official data to hand do not include all the winter wheat countries. Just a brief reference to a few that are omitted. Sweden and Norway produce practically no winter cereals. Italy is credited with an area in wheat about equal to that of 1917, with a promise of a crop of about the same size. Egypt is officially reported to have increased its acreage in all cereals by 35%. There is no report from Algeria, except of favourable seeding and growing conditions. England and Wales report 15% increase in wheat and 3% in rye.

The outstanding feature in Table "C" is the great increase of wheat acreage in the United States and India, and winter rye as well, in the United States. Spain's slight decrease in wheat is offset by increases in all other grains. Increased production of rye in the coming season from the acreage already reported and that in prospect, in view of its growing popularity, will bring it into prominence among the other bread cereals of 1918-19.

That all the grains share in the increases, as well as wheat and rye, is apparent from the following percentages exhibited by the

totals of each kind of cereal in 1917-18, compared with 1916-17. Wheat shows an increase of 15%; rye, 24% barley, 5%; oats, 14%.

SUPPLY AND DEMAND AUGUST 1, 1917, TO AUGUST 1, 1918

The situation, in so far as the European requirements are concerned, as presented in the January AGRICULTURAL GAZETTE, (p. 110), notwithstanding the receipt of later data, does not need any material change. The import requirements of these countries for the current grain year, resulting from the detailed analyses of their production by groups, were recapitulated in the table which is here reproduced as follows:—

	Pre-war Consumption	Normal Import Needs 1917-18	Estimated Minimum Needs, 1917-18
	Bushels	Bushels	Bushels
France	361,364,000	217,214,000	180,000,000
Italy	236,614,000	96,614,000	80,000,000
Great Britain	275,693,000	211,629,000	180,000,000
Greece	.....	.....	20,000,000
Portugal	.....	.....	3,000,000
Belgium	64,000,000	55,000,000	24,000,000
Malta, Egypt, Mesopotamia, Jerusalem	.....	.....	10,000,000
Total Allied requirements			497,000,000
Scandinavia, Netherlands, Spain and Switzerland			48,000,000
Outside of Europe, including 15 millions to Brazil			50,000,000
World's requirements, 1917-18			595,000,000

The supplies from the exporting countries to meet this demand and the estimated exports for the current year, as set forth in the January GAZETTE, need no modification in so far as Canada and the United States are concerned. The detailed production of all the exporting countries are comprised in Table "A." New Zealand, Uruguay, Chili, and Algeria, although classed among the exporting countries, can ship but a negligible quantity. The European demand must be supplied from the remaining five producing countries. The total production of the United States, Canada, Argentina, Australia, and India for 1917 was 1,605,015,000 bushels, compared with 1,439,417,000 for 1916, and a five-year pre-war average of 1,480,417,000 bushels.

The following Tables "D," "E," and "F" give the monthly exports of these five countries for 1915-16, 1916-17, and nine months of 1917-18 to date.

TABLE D.

WHEAT EXPORTS OF CANADA AND UNITED STATES FOR THE GRAIN YEARS 1915-16, 1916-17 AND 1917-18 TO DATE (INCLUDING WHEAT FLOUR EXPRESSED AS WHEAT).

1915-16	CANADA	UNITED STATES
August	3,149,532	20,258,000
September	7,629,162	25,864,000
October	35,144,450	23,590,000
November	47,045,176	19,143,000
December	42,524,051	20,250,000
January	8,245,626	20,743,000
February	8,309,850	20,992,000
March	10,072,595	23,964,000
April	16,216,850	22,323,000
May	34,101,415	20,503,000
June	28,049,379	12,113,000
July	28,669,653	10,422,000
Total for 1915-16	269,157,739	240,165,000
1916-17.		
August	23,127,830	15,316,000
September	12,802,841	17,987,000
October	16,618,305	15,722,000
November	18,263,408	18,916,000
December	22,383,800	18,608,000
January	10,000,587	24,003,000
February	4,231,090	13,560,000
March	8,594,437	12,419,000
April	4,544,841	18,505,000
May	23,647,730	16,368,000
June	19,946,412	20,943,000
July	10,403,967	8,422,000
Total for 1916-17	174,565,248	200,769,000
1917-18		
August	18,697,663	9,739,000
September	6,154,422	7,182,000
October	17,174,094	11,483,000
November	29,191,024	10,614,000
December	33,755,806	15,315,000
January	8,491,833	12,432,000
February	9,574,045	10,502,000
March	13,500,367	12,207,000
April	11,073,961	12,364,000

TABLE E.

EXPORTS OF WHEAT FROM INDIA, AUSTRALIA AND ARGENTINA, 1915-16 TO 1917-18.

Months.	India	Australia	Argentina
	Bushels	Bushels	Bushels
Total for 1915-16	6,981,000	36,744,000	62,464,000
Total for 1916-17	52,504,000	70,632,000	55,376,000
1917-18.			
August	3,004,000	8,164,000	720,000
September	1,724,000	4,236,000	1,600,000
October	860,000	3,080,000	928,000
November	600,000	1,852,000	2,048,000
December	1,020,000	2,532,000	1,856,000
January	612,000	2,260,000	2,904,000
February	688,000	2,004,000	3,080,000
March	1,224,000	3,000,000	8,160,000
April	840,000	2,144,000	13,992,000
Total for 9 months	10,572,000	29,272,000	35,288,000

TABLE F.

RECAPITULATION OF TABLES "D" AND "E"

Countries.	1915–16	1916–17	9 months, Aug. 1, 1917, to April 30, 1918
	Bushels	Bushels	Bushels
Canada	269,157,739	174,565,248	147,613,215
United States	240,165,000	200,769,000	101,838,000
India	6,981,000	52,504,000	10,572,000
Australia	36,744,000	70,632,000	29,272,000
Argentina	62,464,000	55,376,000	35,288,000
	615,511,739	553,846,248	324,583,215

The exports for the nine months of the current year, amounting to only 324,583,000 bushels, are not up to requirements nor, except on this continent, up to expectations. If they were to continue at the same average annual rate they would barely reach 434,000,000 bushels against estimated world requirements of 595,000,000, comprising allied requirements of 497,000,000. There has been a notable falling-off for India and Australia, but it is encouraging to note that the figures for Argentina have steadily risen, and it is to be presumed that the bulk of the 93,000,000 bushels contracted for by the British Government will be shipped by August 1st, and this would involve the further shipment of probably some 65,000,000 bushels. It is quite problematical what India and Australia can do. For Canada and the United States, the earlier expectations of many who have publicly expressed opinions have been much exceeded, and instead of a United States export of only 50,000,000 to 80,000,000 bushels, and Canadian exports of some 100,000,000 bushels, the figures will probably reach 151,000,000 and 185,000,000 bushels respectively as the following table shows: (a)

	Canada	United States
	Bushels	Bushels
Production for 1917	234,000,000	651,000,000
Carry-over August 1st, 1917	26,000,000	22,000,000
Total supply of wheat	260,000,000	673,000,000
Food for 12 months and seed (estimated)	70,000,000	512,000,000
Total remaining	190,000,000	161,000,000
Exports for 9 months to May 1st	147,000,000	101,000,000
Balance for export and carry-over (estimated)	43,000,000	60,000,000

(a) Our forecasts in the GAZETTES of September, 1917, and of January, 1918, were for an export of 140,000,000 from the United States and 185,000,000 from Canada.

UNITED STATES MAY CROP REPORT

Estimates for the winter wheat crop for 1917-18 are made by the U.S. Department of Agriculture at 572,539,000 bushels, based on conditions prevailing May 1st. The estimate as of April 1st, 1918, was 560,000,000, but the favourable weather prevailing throughout the greater part of April was very beneficial. Last year the crop amounted to 418,070,000 bushels, and the largest crop ever grown was that of 1914, when 684,990,000 bushels were harvested.

Production of 82,629,000 bushels of rye is forecast from May 1st condition, compared with a forecast of 86,000,000 bushels based on the April 1st condition, 60,145,000 bushels produced last year, and 47,383,000 bushels in 1916.

Production of hay will be 107,550,000 tons, based on a condition of 89.6 per cent. of normal and an expected acreage of 69,531,000 acres, of which 53,605,000 is tame and 15,926,000 wild.

Stocks of hay on farms May 1st, are estimated at 11,096,000 tons. Average condition of pastures was 83.1 per cent. of a normal, spring ploughing was 77.5 per cent completed, and spring planting 60.8 per cent.

WHEAT FED TO LIVE STOCK IN THE UNITED STATES

(In the U. S. Monthly Crop Report, March, 1918)

A special telegraphic inquiry was made under date of March 2nd to the field agents of the Bureau of Crop Estimates in the fifteen leading wheat producing States concerning the amount of the 1917 wheat crop fed to live stock.

The responses show that the amount of wheat fed to live stock is less than in former years, except in a few States or sections where there was difficulty in obtaining other feed stuffs.

The highest figure reported, 7 per cent. was from Montana, where in some sections feeding of wheat was necessary to prevent live stock from starving. In Oregon, 6 per cent. was fed. These two States together account for 2,000,000 bushels thus fed. Washington reports 4.5 per cent., being 1,500,000 bushels, against 2,300,000 usually fed. Moderately heavy feeding in western and west central Texas and Oklahoma in sections where other crops were almost a total failure, in order to save live stock, has required about 800,000 bushels in the former State and 900,000 in the latter, being 5 per cent. and 2½ per cent. of the total crops of those States. Something over 1,000,000 bushels has been fed in North Dakota, about 2 per cent. of the crop. Ohio has fed less than a million bushels, and less than 2 per cent. of its crop. Pennsylvania reports almost 1,500,000 bushels, or about 6 per cent, of the crop.

The remaining States report very small quantities of wheat being fed. It appears that the total quantity of wheat fed to live stock will not exceed 2 per cent., and that the sound wheat fed is probably within 1 per cent. of the crop. A large part of the wheat fed is inferior or musty grain unfit for milling. A considerable amount of it represents the screenings from seed wheat. In Ohio, it is reported that 49 per cent. of the wheat fed was of grade 1 and 2, 15 per cent. of grade 3, and 36 per cent of grade 4, screenings and spoiled wheat. Sixty-four per cent. of that was fed to poultry, 26 per cent. to hogs, and 10 per cent. to other animals.

Except in some of the western States named, the principal consumption of wheat fed has been by poultry.

FOOD SURVEYS BY THE U. S. DEPARTMENT OF AGRICULTURE

The first number of "Food Surveys," a new monthly published by the Bureau of Markets of the United States Department of Agriculture, has just been issued. It contains an announcement of the Act of Congress dated August 10, 1917, authorizing the Secretary of Agriculture "to investigate and ascertain the demand for, the supply, consumption, costs, and prices of, and the basic facts relating to the ownership, production, transportation, manufacture, storage, and distribution of foods, food material, feeds, seeds, fertilizers, agricultural implements and machinery, and any article required in connection with the production distribution, or utilization of food."

The first issue of "Food Surveys" contains information regarding the stocks of wheat and wheat flour, other important cereals, and wheat flour substitutes, reported by elevators and grain warehouses, general warehouses, grain mills, and wholesale grain dealers. The tables submited include total stocks reported for April 1, 1918, and April 1, 1917. A similar report will appear in each monthly issue. A series of special issues will appear shortly giving the final results of a comprehensive survey of the commercial stocks of different products on December 31, 1917

According to the first issue of "Food Surveys," 7,518 firms, including elevators and grain warehouses, general warehouses, grain mills and wholesale grain dealers, have sent in reports. The stocks of wheat held by these firms on April 1, 1918, amounted to 26,393,909 bushels, com-

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DEPARTMENT OF AGRICULTURE

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CONTENTS.

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CANADA'S EFFORTS TOWARDS INCREASED PRODUCTION

THE war has made many unusual demands on the people of the countries fighting for the ecomonic, political, and social freedom of the world. Self-preservation, always an impelling force, at the very beginning of the conflict asserted its claims to special effort. Before the end of 1914, the first drive in Canada for production was under way.

To the credit of the late Dr. C. C. James, then federal Commissioner of Agriculture, must be attributed the "Patriotism and Production" appeal that followed, and this was the doctrine he preached—"The man who feels when he is holding the plough and sowing the seed and reaping his wheat, that he is doing it, not merely for himself, but also for his brother Canadian who is risking life in the trenches, or in the bayonet charge, will do it with lighter heart."

In response to the Dominion-wide effort of the federal and provincial Governments that was then made, Canada was blessed with the richest harvest yet reaped. The "Production and Thrift" campaign, on which nature did not smile so favourably, followed in 1916.

Although in this country practically none go hungry, the world's need increases and we maintain our efforts. Through the experience of three annual campaigns, the forces have become better organized, and we hopefully look for another "Year of Plenty", as 1915 was rightly termed. A favourable seeding is being succeeded by an almost ideal growing season for the largest cereal acreage in our history, the increase in which is shown in the following table:

	1917 acres	1918 acres	Increase acres
Wheat	14,755,850	16,080,800	1,324,950
Rye	211,880	234,530	22,650
Barley	2,392,200	2,395,800	3,600
Oats	13,313,400	13,739,000	425,600

A similar result has been obtained in the Mother Country, where a stage of self support is being reached. For forty weeks out of the fifty-two, the entire population could be fed on the anticipated harvest of the United Kingdom this year. That Canada will make up their needs, and also help succour the armies of the Allies, is indicated by the efforts towards greater production put forth this year by the provinces, assisted by federal aid, as concisely recorded in Part II of this number of THE AGRICULTURAL GAZETTE.

FEDERAL AGRICULTURAL LEGISLATION

SUMMARY OF MEASURES PASSED AT THE RECENT SESSION OF PARLIAMENT

AT the first session of the thirteenth Parliament of Canada which closed on May 24th, 1918, several bills were passed directly relating to agriculture. These included the following:—

"An Act to Amend the Animal Contagious Diseases Act."

"An Act to Amend the Meat and Canned Foods Act."

"An Act to Amend the Inspection and Sale Act (Fruit, Fruit Marks and Potatoes.)"

CONTAGIOUS DISEASES ACT

The Act to Amend the Animals Contagious Diseases Act changes the Act as it originally existed only as regards Sub-section I of Section 6, provision being made that instead of $60 for each head of grade cattle paid to the owners of animals slaughtered under the conditions of the Act, $80 shall be paid, and $20 instead of $15 for each pig or sheep. For pure-bred animals $250 is to be paid for each head of cattle, instead of $150, and $75 for each pig or sheep, instead of $50, as formerly. The compensation for horses slain under the Act remains as before, namely $200 for each grade horse and $500 for each pure-bred horse. The amendment is only to remain in operation for three years from its adoption.

THE MEAT AND CANNED FOODS ACT

The Act to Amend the Meat and Canned Foods Act of 1907 adds to Paragraph (b) of Section 2, defining the meaning of "establishment" as used in the Act the words "or any food or food product which may be named by the Governor-in-Council." Paragraph (b) now reads:

"establishment" means any abattoir, packing house, or other premises in which such animals are slaughtered, or in which any parts thereof or products thereof, or fish, or fruit, or vegetables, or any food or food product which may be named by the Governor in Council, are prepared for food for export or are stored for export.

Section 13 of the Act of 1907 is amended by adding to the words "all fish, fruit, or vegetables," the words "or products thereof, or any food, or food products, which may be named by the Governor in Council under the provisions of Section 16 (a) of this Act". The section goes on to say that in any establishment where these articles are prepared for export they shall be sound, wholesome, and fit for food. Any articles not so found are to be confiscated and destroyed in such manner as may be provided by the regulations.

EXPORTS AND IMPORTS OF INSPECTED ARTICLES

Sections 16 and 17 of the Act of 1907, and as subsequently amended in 1908 and 1910, are repealed and the following inserted in lieu thereof:—

16. No person shall offer or accept for export or import, or shall export or import, any articles subject to inspection under this Act, unless the requirements regarding inspection and marking have been complied with in respect to such articles. Every person offering any carcass, or portion or product thereof, or fruit or vegetable, or products thereof, or food or food products named by the Governor in Council under the provisions of section sixteen (a) of this Act, for export or import, or exporting or importing such carcass, portion or product, or any fruit or vegetable, or products thereof, or food or food products named by the Governor in Council

as aforesaid, shall furnish such proof as is required by the regulations as to whether the articles so offered for export or import, or exported or imported, are subject to inspection or not.

PROOF OF INSPECTION REQUIRED

16a. (1) No carcass or portion or product thereof intended for food shall be imported into Canada unless proof satisfactory to the Minister accompany it that the same has passed Government inspection in the country of origin, and any such carcass, or portion or product thereof, imported into Canada shall be subject to such further inspection, and shall conform to such requirements as the Governor in Council may by regulation prescribe.

(2) No fruit or vegetables or products thereof, or food or food products, which may be named by the Governor in Council shall be imported into Canada or exported from Canada unless the same conform to such requirements as the Governor in Council may by regulation prescribe.

(3) Any carcass, or portion or product thereof, or fruit or vegetable, or product thereof, or food or food product, that does not conform to the requirements of such regulations shall, upon condemnation by any inspector, be forfeit to His Majesty, and may be disposed of as the Minister may direct.

FRAUDULENT LABELLING

17. (1) No article subject to inspection under this Act shall be offered or sold for export or import, or exported or imported, under any name intended or calculated to deceive as to its true nature.

(2) No package containing any article subject to inspection under this Act shall be marked with any label, brand or mark which falsely represents the quantity or weight or contents of such package.

(3) No package containing any article subject to inspection under this Act shall be marked with any label, brand or mark which falsely represents the date when the articles or goods contained therein were packed.

While section 16 is rearranged and added to in several particulars, section 17 is the same as in the original bill except that in sub-section 1 "or import" is added after "export" in the second line and "or imported or exported" in the third line and in sub-section three the word "packed" is substituted for "marked" as it appears in the Act of 1907.

INSPECTION AND SALE ACT

The Act to Amend the Inspection and Sale Act, relative to Fruit, Fruit Marks and Potatoes, based largely as regards fruit and fruit marks, on recommendations made by a convention of fruit growers and dealers held in Ottawa in March, repeals sections 319, 320, 320 A, 321, 322, 328, 329, and 332 of the Act as adopted in 1906. Sections 325 and 326 of the same Act are also repealed and cease to have any effect on and after the first day of June, 1919.

RELATIVE TO FRUIT AND FRUIT MARKS

The following are the amendments to the sections at first referred to that appear in the bill of this year, numbered 108, and introduced by the Minister of Agriculture on May 18th:

319 (c) "Culls" means fruit that is either very small for the variety, is seriously deformed, or has 15 per cent or more of its surface affected by any of or by the combined injuries caused by apple scab (venturia pomi), insects, cuts, bruises or other causes, or the flesh of which is not in an edible condition, or the skin of which is broken so as to expose the tissue beneath.

319 (d) "Immature fruit" means fruit not ripe enough for dessert purposes and which will not attain such condition after being picked from the tree, bush, plant or vine.

320 (5) Every person who, by himself or through the agency of another person, packs immature peaches, plums, pears, prunes or grapes, intended for sale, shall cause such package to be marked, in a plain and indelible manner, in letters not less than three-quarters of an inch in length, with the words "Immature fruit," before it is taken from the premises where it is packed.

321 (3) No person shall sell, or offer, expose or have in possession for sale, any fruit packed in a closed package, upon which package is marked 'No 2' unless such fruit includes no culls and consists of specimens of not less than nearly medium size and some colour for the variety, sound, and not less than eighty-five per cent free from scab, worm holes, bruises and other defects, and properly packed.

(4) No person shall sell, or offer, expose or have in his possession for sale, any fruit packed in a closed package, upon which package is marked 'Domestic' unless

such fruit includes no culls and consists of fruit of not less than medium size for the variety, sound, and not less than eighty per cent free from worm holes (but may be slightly affected with scab and other minor defects), and properly packed.

(5) No person shall sell, or offer, expose or have in his possession for sale, any fruit packed in a closed package, upon which package is marked 'No. 3', unless such fruit includes no culls and is properly packed.

(6) No person shall sell, or offer, expose or have in his possession for sale, any fruit packed in any package in which the faced or shown surface gives a false representation of the contents of such package; and it shall be considered a false representation when more than ten per cent of such fruit is smaller in size than or inferior in grade to, or different in variety from, the faced or shown surface of such package.

(7) No person shall sell, or offer, expose or have in his possession for sale, any fruit in any package that is so diseased, wormy or otherwise depreciated as to render it unfit for consumption.

(8) No person shall sell, or offer, expose or have in his possession for sale, at original point of shipment, any fruit in any package unless such package is well and properly filled.

(9) No person shall sell, or offer, expose or have in his possession for sale, any fruit in any package that has been repacked, unless such package is well and properly filled.

NOTE—The definition of the Fancy Grade has been eliminated from the Act; the No. 1 Grade remains as previously defined.

DIMENSIONS OF APPLE BARRELS AND BOXES

Sections 325 and 326, which stand as they are until the first of June next year, are substituted in the amended Act by sections defining the dimensions of apple barrels, peach boxes, pear boxes, prune boxes, berry hallocks, crates, cherry lugs, eleven and six quart baskets and standard bushel baskets. The United States standard apple barrel is adopted for Canada, the dimensions being 17⅛ diameter, 28½″ stave, 26″ distance between heads, 64″ circumference at bulge, outside measurements, and 7,056 cubic inches content. When apples are sold in boxes the inside dimensions are required to be:—length 18″, width 11½″, depth 10½″, representing as nearly as possible 2,174 cubic inches. When apples are packed in boxes or barrels in trays or fillers the provisions of this section do not apply. All apples packed in Canada for sale in Canada must be packed in good strong crates of seasoned wood, the inside dimensions being, length 18″, width 11½″, depth 10½″, with slats at least ¾ of an inch apart. Pears or crab-apples must be packed in boxes of good and strong, seasoned wood, 18″ in length, 11½″ in width and 8½″ in depth, representing as nearly as possible 1,760 cubic inches. Peaches packed in Canada for sale in Canada by the box must be packed in boxes 18″ long, 11½″ wide and either 4½″, 4″ or 3½″ in depth. Plums or prunes must be packed in boxes 18″ long, 11½″ wide, and 3½″ deep. Cherries must be packed in similar boxes as to length, but 14″ wide and 5½″ deep. Baskets for fruit are required to be 7½″ by 7½″ at top, 6½″ by 6½″ at the bottom, 3¾″ deep measured perpendicularly. Crates are required to be 15¾″ by 15¾″ by 4¼″.

Section 326 deals with berries and currants and gives the dimensions of the boxes and baskets that shall be used and enacts, acting on the recommendation of the afore-mentioned conference, that three sizes of berry hallocks shall be legal in Canada, namely, the standard 4/5 quart, the standard 2/5 quart and the mperial pint, measuring 4⅜″ by 4⅜″ at top and bottom, and 1⅞″ deep. The Act provides that the Minister may make regulations allowing any person or persons to use baskets of other sizes than those which are specified in the Act.

POTATO GRADES

By an addition of section 337, provision is made regarding potato grades as follows:

(a) Number 1 quality unless such potatoes consist of specimens which are sound, of similar varietal characteristics, which are practically free from dirt, or other foreign matter, frost injury, sunburn,

second growth, cuts, scab, blight, dry, rot and damage caused by disease, insects, or mechanical means. The minimum diameter of potatoes of the round varieties shall be one and seven-eighths inches, and of potatoes of the long varieties one and three-fourths inches. In order to allow for variations incident to commercial grading and handling, five per centum by weight of any lot may be under the prescribed size and, in addition, three per centum by weight of any such lot may be below the remaining requirements of this grade.

(b) Number 2 quality unless such potatoes consist of specimens which are sound and practically free from dirt or other foreign matter, frost injury, sunburn, second growth, cuts, scab, blight, dry rot, and damage caused by disease, insects, or mechanical means. The minimum diameter of potatoes of the round varieties shall be one and seven-eighths inches, and of potatoes of the long varieties one and three-fourths inches. In order to allow for variations incident to commercial grading and handling, five per centum by weight of any lot may be under the prescribed size and, in addition, three per centum by weight of any such lot may be below the remaining requirements of this grade.

(2) This section shall not apply to seed potatoes.

(3) 'Practically free', means that the appearance shall not be injured to an extent readily apparent upon casual examination, and that any damage from the causes aforesaid can be removed by the ordinary processes of paring without appreciable increase in waste over that which would occur if the potato were perfect. Loss of the outer skin (epidermis) only shall not be considered as an injury to the appearance.

"Diameter" means the greatest dimension at right angles to the longitudinal axis.

PENALTIES FOR VIOLATIONS

Persons violating any provisions of the Act are liable to a fine not exceeding $25, and not less than $10, for the first offence; to a fine not exceeding $50, and not less than $25, for the second offence, and, for a third and each subsequent offence, to a fine not exceeding $200, and not less than $50, together in every case with the costs of prosecution.

APPROPRIATIONS FOR AGRICULTURE

Following are the appropriations for agriculture for the fiscal years ending March 31, 1918 and 1919:—

	1918–19	1917–18
Experimental Farms—Maintenance of Central Farm, and establishing and maintaining of additional branch stations	$1,012,036.60	890,000.00
Brandon Manitoba Experimental Farm—To replace buildings destroyed by fire, including interest at 5% on amount due contractor—Further amount required	.....	14,900.00
Branch of Entomology	22,000.00	20,000.00
For the Administration and Enforcement of the Destructive Insect and Pest Act	134,400.00	85,000.00
For the development of the Dairying Industries, and the improvement of transportation, sale and trade in food and other agricultural products	155,000.00	155,000.00
Towards the Encouragement of Cold Storage Warehouses for the better preservation and handling of perishable food products	25,000.00	50,000.00
Fruit Branch	127,715.00	105,000.00
Health of Animals	415,000.00	517,000.00
For the Administration and Enforcement of the Meat and Canned Foods Act	379,000.00	325,000.00
Publications Branch	30,000.00	30,000.00
International Institute of Agriculture to assist in maintenance thereof and to provide for representation thereat	10,000.00	15,000.00
For the Development of the Live Stock Industry	600,000.00	700,000.00
To Enforce the Seed Act, to test seeds for farmers and seed merchants, to encourage the production and use of superior seeds and to encourage the production of farm and garden crops	165,000.00	150,000.00
For the Administration and carrying out of the provisions of The Agricultural Instruction Act	25,000.00	25,000.00
Total	$3,100,151.60	$3,081,900.00

UNDER "THE AGRICULTURAL INSTRUCTION ACT"

Ontario	$336,303.26	$336,303.26
Quebec	271,113.76	271.113,76
Nova Scotia	81,716.69	81,716.69
New Brunswick	64,110.80	64,110.80
Prince Edward Island	31,749.22	31,749.22
British Columbia	69,199.06	69,199.06
Manitoba	77,113.11	77,113.11
Saskatchewan	81,728.48	81,728.48
Alberta	66,965.62	66,965.62
Veterinary Colleges	20,000.00	20,000.00
Total	$1,100,000.00	$1.100,000,00

BY GOVERNOR-GENERAL'S WARRANT

The following sums were provided by Governor-General's warrant in the year 1917-1918 for the purposes indicated:

For the Purchase of Seed Peas and Beans	$500,000.00
For the Purchase of Feed Oats	500,000.00
For the Purchase of Seed and Feed Grain	1,000,000.00
For the Purchase of Screenings, Mill Feed, and Corn	300,000.00
For the Purchase of Oil Cake and other stock food	300,000.00
For he Purchase of Seed Grain and Field Oats	700,000.00
Total	$3,300,000.00

DESTRUCTIVE INSECT AND PEST ACT

HIS Excellency the Governor General in Council, on the recommendation of the Minister of Agriculture, has been pleased to order that the General Regulations under "The Destructive Insect and Pest Act," established by Order in Council of 17th July, 1917, and amendment thereto, be further amended by striking out paragraph "f" of Section 7 thereof, and substituting the following therefor:—

7. (f). All species and varieties of currants and gooseberries (Ribes and Grossularia): provided, however, that the importation of such currants and gooseberries shall be permitted from that portion of the United States of America west of the line of and including the States of Minnesota, Iowa, Missouri, Arkansas, and Louisiana, if accompanied by a certificate signed by the duly authorized state official that such currants and gooseberries have been grown within the state from which they are shipped and are free from insect pests and plant diseases.

Dated 6th day of June, 1918.

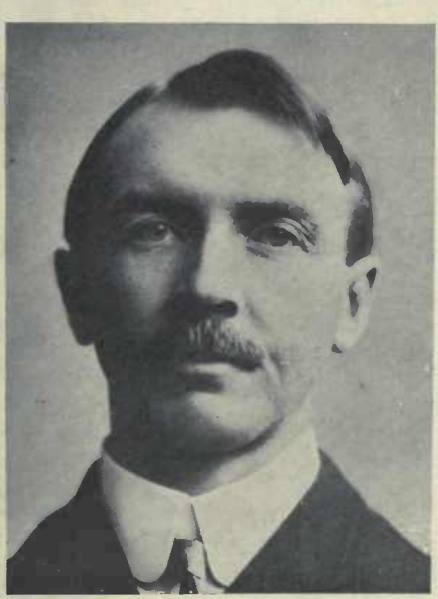
This amendment removes the total embargo on the importation into Canada of all species and varieties of currants and gooseberries, in force since July 17th, 1917, and permits the importation, after date of order, of this class of vegetation from the specified territories in the United States of America, providing a certificate accompanies all shipments. Importers should arrange with the exporter when ordering above plants to secure such certificate from the authorized officials, without which shipments will be returned to sender.

The embargo remains in force against said vegetation, as far as all other countries and other territories of the United States of America are concerned.

PART I
Dominion Department of Agriculture

ACTING DEPUTY MINISTER OF AGRICULTURE

MR. Joseph Hiram Grisdale, B.Agr., Director of the Dominion Experimental Farms system, has been appointed Acting Deputy Minister of Agriculture. Mr. Grisdale succeeds Mr. George F. O'Halloran, B.A., B.C.L., Deputy Minister of Agriculture and Deputy Commissioner of Patents. The change has come about as a result of removing from the Department of Agriculture the Patents and Copyrights Branches.



MR. J. H. GRISDALE, B.AGR.
Acting Deputy Minister of Agriculture and Director of Experimental Farms

Mr. Grisdale graduated from Albert College, Belleville, Ontario, and took part of the arts course of the University of Toronto; and he is a graduate of the Ontario Agricultural College and of the Iowa State College of Agriculture. He entered the Government service in 1899, when he was appointed Agriculturist of the Central Experimental Farm, which position he occupied until 1911, when he succeeded the late Dr. Wm. Saunders, who had been Director of the Experimental Farms from their organization.

THE LIVE STOCK BRANCH

THE CAR-LOT POLICY

BY DAN M. JOHNSON, MARKETS REPRESENTATIVE, UNION STOCK YARDS, ST. BONIFACE, MAN.

THE car-lot policy of the Live Stock Branch, naugurated in the fall of 1916 and described in Volume IV., page 25, of THE AGRICULTURAL GAZETTE, and also in Volume V., page 563, has been well maintained during the present year. Under this policy the reasonable travelling expenses of farmers were paid in going to the stock yards or other buying points in Western Canada to purchase breeding stock, or to stock yards to purchase cattle feeders, either for their own use or on co-operative order for their neighbours.

Below are given statements of shipments made under this policy for the months of January, February, March, April, and May of this year. Steers, heifers, hogs, sheep, and horses shipped back to the country during the five months referred to are included. The records show from which stock yard the shipments originated, and their destination by provinces. In reference to the shipments made from outside points, I would say that these consignments were purchased in country points and not in the stock yards, and also show their destination by provinces. No assistance has been given on purchases at points outside of stock yards since the 1st of May. The statements follow:—

SHIPMENTS MADE IN JANUARY

To	Manitoba				Saskatchewan			Alberta			Totals					Grand Totals
From	sts	hfs	hgs	shp	sts	hfs	shp	sts	hfs	hrs	sts	hfs	hgs	shp	hrs	
Winnipeg.....	70	44	111	—	261	262	—	—	55	—	331	361	111	—	—	803
Calgary.....	—	—	—	—	—	—	—	36	117	—	36	117	—	—	—	153
Edmonton....	—	—	—	—	30	41	—	365	889	—	395	930	—	—	—	1325
Outside Pts..	—	—	—	380	—	—	9	—	—	19	—	—	—	409	19	428
Totals...	70	44	111	380	291	303	9	401	1061	19	762	1408	111	409	19	2709

SHIPMENTS MADE IN FEBRUARY

To	Manitoba		Saskatchewan			Alberta			Totals			Grand Totals
From	sts	hfs	sts	hfs	shp	sts	hfs	shp	sts	hfs	shp	
Winnipeg....	92	108	367	346	—	82	91	—	541	545	—	1086
Calgary.....	—	—	—	—	68	20	501	—	20	501	68	589
Edmonton...	—	—	—	—	—	275	176	85	275	176	85	536
Outside Pts..	—	—	—	—	—	—	—	200	—	—	200	200
Total....	92	108	367	346	68	377	768	285	836	1222	353	2411

SHIPMENTS MADE IN MARCH

To	Manitoba			Saskatchewan		Alberta			Totals			Grand Totals
From	sts	hfs	shp	sts	hfs	sts	hfs	shp	sts	hfs	shp	
Winnipeg	172	119	—	397	302	115	152	—	684	573	—	1257
Calgary.....	—	—	—	—	—	40	90	—	40	90	—	130
Edmonton ...	—	—	—	54	—	305	453	35	359	453	35	847
Outside Pts..	—	—	1023	—	—	—	—	—	—	—	1023	1023
Totals...	172	119	1023	451	302	460	695	35	1083	1116	1058	3257

SHIPMENTS MADE IN APRIL

To	Manitoba			Saskatchewan				Alberta			Totals					Grand Totals
From	sts	hfs	hgs	sts	hfs	shp	hrs	sts	hfs	shp	sts	hfs	hgs	shp	hrs	
Winnipeg....	520	187	90	412	412	—	—	24	45	—	956	644	90	—	—	1690
Calgary.....	—	—	—	—	—	—	—	97	58	100	97	58	—	100	—	255
Edmonton...	—	—	—	—	—	—	—	338	374	—	338	374	—	—	—	712
Outside Pts..	13	20	—	—	—	100	12	58	23	—	71	43	—	100	12	226
Totals..	533	207	90	412	412	100	12	517	500	100	1462	1119	90	200	12	2883

SHIPMENTS MADE IN MAY

To	Manitoba		Saskatchewan		Alberta		Ontario		Totals		Grand Totals
From	sts	hfs	sts	hfs	sts	hfs	sts	hfs	sts	hfs	
Winnipeg.....	384	137	353	182	—	—	25	24	762	343	1105
Calgary.....	—	—	—	—	—	—	—	—	—	—	—
Edmonton.....	—	—	89	21	521	474	—	—	610	495	1105
Outside Pts.....	—	—	—	—	—	—	—	—	—	—	—
Totals.....	384	137	442	203	521	474	25	24	1372	838	2210

RE PURCHASE AND DISTRIBUTION OF FEEDS

BY R. J. ALLEN, IN CHARGE OF FEED DIVISION

IN order to assist the feeders of live stock throughout Canada in securing an adequate supply of feed stuffs, the Feed Division of the Live Stock Branch, Ottawa, has, during the past few months, been engaged with the importation, sale, and distribution of such commodities as corn and linseed oil cakes. In addition to this, a considerable quantity of recleaned elevator screenings has been taken over from the elevators at Fort William, Port Arthur, and points in Western Canada, and sold to Farmers' co-operative organizations and individuals, at $35 per ton, bulk, f.o.b. shipping point.

The Feed Division also purchased and distributed 127 carloads of bran and shorts, which had been previously sold for export, and by disposing of this material in Canada was able to help off-set to some extent the shortage of mill feeds in districts where the same were urgently required.

During the months of December, January, February, and March, transportation conditions were such as to make it difficult to distribute these feeds, but with the co-operation of the Railway Board good progress was made, and feed was rendered available at many points that were badly in need of the same at the time.

The method of sale and distribution may be briefly outlined as follows: The provincial Department of Agriculture have arranged to acquaint their feeders with the availability of any feeds that may be offered for sale by the Feed Division, and to accept orders for the same, which in turn are forwarded to this Division for attention. In doing this the provincial Departments have agreed to guarantee the Feed Division against any loss that might result in consequence of the material being refused on arrival, and it being necessary to re-ship to some other point, thus incurring additional expense in the way of demurrage, extra freight, etc. This arrangement is working out very satisfactorily.

The following table shows the number of cars of the different feeds handled to date:—

	Cars
Bran	86
Middlings	40
Feed Wheat	2
Screenings	159
Corn	111
Oilcake	168
Total	566

The money value of these feeds amounted to $1,067,853.68, which is made up as follows:—

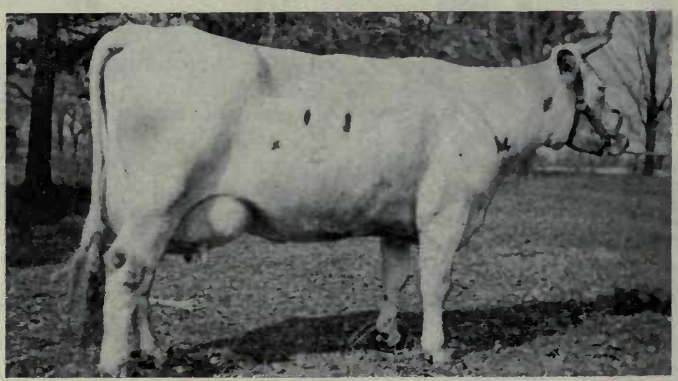
Commodity.	Value.
Bran and middlings	126,875.25
Linseed Oil Cake	539,523.14
Corn	251,364.48
Recleaned Screenings	150,090.81
Total	$1,067,853.68

RECORD OF PERFORMANCE TEST FOR PURE-BRED DAIRY CATTLE

BY C. S. WOOD, CHIEF INSPECTOR RECORD OF PERFORMANCE

OWING to the scarcity of help on the farms, there has been a slight falling off in the number of cows entered for the Record of Performance during the year 1917-18. Jersey and Shorthorn breeders, however have entered more cows than in any previous year.

Breeders of dairy cattle are now depending to a great extent on the information derived from the Record of Performance test to enable them to select stock which will improve their herds both in milk and butter fat production.

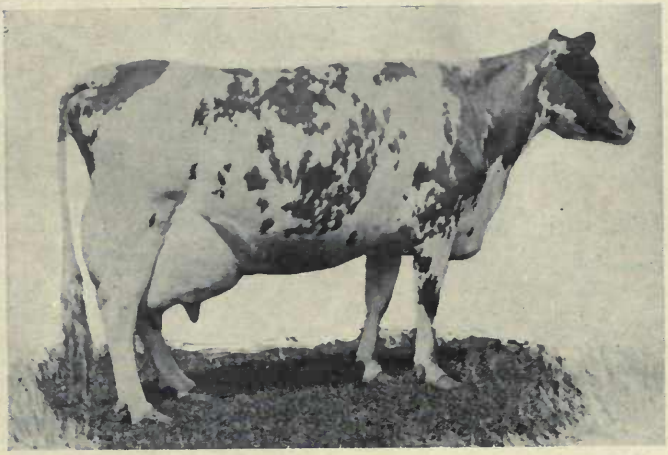


CALAMITY SNOW MECHTHILDE 2ND 26707

Holstein-Freisian cow owned by Walburn Rivers, Folder's, near Ingersoll, Ont. This cow is now under test in the 4-year-old class and has produced up to 108.2 lb. milk in one day.

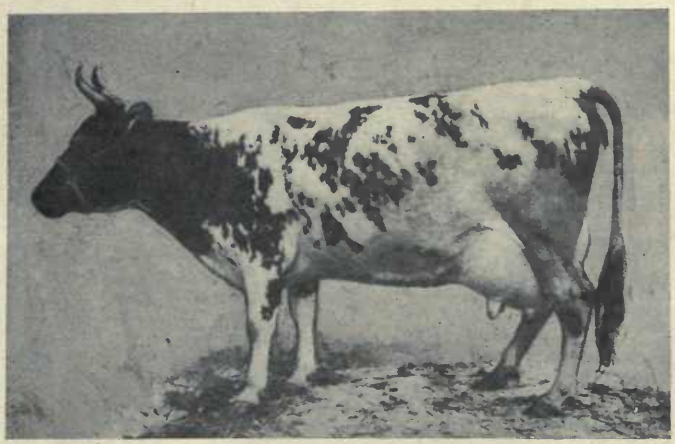
The following is a brief summary of the year's work:—

	No. of cows entered for the test	No. of cows qualified	Number of cows which produced enough milk and fat to qualify, but failed to calve within fifteen months after commencement of test.
Ayrshire	614	172	33
French-Canadian	21	14	3
Guernsey	19	4	—
Holstein	540	177	56
Jersey	246	68	7
Shorthorn	153	51	15
Totals	1593	488	114



GRANDVIEW ROSE 37030

Ayrshire cow owned by Shannon Bros., Cloverdale, B.C. This cow in the mature class produced milk, 21,423 lb.; fat, 890 lb., but, owing to calving eight days over the fifteen months after the test commenced, failed to qualify for a Record of Performance certificate.



DAIRYMAID 2ND 35126

Ayrshire cow owned by T. C. Treverton, Latta, Ont. This cow produced milk, 15,365 lb.; fat, 617 lb., and was awarded the silver cup presented by the Canadian Ayrshire Breeders' Association, for the highest record made by an Ayrshire cow in the mature class of the Record of Performance during the year 1917.

Following are given the names, records, and owners of highest butter fat, producing cows in each class for the various breeds since the inception of the test:—

Class	Name	Reg. No.	Lb. Milk.	Lb. Fat	Owner
Ayrshire—					
Mature.	Lady Jane	30886	19405	786	A. S. Turner & Son, Ryckman's Corners, Ont
4 yr.	Milkmaid of Orkney	39834	14872	596	Harmon MacPherson, Orkney, Ont.
3 yr.	Scotch Thistle	41685	14907	631	A. S. Turner & Son, Ryckman's Corners, Ont.
2 yr.	Springbank White Rose	44100	12209	546	A. S. Turner & Son, Ryckman's Corners, Ont.
French Canadian—					
Mature.	Aromaz	1597	13219	631	Director, Experimental Farms, Ottawa.
4 yr.	Pauline 3rd	2482	10210	484	Paul Sylvestre, St. Simon, Que.
3 yr.	Labelle 2nd	2865	7916	406	Director, Experimental Farms, Ottawa.
2 yr.	Bruna Reine	3228	7484	337	Paul Sylvestre, St. Simon, Que.
Guernsey—					
Mature.	Trislette of Whitewater	392	15502	631	Chas. Hawthorne, Chilliwack, B.C.
4 yr.	Western Queen	834	12132	661	Banford Bros., Chilliwack, B.C.
3 yr.	Western Queen	834	10153	576	Banford Bros., Chilliwack, B.C.
2 yr.	Gladys of Willow	654	10234	544	W. M. Banford, Chilliwack, B.C.
Holstein—					
Mature.	Posch Queen Wayne	12190	25085	897	John Russell, Alix, Alta.
4 yr.	Plus Pontiac Artis	16792	20911	816	S. Lemon, Lynden, Ont.
3 yr.	Calamity Snow Mechthilde 2nd	26707	23274	843	Walburn Rivers, Folden's, near Ingersoll, Ont.
2 yr.	Duchess Wayne Calamity 2nd	15514	16714	677	Walburn Rivers, Folden's, near Ingersoll; Ont.
Jersey—					
Mature.	Sunbeam of Edgeley	629	18744	926	James Bagg & Sons, Edgeley, Ont.
4 yr.	Beauty Maid	2019	14852	872	D. A. Boyle, Woodstock, Ont.
3 yr.	Lass of Meadowview	6337	10260	634	Edwards & Alexander, Hillhurst, Que.
2 yr.	Dorothy of Avelreagh	6115	11882	666	E. H. Barton, Chilliwack, B.C.
Shorthorn—					
Mature.	Coquette 2nd	107052	17723	636	Ed. Knight, Vanessa, Ont.
4 yr.	Daisy Lodge	109482	11638	480	Miss Charlotte Smith, Clandeboye, Ont.
3 yr.	Buttercup	111906	12691	482	Geo. W. Carter, Ilderton, Ont.
2 yr.	Jean Lassie	104803	8939	371	S. A. Moore, Caledonia, Ont.

THE HEALTH OF ANIMALS BRANCH

THE BIOLOGICAL LABORATORY

BY S. HADWEN, D.V.S., DOMINION PATHOLOGIST

THE Biological Laboratory is under the direction of Dr. F. Torrance, Veterinary Director General, and is under the immediate supervision of Dr. S. Hadwen, Dominion Pathologist, and his coworkers, Drs. A. B. Wickware, J. C. Reid, J. A. Allen, and Lt.-Col. T. C. Evans, who is at present overseas in the service of the Canadian Army Veterinary Corps.

The laboratory was instituted in 1902, and was primarily intended for the manufacture of biological products such as mallein and tuberculin and the various vaccines. Under the former pathologist, Dr. Chas. H. Higgins, the activities of the staff were mainly directed towards that end, though for the past two years Dr. Wickware conducted investigations on the diseases of poultry, and Dr. Reid has made some studies of contagious abortion in cattle.

The laboratory has always been largely self-supporting. The attached chart shows the output of products for the past year. After deducting the salaries of the staff, consisting of four veterinarians, two laboratory helpers, a caretaker and a stenographer, besides paying for the many instruments, chemicals, etc., used at the laboratory, it was found that the institution had been run at a cost of $1,760 over the revenue it receives from its products. This figure may be misleading in a sense, as it includes the cost of the preparation of 20,350 doses of mallein; 28,276 doses of tuberculin, and several hundred doses of abortion vaccine, which are not charged for, the Government obtaining them free of cost. If these latter products were included at current market prices, the profits would be quite large.

Besides the manufacture of biological products, the staff renders aid to the Field Veterinary Division, the Meat and Canned Foods Division, and to farmer sat large, in examining and reporting on specimens which are sent in for diagnosis. Many obscure diseases are encountered which have to be examined by bacteriological methods, and the records of the laboratory show that during the year some eight hundred specimens were examined and reported upon. These specimens range from the determination of minute parasites, such as mites and ticks, to the diagnosis of diseases in fur-bearing animals Occasionally, laboratory aid is sought by the veterinary field officer in the determination of obscure maladies in the field. In these cases one of the members of the staff visits the affected herds and makes an investigation on the spot. It is considered that the first and foremost function of the laboratory is to aid veterinarians in the diagnosis and in the study of animal diseases, and, consequently, the publications of the Biological Laboratory, and also of the outside laboratories at Lethbridge and Agassiz, are nearly all of a technical nature. There are, however, a few publications which have been issued in the form of bulletins which are available to the farmer, but a large number of the studies on diseases which have been published are to be found in the various scientific journals.

BIOLOGICAL PRODUCTS DISBURSED AT THE BIOLOGICAL LABORATORY DURING THE YEAR 1917-18

	Mallein	Tuber-culin	Tuber-culin Special	Single Blackeg Vaccine	Double Blackleg Vaccine	Anthrax Vaccine	Stran-gles Vaccine
April	2,025	2,400	.....	49,570	500	32	.....
May	.....	2,000	.....	21,890	660	20*	100
June	2,025	2,260	200	17,000	272	190	50
July	.....	.....	.....	29,350	.....	.....	160
August	4,000	2,040	.....	9,100	.....	.....	.....
September	6,000	2,000	.....	1,900	.....	.....	.....
October	.....	5,000	.....	33,100	.....	.....	.....
November	2,000	3,520	.....	27,300	640	105	100
December	.....	1,500	.....	8,900	.....	.....	113
January	.....	2,900	.....	8,950	.....	.....	375
February	2,300	2,256	.....	2,300	.....	.....	50
March	2,000	2,200	.....	40,550	1,008	.....	100
	20,350	28,076	200	249,910	3,080	347	1,048

* "First" Anthrax Vaccine only.

THE DAIRY AND COLD STORAGE BRANCH

CARGO INSPECTION AT BRITISH PORTS

THERE are inspectors representing Canada at the four principal ports in Great Britain, viz., London, Liverpool, Bristol, and Glasgow, whose duty it is to inspect cargoes on their arrival from Canada, and to report on their condition, etc., with advice as to methods that might be adopted in future shipments. They are connected with the Extension of Markets Division of the Dairy and Cold Storage Branch, and naturally come into knowlegde of matters of vital interest to the Canadian trade in dairy products. At the present juncture these reports are of special interest.

CHEESE AT PORT OF LONDON

The inspector at London, in his report for the year ending March 31, 1917, states that except for about half a dozen shipments at the beginning of the season, the bulk of the cheese arriving was hooped with two bands of thin flat iron of about three-quarters of an inch in width. This method has superseded the expensive and heavy square box in which cheese was formerly packed, and it enables the round boxes to be landed in better and sounder condition. In the main, the inspector goes on to say, the shipments of heated cheese were more frequent than in previous years, and some of those arriving during August and September were in a very bad way. The shortage of shipping and the fact that few ships arrived that were fitted with cold or cooled air chambers, lowered the percentage of cheese arriving in good condition. A new kind of fibre box was tried, but it was not always successful, there being a lack of stiffness in the material, and, the boxes not being proof against moisture, the result was the badly heating of the contents.

CHEESE AT LIVERPOOL

The inspector at Liverpool has formed a rather different opinion of the fibre boxes to that conveyed by his confrere in London. He says that these boxes in warm weather, at any rate, keep the cheese in as good condition as the wooden box, but he

agrees that when they are stowed under a great weight as is frequently the case, in the lower hold of a ship, they collapse. He approves of banding, but fears that the expense of the system would be too great for general adoption.

GOOD REPORTS FROM BRISTOL

The inspector at Bristol announces the arrival in good condition of 280,000 boxes from the opening of the Montreal season until the date of his report. There were no large quantities of heated cheese during the hot season, and no complaints were received from the trade in general. He notes the reception of a shipment of boxes which were bound round crosswise with a thin one-half inch iron band, and says, further, that this system was an undoubted success. He also states that the stave type of box proved successful, and was an improvement on the ordinary type. He has a good word to say for the fibre boxes, stating that a number of people who saw them at the dock expressed the opinion that they were very successful as carrying packages, the chief difficulty being with the corners, which, if the band gets torn off, immediately flatten out and go amissing. The body of the box is likely to be cut down by the hooks the men use, and if the box does not properly fit the cheese it is liable to get crushed or chafed. On the other hand, it does not split readily, or, with other slight injuries, present such a wrecked appearance as the ordinary type.

BUTTER SHIPMENTS

The shipments of butter were reported as very small. The inspector at Liverpool states that the packages continue to be very frail, and to take a deal of watching to prevent damage. The inspector at Bristol states that all of the 1,400 packages received arrived in good condition. He reports the supply from Denmark and Holland as very light. Denmark, he says, has large stores, but, owing to the high values ruling, the authorities were not purchasing. New Zealand and Australian stocks had been purchased and awaited shipment.

BACON IN HALF AND FULL SIZE CASES

Relative to shipments of bacon, the inspector at the port of London remarks that for a short period, a small percentage of the cases arriving were about one-half the size of the usual large packages of a dozen sides. These small ones contained from three to six sides, and, as a result, the breakage of cases was considerably reduced, although the shipments were never quite free from damaged boxes. He thought that so long as the contents are as heavy as they usually are, and so long as the present thickness and condition of timber are used in making these cases, so long will the number of boxes broken be large. The inspector at Liverpool reports a larger number of frail cases than usual, owing to the use of perished timber. The loose packing of long sides also increased the chances of breaking in discharging. In spite of this, however, he records the fact that Canadian produce is landed in a far better condition than similar produce from other places, with the exception of New Zealand cheese. The half case, weighing about 350 lb. gross, is strong and eminently suitable as far as immunity from breakage is concerned, but the bacon does not keep as well as in the large case, and the cost is more.

The inspector at Bristol reports a big increase in the bacon shipments and that the condition has been good. He also says that the half-size box was the most satisfactory, the breakages being few. He complains of the large cases being insecurely fastened, while the wood was of poor quality.

The inspector at Liverpool notes that the hog-casing business, which, before the war, was almost a mon-

opoly in the hands of German merchants, has now been taken hold of by English traders.

DECREASE IN EGG RECEIPTS

All three inspectors (at London, Liverpool, and Bristol), report a decrease in the arrival of eggs, but affirm that the condition in which they had come to hand left little room for complaint so far as breakages were concerned. The inspector at London says the packages are of a convenient size, that the boxes receive the care and attention which the fragile nature of the contents warrants, and that arrangements have been made to carry the eggs in the forepart of the ship and at as low a temperature as possible without forced ventilation or cooled air departments. The inspector at Liverpool places particular stress upon the importance of properly branding shipments. He instances a couple of cases in regard to altered brands where he found it necessary to threaten prosecution. The inspector at Bristol records the arrival of 20,000 cases in good condition and carefully packed.

REFRIGERATOR SHIPMENTS

The inspectors at London and Bristol report the arrival of consignments of frozen fish, and quarters of beef and carcasses of pigs, carried in refrigerator or cooled-air chambers, in clean, hard condition. The inspector at Bristol makes special mention of the placing of a number of thermographs on board different steamers by the Department's inspectors in Montreal, which have shown good results, the temperatures in the refrigerator chambers having been well maintained.

THE ENTOMOLOGICAL BRANCH

THE CONTROL OF INSECTS IN SHIPS BY STEAM

BY R. C. TREHERNE, FIELD OFFICER

ONE of the problems confronting quarantine officers on the British Columbia coast is that relating to the proper disposal and handling of ships' cargoes containing food products infested with insects.

The rules and regulations of the Board of Horticulture of the province of British Columbia demand that all cargoes of corn, beans, rice and other stored products found infested, shall be fumigated under the direction of an inspector. This work is accomplished at special sheds erected for this purpose. Discretion is allowed the inspector to treat any infestation in any manner deemed suitable and advisable.

An instance, however, occurred a short while ago where it was found that after the cargo had been removed for fumigation, the hold was left infested with insects to such a degree that it was considered impossible to reload with other grain produce. A Japanese steamer, laden with Manchurian corn in 180 lb. sacks, arrived at Seattle, Wash., from the Orient. A portion of this cargo of corn, destined for Vancouver was loaded onto a small 4,000 ton steam coasting vessel, the "Matsqui" for conveyance to Vancouver. The cargo on arrival at Vancouver was found to be heavily infested with the Rice Weevil, *Calandra oryzae*. The sacks were accordingly unloaded directly onto flat cars and conveyed to the fumigating station. It appeared, however, that the captain of the "Matsqui" desired to reload with a cargo of shorts and flour consigned to another port within the province.

Examination of the hold of this vessel showed that enormous numbers

of the weevil still remained at large and were in a position to immediately infest the flour. The captain was advised, on the authorisation of Mr. W. H. Lyne, Provincial Inspector of Imported Fruit and Nursery Stock, that it would be impossible to reload his vessel while it was in such a condition. As a remedy superheating was advised on the grounds that the vessel was empty and had steam fittings. It would be a simple matter to disconnect one of the steam pipes passing through the hold, turn it inwards, and allow live steam to circulate throughout the hold which ran the full length of the vessel. The alternative scheme was fumigating with sulphur.

The captain decided to try the latter method. An all-night sulphur fumigation was then undertaken. Twenty pounds of sulphur were burned in an iron carrier, the size of the hold being 43 feet long, 18 feet wide and 8 feet deep.

The following morning on opening the hatches and after a period of time allowed for airing, examination of the hold revealed the fact that only a percentage of the weevils had been killed and that the hold was not yet sufficiently free from infestation to permit of reloading. It was then decided to apply heat. Arrangements were accordingly made to batten down the hold and disconnect one of the steam pipes. The hold was then subjected to a high pressure of steam and the upper deck was washed down with boiling water to destroy those weevils which were present on the outside. Steam was maintained for five hours during which time the temperature ranged about 200 degrees Fahr. inside the hold. Later examination of the vessel indicated that the treatment had been successful n killing all the weevils. No live weevils were in sight and all those adults found were dead. This was unlike the effects following the application of sulphur for the reason that shortly after airing the vessel live weevils were noticably abundant. Twelve hours later it developed that live weevils commenced to emerge from the bilges. It was apparent, therefore, that a large number of the weevils had retreated beneath the hold, where the heat had not penetrated, thus many adults had survived.

It was found possible to flood the bilges with water, thus driving the adults back again into the hold. Heat was then again supplied in the same manner as before. This practice proved eminently successful and finally the vessel was rid of all sign of weevil infestation.

The work demonstrates the practicability of superheating an ocean going vessel. It may even be possible to treat a cargo in this way. Further information is required on the effects of wet and dry heat on dried stored products and grain. So far as our work has gone in this connection in British Columbia we are satisfied that the treatment of rice with heat is a dangerous practice and that such superheated rice becomes useless for milling. Injurious effects have not thus far been seen with corn, beans and peas, but as stated before further information is required before we can base an opinion on this matter.

A successful school fair is a chain of five links in which the pupils, teachers, parents, trustees and the Department of Agriculture all have their own part to play.

THE SEED BRANCH

IMPROVING FIELD CROP COMPETITIONS, SEED FAIRS, AND EXHIBITIONS

BY GEO. H. CLARK, B.S.A., SEED COMMISSIONER

A brief statement of the history of field crop competitions, seed fairs and provincial seed exhibitions, and of their progress for the five-year period, 1910-15, may be of interest as an introduction to the subject of their improvement. Prior to 1912 the work and expenses of organizing, judging, advertising, and reporting of these competitive enterprises was done by the Seed Branch on application from agricultural societies that had received necessary grants as prize moneys for their province, and the Seed Branch also offered grants for provincial seed exhibitions. However, some of the provincial Departments of Agriculture were already conducting these services,—Ontario all three, Manitoba her field crop competitions and seed fairs, and Saskatchewan her seed fairs and exhibition. In 1912 all were passed over for provincial administration and Dominion subventions were offered through the Seed Branch, which now amount to two-thirds of the moneys awarded in cash prizes, but must not exceed:—$50 for each of five crops in a field competition; $50 for each seed fair; $600 for each provincial seed exhibition.

These amounts are approximately one-half the total cost of conducting this educational work.

DISTRIBUTING METHOD OF SUBVENTIONS

The subventions are paid on the basis of $1,500 to each province having less than one million acres under field crops, and $1,500 for each additional million of field crop acreage, but not more than $1,500 *pro rata* per 100,000 of total population.

The appropriation in the Seed Branch estimates for this purpose increased from $14,000 in 1910-11 to $50,000 in 1915-16, of which $36,000 was claimed by the provinces. The $14,000 covered the expenses of conducting 110 field competitions, 52 seed fairs, and 6 provincial seed exhibitions, including about $1,000 in grants. The $36,000 paid to the provinces in 1915 assisted 418 field competitions, 149 seed fairs and 9 provincial seed exhibitions. Approximately $37,000 was paid in subventions on this account during each of the past two years, and the services are still being extended.

REORGANIZATION OF THE SYSTEM

The district officers of the Seed Branch have been required to study their effect upon agriculture in relation to the amounts paid in subventions. Their reports show ample evidence that, on the whole, these moneys have been well and wisely expended. However, in view of the present national emergency, and the need for sound economy, Deputy Ministers of Agriculture were consulted during the past winter as to the elimination of that part of these services that might be considered to have served its purpose, and the revision of the remainder so as to secure the largest possible benefits to agriculture. Their replies emphasized the value of the work, especially in view of the great need for increased production, and suggested extension rather than curtailment. Some gave improvements in rules and regula-

tions, actually made or under contemplation, and requested further suggestions from the Seed Branch.

PAYMENT TO THE PROVINCES

Subventions are paid to the provinces on certain prescribed conditions. For example, a grant may be paid on account of an agricultural society conducting field competitions with each of five kinds of crops, including cereal grains, grass, clover, or other crops grown for seed, also fodder, field root and garden vegetable crops. A grant of $200 may be paid toward a provincial seed exhibition on account of prizes awarded in each of three classes, namely, (a) general class; (b) exhibits from prize-winning or commendable fields in crop competitions, and (c) exhibits of selected seeds or plants eligible for registration.

THE REVISED PLAN

The following plan has now been offered to the provinces from the standpoints of both economy and improvement:—

Field Crop Competitions.—1. In the case of biennial crops, as field roots or garden vegetables, prizes shall be awarded on the total score of the growing steckling or root crop and the growing seed crop produced therefrom. (This is an amendment to No. 1 under our amended plan for 1914, replacing: "also fodder, field root, and garden vegetable crops.")

2. Varieties of field crops shall be eligible for competition only on the approval of a Provincial Seed Board or representative committee of responsible Dominion and Provincial officials; and as soon as practicable, prizes shall be paid only on seed crops grown from approved seed stocks of such varieties.

3. The amount or value of prizes shall be a certain value per point over a specified minimum score. (Nova Scotia awards to prize winners, 40 cents for each point over 75 in scoring wheat, oats and potatoes, and 75 cents in scoring turnips. This system eliminates unworthy fields and juggling places in case of a tie.)

4. The number of prizes in each competition shall be based on the number of competitors, five being a necessary minimum with two prizes available; 6 to 10 entries, 4 prizes; 10 to 15 entries, 6 prizes; 15 to 20 entries, 8 prizes; 20 to 25 entries, 10 prizes; 25 to 30 entries, 12 prizes, and for 30 or more entries, 15 prizes. (Three and 4 imply the adoption of the sliding scale in determining value and number of prizes.)

5. At least certain minimum quantities of each competing seed crop shall be offered "for sale" in the official report of the competitions.

Honour Roll.—Prize winners who have come within the first three placings in any two of three consecutive years, and whose seed stocks are and remain of recognized merit, shall have their names placed on an Honour Roll for the particular variety of seed crop in which they have been specializing, and shall not be eligible for prizes in that seed crop during the three succeeding years.

Seed Fairs.—1. Only approved varieties of seed crops shall be eligible for competition at a seed fair.

2. Competitors shall list at least certain minimum quantities of seed for sale at reasonable prices and of as high quality as that exhibited. An official representative sample of seed fair exhibits shall be taken to be used in settling purchasers' disputes as to quality.

3. Prize-winning exhibits shall be sold by auction at the close of the seed fair.

4. *Honour Roll.*—For seed fair prize winners on the same general principles as suggested for field crop competitions.

5. Seed fairs shall be discontinued when improvements cease to be commensurate with the expenditures involved.

PROVINCIAL SEED EXHIBITIONS

The same general rules as suggested for seed fairs may be applied to provincial seed exhibitions.

The importance of employing capable judges was emphasized and a provincial Seed Board with representation on a Dominion Seed Board was suggested to co-ordinate the whole work of seed supply and improvement. Field crop competitions, seed fairs, and provincial seed exhibitions have been conducted in each of the provinces by a special official, who, no matter how capable and faithful in the performance of his duties, might have his hand strengthened and his work made more effective by recommendations from a representative provincial Seed Board respecting rules and regulations governing or discontinuing these

services. The operations of the Seed Branch and its Seed Purchasing Commission in the supply and distribution of seed indicate the desirability of hearty co-operation. At the present time field root and vegetable seed growing commands special attention in British Columbia; timothy in Alberta; cereal grains in the Prairie Provinces; clover, corn and potato in Ontario; potato and swede seed growing in Quebec and the Maritime Provinces. The primary aim of field crop competitions, seed fairs, and exhibitions is to encourage the production in commercial quantities of well-bred, clean seed of strong vitality, and of varieties suited to both local and national conditions. Dominion and provincial experienced station officials engaged in the production of pedigreed seed, the Canadian Seed Growers' Association, which multiplies pedigreed seed under provincial supervision, and puts it on the market as registered seed, field crop competitors who use registered seed as foundation stock to produce the highest class commercial seed, and seed merchants acting in an advisory capacity, are all interested in their improvement and should have representation on provincial and Dominion Seed Boards. Practically all of the Provincial Departments of Agriculture have concurred in these suggestions, and some have already appointed their Seed Boards.

SEED TESTING IN MAY

BY J. R. DYMOND, SEED ANALYST

AFTER April the number of samples of seed received for test rapidly decreases. During May only 637 samples were tested at Ottawa, as compared with 1,959 in April, and 2,444 in March. Of the 637 samples received 203 were sent by farmers, 322 by merchants, and 112 by institutions.

As a germination test requires from a week to two weeks, or a month, depending on the kind of seed, many of the germination reports sent out during May were for samples received in April. The following table summarizes the results of the germination tests reported during the month:—

	Wheat	Oats	Barley	Corn	Peas	Beans	Mangels and Beets
Number of samples reported	29	177	8	137	7	14	16
Average per cent germination	89	88	94	72	85	87	62-127
Number germinating up to standard for good seed	22	54	6	40	3	9	..
Number germinating below ⅔ of standard for good seed	2	8	..	41	1	..	6

TIMOTHY AND CLOVER

The grading of timothy and clover samples is summarized below:

	Timothy	Red Clover	Alsike	Alfalfa	Mixture
Number of samples received	152	80	56	3	18
Number received from farmers	63	38	20	2	8
Number received from merchants	85	41	36	1	10
Number grading No. 1	31	23	8	..	2
Number grading No. 2	51	22	15	2	4
Number grading No. 3	20	27	14	..	6
Number grading rejected	50	6	19	1	6
Other reports		1			

PART II

Provincial Departments of Agriculture

SPECIAL PRODUCTION EFFORTS

In the April number of THE AGRICULTURAL GAZETTE, a statement was given regarding the special assistance afforded by the Federal Government to the different provinces in the advancement of greater production. While every Provincial Government for the past three years has loyally, specially, and energetically taken steps in this direction, and by this federal aid was doubtless encouraged to extended effort, necessarily the steps taken have not all been of the same character, nor the methods employed in every case identical. The following articles have, therefore, been brought together, not alone to indicate the policies pursued by each province, but in order that suggestions arising from the actions of one, may by this means be made available to another:

NOVA SCOTIA

BY M. CUMMING, B.A., B.S.A., SECRETARY FOR AGRICULTURE

IN an advertisement, which, on a large and imposing scale, was published in all the papers of Nova Scotia, there was given a fair outline of the more important measures adopted in this province for the increase of production. This advertisement set forth that arrangements had been made for a special credit by which *bona fide* farmers might obtain loans payable after harvest from banks for the purpose of purchasing seed and fertilizer, and that:

To secure supplemental labour for farmers—all boys from 15 to 19 years are being recruited as Soldiers of the Soil. There are local representatives in every county centre who will supply where possible neighbourhood boys or women or other available labour. Farmers' application for such labour should be forwarded free of postage to Arthur S. Barnstead, Organizing Secretary, Food Resources Committee, Halifax. It is also recommended that every person or firm such as lumbermen who have teams of horses or oxen that could be spared at seeding time should hire these teams with or without teamsters at reasonable terms to farmers so as to increase the acreage of cultivated crops.

Business firms and Co-operative Farmers' associations making application are guaranteed against loss on the unsold surplus of oats, wheat and barley seed. This has already resulted in a satisfactory extra supply of seed being available for farmers through the regular channels of distribution.

To supplement the supply of fertilizer in the hands of established companies the Department of Agriculture has imported a substantial quantity of fertilizer to be sold mainly in car-load lots to centres where supplies are lacking.

Seeds for early maturing beans suitable for eastern and northern Nova Scotia have been secured and may be purchased at the Agricultural College, Truro, and other centres.

A bonus is being given on all two-furrow ploughs brought into the province up to May 1st this year, and purchased by *bona fide* farmers; and a like bonus on seed drills and grain fanning mills is given in the Cape Breton counties and the shore counties from Guysboro to Digby inclusive.

Seventeen farm tractors have been imported to be sold at cost and more will be provided if ordered.

SUCCESS OF THE POLICY

In respect to the foregoing, I would add:

We found a large interest in the farm credit scheme which has proved

very effective. Banks advanced an amount not exceeding $100 to any farmer at 6 per cent, payable November 1st.

The S.O.S. movement has proven very successful, upwards of 2,000 boys being enrolled.

It would appear as a result of our policy that there was an excess of supplies of the essential seeds in Nova Scotia. We purchased an extra supply of barley, seed beans, and turnip seed and seed peas, of which seeds we anticipated a shortage.

We handled upwards of 125 20-ton cars of fertilizer. It was most fortunate that we anticipated this shortage and had the goods to ship out. These goods were shipped almost entirely through the regular channels of trade, and were not put on the market until the trade advised us that their usual supplies were exhausted. The trade approved, even recommended, the measure.

The encouragement of the growing of hardy strains of beans in eastern and northern Nova Scotia has taken hold. All our own stocks disappeared, and we had to draw on reserve stocks wherever we could locate them.

THE IMPLEMENT BONUS SYSTEM

In my opinion our limited "implement bonus system" was, under Nova Scotia conditions one of the best measures we could have adopted. Exact figures are not yet available, but a bonus will be paid on approximately 225 two-furrow ploughs, 100 seeders in outlying counties, and 25 fanning mills, also in outly ng counties.

We have made a very good start on tractors, when you consider conditions obtaining in Nova Scotia. Our engine expert spent three weeks in Ford's factory, where he learned details, etc., and so could give expert service in the county.

In addition to these methods, we fortunately began in 1914 a policy to encourage the erection of wheat mills and the growing of wheat. Through this, there have been erected in the past two or three years and there will be erected this year about ten new roller process mills, which will amply take care of a substantial increase in wheat acreage which is now forthcoming. In two special cases we built mills outright, but in most cases we provided assistance in the way of a bonus.

PRODUCTION MEETINGS AND LITERATURE

During the year we have held the most extensive series of food production meetings ever held in the history of the province, and at certain important centres we held what we termed agricultural rally days, consisting of sometimes sessions held in the afternoon and evening of one day, and sometimes on two successive days.

Also the following food production bulletins were issued:—

1. Wheat Growing in Nova Scotia, by M. Cumming and S. J. Moore.
2. Bean Growing in Nova Scotia, by P. J. Shaw.
3. Greater Labour Efficiency on the Farms of Nova Scotia, by J. M. Trueman.

Finally, we sent a copy of the addresses delivered by Dr. J. W. Robertson and others before the House of Assembly at Halifax on "The Needs of the Day" to every farmer in Nova Scotia, the total number of copies sent out being in the neighbourhood of 55,000. Besides these, some 15,000 extra copies were sent to part of the urban population.

NEW BRUNSWICK

BY W. R. REEK, B.S.A., SECRETARY FOR AGRICULTURE

IN this province every effort was made to increase production by attention to the preliminary needs of the growing season. Following is an outline of the leading activities:

Seed.—Seed (oats, wheat, and barley) was distributed throughout the province, the Government purchasing and delivering to the municipal councils and agricultural societies.

Fertilizer.—A supply of fertilizer was secured last November, and shipments amounting to 1200 tons were brought into the province. This fertilizer contained five per cent potash, which is very necessary in our potato-growing sections. This was offered to agricultural societies and dealers, or any individual who could handle a car-load lot.

Distribution of Eggs.—A large supply of good eggs was arranged for and distributed, to boys and girls principally, without charge, providing a return would be made in the fall. This idea was to interest the boys and girls in some line of work, and to encourage the production of meat for home consumption when it could be produced cheaply.

Pig Pastures.—Arrangements were made for the establishment of pig pastures in every county, in order to give cheaper pork production, and, incidentally, to emphasize the value of such efforts in the time of peace.

Back-Yard Gardening.—Most of this work was taken care of by local committees, but up-to-date information was given out through the local papers, in order that every one entering into the work would have a better idea of how to proceed, the varieties to plant, and how to take care of them.

Pruning.—A pruning campaign was arranged during the winter, in order to have the orchards in shape before the spring work came on. This was done to ensure a good quality of fruit. Too often, when labour is scarce, the orchards are neglected.

Tractors.—The applications for tractors were very few, because of the fact that they had not been generally introduced into the province previously, and because no one could say definitely as to their ability to do the work on very rolling districts.

Meetings and Conferences.—Early last fall the county councils were called into conference with the Government to consider ways and means of greater production this year, and a definite line of action was decided upon. Sectional conferences were later called to work out further details, and to discuss more recent problems. Meetings were held throughout the province continuously, and addressed by members of the Department of Agriculture and others of authority.

Advertising.—The local Government carried on only advertising as was necessary in connection with the working out of the plans formulated. The educational advertising was directed from Ottawa.

It is purposed to carry on similar work another year, and to make special provision in the coming fall for doing so.

QUEBEC

BY A. S. CHARRON, CHIEF OF THE GREATER PRODUCTION DIVISION

THE question of agricultural greater production is not a new one in this province. An energetic campaign was carried on by the provincial Department of Agriculture in 1917, and a very satisfactory increase in production was obtained. This year, Quebec made an effort to place under crop 600,000 acres more than usual. A summary of the means by which the provincial Department proposed to achieve this object is herewith given:

Lectures.—The plans for the campaign of 1918 were laid last November. All agricultural parishes were visited in December and January by lecturers, who spoke on the raising of pigs, and on the intensive production of wheat, beans, and peas. Subsequently, Agricultural Representatives lost no opportunity to give information to farmers, and to urge upon them the absolute necessity of greater production. Everywhere they met with the best of good-will and readiness.

Greater Production Division.—In order to co-ordinate these efforts, a Greater Production Division was established by the Department of Agriculture. This division includes a central office in charge of everything pertaining to these questions. In each county, an Agricultural Representative supervised the organization of the parishes of his district. In each parish, a greater production committee was organized to facilitate the purchase of seed grain, of agricultural machinery, to make an inventory of areas under crop, of available labour or of the need of labour.

Seed Grain.—The Greater Production Division was successful in securing, from various sources, all the seed grain wanted by the farmers in the province. The orders were grouped by agricultural societies or parish committees, and filled in good time. The committees were also helped by the Department in purchasing the required quantity of formalin to treat cereals and potatoes.

Tractors.—A number of tractors were purchased in order to make demonstrations in various places of the advantages derived from the use of these machines. In this way, several thousand acres that otherwise might never have been used were ploughed.

Publicity.—The central office advertised in the papers and magazines to keep the committees, the farmers, and the public informed. It also endeavoured in this way to encourage the cultivation of war gardens, and to find the labour necessary for field crops.

Labour.—A Director of Agricultural Labour was appointed and put in charge of this important factor in our programme of greater production. He received his information from the parish committees or from the Agricultural Representatives.

Advertisements, with application forms, were published in the newspapers, and these forms were filled and sent to this office by those who were in need of labour or who desired to work on a farm. A large number of school boys enlisted in the army of Soldiers of the Soil. Again, the various provincial employment bureaux, situated in the chief towns, compiled these requests and endeavoured to reply to them without delay.

War Gardens.—In co-operation with the horticultural division, the Greater Production Division organized, in the main towns of the province, committees for the cultivation of vacant lots, or of war gardens. One or several gardeners were stationed in every town. They supervised the choice of the lots, made model gardens to instruct the beginners, gave them all necessary advice and

information, and are inspecting the gardens. Most of the municipal councils decided to plough these lots free of charge. The purchase of seed grain was also greatly facilitated. Special publicity was given to this work.

Competitions.—Cultivated field competitions were organized by the parish committees. A comparative survey of cultivated fields in each parish, compared with the total arable area, was made. Several prizes will be given to the most deserving.

Diffusion of Information.—Considerable information has been given to the farmers by means of bulletins circulars, posters, or newspapers.

ONTARIO

BY W. BERT ROADHOUSE, DEPUTY MINISTER OF AGRICULTURE

FOLLOWING in itemized form is a detail of the principal efforts made officially to stimulate an increase of production in the province of Ontario:

ORGANIZATION

Appointed an Agricultural Section of the Resources Committee composed of prominent farmers to plan and advise the organization of the province and to appeal to farmers in regard to growing more food stuffs.

Appointed a Labour Section of the Resources Committee composed of farmers and business men to assist in securing an adequate supply of labour to meet the demands on the farm.

Appealed to the municipal council in every township to see that local organization in the township was effected to look after matters locally in carrying out the plans of the Provincial Committee. Agreed to pay part of the expenses of local organizations.

His Honour the Lieutenant-Governor, by proclamation, set aside a week of dedication and preparation for the work of food production and urged the presentation of the facts in all pulpits, and the calling of emergency sessions of the county councils to stimulate interest and assist in local organizations.

Have now provincial, urban, and rural organizations working together furthering food production.

OTHER ACTIVITIES

Held a large number of organization meetings and conducted a canvass in every county in order to increase hog production, and reports received indicate an increase of 25%.

By advertising and special pamphlets encouraged the sowing of spring wheat, and distributed through the departmental organization over 40,000 bushels of Western seed for this purpose, with the result that the acreage in this province in spring wheat is expected to show an increase of at least 100%.

Utilized generous amounts of advertising space in daily and weekly papers in presenting the general food situation, and the needs arising therefrom, to people all over the province.

By special advertising campaign, supported by distribution of pamphlets and organization of local committees, encouraged back-yard and vacant-lot gardening, which has also met with a general response.

Arrangements made with the banks by which they loan up to $200 to responsible parties for the purchase of seed for spring planting, repayment to be made in the fall with interest.

Co-operated with the Canada Food Board in conducting a Soldiers of the Soil campaign, as a result of which upwards of 20,000 boys from high schools and collegiate institutes volunteered to take up work on the land if needed.

Conducted through the Labour Branch of the Government a campaign in towns and cities to secure men for seeding, and planning to conduct similar campaigns to secure additional men for harvest.

Arranged for local courses for the training of girls who expressed a willingness to take up farm work, and put on a special three weeks course for farmerettes at the Ontario Agricultural College.

Operating 128 tractors throughout the province under the supervision of local Representatives, doing work for farmers, and thus relieving the labour situation.

Co-operated with the Canada Food Board in taking orders for the Fordson tractors, and placing 200 of these in the province.

Taking over about 150 acres of vacant land in the vicinity of Toronto, sowing it to flax preparatory to sowing fall wheat in the autumn.

Appointed a special committee to investigate the possibilities of feeding hogs on garbage, and issued a prompt and practical report, giving municipalities the very latest information available on this subject, with the result that a number of municipalities are undertaking the enterprise.

Offered increased prizes in the field crop competitions for the growing of spring wheat.

Organized through the Labour Branch university and college girls to work in the fruit districts, following the very successful operation of the plan last year.

Organized through the Labour Branch parties of boys and girls to help with the sugar beet crop and pull the flax crop, the importance of both of which has been emphasized, but which would suffer materially if the essential labour were not forthcoming.

Co-operated with the federal authorities in securing a supply of seed corn for the seed-producing sections of Western Ontario.

In co-operation with the federal authorities placed about 200 cars of concentrated stock feed, and continue to give this important matter necessary attention.

Assisted in securing the importation of 40,000 bushels of seed potatoes of standard varieties in order to improve the crop in the province.

Emphasized the importance of conservation of foodstuffs by conducting community canning centres, giving a large number of canning demonstrations, and distributing thousands of copies of publications on canning, preserving, war breads, war recipes, and similar subjects.

SASKATCHEWAN

BY F. H. AULD, DEPUTY MINISTER, DEPARTMENT OF AGRICULTURE

THE means employed in Saskatchewan to utilize the federal grant for greater production, consist in placing fifteen representatives in a similar number of districts to ascertain the hindrances to production. Saskatchewan farmers have always produced all they possibly could of agricultural products, and any increase in production can be obtained only by assisting our farmers in the removal of the obstacles which are impediments to production, hence the employment of the greater production grant in the manner indicated to ascertain fully the conditions in rural districts.

ALBERTA

BY J. McCAIG, M.A., EDITOR OF PUBLICATIONS

EVERY endeavour has been made in this province to encourage increased production. A few of the directions in which special efforts have been made are herewith referred to:

Pork Production.—The Department through the Live Stock Commissioner's Branch, conducted lectures on all phases of pork production, distributed literature, had circulars published in the press, and distributed pure-bred brood sows to farmers at cost.

The Department has appointed an organizer of pig clubs this year. Twenty-five of these are already in operation, and juvenile pig club bulletins have been prepared to give the right kind and amount of instruction.

Short Course School Work.—The short courses given this year related to increased pork production and soil cultivation, particularly in relation to the care of the wheat crop. On the woman's side, the short courses related to economies in cooking, substitution, and the reduction of luxuries.

Poultry.—The poultry branch has given encouragement to the setting of a larger number of hens of the utility breeds. A recently appointed poultry market commissioner is organizing the selling and assisting in the educational work of the Department.

Seed Grain.—The legislature passed a Municipal Seed Grain Act, giving municipalities power to borrow money to purchase seed grain to be supplied to resident owners and tenants, on certain conditions, of patented lands, and another Act by which the treasury of the province guarantees the repayment of moneys loaned to parties outside of municipalities for the purchase of seed grain.

Greater Production Agents.—The chief effort of the Department with respect to production is represented in the appointment as agents of greater production of sixteen trained men who are allotted to work in sixteen divisions of the province. Their duties take account of the securing of a greater amount of cropping, of a greater amount of breaking, of the securing of labour for farmers, of the securing of seed grain under the recent Act, of the mobilization of labour, securing available surplus power, and of securing the eradication of weeds. These men are trained agriculturists with respect to cultivation, crops, live stock, weed eradication, and the operation of gas engines.

Tractors.—The Department of Agriculture is acting as agents for the Dominion Department in the distribution of Ford tractors. Over three hundred of the first allotments to the province have been distributed in this way.

Women's Institutes.—A complete itinerary of the province has been arranged by the Director of Women's Institutes for the special teachers of domestic science of schools to carry on a campaign of food conservation in all parts of the province.

The agents of greater production are the most important working force we have in the interests of bigger crops, but the work of all our branches has been dominated by the war need.

BRITISH COLUMBIA

BY W. T. McDONALD, ACTING DEPUTY MINISTER OF AGRICULTURE

UNDER authority of the British Columbia Seed Grain Act, 1918, our Department has distributed seed to the value of approximately fifty thousand dollars. This has been sold for cash, or for the notes of purchasers, as per above Act. We have also been fortunate in securing the services of one of our most successful and up-to-date farmers for special field work along the lines of increased production, particularly in relation to hog raising and dairying. Legislation was also enacted during the last session of the legislature giving municipalities the power to make arrangements for the cultivation of idle lands.

In addition to the above, all activities of the Department are being conducted with particular reference to increased production.

DRAINAGE INSTRUCTION AND DEMONSTRATION

THE MARITIME PROVINCES

BY J. W. MITCHELL, B.A., SUPERVISOR UNDER THE AGRICULTURAL INSTRUCTION ACT IN THE MARITIME PROVINCES

THERE is a realization on the, part of the Departments of Agriculture of the Maritime Provinces of the necessity for drainage instruction and demonstration, there being a very considerable amount of land in all three provinces that requires underdrainage. Besides demonstration work, there is considerable following up to be done in the way of survey work. There is also a certain amount of what may be termed experimental work to be done, to ascertain the best methods of carrying it on. While the ditching machine will, doubtless, have a large plan where the area to be drained is not too small and the land not too stony, it is quite possible that where the conditions are the reverse of these, the plough and spade will prove quite as economical as machine work, if not more so. War conditions have tended to curtail the work, through taking away trained men and also by causing a great shortage of labour.

THE WORK IN NOVA SCOTIA

Professor Cumming makes the following observations upon the work in Nova Scotia: "Our plans have been considerably curtailed since the beginning of the war. The head of our drainage department has been killed in France, and both of his assistants have gone over-seas. None the less we have still tried to carry on the work. Our present plans are limited to a rather extensive proposition of putting in some drainage for farmers in Pictou county. For this purpose we use the Buckage Traction Ditching machine and carry on the work in the ordinary commercial way. Also, whenever asked we are prepared to send out one of our men connected with one of the other departments, to make a survey of property for the purpose of plans for drainage. We find, however, that since the war has begun our people are not going so heavily into drainage work as before the war."

DITCHING IN NEW BRUNSWICK

The province of New Brunswick owns a ditching machine, and in 1917 operated it in Kings county during the months of July to October inclusive. During a portion of the time the operator had an assistant who helped

to lay tile. In all, 1,435 rods, average 2½ feet in depth, were done. A fixed charge of 30 cents per rod for the trench digging (based on a depth of 2½ feet) and the laying of the tile was made by the Department. This did not nearly pay the actual cost. Twenty-nine surveys were made for farmers, distributed over four different counties. The ditching done last year in New Brunswick, was done largely for the purpose of draining "springy" areas. There is room for a considerable amount of drainage work over the province as a whole. This year the Department intends, if possible, to put in demonstration ditching plots in several counties—possibly plots of about an acre each; and it is quite possible that, for purpose of comparison, a fair portion of the work will be done entirely by hand.

ACTIVITY IN PRINCE EDWARD ISLAND

In all parts of Prince Edward Island considerable underdrainage work should be done, and this means, to begin with, quite an amount of demonstration work. The work would be for general drainage of a field, and not so much for the purpose of draining wet or "springy" spots as in other provinces. Last year the Department of Agriculture purchased a large ditching machine, and, although it did not arrive until about the end of July, it was put into immediate use in Prince county, where the largest amount of drainage work requires to be done, and was kept going to the end of the season. It proved to be a good machine and a considerable amount of work was accomplished. The operator and his assistant did the digging of the trenches and laid the tile, while the farmers themselves did the balance of the work.

The District Representative for Prince county did all of the survey work, and prepared the plans for the drainage system in each case. The survey and demonstration work begun last year is being continued during 1918.

As Prince Edward Island is practically free of rock and stone the ditching machine should prove quite as serviceable in this province as in any other part of Canada.

QUEBEC

BY F. N. SAVOIE, SECRETARY, DEPARTMENT OF AGRICULTURE

THE underdrainage of arable lands is encouraged by the Department of Agriculture in two ways, first, by making surveys and plans; and, secondly, by doing the work.

SURVEYS AND PLANS

When an application on a special form is received from a farmer who wants to have his land drained, an instructor is sent out, who makes a survey of the farm and prepares the topographic maps necessary to enable him to prepare a plan. This plan is explained, all the information necessary for the proper carrying out of the work is given on the spot to the farmer, and the plan with observations is sent to Quebec, where it is verified. A corrected copy is later returned to the farmer. The services of the instructor are free of charge, but the farmer must board him during his work and give him the help which he may require.

Six instructors were required last year to make surveys. They visited 79 farms and made plans for 2,154 acres of land. Two more instructors were also continuously employed making a copy of the plans.

The work will be continued this year with a reduced staff, owing to existing circumstances.

DOING THE WORK

In order to give the work a good

start, the Department has purchased two Buckeye ditching machines, and these machines are operated on these terms: The work is done free of charge up to five acres, the farmer paying for the board of the conductor and his assistant; above five acres and up to twenty acres, the farmer pays, in addition to the board of the two men employed, the salary of the conductor; twenty acres form the maximum area which may be covered for any farmer.

The length of the trenches dug by these two machines during last year, was 12,963 feet. The amount of work done was below the average owing to the unfavourable season, various accidents, the difficulty in getting exchange parts and delays in delivery. The same machines will be employed during the present season under the same conditions, but for the last time.

It is intended to send a list of questions to the farmers who have done some draining and to publish the replies obtained. It is believed that this will be a good way of spreading information on drainage.

In the future, when a farmers' club, or an agricultural association, desires to purchase machines for their members, a substantial grant will be made by the Minister of Agriculture.

ONTARIO

BY W. H. SCOTT, B.S.A., DIRECTOR OF DRAINAGE DEMONSTRATIONS, O.A.C.

THE instruction on drainage work was given last year in a manner somewhat similar to that of former years. It comprised lectures and practical demonstration work given to the students of the different classes taking the regular course at the Ontario Agricultural College, short course students, and advice given by the surveyors in connection with extension work. We also had a convention of ditching machine owners and others interested in drainage work, at which instruction was given regarding the different drainage problems. Late last summer we commenced preparing a moving picture film, comprising pictures taken of different drainage operations, this film to be shown by the Agricultural Representatives throughout Ontario at meetings of farmers' clubs, institutes, etc. This film is to be supplemented by more pictures which will be taken this coming season.

In connection with our demonstration work, two ditching machines were used in Northern Ontario for this purpose. One machine was operated in the Nipissing District and the other in the Rainy River District, to encourage drainage in Northern Ontario.

Along with these machines concrete tile making machines were also used, as no tile of any quantity is manufactured in Northern Ontario as yet. Farmers desiring work made their tile and the ditching machine was used to dig the ditches. For this work a nominal charge was made to cover some of the expenses incurred. By this method several demonstration plots were established in the northern district. It is expected that we shall follow this method of demonstration to some extent this coming season. Owing to the increased amount of extension work which we have at present our demonstration work will be confined to that done in Northern Ontario and several demonstration plots established on different Government farms in Old Ontario. At present a ditching machine is being used in draining 87 acres at the Horticultural Experiment Station, Vineland. This will be an exceptionally good demonstration plot, and will enable us to obtain first hand information re drainage in connection with fruit farming.

BRITISH COLUMBIA

BY H. O. ENGLISH, B.A., B.S.A., CROP AND SOIL INSTRUCTOR

THE British Columbia Department of Agriculture set aside a small fund in 1917 for drainage demonstrations. It was considered advisable in view of the scarcity of farm labourers, and the high cost of drainage materials, to confine our attention to those districts in which the need for underdrainage was most apparent.

In Coast districts, where large tracts of land require underdrainage, it is possible for farmers to unite, and by using power ditchers lower the cost of the work to the individual. While this policy has not been adopted in all Coast districts, the need for some such concerted action is so obvious that the Department will doubtless leave it to the farmers in the respective districts to deal with upon the return of normal conditions.

The Department planned to aid the farmers in the Interior valleys, and those in the irrigated sections of the province, where the problem of land drainage was not general, and where the individual farmer was forced to depend more or less upon his own resources to improve his soil condition by underdrainage.

In such districts the farmers appeared to require more than anything else an inexpensive ditching machine that would reduce the actual hand labour to a minimum. We aimed, therefore, to introduce one or more such machines, which seemed to cope successfully with this problem in other parts of the continent, and endeavour to ascertain which was best suited to our conditions. It was decided to purchase a "Cyclone Ditcher," and to test this machine in the Okanagan Valley. A drainage expert was sent into the above district to survey the fields to be drained and to advise those applying for the use of the machine as to the drainage materials necessary.

A TEST

Unfortunately the machine ordered and shipped early in February was lost in transit and did not arrive until the season for underdrainage work was well advanced. Accordingly only one field was ditched. The field ditched did not present the most favourable conditions for the work owing to the shortness of the main ditches. Mr. R. V. Agur, on whose farm the ditcher was operated, commented on the work, as follows:

> I believe for ditches down to 2 feet deep on good firm soil free from stone this machine, in the hands of a contractor doing this class of work steadily, would put the ditches in quite a little cheaper than if done by hand labour, especially with the present high rate of wages. However, with any delays, with eight horses standing idle, you can see the advantage would be soon offset. For ditches much deeper than 24 to 28 inches, with the horsepower we used (and we had four pretty fair teams), the ditcher does not seem to work satisfactorily, in fact, it does not seem possible to get it down much below the latter depth.

As will be seen from Mr. Agur's remarks, this machine is adapted to the excavating of shallow ditches, but in the soil on his ranch would not remove the earth to a greater depth than 28 inches. The field in question was underdrained to remove the surplus irrigation water which, applied to higher benches, was seeping through and coming to the surface in this field. This field was becoming less productive each year, due to the alkali salts carried down and deposited on the surface of the soil of this field on the evaporation of the water.

Similar work was planned in other parts of the Okanagan, but was postponed owing to the late arrival of the ditcher.

PRODUCTION ACTIVITIES OF WOMEN'S ORGANIZATIONS, 1917-18

There is no direction more interesting and more valuable, that the efforts for increased production have taken, than that in which the women of the land have shown their active sympathy. This has been the case both individually and collectively. Every woman's organization has gone into the matter with exemplary earnestness of devotion. Especially is this true of the women's institutes and corresponding organizations which, largely aided by funds granted under THE AGRICULTURAL INSTRUCTION ACT, all over the country are bending their energies towards, not only the greater multiplication of food supplies, but also of conservation and preservation. Both of these qualifications are as necessary in these times of emergency as production itself. The articles herewith given, in some manner show the scope and industrial lines on which the members of women's institutes are working:

QUEBEC

THE Homemakers' Clubs, of Quebec, true to their motto "For Home and Country," have been doing their best, not only in encouraging increased production, but also in the conserving of food. Demonstrators have been busy during the past three years with the result that now the stress has come the clubs are found well qualified to respond to the call that is made on them. Early in the year each club was called upon to organize, under the leadership of one or more members, all the girls in the surrounding community, and a canvass was made to induce every woman to join in the movement. The work undertaken was; the canning of more vegetables and the canning of all perishable foods not needed immediately for food; the raising of seed for the use of the members of which there might be a shortage next year; the picking and canning of all fruit, both wild and cultivated, that might otherwise go to waste; the raising of more chickens to take the place of beef, and the canning of surplus product; inducing each housekeeper to produce and preserve, at least, her own supply of eggs for the year; the increasing of the supply of maple sugar and the using of substitutes for cane and beet sugar in candy-making; the making of the soap for laundry purposes out of the bones and fats not used for food, and encouragement of any movement along the lines of production and conservation, such as school fair projects, the keeping of pigs and growing more wheat.

THE WORK ACCOMPLISHED

Mrs. N. C. MacFarlane, Demonstrator for Women's Clubs, in her annual report recently presented referred to the success that has been achieved. She says that studies in respect to foods have been well supplemented with practical demonstrations, that on canning being especially appreciated as a factor not only in preventing waste, but also in insuring the supply of fresh fruits and vegetables throughout the year. The secretaries of all the clubs have been placed on the mailing list of the Canada Food Board, so that they may receive the literature issued by the Board. Forty practical demonstrations on the making of meat and wheat substitutes were given to the clubs by the demonstrators from the Extension Department of the School

of Household Science, Macdonald College. From their previous studies, along the lines of food and nutrition, the clubs were well prepared to make use of the advice and instruction given. School fair work has received a great deal of encouraging attention, many of the clubs assisting in the prize list and encouraging children to exhibit. Sixty-eight practical demonstrations were given to the clubs on bread-making, cake-making and canning by the Macdonald College Demonstrators in co-operation with the Provincial Government Demonstrators.

The total number of lectures and demonstrations given by the demonstrators was 140. The report concludes by saying that while the Quebec Homemakers' Clubs are ready for the urgent duties of war-time, they are not losing sight of their main object, which is to build for the future.

ONTARIO

BY GEO. A. PUTNAM, B.S.A., SUPERINTENDENT OF INSTITUTES

THE members of the Ontario women's institutes are largely of the farm, although many residents of the towns and villages take a keen interest and active part in the work. Even before the organization of women's institutes, many of the farm women were much interested in the lighter forms of agriculture, fruit-growing, gardening, poultry-raising, bee-keeping, dairying, etc. More or less attention has been given to these subjects from the beginning in the regular work of women's institutes, and, during the past year, features as herewith outlined have been emphasized.

INCREASED PRODUCTION CAMPAIGN

During the winter months lecturers were sent out to address meetings held under the auspices of the women's institutes and the boards of agriculture. The lecturers presented to the people important facts with regard to the food situation to show the need for increased production and conservation of food, and helpful suggestions were given for the carrying out of the same.

In the general campaign to increase the production of vegetables, the women's institutes depended largely upon the literature furnished by the Department, and utilized local talent at their regular meetings to give instruction and carry on discussion along gardening lines.

The members of the women's institutes took advantage to a limited extent of the instruction given on the "Better Farming Special" cars run throughout Central and Eastern Ontario for nearly a month last fall, stopping at the more important centres.

INSTRUCTION BY DEMONSTRATION

Twenty demonstration lecture courses in food values and cooking were given last winter. These were ten-day courses, made as simple and practical as possible, keeping constantly in mind war-time needs, and emphasizing particularly substitutes for beef, pork, wheat, and sugar.

Canning demonstrations were given last fall to the number of 175, with an aggregate attendance of 15,580. This year the work will be continued. Already applications are reaching us for canning demonstrations. Canning by the hot water bath method, using a wash boiler with a false bottom, was demonstrated. This year, some branches are asking that the demonstrator use the steam pressure cooker in addition to the hot water bath outfit. The demonstrators will also

emphasize the drying of fruits and vegetables, particularly apples, corn, peas, beans, etc.

Demonstrations in canning, drying, and war-time cookery were given at the fall fairs of 1917 in Toronto, London, Ottawa, Picton, Peterboro, Chatham, and other places. This work will be repeated this season.

COMMUNITY CANNING CENTRE

A community canning centre was established at Parkhill, in Middlesex County, last year. The town provided the building and the Department furnished the equipment. An eight-horse power boiler, which received water from the town water supply, was placed near the cook room. In this room two large wooden vats lined with galvanized iron were placed—one for sterilizing the canned fruit, the other for scalding, blanching, etc. In addition to this, there was a steam-heated copper kettle for making jams, jellies, pickles, etc. The Department placed an expert demonstrator in charge. Over 4,000 quarts of fruit, vegetables, chicken, etc., were canned for patriotic purposes in addition to what was canned for home use. This year, five or six such centres are being established in Ontario.

WAR-TIME COOKERY

Splendid demonstrations in war-time cookery, canning, and drying of fruits and vegetables, and gardening, were given at the Toronto Arena during the Home Exposition week in April, 1918. The war-time cookery department showed substitutes for beef, pork, wheat, and sugar, and also emphasized the value of milk and oatmeal over certain other foods. Samples of bread made with 75% standard flour and 25% of either corn, barley, rye, or buckwheat flour were shown, also cookies and certain dishes prepared from recipes contained in circular No. 11, issued by the Women's Institute Branch.

In the canning and drying division could be noticed the home-made drier with three screens, the patented drier or evaporator made of a metal box filled with water, which could be heated over a stove, by gas, or by electricity; a steam cooker which would hold sixteen one-quart jars, various racks, and other utensils used in canning, and samples of canned and dried fruits and vegetables.

FARMERETTES

In the gardening division were the farmerettes, dressed in the regulation costume for fruit picking and general farming. A small garden and garden tools were shown, also products of last year's war gardens. In addition to this were shown some Siberian hares, the meat of which is recommended as a substitute for red meats used overseas.

INSTRUCTIVE LITERATURE

The Department has for distribution several bulletins, namely:—

Bulletin 252.—The Preservation of Food —Home Canning.
Bulletin 254—War Breads.
Bulletin 231—Vegetable Growing.
Dairying (new edition).
Circular 11—War-time Foods and Cookery.

In addition to these, are the standard bulletins on poultry, hogs, fruit growing, vegetable, bee-keeping, etc.

MANITOBA

BY S. T. NEWTON, DIRECTOR EXTENSION SERVICE

THE shortage of help on the farms has resulted in the great majority of the farm women taking over a considerable part of the chores incident to farm life in Manitoba. This in turn has resulted in the boys and girls becoming responsible in a great measure for the poultry and garden.

The Home Economics Societies have actively co-operated with the teachers and inspectors in organizing and helping to direct the activities of the boys' and girls' clubs. In many cases they have secured seeds, and in others eggs have been provided, with the result that in the five food contests the enrolment at present is:—Calf-raising, 1750; pig raising, 2,120; chicken raising, 7,500; gardening, 9,800.

Of course the majority of Home Economics society members have a garden as well, as in this way they can more readily encourage the young people. Particular attention has been given to such vegetables as may be successfully canned, and already the requests for instruction in canning has developed to such an extent that four members of the Extension Staff are devoting their attention to vegetables and fruit canning, and during July and August this number will be doubled. The usual plan is to have a demonstration lecture in the forenoon for the boys and girls, and in the afternoon for the members of the Home Economics society.

During the first week in September, when the Winnipeg Garden Show is being held, the Extension Service is arranging for demonstrations to be given in the use of the various canners and driers on the market. A competition in canning will also take place, the competitors being teams from several of the progressive boys' and girls' clubs of the province.

SASKATCHEWAN

BY MISS ABBIE DE LURY, DIRECTOR OF HOMEMAKERS' CLUBS

FOLLOWING is a list of the special activities of the Home makers' Clubs of Saskatchewan for increased production of food:

1. It is quite general for clubs to offer prizes for school gardens.

2. Club members have competitions among themselves for better gardens.

3. Clubs are co-operating with teachers to have school garden produce used for the school lunch.

4. The members of clubs are having gardens and encouraging increased acreage of crops by doing work to release man labour and in other ways.

5. Many are having gardens and getting them cultivated for the purpose of selling the produce for patriotic purposes.

6. School fairs are general and prizes given for produce of the best kind for purposes of utility.

7. Clubs hold demonstrations of vegetable and meat canning and curing of meats are taken up.

8. Members are doing their best to keep down cut worms and gophers and using their efforts for the preservation of birds.

9. Members of one club have pledged themselves to either raise six pure-bred chickens or to can vegetables and sell them for patriotic purposes.

10. Another great effort is being put forth to raise more poultry.

11. A club has rented a piece of land, bought seed wheat, and given it to farmers to cultivate for them.

GRADUATING CLASSES, AGRICULTURAL AND VETERINARY COLLEGES

NOVA SCOTIA

BY M. CUMMING, B.A., B.S.A., PRINCIPAL

THE following is a list of the graduates from the Agricultural College this year, together with their home addresses. Since graduation, several of these have enlisted. The majority of the rest are back on their own farms:—

Martin F. Anderson, Chapman Settlement, N.S.

Dennis D. Arsenault, Mt. Carmel, P.E.I.

Susannah I. Chase, Church Street, N.S.

David Dewar, Truro.

Ernest L. Eaton, Upper Canard, N.S.

Richard Hurst, Pictou.

James Wallace Kenty, 8 Mott St., Halifax.

Wilfred R. Kinsman, Canaan, N.S.

Alfred Leger, Richibucto Village, N.B.

A. A. LeBlanc, St. Anselm, N.B.

Mary Lee MacAloney, Fairview, N.S.

Clyde McDougall, and Tennyson McDougall, 156 Leicester Ave., Moncton.

Lawrence MacKay Ogilvie, Elderbank.

Walter Murray Ogilvie, Elderbank.

Dennie J. Robicheau, Maxwelton, Digby Co., N.S.

Prye Simmonds, 10 Wellington St., Amherst, N.S.

John A. Semple, R. R. No. 3, Truro.

Oliver S. Smith, South Brookfield, Queens Co., N.S.

B. Frank Tinney, 42 Pasmore st., Charlottetown, P.E.I.

Stanley Wood, Carter's Point, N.B.

The two ladies who graduated from the Agricultural College this year, and whose names are herewith given, took the regular course in all details. One of them, Miss Chase, earned most of the money for her course by raising and marketing strawberries on her father's farm, and frequently carries on ploughing, spraying harrowing, etc. The last communication we had from her stated that she was engaged in spraying her father's orchard.

Several ladies have taken the regular course at the College of Agriculture, Truro, namely, Miss Helen Woodroofe, now Mrs. Good, of Dartmouth; Miss Pearl Stanford, of Dartmouth, who this year obtained her B.S.A. degree from Macdonald.

This makes in all four ladies who have completed the full course in Truro, taking the same course as specified for men.

MACDONALD COLLEGE

THE following is a list of the graduates of the School of Agriculture for the session just closed, together with appointments secured to the present date:—

Arnold, G. E.—On home farm.

Boulden, C. E.—Animal Husbandry Department, Macdonald College.

Dobie, E. E.—Governmental position in agriculture, P.E.I.

Kelsall, Arthur.—Governmental position in agriculture, N.S.

Kinsman, F. B.—Nova Scotia Department of Agriculture.

McMahon, E. A.—Governmental position in agriculture, Annapolis Royal, N.S.

Mace, H. S.—Not known.

Newton, Margaret.—Biology Department, Macdonald College, P.Q.

Reid, R. J. M.—Manager Fruit Farm, Rougemont, P.Q.

Stanford, Miss P. O.—At home.

Taylor, E. A.—Department of Agriculture, Fredericton, N.B.

The class, it will be noticed, includes two ladies, who were the first to complete the full course in agriculture and to receive the degree of B.S.A. from McGill University. Miss Margaret Newton, from Lennox ville, Quebec, ranked first in general proficiency. Miss Pearl Clayton Stanford, of Dartmouth, Nova Scotia, was the other woman graduate. The list also includes three men who completed their third year at Macdonald College in 1914-15, enlisted for the war, were invalided home, and have completed their degree work during the session just closed.

The Institution Administration Graduates of 1918 and the positions accepted by them so far as known are:

Buzzell, Dorothy E., Abbotsford, Que.
Cavanagh, M. Isabel, New Glasgow, N.S.
Law, M. Ernesta, Yarmouth, N.S.
MacFarlane, Margaret W., Fredericton, N.B., —Experimental and demonstration work, Experimental Farm, Ottawa.
Meldrum, Mary C., Montreal, Que.
Moynan, Ida M., Waterloo, Que.—Teacher of Household Science and Primary Grades, Shawville Academy, P.Q.

OKA AGRICULTURAL INSTITUTE

NINETEEN candidates were awarded their B.S.A. diplomas at the conclusion of the 1917-18 session of the Oka Agricultural Institute at La Trappe, Que. Of this number, seven have been appointed assistants to Agricultural Representatives in the province. All the others, with the exception of one, who has joined the Aviculture Branch of the Department of Agriculture at Quebec, are engaged in farming:—

Auger, Jules, assistant to Agricultural Representative.
Baribeau, Bernard—Farmer.
Boivin, Eugene, B.A.—Assistant to Agricultural Representative.
Carignan, Paul, B.A.—Farmer.
Charbonneau, Avila—Assistant to Agricultural Representative.
Comtois, Paul, B.A.—Farmer.
Descostes, Oscar, B.A.—Farmer.
Hamelin, Lorenzo—Assistant to Agricultural Representative.
Langevin, Leonidas—Farmer.
Lauziere, Henri, B.A.—Assistant to Agricultural Representative.
Lanoue, Aime—Service of Aviculture, Quebec.
Marcotte, Albert, B.A.—Assistant to Agricultural Representative.
Methot, Jules—Farmer.
Perras, Aristide, B.A.—Farm manager, Boucherville.
Piette, Hector, B.A.—Assistant to Agricultural Representative.
Proulx, Josaphat, B.A.—Farmer.
Roy, Elzear—Farmer.
Sylvestre, Louis-Joseph—Farmer.
Tasse, Leo—Farmer.

STE. ANNE DE LA POCATIERE

NINE candidates successfully passed the required examinations for the B.S.A degree at the School of Agriculture at Ste. Anne de la Pocatière this year.

ONTARIO

FOLLOWING is a list of the 1918 graduating class at the Ontario Agricultural College, together with their home addresses and the positions which they have accepted:—

Chemistry and Physics Option:

Geddes, W. F., Kinburn, Ont.—Chemist with the British Chemical Co., Trenton, Ont.

Biology Option:

Flock, L. A., Burlington, Ont.—Investigations in Economic Entomology, Fruit Branch, Ont., Dept. of Agr.

Mitchener, A. V., Port Rowan, Ont.—Lecturer in Horticulture and Entomology, Agricultural College, Winnipeg.

Robinson, W., 984 Ossington Ave., Toronto.

Dairy Option:

Davis, H. L., Forbes Ave., Guelph.
James, N., R.R. 2, Dublin, Ont.—Lecturer in Dairying, Agricultural College, Winnipeg.
Parfitt, E. H., 1066-82nd st., Brooklyn, N.Y.—Demonstrator in Dairying, O.A.C., Guelph.

Bacteriology Option:

Lord, S. N. (Lieut.), 35 Lakeview ave., Toronto.—On leave of absence.
McCurry, J. B., Hurdman's Bridge.—Botanical Department, Experimental Farm, Ottawa.

Horticultural Option:

Jones, W. M. (Lieut.), 307 King st., London, Ont.—On leave of absence.
Patterson, C. F., R.R. 8, Watford, Ont.—Farming.
Tomlinson, A. H., O.A.C., Guelph.—Lecturer in Landscape Gardening, O. A. C., Guelph.
Mann, A. J., Colquitz, B.C. (conditioned in French)—Enlisted.
Selwyn, H. H., 545 Gilmour St., Ottawa (conditioned on thesis)—Managing his own apiary.

Agricultural Option:

Arnold, G. J., Old Charlton, Kent, Eng.
Cooper, T., R.R. 1, Wallenstein—District Supervisor of Drainage, Dept. of Agr., Hamilton, Ont.
DeLong, G. E., Rossmore, Ont.—Farming.
Elder, R. C., Canfield, Ont.—Farming.
Ferguson, F. L., Parkhill, Ont.—District Supervisor of Drainage, Dept. of Agr., Chatham, Ont.
Graham, H. W., Britannia Bay, Ont.—Farming.
Heimpel, L. G., 38 Alma st., Guelph—District Supervisor of Drainage, Guelph.
Maxwell, R. W., R.R. 5, Watford, Ont.—Enlisted.
Michael, G. W., Sherkston, Ont.—Farming.
Munro, A. D., North Lancaster, Ont.—Farming.
McBeath, J. C., Woodstock, Ont.—Poultry Dept., O.A.C., Guelph.
McCulloch, O. D., R.R. 1, Port Perry, Ont.—Farming.
Newton, R. G., R.R. 2, Tavistock, Ont.—Farming.
O'Neill, L. E., Bradford, Ont.—Live Stock Branch, Dept. of Agr., Toronto.
Overholt, P. M., Marshville, Ont.—Farming.
Scales, A. A., St. Eleanors, P.E.I.—Fox farming.
Snyder, E. S., Kitchener, Ont.—Poultry Dept., O.A.C., Guelph.
Timms, J. N., 118 Chatham st., Windsor, Ont.—Enlisted.
Waterman, J. M., Fraserville, Ont.—Associate Editor, Canadian Countryman, Toronto.
Weston, E. W., 108 Queen St., Sarnia.
Wilson, C. R., Merrickville, Ont.—Enlisted.

MANITOBA

BY G. A. SPROULE, REGISTRAR

FOLLOWING are lists of students who have graduated this year at the Manitoba Agricultural College in agriculture and home economics.—

Fifth Year Students in Agriculture:

Brander, James John, Nesbitt, Man.
Ellis, Joseph Henry, Manitoba Agricultural College, Winnipeg.
Heise, Arthur C., Isabella, Man.
Hutton, Frank Valentine, Redvers, Sask.
Johnson, Tandy Allen, Box 111, Russell, Iowa, U.S.A.
Rawlins, Robert, Cupar, Sask.
Robertson, David Wield, Manitoba Agricultural College, Winnipeg.
Watson, Wilmot Earl, (Enlisted)—Valley River, Man.
Wood, Henry Evelyn, Belmont, Man.

Fifth Year Students in Home Economics:

Brown, Aurilla, Sperling, Man.
McKillop, Margaret Marion, Carnduff, Sask.
Rayner, Margaret Madeline, Cromer, Manitoba.
Thompson, Esther, Ethelbert, Man.
Weir, Mary Jane, 422, 8th street, Brandon, Man.
Wright, Bernice, Manitoba Agricultural College, Winnipeg.

Our first class in agriculture graduated in 1911, 10 in number. In 1912 there were 6; in 1913, 12; in 1914, 20; in 1915, 27; in 1916, 13; in 1917, 7; and in 1918, 8 in agriculture, and 6 in home economics. The falling off since 1915 has been due to abnormal conditions brought about by the war. Three of the present year's graduates

(Mr. Hutton, Mr. Johnson, and Mr. Watson) have already signed up for military service. Two (Mr. Ellis and Mr. Robertson) are engaged in the Field Husbandry Department on the Agricultural College farm, and the other three (Mr. Heise, Mr. Rawlins, and Mr. Wood) are working their own farms. Mr. J. J. Brander was a member of this class, and will get his degree in May, 1919, on the completion of some work in one subject. Mr. Brander has applied for admission to the Royal Flying Corps.

Six young women have completed the five-year course in Home Economics and received the degree of Bachelor of Home Economics (B.H.Ec.) from the University of Manitoba. This, I believe, is the first class to graduate in Canada with a Home Economic degree. Miss Brown and Miss McKillop have returned to their homes, where for the present at least they believe they can render the greatest service. Miss Thompson has been engaged by the Department of Agriculture of Manitoba to work among the women in foreign settlements. Miss Thompson was engaged in this work last summer, and proved to have very special qualities for this difficult line of work. Miss Wright has been appointed to the College staff as instructor in Household Science. The other two members of the class have been married, and are applying the principles, learned at College, in their own homes.

SASKATCHEWAN

BY W. J. RUTHERFORD, B.S.A., DEAN OF AGRICULTURE

THE following have graduated in the B.S.A. course at the University of Saskatchewan:

John K. MacKenzie, specializing in Agricultural Engineering;

Vigfus S. Asmundson, specializing in Poultry Husbandry;

John Cameron, specializing in Field Husbandry;

Erle E. Eisenhauer, specializing in Field Husbandry.

John Cameron was one of our students who enlisted with the Princess Pats, spent two years in France, was wounded twice, and returned and finished his course. He has been retained as instructor in field husbandry.

Vigfus S. Asmundson is engaged as student assistant in poultry; J. K. Mackenzie as demonstrator in agricultural engineering; and E. E. Eisenhauer is engaged in irrigation work with the Commissioner of Irrigation, Calgary, Alberta.

In the associate course the following received their certificates: Everett C. Jarvis, Cyril H. Goulden, M. R. Kirk, Wilbur Sommerfield, Floyd E. Young, David R. Green, Milton K. Knudston, and T. B. McDonald.

Our classes have been very much depleted owing to the war.

ALBERTA SCHOOLS OF AGRICULTURE

BY W. J. ELLIOTT, PRINCIPAL

OLDS

WE had thirty-three students who graduated from this school last March. All of the boys who took the work went back to their own farms, although the last draft has taken a great many of

them. Most of the girls have gone home to their farms, although we have a very few from the small towns.

We notice that the age of our students is decreasing every year. When we started the average age was twenty-two, and during the past year we found that the average was eighteen. This is almost entirely due to the war.

CLARESHOLM

At the Claresholm School eight boys graduated in practical agriculture and five girls graduated in domestic science. The graduating class of boys is much smaller than in previous years, owing to so many being called to the war.

VERMILION

In the Agricultural School at Vermilion, there were seventeen graduates this spring, namely, 7 boys and 10 girls. In the agricultural class seven boys who took the entire two-years' work did not succeed in qualifying for their diplomas.

ONTARIO VETERINARY COLLEGE

THE graduating class at the Ontario Veterinary College included forty-seven students. All with the exception of four received their diplomas. The four diplomas withheld were for students under the age of twenty-one years. The class represented students from the various provinces and countries, as follows:—

Prince Edward Island	1
Nova Scotia	3
Quebec	3
Ontario	21
Manitoba	2
Saskatchewan	7
Alberta	2
Newfoundland	1
England	1
United States	6
Total	47

MONTREAL SCHOOL OF COMPARATIVE MEDICINE AND VETERINARY SCIENCE

At the recent closing exercises of the Montreal School of Comparative Medicine and Veterinary Science, held April 25, 26, 27 and 29, twelve students graduated, all from the province of Quebec. Two of the graduates have entered military service.

There are now 1,551 women, including state, district, county, and city agents, engaged in home demonstration work under the direction of the United States Department of Agriculture and the state colleges. Of these, 1,056 are in the southern states and 495 in the northern and western states. During 1917 there were 895 additional women agents appointed, 491 in the South and 404 in the North and West. On January 1, 1917, there were only 500 women agents engaged in home demonstration work, 480 in the South, and 20 in the North. This work of women agents has thus grown in the United States from nothing in 1910, to 500 women agents in 1917, and from 500 in 1917 to 1,551 in 1918.

THE CULTIVATION OF FRUIT IN THE PRAIRIE PROVINCES

One of the regrets often expressed by residents of the Prairie Provinces is that they are unable to procure home-grown native fruits of more than a very limited number of varieties. As this is a matter of great importance, not only for the comfort, but for the health, of the people, it has been considered wise to bring together what the Departments of Agriculture of the Prairie Provinces are doing in the direction of developing the fruit growing industry. The activities of these departments are shown in the following articles:

MANITOBA

BY H. E. WALKER, SUPERINTENDENT DEMONSTRATION FARM, KILLARNEY

THE cultivation of fruit, especially the tree fruits, is something that is seldom successfully attempted on the average farm of the prairie. Many persons have tried certain fruits in a haphazard way, and, due to neglect in some cases, and, to the stock planted not being hardy in other cases, failure has resulted.

Until recently little has been attempted by the Manitoba Department of Agriculture as regards this question of fruit cultivation, with the exception of that carried out under the direction of Professor Brodrick at the Agricultural College, and for the purpose of remedying many of the mistakes, and of reducing the chances of failure, the Department of Agriculture decided to use the Killarney Demonstration Farm as a horticultural experimental and demonstration station. From this station the work will be gradually extended throughout the province by means of the other Demonstration Farms and private farmers. The work carried out will supplement that of the Agricultural College, and also that to be carried out by the Dominion Department of Agriculture at Morden. At Killarney, however, conditions are somewhat more typical of the average prairie, and fruit cultivation will be considerably more of a problem than at Morden, due to a difference in altitude of between 600 and 700 feet, among other things, and the work that is brought to a successful issue should be of considerable value to the province in providing the much needed and health-giving fruits.

Plans are made for a general and specific study of wild and cultivated fruits, and cultivation of the same, as applied definitely to Manitoba conditions. It is the purpose to convince the farmer of the profitableness of fruit production, as well as the necessity from the standpoint of health. A study of the best methods of cultivation will be made. Various varieties of each fruit will be tested and differing systems of pruning used until the best method is found under the local conditions. All wild fruits possible will be grown and grafted with the idea in view of improvement and the production of hardy varieties. Hardiness to stand extreme temperatures constitutes the main problem before the fruit grower, and the question of protection will call for consideration. Various methods of winter protection will be used, and that of the summer must be supplied by windbreaks. Protection is almost as essential in the summer as in the winter.

SASKATCHEWAN

BY W. J. RUTHERFORD, B.S.A., DEAN OF AGRICULTURE

WILD fruits grow abundantly in many parts of Saskatchewan, and are used freely by the people in those localities. Saskatoons, raspberries, strawberries, black currants, gooseberries, wild cherries, high bush and low bush buffalo berries, cranberries, and blueberries furnish fruit in their season.

When the earliest settlements were founded—Hudson Bay posts, missions, etc.—the people brought with them garden fruits such as red, white, and black currants, gooseberries, raspberries, strawberries, and rhubarb, which substitutes nicely for fruit, and proved that hardy, useful varieties would live and thrive here. It was observed that shelter from winds was of great advantage in their cultivation. The Experimental Farm at Indian Head did good service by testing out varieties and distributing those that were hardy and desirable.

The Forestry Station at Indian Head, through its tree planting and shelter belt work, has done yeoman service to the fruit industry in that it has encouraged and assisted farmers to plant tree belts within whose shelter it is possible at almost any point on the prairies for successful small fruit plantations to be established. And these have been planted and are now bearing fruit. Without shelter for bush and tree fruits in Saskatchewan the results would be very disappointing. So that all interested in the promotion of this branch of agriculture are concentrating their efforts, first upon establishing of shelter belts, which is now being so well done under the encouragement, direction, and supervision of the Forestry Stations at Indian Head and Saskatoon (Forestry Branch, Department of the Interior, Ottawa).

Where shelter belts are afforded apples (standard and crab), plums and cherries are fairly successful. It has been demonstrated that within a properly established shelter belt a farmer, or gardener, may experience the pleasure of plucking and eating the fruit from his own trees and vines.

The College has not yet established a horticultural department. It is, however, preparing the ground and getting ready for such a department. Through its extension service, it is encouraging the planting of shelter belts which must necessarily precede successful efforts in fruit production. Small fruit plantations, raspberries, currants, gooseberries, strawberries, have been established. A few cherry, apple, and plum trees have been set out. Wild currants, gooseberries, Saskatoons, cherries, and strawberries, bushes, and vines, have been gathered and planted on the grounds. We gathered wild plum pits from old established plantations in the Mennonite settlements around Rosthern, and planted them for the purpose of making selections. Hybridizating wild and tame varieties of strawberries is being carried on with a view to securing possibly vigorous, hardy, prolific strains.

Local horticultural societies at different points in the province hold meetings for the discussion of topics relating to this industry, and exhibitions for the purpose of encouraging the efforts of those already engaged and stimulating the interest of others in this very worthy enterprise.

ALBERTA

BY JAS. McCAIG, M.A., EDITOR OF PUBLICATIONS

WE have made a beginning at the Demonstration Farms in the planting of small fruits particularly. In establishing this class of work, we have had only four or five years on the Demonstration Farms from the time that the farms were practically wild land. The taming of the land has taken some time in the first place, and the furnishing of right conditions for gardening, particularly in the open prairie areas, has taken time in the second place. I refer to the need of furnishing proper wind-breaks and shelters for this work. What we can say so far is that gooseberries, red currants, black currants, raspberries, and strawberries have been started, and they appear to be a success so far, but in no place are we past the stage of getting a small first crop of the bush fruits, and we are not able yet to give results in the testing of different varieties.

We have nothing to record with regard to tree fruits.

NOVA SCOTIA

CO-OPERATIVE GATHERING AND STORING OF EGGS

BY J. P. LANDRY, MANAGER AND LECTURER, POULTRY DEPARTMENT, AGRICULTURAL COLLEGE, TRURO

THE Poultry Department of the Nova Scotia Agricultural College has afforded assistance to poultry raisers in some sections of this province in assisting them in the co-operative gathering and storing of eggs during the season of plentiful supply. During the months of April, May, and June the eggs are gathered and stored in tanks with water glass, and are disposed of during the season of scarcity extending during the months of November, December, and January. By this means we have been able to help the farmers to obtain a better price for their eggs, and have also been able to supply the markets at a time when eggs were very scarce. During the season of 1917-18, we handled more than fifteen thousand dozens.

PLOUGHING MATCHES

BY M. CUMMING, B.A., B.S.A., SECRETARY FOR AGRICULTURE

IN reviewing the several ploughing matches held in Nova Scotia during the fall of 1917, the members of our staff came to the conclusion that prizes should no longer be given for narrow furrow, high-cut ploughing, but on the other hand efforts should be made to increase high-class work, more especially with implements and machines that cover the ground more rapidly. Our prize list for the present year has not yet been issued, but it is purposed to have a competition for expert ploughmen along the former lines, to feature the use of the two-furrow plough with three horse hitches, and to work out a plan for single furrow ploughs, having in view rapidity and the kind of ploughing, as well as the quality of the work done.

NEW BRUNSWICK

A LIVE-STOCK INFORMATION BUREAU

THE Department of Agriculture of New Brunswick, has established a live stock information bureau. The breeders of the various classes of pure-bred stock having animals for sale notify the chief of the Live Stock Division. This information is classified and filed. This information is given to farmers who are looking for animals to purchase. The service is proving a great help to the breeders of pure-bred stock, as well as to those who desire to improve their farm animals. A statement of the live stock available in the province is issued once a month to all the agricultural societies and breeders of the province, and to others who write for information regarding the location and price of animals. This monthly statement is revised from returns made to the Department by breeders on forms sent them for the purpose.

FARM SETTLEMENT

THE Farm Settlement Board of the province of New Brunswick placed thirty-three young men on farms in the province last year at an average price for each farm of $894.10. This brings the total of vacant farms purchased since the inception of the Farm Settlement Act in 1912 up to three hundred and forty-five. The great majority of the settlers on these farms are meeting their payments promptly and many have paid up in full, taking their deed. A few, in consequence of bad seasons, and other reverses, have secured an extension of time for which the Act provides. The conditions under which these farms are allotted were published in THE AGRICULTURAL GAZETTE, November number, last year.

The increase in staple products exported from Canada last year over the average annual shipments of the three years previous to the war are very striking. Here is the table as given out by the Canada Food Board:—

Pork	122,000,000	pounds	increase.
Beef	74,000,000	"	"
Butter	12,000,000	"	"
Cheese	30,000,000	"	"
Eggs	15,000,000	"	"
Wheat and Flour	85,000,000	"	"

ONTARIO

THE NEW MINISTER OF AGRICULTURE

HON. George Stewart Henry, the new Minister of Agriculture for Ontario, is of Irish descent, and was born in King township, York county, on July 16,

HON. GEORGE S. HENRY, B.A., LL.B.
Minister of Agriculture for Ontario

1871, the son of William Henry, a native of Ulster, and Louisa Henry, whose ancestors were also from Ulster. He was educated at Toronto Public School, Upper Canada College, University of Toronto, and Ontario Agricultural College, and holds the degrees of B.A. and LL.B. Shortly after completing his education, he took over the 300 acre farm in York township, about ten miles from the city of Toronto, which had been the property of his forefathers, and since that time has been an energetic and successful farmer. He has served in municipal affairs for many years, being in the York township Council in 1903 and continuing as a member until 1910, being reeve from 1907 to 1910, and warden of the entire county of York for 1909.

The question of good roads was a matter in which the new Minister always took special interest, and he has been for many years secretary-treasurer of the Ontario Good Roads Association as well as a member of the York Highway Commission. A few years ago he helped to organize The Farmers' Dairy Company, Limited, Toronto, of which he has been president since its inception. He became a member of the Ontario Legislature in September, 1913, in a bye-election and was re-elected at the general election in 1914. He now assumes the Portfolio of Agriculture, which has been held by the Prime Minister, Sir William Hearst, since the death of the Hon. J. S. Duff a year and a half ago.

A STANDARD CATTLE AND HOG FEED

BY C. F. BAILEY, B.S.A., ASSISTANT DEPUTY MINISTER OF AGRICULTURE

DURING the past year, Ontario farmers have experienced great difficulty in securing cattle and hog feeds, and, as a result, the live stock generally came out of the stables this spring in a thin condition. In a number of cases, conditions proved so serious that farmers were forced to dispose of their live stock, and, in other cases, they had to resort to the feeding of wheat, which we are naturally anxious to discourage at this time. Anticipating a similar shortage of feed this year, the agricultural section of the Organization of Resources Committee took up the study of this question early in April, and appointed a special committee with powers to investigate the whole situation, and enter into an arrangement with the millers, whereby a standard cattle and hog feed would be manufactured and made available to the farmers at reasonable prices. The first problem confronting the committee was the securing of a sufficient quantity of concentrated feeds, such as oil meal, cotton seed meal, and gluten meal, from the United States. Two members of the Committee, together with a representative of the Feed Stuffs Division, Ottawa, visited the Food Administration Board at Washington and were assured that sufficient quantities of the feeds named above would be available for export from the United States.

A tentative form of contract was drawn up and sent to each of the millers in the province. Following this, a joint meeting of the millers and the committee was held at the Parliament Buildings, Toronto, June 13th, at which the whole proposition was fully discussed, and the contract changed in minor details to meet conditions.

The final draft of the contract as agreed upon by the millers, is being sent all the millers interested, and as soon as the contracts are signed and returned to the committee, steps will be taken to secure the concentrated feeds necessary for the manufacture of the standard feed, and machinery set in motion to assist millers in placing the feed on the market.

The formulæ of the hog and cattle feeds are as follows:—

DAIRY CATTLE RATION

At least fifty-four percent of the total feed must be made up of three or four of the following feeding stuffs: Oil cake meal, cotton seed meal, soya bean meal, velvet bean meal, and gluten feed. (The gluten feed shall contain not less than 18 per cent protein.) Provided, however, that not more than 20 per cent of the total feed shall be made from any one of these feeds.

The balance of the feed shall contain sufficient hominy feed or corn to make 15 per cent of the total feed and one or more of the following: corn feed, barley feed, oat feed, beet pulp and wheat bran, and any other feeds that may be from time to time approved by the feed committee. Provided also that the completed feed shall contain not less than 24 per cent of crude protein, 4.5 per cent of crude fat and 45 per cent of soluble carbon hydrates and not more than 10 per cent of crude fibre.

SWINE RATION

The swine ration shall consist of at least 6 per cent of tankage, 10 per cent oil meal, 20 per cent of wheat or rye shorts, 33 per cent of corn or hominy; the balance of the feed shall be made up of one or more of the following: corn feed, barley feed, wheat, bran, or any other feed that may be from time to time approved by the feed committee. Provided

also that the completed feed shall contain not less than 16 per cent of crude protein, 4.5 per cent of fat and not more than 6 per cent of crude fibre.

THE CONTRACT

The contract provides that millers shall purchase the various other articles or ingredients entering into the preparation of the said feeds according to the formulæ previously mentioned; shall assemble the same at convenient warehouses and there mix and prepare the said feeds and have the same later for sale on a day to be mentioned; shall sell, ship and distribute the same only to such farmers' organizations or persons as are approved by the committee; bags or other packages required are to be supplied through the committee; the committee, or persons authorized by it, are to inspect the mills, warehouses or other places of storage, with the books, invoices and other documents of each of the millers at reasonable times; the millers must provide funds to carry on the business and must furnish to the committee monthly statements of the quantities purchased, sold or distributed, and the quantities on hand, whether prepared or otherwise; shall sell the feeds at a price not to exceed $5 per ton over the actual cost of the ingredients, the price to be determined from time to time by a joint committee; shall furnish the committee, when demanded, with samples of the said feeds for the purpose of analysis.

The committee on its part is to furnish to the millers approved formulæ for the composition of the said foods; approve of such sources of supply of said articles and ingredients as may seem proper; arrange that the said articles and ingredients may be imported from the United States; recommend and guarantee to consumers the quality of the feeds and the food values thereof; circularize farmers and farmers' organizations, advertise to a reasonable extent, and place the machinery of the Markets Branch of the Ontario Department of Agriculture at the disposal of the millers for stimulating the sale and use of the said feeds.

The cost price is to be determined by a joint committee of the millers, this committee to be composed of five persons, of whom Mr. C. F. Bailey, Assistant Deputy Minister of the Ontario Department of Agriculture, is to be chairman. Two of this joint committee are to be appointed by the millers and two by the main committee. The joint committee is to act in a general advisory capacity and possesses power to determine all questions arising under the contract.

CANADA'S STATUS IN FOOD PRODUCTION

DR. C. A. Zavitz, Professor of Field Husbandry at the Ontario Agricultural College, has issued a statement which shows that, according to Danish experiments and estimates made in the United States Department of Agriculture, Canada produces *per capita* more food materials obtained from farm crops than any of the other principal countries of the world. The relative standing of these countries in this respect is shown in the following table:—

COUNTRIES	Per cent per capita of food materials from farm crops
Canada	100
Argentina	80
United States	64
Australia	35
German Empire	30
Austria-Hungary	29
France	25
Russian Empire	24
Italy	14
India	11
Great Britain and Ireland	8

PLANT BREEDING FOR NEW ONTARIO

BY W. R. LESLIE, B.S.A., PLANT SPECIALIST, INDUSTRIAL FARM, FORT WILLIAM

THE plant breeding station established on the Industrial Farm at Fort William, as recorded in THE AGRICULTURAL GAZETTE of April last year, has passed through the sort of severe winter to indicate the degree of hardiness for Northern Ontario of many varieties of fruits, shrubs, and trees under test. In making a report on these a few salient considerations should be observed.

Most of the material has been set in its present position only one year; many specimens got away to a poor start, after having a slow journey from distant nurseries; some specimens were weak and equipped with badly mutilated root systems; many were three or more years of age when received, and had apparently not received previous transplanting, and thus the auspices for a good straight ahead start were not so favourable as might have been the case with younger trees; exposure is as yet rather bare and not the most congenial, as the shelter-belt is young and low. In some cases the test was narrow, such as in the few instances where there were as few as two specimens of a variety.

The temperature reached 37 degrees below zero at the station.

PLANT BREEDING GREEN HOUSE AT THE INDUSTRIAL FARM, FORT WILLIAM

VARIETIES SET OUT LAST YEAR

The varieties set out in 1917, of which at least some specimens came through the winter altogether, or nearly, in good condition were:—

Pear—Bessimanka.

Apples—Hibernal; Simbirsk; Patten Greening; Ostrakoff; Wealthy; Duchess; Charlamoff; seedlings from Manitoba-grown standard apples; and seedlings grown in 1917 from seed received from the Dominion Horticulturist, Ottawa.

Crabs—Transcendent; Hyslop; Red Siberian; Yellow Siberian; Dr. Saunders, Hybrids,—first and second generations.

Plums and hybrids—Aitkin; Cheney; Forest Garden; Brandon; Major; Opata; Hanska; Compass Cherry; and wild plums from Eastern Ontario, Northern Ontario, and Manitoba.

Cherries—Sand Cherry, Wild Red Cherry,; Choke Cherry.

Varieties that killed back from 25 to 75 per cent.

Apples—Antonovka; Yellow Transparent; Wismer's Dessert; Tetofsky; Golden

Sweet; Blushed Calville; Borovinka; Longfield; McIntosh; Okabena; Anisim; Repka Kislaga.
Crabs—Whitney; Lyman; Phillips; Excelsior.
Plums and hybrids—Wastesa; Wolf.
Cherries—Prunus Tomentosa; Wragg; Rocky Mountain Cherry.

Varieties that killed back more than 75 per cent.

Pear—Renfrew.
Apple—Gipsy Girl.
Crab—Virginia.
Plums and hybrids—Surprise; Tokeya; Sansota; Mammoth, Oniya; Waneta; Kaga; Odegard; Etopa.

Crabs—Lyman; Transcendent; Hyslop: Isham; Pyrus baccata seedlings and seedlings of hybrid crabs.
Plums and hybrids—Cheney; Aitkin.

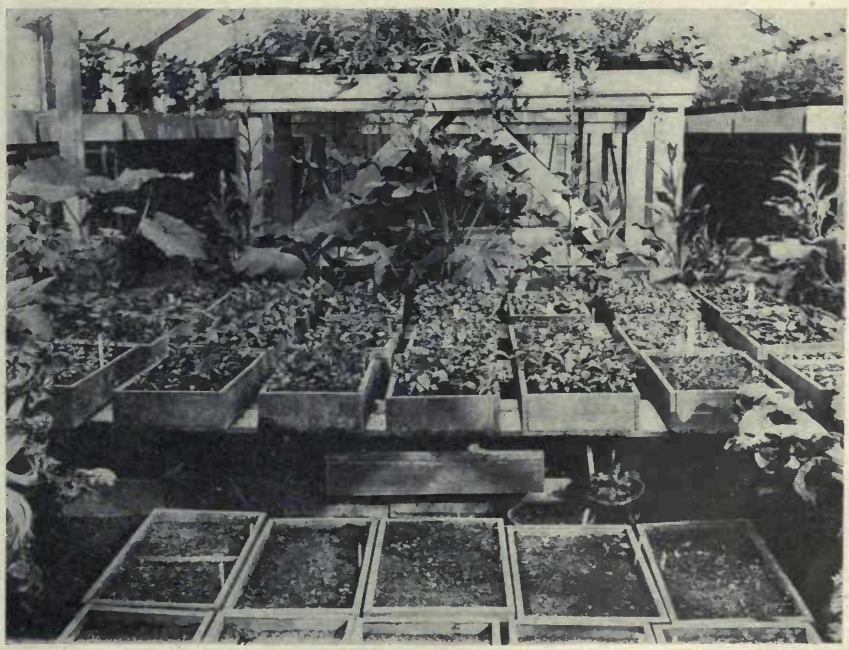
Varieties that killed back 25 to 75 per cent.

Apples—Antonovka; Montreal Peach: McMahon White; Wealthy; Lowland Raspberry; Yellow Transparent; Gipsy Girl; Borovinka.
Crabs—Whitney.
Plums and Hybrids—Waneta; Takota.
Cherry—Rocky Mountain Cherry.

SMALL FRUITS

Practically all varieties of small fruits are in good heart this spring. A number of the different sorts of strawberries received different sorts of treatment. The Glen Mary was in part mulched with straw, with partly rotted manure, and with spruce boughs, and all of these berry plants seem to benefit from their mulch, as was shown in comparison with the Glen Mary plants unmulched.

Most varieties of raspberries were benefitted from being bent over in the autumn.



HARDY FRUIT SEEDLINGS FOR NEW ONTARIO

Cherries—Vladimir: Ostheime; Orel No. 24; Orel No. 25; Fouche Morello; Lieb.

VARIETIES SET OUT IN 1916

The varieties set out in 1916, which came through the winter altogether, or nearly, in good condition, were:—

Apples—Hibernal; Blushed Calville; Charlamoff; Dudley; Duchess; Simbirsk; Repka Kislaga; and seedlings of the following varieties received from the Dominion Horticulturist, Ottawa: Duchess; Anis; Anisim; Antonovka; Hoadley; Patten Duchess.

ORNAMENTAL TREES AND SHRUBS

A list of the ornamental trees and shrubs which in early spring growth are making a satisfactory showing, includes:—

Scotch pine, jack pine, dwarf pine, white spruce, Colorado blue spruce, Siberian arbor Vitæ, Sabin juniper, green ash, mountain ash, basswood, silver maple, golden willow, French laurel-leaved willow, butternut, silver poplar, snowball, elderberry, Ginnalian maple, Van Houtte's spiræa, arguta spiræa, Thunberg's barberry, purple-leaved barberry; common barberry, Tartarian honeysuckle, grandiflora honeysuckle, Viburnum lantana, Viburnum tomentosum, Siberian dogwood, caragana, all lilacs—including vulgaris, Josekea, Villosa, Persian and numerous fancy varieties; and of roses—the rugosa type and a few others.

All native seedlings under test—sugar maple, American elm, canoe birch, white pine, American larch, American yew, cranberry, nanny-berry, arrowwood, Saskatoon-berry, plum, cherries, clematis(purple and white), etc., etc.,—are thriving.

PERENNIALS

Perennials were grown in 1917 from seed received from the Experimental Farm, Ottawa. The plants were mulched with balsam boughs, and the following sorts are in fine condition:—

Aquilegia-mixed and special strains, Althea rosea; Campanula latifolia macrantha; chrysanthemum maxima; Delphinium compacta; Delphinium cashmeriana; Dianthus mixed; Dianthus barbatus; Dianthus deltoides glauca; Gaillardia; Herperis matronalis; Lychnis chalcedonica; Pentstemon barbatus; Papaver orientale; Papaver nudicaule.

Coreopsis grandiflora suffered considerably. Digitalis purpurea succumbed.

At the Northern Ontario Plant Breeding Station but few real convictions as to the complete success, or the impossibility of cultivating different varieties of the material under test, are as yet evident. Among the failures already experienced with plantings of fruit trees and ornamentals, replacements will be made, conditions improved where possible, so that each will receive justice in retrial.

Past experience of experimenters in northern horticulture encourage planters to hope that even in some cases where a fruit tree, or ornamental tree, the first year after planting, kills back a considerable distance that a shoot may spring from the trunk at a point near the ground, and that this shoot, being developed into the future tree, prove quite hardy.

THE FARMERETTE

BY S. H. GANDIER, B.S.A., SECRETARY, O. A. C.

CAN the Ontario farmer use to advantage "farmerette" assistance? In the present acute state of the farm labour problem, almost any sort of assistance should be welcomed, but it is unlikely that the farmer will put much faith in the "farmerette" to solve some of his difficulties until she has demonstrated her real value. In England this class of farm labour is well established, and has proved to be one of the greatest factors in maintaining the standard of agriculture; but Canadian and European agriculture is of a widely different type; therefore, it does not follow that the "farmerette" will prove of equal value to the average Ontario farmer.

"Farmerette" labour in Ontario, in so far as mixed farming is concerned, has been quite unheard of until very recently, when the Ontario Department of Agriculture decided that the experiment was worth trying.

WORK WOMEN CAN DO

During the past two farming seasons, it has been demonstrated that patriotic young women with no previous experience in farm life can do a great deal of useful work in assisting on our Ontario farms with the lighter farm jobs; thus freeing the farmer himself for the heavier work. The feeding of horses and cattle, pigs, poultry, and calves; butter-making; planting, hoeing, and thinning of roots; care of the farmer's vegetable garden, and other light jobs, have been successfully undertaken by women from our towns and cities. Then, again, certain special kinds of farming such as fruit growing, market gardening, and the raising of sugar beets, require a great amount of light labour at certain periods during the season. Many of the fruit and vegetable growers in the vicinity of Toronto, Hamilton, St. Catharines, and other towns and cities, were able to produce and market normal crops in 1917 only because many city women and girls considered it their duty, in these days of limited labour, to do what they could for these farmers during their busiest times.

THREE WEEKS' COURSE AT GUELPH

Many other young women are willing to go out on our farms for the summer of 1918, and, in order to give these girls an opportunity to learn something of the work which they would be expected to undertake, the Ontario Department of Agriculture decided to establish a three weeks' course in practical agriculture at the Ontario Agricultural College, Guelph, from May 1st to 22nd.

A practical course of this kind requires a great amount of personal supervision, and, at this particular season of the year, departments at the college are busy with their spring work, hence it was necessary to limit the attendance in order to insure an adequate teaching and demonstrating staff. An applicant was not accepted unless she was at least eighteen years of age, furnished a doctor's certificate of sound health and agreed to work on a mixed farm in Ontario for at least four months upon completion of the course. The matter of applications for the course, and employment for these young women, was placed in the hands of the Ontario Government Public Employment Bureau at Toronto. The Employment Bureau undertook to guarantee a wage of $20.00 per month and board, and paid railway expenses from Guelph to the farms. Each student was charged $5.00 per week for board at the college.

On May 1st thirty-one young women registered for the course, over half of the number coming from Montreal, Toronto, and Ottawa, and the remainder from the smaller Ontario towns. They were required to wear the National Service uniform, khaki breeches and smock, and presented a neat and business-like appearance.

A PRACTICAL COURSE

The programme of the course was entered upon in real earnest on Thursday, May 2nd, and the girls attacked the work with great energy and enthusiasm. They soon demonstrated that they were heart and soul in the venture, and that they had signed their four months' contracts in all seriousness, with the intention of giving their best to agriculture. In fact, members of the college staff who were dubious of the experiment, were obliged to change their opinons when these young women had demonstrated their possibilities of usefulness.

The entire course was made as practical as possible. Most of the time was spent at work in the gardens, orchards, stables, and farm dairy, giving actual practice in the operations which women are likely to be called upon to perform on the farm. The practical work was supplemented by lectures when necessary.

Each morning milking, cleaning stables, and feeding commenced at 5.30, the class being divided into sections for the work. Breakfast was at 7.30 and the day's work commenced at 9.00 o'clock. The first hour from 9.00 to 10.00 was the only lecture period of the day, the remainder of the morning and the afternoon until 5.00 o'clock being devoted to practical demonstrations, and labour in the garden and orchard, on the farm and at the dairy. One section of the class was scheduled for "milking" at four o'clock.

THE WORK

Following is a summary of the instruction and work:—

Fruit Growing—Pruning trees, bush fruits and raspberries; planting and hoeing strawberries; spraying and dusting; tree planting.

Vegetable Gardening—Garden planning and planting; preparation of land; use of seed drills; seed sowing by hand; transplanting early plants; hoeing, scuffling, weeding, thinning, etc. Special attention was given to "The Farmer's Garden." Each student was given a small piece of land to prepare, plant and care for during the course.

Dairying—Buttermaking at the farm dairy; use and care of cream separators; milking cows at the dairy stable; handling and care of milk; lessons in milk testing.

Animal Husbandry—Feeding calves, horses and swine; grooming, harnessing, hitching and driving horses, cultivating with single horse; care of little pigs; cleaning stables.

Field Husbandry—Cutting potatoes; planting potatoes and other root crops; demonstrations as opportunity occurred in thinning roots, weeding, etc.; identification of the most noxious weeds; instruction in rogueing grain fields for weeds.

Poultry—Care of chicks; feeding laying stock; fattening; plucking; care of poultry houses; treating for parasites; handling eggs.

Early Morning Work—Such morning work as cleaning stables, milking, feeding cattle, calves, horses, and poultry commenced at 5.30, being completed at seven o'clock.

Personal Hygiene—Lectures and instruction in the proper care of the body with special application to the work in prospect.

A COMPLETE SUCCESS

The college staff was delighted with the success of the course. These young city women performed their work during the entire course with enthusiasm and determination. Not content with following the regular programme, many of them visited the various departments after the day's work was completed, picking up pointers not included in the course. It was the ambition of a number to learn to plough and some special instruction and practice in ploughing was given by special request, with the result that several could turn a very fair furrow before the course was over. Every student completed the entire three weeks of training, and at the end of that period all were in good physical condition to perform a full day's work at light farm labour without discomfort. Within a week after the course closed, every member of the class was placed on a farm, and all are now hard at work. If during the next four months this class makes a good record, it will do a great deal toward introducing "farmerette" labour upon the mixed farms of Ontario.

PLAN FOR FINISHING LIGHT HOGS

THE Ontario Department of Agriculture, as a war measure, has adopted a plan for taking over and finishing light hogs that are sold on the Toronto market. A feeding establishment has been organized on the Government Industrial Farm, at Mimico. Provision has been made for the feeding of five hundred hogs at a time. The Department has secured a motor truck for handling feed and other branches of work. While garbage will to some extent be used, the feed will consist principally of standard hog rations, such as corn and mill feeds.

MANITOBA

GOPHER CAMPAIGN, 1918

BY V. W. JACKSON, PROFESSOR OF BOTANY, AGRICULTURAL COLLEGE

ONE hundred and fifty schools have sent in returns averaging about 1,000 gopher tails each. This will mean that about 10 per cent of the gophers that wintered through were destroyed by the boys and girls of the province without in any way interfering with school work.

The Elgin consolidated school wins the Pathephone with 3,362 gopher tails. The Winkler village school wins the Grafonola with 3,352 tails; Souris is second. Coultervale school gets the two-room manual training bench. The other schools get the Department of Agriculture bonus, which, this year, will amount to over $2,000.

SASKATCHEWAN

TRAINING RETURNED SOLDIERS AT THE UNIVERSITY

BY W. J. RUTHERFORD, B.S.A., DEAN OF THE COLLEGE OF AGRICULTURE

THE University has been co-operating since March, 1917, with the Military Hospitals Commission in the matter of re-training returned, disabled soldiers, to enable them to get back into civilian life.

Up to a few weeks ago we had in our classes not only discharged men, but also quite a number of convalescents, who were taking the work for the double purpose of its therapeutic value, as well as from a vocational standpoint. We have enrolled in our classes as follows:—

Motor mechanics	31
Farm machinery	13
Blacksmithing	2
Gas tractor engineering	91
Gas engineering	10
Gas tractor mechanics	1
Steam engineering	11
Automobile operation and repair	8
Machine shop practice	1
Woodworking	5
Poultry	1
Grain grading	3
Associate agriculture	6
Animal husbandry	30

The total number of students who have taken retraining since March, 1917, up to March 31, 1918, is 193. In gas tractor and other engineering classes new relays of students are admitted every two months. In the work in animal husbandry, poultry, grain grading and farm machinery, men are admitted any time they wish to enter.

In the associate course in agriculture they can enter only when the regular class enters—the last of October. We have, however, regular classes going on now in agriculture for the men who are being trained under the Invalid Soldiers' Commission. The class numbers 31; it is a little smaller than usual, owing to the fact that since the work was taken over by the Invalid Soldiers' Commission, we have no convalescents, only discharged men.

A very large proportion of the men who have been trained for any special work have found good positions. A small number have found work in other branches of industry.

ALBERTA

REGULATIONS UNDER THE DAIRYMEN'S ACT

UNDER the provisions of the Dairymen's Act, reviewed in THE AGRICULTURAL GAZETTE of May, page 581, an order-in-council has been passed making the following regulations:

1. The Dairy Commissioner shall arrange for examinations of applicants for Milk and Cream Tester's licenses under the provisions of The Dairymen's Act and these regulations, and shall issue such licenses to applicants who have furnished satisfactory proof of being competent to operate the Babcock Test.

2. Pending the holding of such examinations and the issue of such licenses the Dairy Commissioner may, upon being furnished with references, issue to an applicant a written permit to operate the Babcock Test until the said applicant has had an opportunity to qualify for a license. No such permit must be granted, however, for a period of more than sixty days.

3. The license must be in set form and must be posted in plain view in the testing room of the creamery, cream station or cheese factory in which the licensee is employed.

4. Under this Act the Babcock testing equipment is held to include a thermometer of known relative accuracy, and a suitable vessel for tempering the tests prior to the reading of the fat column of each such test. The said fat column must be read at a temperature which is not over one hundred and forty (140) and not under one hundred and thirty (130) degrees Fahrenheit.

BRITISH COLUMBIA

THE HONOURABLE E. D. BARROW

BY W. J. BONAVIA, SECRETARY, DEPARTMENT OF AGRICULTURE

HON. E. D. BARROW
Minister of Agriculture for British Columbia

HON. E. D. Barrow, recently appointed Minister of Agriculture, is now fully employed with the problems of agriculture which affect the present and future of this province.

The leading feature about the Minister's appointment is the assurance that the portfolio of agriculture will have for its administrative head, an official who will be able to devote his whole time to the task that lies before him, and that to the fulfilment of that duty he will bring a practical knowledge of all matters pertaining to agriculture. Mr. Barrow, who has always been a consistent advocate of co-operation, was one of the original organizers of the Chilliwack Creamery in 1902, and took an important part in the organization of the Fraser Valley Milk Producers' association, of which he was elected president. This, he described to the

United Farmers' convention here in February last as a monopoly, but a monopoly not abusing its unique powers. The association has been an economical and financial success in every way, handling considerably more than a million dollars of dairy products the first year.

The newly elected Minister was born in Hampshire, England, and from his childhood days he has been associated with agriculture in on or other of its branches. His parents and ancestors tilled the soil in the old land. For ten years before coming to Canada in 1892, Mr. Barrow obtained a business training in the provision business, in which he acquired his knowledge of butter, cheese, bacon, etc., and, as soon as he reached British Columbia, he settled in the Chilliwack district and worked among the farmers there for three years. In 1897 Mr. Barrow returned to the Fraser Valley and took up land in the constituency he has represented in the legislature since the general election of 1916. He bought and cleared his own property and is, therefore, in a position to appreciate the trials of the pioneer.

THE NEW PREMISES OF THE COLLEGE OF AGRICULTURE

BY J. A. McLEAN, PROFESSOR OF ANIMAL HUSBANDRY

IN THE AGRICULTURAL GAZETTE for November, last year, there was published a general statement respecting the College of Agriculture of British Columbia and its relationship to the university of this province. Plans had been made in 1914 to proceed with the erection of the various buildings on the site at Point Grey, but this work had been delayed owing to the difficulty of raising the necessary funds. The situation was met by the university taking over the premises in Fairview, where some temporary buildings have been added to those already on the grounds, and until that time used by McGill College. The development of the university has reached such a stage that further buildings are needed in order to cope with the needs. The Government is seriously and favourably considering the making of all further expenditures where they will be of a permanent instead of a temporary value, and it is hoped that the session of 1918-19 will be conducted at Point Grey. The board of governors have planned arrangements whereby this can be done at the minimum of expense. Some time ago a concrete frame for the permanent science building was erected. This is now to be closed in and finished in a temporary way to enable the work to be carried on. In this building it is proposed to locate the administration, library, chemistry, and physics departments. Temporary wooden buildings giving additional floor space of about 100,000 square feet will house the remaining departments.

WORK AT POINT GREY

On the Point Grey site much temporary work has been done by the staff of the College of Agriculture. One hundred acres of land are now under crop, and an additional 110 acres have been cleared sufficiently to enable the land to be seeded with grasses and clovers. The additional grant of 290 acres last fall made it possible to locate the farm buildings and labourers' cottages in right relation both to the campus and the farm proper. The department of agronomy has for three years been doing experimental work with soils and crops, and obtained much valuable information as to the best cultural methods to be employed, and the most productive classes of field crops. The results of

these experiments have been turned to immediate account in arranging rotations, and working out systems of soil management. Eight acres have been devoted to the growing of small fruits and vegetables, under direction of the department of horticulture, and two small orchards—one for experiment, the other for student practice in pruning, etc.—set out. These facilities will give students in horticulture types of standard tree and small fruits, and of grains and seeds. It has two stories and an attic, and is an attractive as well as necessary part of the farm equipment.

Similar work to that done by the department of horticulture in supervision of seed growing is being undertaken, but on a much larger scale, by the department of agronomy. Prof. Boving, at the request of the Dominion Government, has just completed a tour of the agricultural centres of the province, and arranged contracts

HORTICULTURAL BARN, UNIVERSITY OF BRITISH COLUMBIA, VANCOUVER

of vegetables, for class study, and also enable much to be done to improve the strain of standard and suitable types.

HORTICULTURAL STORAGE BARN

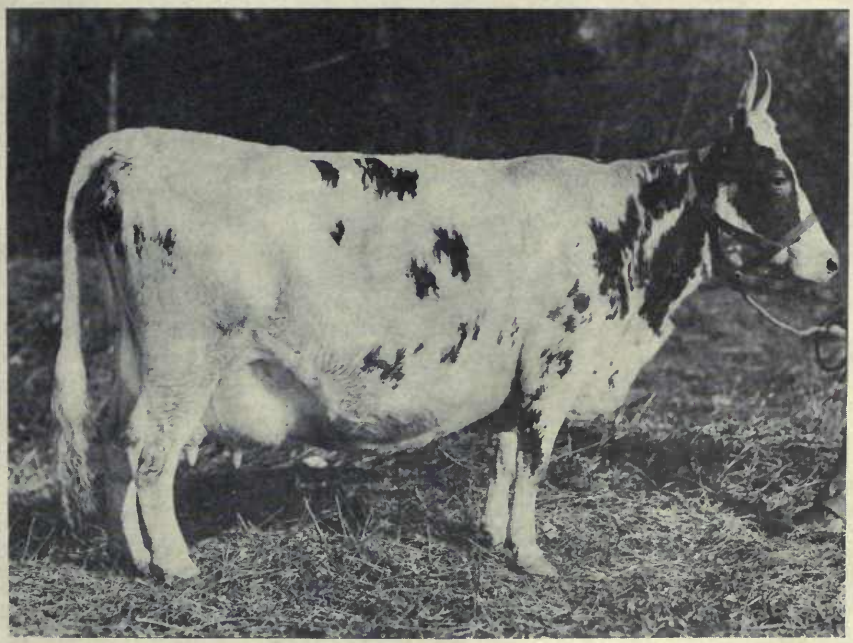
Last season, for the needs of the department of horticulture, a storage barn 63x34 feet was built at Point Grey. This is primarily for the testing, cleaning, sorting, and storing with farmers by which they undertake to devote specified acreages to the raising of grass, root, vegetables, and garden seed. This seed will be grown under university supervision, and the crop purchased by the Dominion Department of Agriculture at an agreed price profitable to the grower. As a result of this campaign undertaken by the university, the acreage hitherto devoted to these

purposes in British Columbia this season, been multiplied tenfold.

ANIMAL HUSBANDRY

The department of animal husbandry, though established but a year ago, can show results different in kind, but equally satisfactory. The first of the series of buildings planned—a dairy and dairy barn—is now under construction. It will be of concrete and tile, rough-cast externally. This will be only a wing of the building as finally constructed, and in addition to a well equipped dairy will give accommodation for forty-seven cows.

The beginnings of an excellent herd of dairy cattle have already been made, there being now at the university farm five pure-bred Jersey cows—all bought in British Columbia—and five pure-bred Ayrshire cows. Among them is the highest milk-producing 3-year-old Jersey in Canada, while among the Ayrshires is Springhill White Beauty, with an Advance Registry record of 12,502 lb. milk and 559.7 fat, a cow that for years held the Canadian record at her age. There is an equally good foundation herd of seven pure-bred Shorthorns. The nucleus of a pure-bred swine herd has been established by the purchase of three Yorkshire sows and a boar. Though not yet equipped to properly house horses, there were reserved for use, from the dispersion sale of the Colony Farm last fall, seven pure-bred Clydesdale mares.



PURE-BRED AYRSHIRE COW, SPRINGHILL WHITE BEAUTY, NO. 28757
Record as a 3-year-old 12,502 pounds of milk and 559.7 pounds fat.

AS TO THE NEAR FUTURE

Plans for the near future in the department of animal husbandry include a live stock pavilion for class judging. This work is at present carried on in the barns. In the short course given in January, as the university had no accommodation suitable for the purpose, the stock judging demonstrations had to be

given in a vacant warehouse down town. Investigation into the cost of milk and live stock production under various conditions, made in co-operation with the producers, are among the activities planned by this department. This, with institute and extension work, the direction of the live stock operation at Point Grey, and consultation and co-operation with Dominion and provincial departments of agriculture, constitute the present programme for this department.

Other building improvements in progress are three workmen's cottages, each with living-room, kitchen, bathroom, and two bedrooms. These have full-size basements and will form the nucleus of a community centre situated on the east side of the farm.

BOTANICAL GARDEN

Another interesting development, of which little is as yet generally known, is the botanical garden, which in a few years promises to be a pronounced attraction. It is a demonstration of the floral resources of the province, visualizing much information concerning soil, rainfall, temperature, and length of growing season. It was organized in 1911, at the Colony Farm, and moved to the university two years ago. At that time it contained over 20,000 specimens, and approximately 900 species and varieties. Between two and three acres are devoted to the botanical exhibit, providing growing accommodation for 2,500 different species of native plants, all assembled and arranged by scientific classification. Another plot is the arboretum, where space is provided for between 50 and 60 varieties of native trees. A pond is to be located at the western boundary of the garden for a collection of water lilies, and other aquatic plants. A commencement has been made in growing different species of native and introduced medicinal plants, and information respecting the analyses of the drug contents of these will be available for those contemplating drug farming.

SILO DEMONSTRATION WORK

BY R. J. FERRIS, SILO DEMONSTRATOR

THERE is an increasing desire by the farmers of British Columbia to become acquainted with the merits of silage as an aid to the cheaper production of live stock. Our operations have covered to a large extent the southern part of the province. The initial policy of the Branch of placing the silos in the outlying districts such as the Okanagan, Arrow Lakes, Kamloops, etc., instead of the more thickly populated part of the province, has proved a first class method of advertising, with the result that they are now being built more rapidly The offer of assistance to the first farmer in an Institute District who erected one of the type of silos which was recommended, has been taken advantage of by 30 per cent of the Farmers' Institutes. There are still a large number of Institute districts where they have not yet begun to feed silage to their cattle. Silage is an economic necessity, and the modern dairy farm is not complete without a silo; especially does this apply to British Columbia with its varyin ; temperatures.

A circular entitled "The British Columbia Farmer and his Silo" was compiled, and the information th re-in given has led to a large number of farmers building silos. There has also been a large demand for the bulletin entitled "Silos and Silage."

Twenty-three silos have been erected by the Department representatives, and thirteen have been filled.

THE DISTRIBUTION OF PURE-BRED MALE ANIMALS

BY W. T. McDONALD, B.S.A., ACTING DEPUTY MINISTER

IN the year 1913, under the direction of our Live Stock Branch, our Department formulated a plan whereby pure-bred sires were supplied to Farmers' Institutes on easy terms of payment. In the case of rams and boars the terms are:—One-half at time of purchase, and the remaining half at the end of one year. In the case of bulls, the terms are:—One-third at time of purchase, one-third at the end of one year, and the remaining one-third at the end of two years. In all cases our Department pays all transportation charges from the point of purchase to the point of delivery. While we deal only with Farmers' Institutes, those organizations have the privilege of transferring the animals to individual members on the same terms. The maximum price to be paid for any animal is a matter of agreement between the Department and the Institute. The sires are carefully selected, and many excellent animals have been distributed.

We have endeavoured at all times to encourage community breeding, and have been in a large measure, successful, owing to the pioneer conditions prevailing in many parts of the province, and to the community efforts already followed in many districts. In this connection an address which I delivered in the winter of 1912-13 at the Dairymen's Convention has been printed in leaflet form, and widely distributed. Our farmers generally have shown a hearty spirit of co-operation in this movement.

It is very gratifying to note that in many cases where pure-bred sires were placed, a number of farmers decided to take up the raising of pure-bred stock of that particular breed.

We had anticipated great influence on the improvement of live stock as the result of this work, and the apparent results have far exceeded even our most sanguine hopes.

Since the work began we have distributed pure-bred stock as follows:—Of cattle, 5 Jersey; 3 Holstein; 12 Ayrshire; 1 Guernsey; 2 Red Polled; 5 Shorthorn; 2 Hereford. Of hogs, 12 Berkshire; 8 Yorkshire; 1 Poland China; 2 Duroc Jersey; 1 Tamworth. Of sheep, 10 Shropshire; 8 Oxford; 5 Hampshire; 1 Dorset. Of goats, 3 Toggenburg.

PART III

Junior Agriculture

DEMONSTRATIONS, COMPETITIONS, AND CLASS-ROOM STUDIES IN RURAL LIFE FOR BOYS AND GIRLS

PRINCE EDWAND ISLAND

HOME PROJECTS

BY J. E. McLARTY, DIRECTOR, RURAL SCIENCE, PRINCE OF WALES COLLEGE

GRADUALLY the practical side of Rural Science in the public school is being devoted to so-called home projects in preference to the garden at the school. A comparison of this work carried on for the past three years will reveal this. In 1915 there were 156 school gardens and 2,688 home projects; in 1916, 113 school gardens and 1,604 home projects, and in 1917, 93 school gardens and 2,250 home projects. The home projects were classed under the following heads for 1917: Grain raising, vegetable growing, beans, potatoes, flowers, poultry, live stock, and chores. The home project scheme and the school fair go hand in hand, the school fair being the finale for the home project work. For 1918 we are very optimistic, and look forward to having every boy and girl enrolled in our schools responsible for a project of some kind.

The Inspectors render valuable assistance in reporting the quality of work done by the teachers and recommending them for their bonuses. This work could be made more effective by the appointment, at present, of one field man who would devote all his time assisting teachers with their troubles right in their own schools. The work has developed sufficiently to warrant such an appointment. Anything that has to do with the betterment of rural conditions is a sound investment.

NEW BRUNSWICK

PRE-VOCATIONAL AND VOCATIONAL TRAINING

THE commission on vocational training for boys and girls, comprising Messrs. F. Magee, M.L.A., J. R. Campbell, M.L.A., G. H. King,, M.L.A., J. T. Jennings, and A. M. Belding, and Rev. Father Tessier, appointed by the New Brunswick Government last September, visited a number of places in Canada and the United States and in their report made the following recommendations:

(1) That in centres where there are not less than 100 in Grades VII, and Grade VIII, pre-vocational classes be organized for pupils who have reached the age of 12,

and who do not wish to take a college preparatory course. That in these classes half the time be devoted to book work and half to practical subjects.

(2) That in smaller centres and rural localities the work of Grades VII and VIII be given a specially practical tendency.

(3) That vocational training be provided for pupils over fourteen years of age; that this be done by establishing special day schools, day departments, and evening classes, according to the wish of the community to be served.

(4) That these schools and classes be under the control of special local vocational committees appointed by the local school boards.

(5) That the province reinburse the local vocational committee for half the cost of maintenance of these vocational schools under terms to be fixed.

(6) That a policy of developing regional agricultural and trade schools be considered by New Brunswick, and that the Woodstock and Sussex schools be used to inaugurate this.

(7) That county vocational educational boards be appointed to control the county vocational schools.

(8) That vocational departments in agriculture and motor mechanics and home economics be developed in schools employing three or more teachers.

(9) That special provision be made at the expense of the province for training pre-vocational and vocational teachers.

(10) That a bill giving effect to these regulations be passed at the 1918 session of the legislature.

(11) That the board of education appoint, before the end of the present school year, a vocational education board to direct and promote vocational education.

SUMMARY OF FINDINGS

In a summary of findings the commission set forth that the modern conception of the obligation of the state as far as education is concerned, includes the training of all boys and girls from 5 to 18 years; that those who do not go to college should be trained for efficiency as workers in the industries of the country; that the school attendance falls off alarmingly after Grade VI; that there were only 2,097 students in the public high schools last year, and of those only 343 reached Grade XI; that there were 16,000 boys and girls between 14 and 18 years old in New Brunswick, and that there are in the province 75,000 housekeepers and 100,000 workers, of whom many would appreciate an opportunity for future training; that the schools of the province do not sufficiently direct the attention of our young people to our great natural resources; that New Brunswick and Prince Edward Island are the only provinces in Canada which have not developed efficient forces in vocational training; that vocational education will hold a large proportion of the pupils in school until they are 16 to 18 years of age; that vocational education should be made accessible to all, and that the training should be furnished in proximity to the worker's home; that vocational agricultural education is being carried to a rural centre successfully in Europe and the United States, and that this is the greatest single need in New Brunswick; that certain subjects such as home economics and motor mechanics are needed in all centres of the province; that the system of federal grants for education has been fully recognized in THE AGRICULTURAL INSTRUCTION ACT of Canada; that everywhere vocational education is preceded by pre-vocational courses for the purpose of holding the pupils until they are 14 years of age to enable them to choose a vocation wisely, and to lay a foundation for real vocational training.

THE RECOMMENDATIONS ACTED UPON

In accordance with the foregoing recommendations the legislature of New Brunswick at its last session passed an Act to be known as "The Vocational Education Act, 1918." Pre-vocational Education is defined as meaning the education to enable a child to select its course of study and training. Vocational education is described as any education, the controlling purpose of which is to fit for profitable employment, and includes industrial, agricultural and commercial education and home

economics. A pre-vocational school is an organization designed to instruct pupils from 12 to 14 years of age who wish to enter industry early. Vocational School is described as meaning an organization to give industrial, agricultural, commercial, and home economics education, under a separate director. For the purpose of administering the Act, the Board of Education is authorized to appoint a vocational educational board consisting of seven members, including, the chief superintendent of education, the principal of the normal school, the Secretary for Agriculture, the director of elementary agricultural education, and three others, including a representative of capital and a representative of labour. The board is to be appointed for a period of three years without remuneration, except for expenses actually incurred.

The duties of the board are to investigate the need for and to aid in the introduction of vocational education, to superintend the establishment of such schools and departments. The board is authorized to appoint such officials as are necessary to administer the Act.

The board of school trustees may on recommendation of the common council, city council, or town council, apply to the vocational educational board for power to establish, equip and maintain the vocational school. Upon the application being approved the school trustees are given power to assess and collect a sufficient sum required for the establishment and equipping of a suitable building and for otherwise carrying on the work. Upon this being done, a local vocational committee is to be appointed by the local school board, such committee to consist of five or seven members, the chairman and secretary of the school-board being also chairman and secretary of the local committee.

Two or more cities, towns or school districts, may combine for the purpose of establishing a vocational school. Any county can establish and maintain a county vocational school or schools, subject to the approval of the vocational educational board.

Any vocational committee may establish a pre-vocational school, subject to the approval of the vocational education board, for the instruction of boys and girls between 12 and 14 years of age who wish to enter industry early.

Vocational and pre-vocational schools established under the Act, are to receive provincial grants. In order to aid in the maintenance of vocational and pre-vocational education, the province is to pay annually to the vocational committee maintaining such school an amount equal to one-half the sum, to be known as the net maintenance sum; such net maintenance sum to consist of the total sum expended for instruction, heating and lighting of such school, less the amount of tuition claims.

Schools boards that have paid grants for tuition in vocational or pre-vocational schools are to be paid provincial grants to the extent of one-half the sums expended in payment of such tuition claims.

Local or joint vocational committees maintaining schools under the Act, in communities of less than 5,000 people, are to receive provincial grants to the extent of one-half of the salaries paid the director and instructors.

It is provided that the sum total of the amounts paid under the Act shall not in any one year exceed $50,000.

QUEBEC

WHEAT GROWING COMPETITION

ONE hundred and eleven Quebec boys between the ages of 14 and 18 have entered the Boys' Wheat Growing Competition which was organized in April by the Cereal Department, Macdonald College, assisted by the Provincial Demonstrators and the Rural School Department.

Those who entered the competition were provided with a bushel and a half of first class Marquis wheat, sufficient to sow one acre. The boys signed a note (not bearing interest), promising to pay for the wheat next December, after the crop has been threshed. Prizes on these acres will be awarded on the following basis:

	Points
Appearance of plot when visited	100
Total yield from acre	100
Quality of bushel shown at fair	100

The competition was divided into eight sections, each section comprising a county. Twenty boys were allowed to compete in each. In only one county, however, were there twenty boys who applied. Below is given the number of boys who entered the contests in each county:

Argenteuil	13
Brome	16
Compton	20
Huntingdon	12
Mississquoi	13
Pontiac	11
Richmond	5
Stanstead	6
Sherbrooke	15

MANITOBA

BOYS' AND GIRLS' CLUBS AND THE HIGH SCHOOL

BY S. T. NEWTON, DIRECTOR, AGRICULTURAL EXTENSION SERVICE

THIS year for the first time every high and consolidated school in Manitoba is taking part in some form of boys' and girls' club work. The juniors are engaged for the most part in raising chickens and in gardening, while the older pupils find most interest in the pig and calf raising contests, and in growing registered seed.

Of the 25,000 who are engaged in boys' and girls' club work fully 3,000 are in the high schools.

Several of the larger clubs have over 50 members raising pigs and 40 raising calves. With these clubs special stock judging exercises will be conducted during the summer, and the calf, pig and poultry judging contests will be an important feature of the boys' and girls' club fair.

In boys' and girls' club work the Departments of Agriculture and Education co-operate very closely, and an effort is made to correlate the educational and economic phases of club work in such a way that the boys and girls, while complying with the rules formulated to govern the contest, are learning agriculture and home economics.

This year no free material was supplied except some 200 bushels of potatoes to new clubs. About 4,000 dozen eggs were supplied, for which the members paid 40 per cent, the Department of Agriculture paying the other 60 per cent. Garden seeds were

supplied at half price, and in a few districts seed centres were established and registered seed supplied at about two-thirds the cost of ordinary seed. At these centres members are engaged in the acre seed contest, and are complying with all the regulations of the C.S.G.A.

Record booklets were provided fo the contests, and the club manager teachers, and inspectors are encou aging the contestants to keep caref records. Ten per cent of the score a the fair will be based on the recor

DAIRYING AT BRANDON NORMAL SCHOOL

IN the June number of THE AGRICULTURAL GAZETTE there is given a description by Mr. B. J. Hales, the Principal, of the dairying equipment which has been set up at the Brandon, Manitoba, Normal School. It will be seen by th photographic illustration herewit presented that the laboratory, whic has a tarazza floor, is very thoroughl fitted for the purpose for which it intended.

DAIRYING LABORATORY, BRANDON, MANITOBA, NORMAL SCHOOL
Described in THE AGRICULTURAL GAZETTE for June, 1918, page 618

THE SHORT COURSE SCHOOLS

BY S. T. NEWTON, DIRECTOR, AGRICULTURAL SERVICES

BETWEEN March 31, 1917, and March 31, 1918, twenty-two short course schools were held in agriculture, gas engines, and home economics. These courses extended over a period of two weeks, and were especially planned to meet the demand for instruction in gas engine operation and care, made so necessary by the shortage of help. But while the gas engine part of the course was especially featured, interesting lectures and demonstrations were given in live stock and field crops, and before the end of the course it was not unusual to find as deep an interest in these subjects as the gas engine work.

It was found most convenient to organize the schools in three circuits, and a carload of equipment was obtained for each circuit, consisting of three tractors, four stationary engines, a lighting plant, a grain-cleaning outfit, about fifty 16 x 20 enlarged bromides of champion live stock, and a full supply of the various grains grown in Manitoba, as well as all the troublesome weeds.

A staff of expert lecturers was engaged for each circuit, made up as follows:—gas engines, two; live stock, one; field crops, one. Wherever the enrolment was over 50, a third practical man in gas engine work was sent.

The forenoons were usually given over to lectures for the whole school, the hours being as follows: 9.30 to 10.30, gas engines; 10.35 to 11.15 field crops, 11.20 to 12, live stock. Practical work was taken in the afternoon, when the class was split into sections.

During the forenoon one gas engine man gave practical instruction in gas engine operation, either to a class of women or to the high school boys. The agricultural lecturers also took advantage of off periods for instruction in the high school.

While probably eight per cent of those taking gas engine work were women, the regular women's classes in home economics were well attended. During the first week the subject taken was usually either dressmaking or millinery, and for the second week cooking or home nursing.

The short course school work commenced early in November and continued throughout the winter. The last courses were held in April. The courses were held at twenty-three places, the average attendance at each place being 48 men and 26 women, and the aggregate attendance of men 19,183 and of women 10,780. The sessions held numbered 455.

DAIRYING AND HOME ECONOMICS

Through the co-operation of the Dairy and Bee Branches, four-day short courses were held at twelve places where dairying is the leading industry. Owing to the fact that the country is not as thickly settled as the districts in which the other courses were held, the attendance was not as large. Nevertheless, the interest was very keen, and the attendance uniformly regular. In women's work, home nursing was very popular, and cookery was the second choice.

For the most part the instruction was confined to live stock breeding and care, particular attention being paid to the dairy herd. The care of milk and cream and bee-keeping were equally popular among the students. At these courses a particularly wide use was made of charts and lantern slides, as well as the bromide enlargements used in the other courses.

Short courses were held at Harcisse, Bender Hamlet, Oak Point, Ericksdale, Mulvihill, Winnipegosis, Inwood, Teulon, Ethelbert, St. Rose, Makinak, Roblin, Neveton, Ashern, the number in attendance at each

session ranging from 15 to 60. The aggregate attendance was 3,152.

HOME ECONOMICS

In addition to the short courses held in connection with the men's courses, a large number of the special five-day courses were held in dressmaking, millinery, cookery, home nursing and canning. The number of courses, average attendance, and aggregate attendance was as follows:

	Courses	Attendance.
Dressmaking	65	22
Millinery	55	24
Home nursing	25	18
Cookery		38
Canning		52

MANUAL TRAINING

During July, the services of eight manual training teachers from the Winnipeg and Brandon Manual Training schools were obtained, and twelve short courses extending over a period of two weeks were held in connection with the boys' and girls' clubs. Binder crates were used to make benches, and the boys brought with them such tools as they were able to find on the home farm. The material used was to quite an extent of the same character. The articles made were chicken brooders, feed hoppers, exhibit coops, wagon boxes, hog self-feeders, etc. By using this kind of equipment, the boys were learning to use the kind of tools, benches, etc., that would be available after the course was over. The aggregate attendance at these courses was over 5,000.

RECAPITULATION

	Aggregate attendance
Short course schools	29,963
Dairy courses	3,152
Home economics courses	37,811
Woodworking courses	5,000
Grand aggregate	75,926

ALBERTA

COURSE IN AGRICULTURE FOR INSPECTORS AT SUMMER SCHOOLS

THE Department of Education for Alberta has this year reorganized the instruction work for public school inspectors at the summer school.

Hitherto, the work has been about the same as the work for teachers, and included school gardening and elementary work on soils and plants. The work this year is to be of a more extended sort. School and home gardens, school fairs, and boys' and girls' clubs will be discussed. The soil and plant work will be changed into practical soil management, crop production, horticulture, arboriculture, and animal husbandry will be added. These lectures will be given by the professors of the University.

The most important addition to the work will be lectures on the generalized aspects of agriculture, which will include farm management, rural economics, and rural sociology. The lecturers include Dean Howes, Professor Cutler, Professor Dowell, Messrs. Geo. Harcourt, E. S. Hopkins and S. G. Carlyle, and Inspector R. H. Roberts. Mr J. McCaig will give a course of lectures on agricultural education, which will be concerned chiefly with the scope and content of agricultural work in elementary, secondary and higher institutions, and of the possibilities and resources of the subject of agriculture in association with general educational work.

This course of lectures as a whole is to be presented from the agricultural side, in order to increase the interest of the inspectors in both the concrete and general aspects of country living and occupation.

AGRICULTURE IN HIGH AND SPECIAL SCHOOLS

BY J. McCAIG, M.A., EDITOR OF PUBLICATIONS

THE writer has been questioned about the duplication of agricultural teaching in general secondary schools and special schools of agriculture, such as there are in Alberta.

Alberta has a system of agricultural schools in operation and likewise has agricultural courses in the high schools. There does not appear to be any real overlapping or duplication of work from the teaching of agriculture in these two types of schools. These two schools differ from each other in the characteristic purpose of the agricultural teaching. The announcement made in the calendar of the Alberta Schools of Agriculture is that "the Schools of Agriculture have been established specially to give the farmer's son and the farmer's daughter that type of education which will better fit them for their business in life, that of agriculture." The agriculture that used to be taught in the high schools began in the first year of the course and extended over a couple of years. It was included in the course of study at that time partly for the reason that it would be valuable for teachers, but was not specially stressed to this end and was probably regarded as a good branch of study to have in the course on general grounds. The course in agriculture in the high schools now is rather explicitly designed for a teacher's course. It is compulsory in grade eleven as a branch of applied science following two years' work in physical and biological science in grades nine and ten. The reason for its being in the course is to give teachers the underlying science of agriculture in order that they can deal with it well in the public schools. The little that they get in the normal schools is not enough, and the agricultural courses in summer schools are purely optional.

THE WHOLE BUSINESS OF REAL AGRICULTURE

The agricultural courses of the provincial Schools of Agriculture take account of soils, soil cultivation and crops, animal husbandry, veterinary science, farm mechanics, dairying, poultry, horticulture, farm bookkeeping and farm mathematics. These are the practical branches. In addition to this we have the science underlying these branches, including chemistry, physics, botany, entomology, and bacteriology. Lectures are given in general aspects of agriculture, such as farm management and economics. The other subjects of the course are English, civics, hygiene and physical culture. The courses for the girls include cooking, sewing, home-nursing, laundry, household administration and sanitation, with the science underlying these subjects, and they likewise have the English, a course in rural organization and sociology, with dairying, poultry, and horticulture optional.

CONCRETE FARM EQUIPMENT

The course of agriculture in the high school includes soil, elementary soil chemistry, seed bed, plant propagation, soil bacteria, weeds, seeds, birds and insects, animal husbandry, and plot work. The chief difference between these courses is that the course in the Agricultural Schools includes all that can reasonably be dealt with in two winter courses in the science, practice and, as far as possible, the business of agriculture, while the other deals chiefly with science, very slightly with the practice, and not at all with the business. For example in the Agricultural Schools, the soil work is dealt with through the facilities of science equipment, plots, and the Demonstration Farms, for each school is located on a typical farm. The

animal husbandry of the schools is carried on through a minute study of breeds, a close study of market types besides the general and veterinary care of all classes of stock. This course is held on the farms. The animal husbandry work of the high schools is a very brief general course relating to the shelter and feeding of animals. The farm management of the schools is not represented in the high schools at all. In the special schools it is made concrete by the work illustrated on the Demonstration Farm. In addition to this, the dairy, poultry, horticulture, and mechanics are all distinctly normal and practical in aspect, and the whole course bulks up into a complete farmer's course.

RESULTS

The best results of the special school are the making of good farmers and home-makers. The best results of the high schools are that pupils in attendance get some well presented information about agriculture with some inside laboratory work and a little plot work. The atmosphere in one case is the atmosphere of the farm, in the other case the atmosphere of the academic high school. The establishment of the special schools of agriculture might be defined as an attempt to get education into agriculture. The incorporation of agricultural courses in the general high schools might be defined as getting agriculture into education. The former of these must be regarded as coming from below and the other from above. The special school movement is the expression of the effort of the agricultural industry to get systematic teaching to the illumination of practice. The other movement is the recognition of the obligation which the school-master feels with regard to incorporating the principles of agriculture into general educational effort.

SPECIAL SCHOOLS MEET SPECIAL CONDITIONS

Where high schools are teaching trade agriculture in places where special schools are also established, there must be a duplication of effort, but the fact of the existence of these two schools has perhaps already brought about a necessary differentiation in their use. It cannot really be said that there is any duplication of effort in agricultural work in the Alberta schools. It would be difficult, or impossible, for the general high schools to do the work that is being done by the special schools. There are no academic restrictions on entrance to the Agricultural Schools, the course is only about half the length of the yearly course of the high schools, and the whole environment is not such as could be secured in the academic high school.

HIGH SCHOOLS CONSERVATIVE

It is not for anybody to dogmatize with respect to what can be done in any schools with regard to adjustment and transformation of courses, but in places where there are no special secondary schools in agriculture such as there are in Alberta, it may be pointed out that the training of farmers is not being done in the high schools, but that the colleges of agriculture are doing this secondary school grade of work. The Agricultural Schools in Alberta, while they are finishing schools with respect to the greater number of pupils who attend them, are integrated with the College of Agriculture of the university, and are not stub lines in the traffic of agricultural ideas.

The special schools are to some extent regarded as an expression of the idea that the school masters are too conservative and unsusceptible in the incorporation of social and industrial interests in their work. The composite high school has greater possibilities for functioning properly on the side of urban industrialism than it has on the side of country

industrialism, because the teaching and housing for both instruction and practice for the former can be concentrated within school walls. The general or academic high school is handicapped for agricultural work by a more or less autocratic origin, and a professional or scholastic atmosphere. The idea of broad inclusion is not necessarily good. We are fond of big schemes, big ideas, and centralization, but the diversification of services is on the other hand a characteristic mark of advance in the complexity of an active civilization.

THE SOCIAL ARGUMENT

This discussion so far has taken account of how the high schools and special schools are functioning in Alberta, and it likewise has taken account to some extent of the suitability of these different schools for real agricultural teaching. There are other questions involved in the discussion. For example, there is the question of social cleavage arising from the establishment of special purpose schools. It is claimed on the social side that the training of people in agriculture by themselves results in intensifying the evils of farm isolation, to the end of simply moulding this personal isolation into community or class bigotry, and, likewise, that it limits the opportunities of boys and girls for becoming interested in what boys and girls of the same age are doing in other things. The pupils of these schools, however, are all over sixteen years of age, and have already chosen their profession, and are people who are seeking a direct knowledge and efficiency.

Another argument against the trade school is that study with an economic basis may lead to selfishness rather than to liberal and enlightened service. This, however, is a question of progressive moulding of the teaching of the schools to take account of community interests represented in the study of rural sociology and organization and rural economics, civics, literature, and history. Whatever may be the dominant aim of these schools, no one would maintain that the experiences of the pupils should not be made round and complete, so as to develop and reflect both the individual and community resources and powers in the personality and nature of the child.

Arrangements have been made for the Allied Buyers' Purchasing Commission to open an office at once in Canada to look after the purchase of Canadian food supplies for shipment overseas. Heretofore the Commission has directed purchases from New York. The Canadian office will be located in Montreal.

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications, and Notes

A NATIONAL FLORAL EMBLEM

THE SANGUINARIA, S. CANADENSIS

BY MRS. E. L. CURRY, PORT HOPE, ONT.

May I suggest a flower for the graves of our fallen heroes in France that I have never seen spoken of in any of the horticultural discussions. I refer to the Sanguinaria, S. Canadensis, the Bloodroot or Puccoon of North America. It is a beautiful pure white flower, with heart-shaped pretty leaves. The name is most symbolical, and both the flower and the leaf, when picked, drop blood. In the spring of the year 1915, when our boys were falling by the score, and this flower was blooming in our woods and hedges, I never picked the flower without a thought of our brave young lads who had given their lives for us, and it has always been in my mind, that if ever flowers were planted on French soil from Canada, this Bloodroot would be a perfect flower. It makes a splendid border; my mother has had it transplanted for years from the woods to her flower borders, and every spring it is beautiful.

Personally, I do not see how any one flower can be called *the* Canadian emblem. Every province has its own special flowers, which seem to flourish well just in that province, and I know nothing will ever take the place of the Maple Leaf. The Poppy, so often mentioned, is a flower very common in all the wheat fields of the old land, and to me it does not appeal at all for the graves of our lads.

I hope my suggestion may bear discussion. No flower will bloom all the season, but when the Canadensis is not blooming the leaves are pretty, and always look green.

COMMUNITY CLUBS

Under the direction of the Women's Department of the Bureau of Farm Development in the Memphis Chamber of Commerce, forty-two separate community clubs have been organized into one institution. This organization has a united membership of over 3,000 men and women, who work hand-in-hand for community betterment, and by their union are enabled to accomplish works of a magnitude worthy of attention.

The activities of these clubs are five-fold. They strive to improve their communities in education, sanitation, beauty, recreation and conservation, or home economics, the sum total of which is more happiness, prosperity and health for every citizen therein. In the educational work they foster the consolidation of the "district schools" into consolidated community organizations in which a higher grade of instruction may be provided. They work for the teaching of agriculture in the schools and strive toward the erection of agricultural high schools at suitable centres. Domestic science, for the training of the future farm housewives, in all rural schools is part of their programme. Playgrounds of the proper type for the boys and girls; story telling sessions conducted by members of the community, and provision of music for the country boy and girl, are all factors for which they reach successfully.

A RURAL COMMUNITY CENTRE

THE rural community social centre idea has made rapid progress in the state of Wisconsin. The method by which some of the difficulties of organization and the securing of suitable quarters for social activities were overcome is exemplified in the experiences of the Lake View Farmers' Club that has brought about a distinct change in public sentiment along community lines.

The Lake View Farmers' Club, organized in the spring of 1913, is located in a strictly agricultural community. The club grew until soon almost every family in the township was a member. Like most new clubs it has been meeting at the homes of members and these it outgrew. Then it met at the schoolhouse which proved too small. This brought the club face to face with the problem of an adequate meeting place if it were to grow and expand. But there was no convenient place in the township except the school building.

"A TOWN HALL FOR LINN"

For some time there has been a feeling that the township should have some form of a community house for general public social use. But there was no unity of sentiment until the club, eight months after organization, chose as a subject at one meeting "A Town Hall for Linn." The club had no money for such a building so it decided to ask the voters of the township, most of whom were club members, to vote the necessary funds. Petitions were circulated, committees appointed by the club to take the necessary legal steps to bring the matter before the voters and to confer with residents of the township regarding the type of hall and the site on which it should be built.

Next the club began moulding public sentiment in favour of the township hall and the voters responded by voting the necessary appropriations. The proposal carried by a large vote and less than one year from the time the matter was first discussed the hall was built and paid for from public funds. The Lake View club built up the sentiment; the taxpayers paid the bill. The building was termed "Linn Township Hall." It was designed especially for general community use and the entire community uses it. It is a real community centre.

THE AIMS OF THE CLUB

The club set out with two aims. First, to bring the people together for social intercourse so that they might become accustomed to being sociable together. Second, to provide something of value from an educational standpoint on general farming subjects. Its programmes are varied and consist of solos by club members, choral selections by the school children, from the various schools in the township, dialogues, recitations and short debates by members. Sometimes there is a special speaker, but an effort is made to confine the programme to club members. Now the attendance at meetings rarely falls below 400, and the new township hall is often taxed to capacity. Following the meetings as much time as possible is spent in a purely social way.

ITS ACTIVITIES

During its first year the club took an active part in the corn contest among school children which was turned into a children's township fair in 1915. The club arranged for the fair and the exhibit of children's products was remarkable. The spirit of co-operation was rampant. When the children's fair was held for the first time in 1915 the club awarded $100 in premiums. During the last three winters the club has sponsored a five-number lecture course; and each year an agricultural school, lasting four days, is held at the township hall by the club. This has proven one of the club's greatest successes. This club has also held many agricultural tours for members, which included visits to successful farms, and has always been an active supporter of its county fair, where it has always been represented.

THE VALUE OF VOCATIONAL TRAINING

An examination of the records of 839 graduates of the Baron de Hirsch trades school in New York shows that these young men at an average age of 17 had their earning power increased 74% as the consequence of a five and a half months' trade school day course in vocational training. In the co-operative Industrial school at Beverley, Mass., which admits boys at 15, in the 120 weeks of shop work the boys increased their average earning power in competition with other workmen by more than 250 per cent. In the Worcester, Mass., boys' trade school, the records show that the average pay the boys get on graduation is $15 per week, and that after two years the average reaches $22 per week. The Williamson free school of trades in Pennsylvania completed its twentieth year in 1913. At that time its 965 graduates were making an average wage of $1,516.45 each.

ASSOCIATIONS AND SOCIETIES

FOR THE UPLIFT OF THE VETERINARY PROFESSION

At this year's annual meeting of the Veterinary Association of Manitoba, held at Winnipeg, Man., the following recommendations were adopted and ordered to be sent to the other veterinary associations in Canada for consideration:

1. That there is a pressing need for closer supervision of Veterinary Education and Training throughout Canada.

2. That in view of this need, there should be formed immediately an official Advisory Board on Veterinary Education and Training in Canada.

3. That the personnel of this Board should include the Veterinary Director-General for Canada and a representative from each province, selected by the Veterinary Association of each province.

4. That the purpose of this Board should be, among others, to revise and improve the status of Veterinary Education and training at colleges, in keeping with the needs of the Live Stock industry of Canada: also to consider the basis under which the Dominion aid is granted to veterinary colleges under THE AGRICULTURAL INSTRUCTION ACT, to determine the best purpose to which it might be applied in the interests of agriculture through veterinary science.

5. That a community of interests exists between the Department of Agriculture, the Live Stock Industry, and the Veterinary Profession of Canada, in regard to this matter.

6. That in furtherance of the subject matter and objects herein presented, joint action and co-operation is desired for the formation of such a Board.

7. Therefore the Secretary-Treasurer and Registrar of this Association is hereby empowered to refer this resolution to the Department of Agriculture for Canada and the several Veterinary Associations in Canada, and such others as may be interested, for their earnest consideration and co-operation.

For consideration of the foregoing recommendations a conference was held in the office of the Veterinary Director General in the city of Ottawa on May 14th-16th, 1918, there being present:—Dr. S. F. Tolmie, M.P., Victoria, President, British Columbia Veterinary Association; Dr. McCord, Edmonton, Secretary-Treasurer, Alberta Veterinary Association; Dr. Chasmar, Hanley, President, Saskatchewan Veterinary Association; Dr. McGilvray, Winnipeg, Secretary-Treasurer, Manitoba Veterinary Association; Dr. Torrance, Veterinary Director General, Ottawa; Dr. C. S. Macdonald, Toronto, President, Ontario Veterinary Association; Dr. Hilton, Ottawa, President, Central Canada Veterinary Association, who also represented the Essex, Kent and Lambton Veterinary Association; Dr. M. C. Baker, Montreal, Honorary President, Quebec Veterinary Association; Dr. George Townsend, New Glasgow, President, Nova Scotia Veterinary Association, and Dr. J. H. Frink, St. John, N.B.

The Veterinary Director General explained that the conference had been called at the request of the Honourable the Minister of Agriculture for the purpose of discussing matters in relation to better veterinary education and more uniform veterinary legislation. A number of resolutions were adopted bearing on these subjects and approving the establishment of a permanent Veterinary Advisory Board.

THE CANADIAN PERCHERON HORSE BREEDERS' ASSOCIATION

The Canadian Percheron Horse Breeders' Association held a meeting at Calgary, on May 4th, to review the Percheron awards at the leading Alberta and Saskatchewan exhibitions. It was decided to offer a series of special prizes at each of the exhibitions, having for their object the increase and improvement of Percheron breeding in the two provinces. A condition is made that the exhibitions must offer the same amount in prizes, and the same classes, for Percherons as are provided for Clydesdales. The prizes are only to be given for registered stock.

UNITED FARMERS OF ALBERTA

The United Farmers of Alberta, in order to support the efforts of the Canada Food Board and the Canada Board of Grain Supervisors in their effort to have all surplus Canadian wheat shipped overseas before the American crop begins to move, have addressed an appeal to the officers and members throughout the province to have surplus wheat marketed with the utmost speed.

ANNUAL MEETING OF SECRETARIES

The annual Secretaries' Convention of the United Farmers of Alberta will be held this year at two points. The secretaries residing in the southern part of the province will meet at Calgary on July 2nd and 3rd, and those at northern points at Edmonton on July 9th and 10th. The purpose of the Secretaries' Convention is to discuss the problems that affect local secretaries in their work. The provincial secretary is H. Higginbotham, Calgary.

WESTERN STOCK GROWERS' ASSOCIATION

At the Western Stock Growers' annual convention held recently in Medicine Hat, a resolution was passed suggesting that such regulations should be framed as would result in the utilizing of outlying districts in Northern Alberta for the raising of live stock, until such time as transportation facilities have been brought within reasonable distance of the lands to make them more operative for farming purposes. The following officers were elected: Hon. Presidents, Hon. T. A. Crerar and Hon. Duncan Marshall; president, Walter Huckvale, Medicine Hat; first vice-president, Dr. J. G. Rutherford, Calgary; 2nd vice-president, Walter Clive; secretary-treasurer, A. P. Burns, Medicine Hat.

ALBERTA NATURAL HISTORY SOCIETY

BY MISS R. E. TYSON, SECRETARY

Several members of the Alberta Natural History Society take a keen interest in bird life and make it their especial study. They endeavour to arouse interest in the subject amongst school children and to encourage the protection of birds. Articles on the value of birds and advocating their protection are published from time to time in the local papers. A list of the birds of Alberta made by Mr. C. B. Horsbrugh was published in the provincial report of agriculture for 1916. Another activity of the society has been to encourage residents of Red Deer and the surrounding district to set up bird houses and to otherwise encourage birds to remain in the district.

CANADIAN GOAT SOCIETY

The first annual meeting of the Canadian Goat Society was held in Vancouver, B.C., on May 11th. The officers, all of whom were re-elected, are: President, D. Mowat, McKay, B.C.; vice-president, R. B. Samuel, Kingsville, Ont.; directors, A. French, Vancouver, B.C.; Ray Knight, Raymond, Alta.; G. H. S. Cowell, Port Alberni, B.C.; C. N. Stetson, Winnipeg, Man.; G. E. O'Brien, Toronto; secretary-treasurer, Geo. Pilmer, Victoria; B.C. It was decided to register with the National Live Stock Records Board, and to contribute 5 per cent. of the Society's income towards expenses. A resolution was passed that the male progeny of foundation stock be not registered, and that the constitution be amended accordingly. It is understood by this that if either sire or dam is registered as foundation stock the buck kids cannot be registered, but that the doe kids can be, and that when these doe kids are bred in time to registered pure-bred bucks, both their male and female progeny can be registered.

Another resolution passed was that the Records Board be asked to provide space on registration certificates and applications for registry forms for the colour markings of animals, and whether horned or hornless, or dehorned, and that no animals be registered which do not conform to the colour markings of the breed.

THE WESTERN CANADA IRRIGATION ASSOCIATION

BY ROBERT J. C. STEAD, ACTING SECRETARY, CALGARY

The Western Canada Irrigation Association, which holds its twelfth annual convention at Nelson, British Columbia, on July 24, 25, and 26, is a somewhat unique organization. There are no membership fees, no profits, and no dividends. The Association is supported in its work by grants from governments and institutions interested in developing the resources of Western Canada. Its functions are largely educational, although by centralizing public opinion with regard to irrigation problems

the Association is also able to bring to bear an important influence toward improving the conditions under which irrigationists must labour.

The first convention of the Association was held at Calgary in 1907, and since that time no year has passed without this convention, which has come to be quite an annual event with farmers and those interested in irrigation. In 1908 the convention was held at Vernon; in 1909, at Lethbridge; in 1910, at Kamloops; in 1911, at Calgary; in 1912, at Kelowna; in 1913, at Lethbridge; in 1914, at Penticton; in 1915, at Bassano; in 1916, at Kamloops; and in 1917, at Maple Creek, Sask. It may be noted that the 1917 convention was the first held outside of the borders of Alberta and British Columbia. The entry of Saskatchewan into the Association is an evidence of the steadily increasing interest in irrigation, and the recognition that the benefits of irrigation may very well be applied to many districts which did not formerly recognize their value.

Steps that have been taken towards the preparation of the 1918 programme give assurance that the addresses will be of a high order. A number of the leading irrigation authorities from the United States are expected to address the convention.

ONTARIO PLOUGHMEN'S ASSOCIATION

The programme for the International Ploughing Match Tractor and Farm Machinery Demonstration, to be held under the auspices of the Ontario Ploughing Association at the Central Experimental and Booth Farms, Ottawa, on October 16, 17 and 18, provides for 16 classes, for which trophies and cash amounting in value to $1,748 will be awarded. Many of the prizes are of a special nature donated by various firms, generally of Ottawa. The first day will be devoted to farm machinery demonstrations, the second to walking and riding plough competitions, and the third to tractor and seed-drilling competitions. Several classes are open to boys under 17 years of age and others to boys under 18 years, also to Indians and Indian boys. Entries for the competitions must be made at Headquarters Tent, Central Experimental Farm, before 8.30 a.m. on October 17th. The presentation of prizes will take place at a luncheon to be held at 1 p.m. on the third day.

NEW PUBLICATIONS

THE DOMINION DEPARTMENT OF AGRICULTURE

THE LIVE STOCK BRANCH

Karakule Sheep and Persian Lamb Fur Production, by G. Erle O'Brien, is pamphlet No. 15 of the Sheep and Goat Division of the Live Stock Branch. In the eight pages of which this pamphlet consists, there is given a complete history of the introduction of the Karakule sheep into Canada and the United States, along with information as to the value of the wool and of the flocks that exist in other countries.

THE PROVINCIAL DEPARTNENTS OF AGRICULTURE

QUEBEC

The Household Pig, by H. Barton, Professor of Animal Husbandry. This is a Macdonald College bulletin giving advice to householders on the keeping of pigs. Diagrams of the structures required are supplied, with dimensions, and advice tendered as to feeding, etc.

ONTARIO

The Vegetable Growers' Association.—The 13th Annual Report of the Ontario Vegetable Growers' Association, being for the year 1917, with a number of illustrations makes a blue book of 84 pages. It gives a full account of the convention held at Toronto, on February 15th, 1918.

Fruit Growers' Association.—The 49th Annual Report of the Fruit Growers' Association, being for the year 1917, makes a blue book of 80 pages and contains the proceedings of the 58th annual convention held in Toronto, on February 14th and 15th, 1918, at which many valuable papers were read.

Women's Institutes, Part II, just issued, of the Provincial Superintendent's annual report of the Women's Institutes for 1918, provides a list of summer meetings and of lecturers with subjects. Advice is also given to district and branch officers with some general notes.

ALBERTA

The Silo in Alberta, by S. G. Carlyle and J. McCaig. This is a ten-page, well illustrated bulletin dealing with ensilage, ripening of the fodder, materials for the construction of the soil, the foundation, the location, capacity, and methods of filling and using.

BRITISH COLUMBIA

The Horticultural Branch of the Provincial Department of Agriculture has recently issued circulars on the following subjects: "Gardening on a City Lot", "Forcing Houses and Frames for Producing Early Vegetable Plants", "Apple-Aphides", "Top-Working of Fruit Trees and Propagation", "The Peach Twig Borer", "The Strawberry-root Weevil". "The Woolly Aphid of the Apple", "The Onion Thrips", "The Imported Cabbage-Worm", "The Lesser Apple-Worm, Codling Moth", "Soap Solutions for Spraying", "The Oyster-Shell Scale", "The Cabbage-Root Maggot".

MISCELLANEOUS

The Lethbridge, Alta., Board of Trade has published a report of a convention held at Lethbridge, on June 22nd on "More and Better Water for Our Farms and Rural Communities". At the convention a number of valuable addresses were delivered by prominent agricultural and railway officials.

Western Canada Live Stock Union. The report of the annual convention of the Western Canada Live Stock Union, held at Regina, Sask., November 14th and 15th, makes a volume of 158 pages. It contains addresses delivered by the Premier of Saskatchewan, the ministers of agriculture for the three Prairie Provinces, the Dominion Veterinary Director General, and other federal and provincial officials.

The Board of Agriculture for Scotland has published the second number of *The Scottish Journal of Agriculture*, issued quarterly. The publication corresponds closely with the *Journal of the Board of Agriculture* issued by the British Board of Agriculture and Fisheries. The initial number was introduced by the Right Honourable Robert Munro, K.C., Secretary for Scotland, who pointed out that *The Scottish Journal of Agriculture* would be the vehicle for conveying to those interested the results of experiments and investigations, for recording the activities of organization societies, for narrating the programme of women's institutes and other bodies designed for the betterment of rural conditions, and for setting out the relevant and important matters contained in the journals and proceedings of agricultural departments in all parts of the world. The aim of *The Scottish Journal of Agriculture* is, therefore, much the same as that of THE AGRICULTURAL GAZETTE of Canada.

NOTES

Mr. R. Schuyler, Agricultural Representative in Brant County, Ontario, has been instrumental in organizing the Brant District Horse Breeders' Association.

About seventy rural education associations have been organized in the province of Saskatchewan and others are being formed from time to time. These organizations are destined to be an important feature in the rural communities of the province.

Mr. E. P. Bradt, Agricultural Representative for Dundas County, Ontario, after assisting at demonstrations in treating grain for smut and potatoes for scab, makes the observation that these preventive measures are being more generally used in Dundas County this year than ever before.

Mr. E. K. Hampson, Agricultural Representative in Welland County, reports that farmers are meeting the labour situation by the use of wider machinery and the adoption of methods not previously considered feasible One farmer is having his hay racks all built low and is arranging to load both hay and grain with the hay loader.

Mr. G. W. Collins, Agricultural Representative at Fort William, Ontario, reports that every public school pupil who is able to cultivate a home garden plot has taken seed this year and has resolved to do the utmost to produce something of value as food. The Fort William Board of Education is taking a keen interest in the work and has delivered thousands of packages of seed to the pupils.

Three live stock associations have been organized this spring under the direction of J. M. McIntosh, Agricultural Representative for the Temiskaming District. The latest one formed, which has twenty members owning sixty-five cows, desires to obtain a dual purpose Shorthorn bull.

To assist farmers in the Thunder Bay District to secure seed oats, Mr. G. W. Collins, Agricultural Representative at Fort William, took the matter up with the officials of the Government elevator at Fort William and with the Seed Purchasing Commission at Regina, through whom he was able to secure more than one thousand bushels of seed of a satisfactory quality.

Twenty-four stall-fed cattle were sold recently at Prince Albert, Sask., jail farm and brought an average of $14.55 per cwt. The total weight of the cattle was 27,480 lb., and the heaviest steer weighed 1,430 lb. The average weight of the 24 steers was 1,145 pounds. They were mostly two-year-olds with a few three-year-olds, and were fed nothing but hay and turnips from December 1st to February 1st, when crushed grain was added to the rations.

A summary of reports made by Agricultural Representatives to the Ontario Department of Agriculture on June 10th, stated that the excellent germination of seed corn was a surprising feature of the season, as so much soft corn was complained of last year. In some of the Lake Erie counties the crop had already received one or more cultivations, and was considered to be very forward in growth. In the same district sugar beets and mangels had already been thinned. Potatoes were also well advanced.

The Department of Agriculture of Manitoba has issued conspicuous posters for exposure in public places, calling attention to services rendered by the Department. A poster on the subject of the co-operative marketing of wool gives advice about shearing and shipping. A poster on potatoes makes recommendations in regard to varieties, treatment of seed, soil, and cultivation and recommends bulletins on potato culture issued by the federal and Manitoba Departments of Agriculture. A poster-headed "Save Cattle from Blackleg" describes the symptoms and cause and methods of prevention that should be adopted.

In the prize list of the Rural School Fair to be held at Cooksville in Peel county, Ontario, provision is made for a Baby Show. The entries include groups of three or more babies, boys or girls, between the ages of six and eighteen months, from one school section. The following points will be considered by the judges: Healthful appearance, proper clothing, good looks and standard weight and measurements. The first prize consists of a coal oil stove for the school, to be used in teaching lessons in Home Economics. The second prize is a set of books on Home Economics for use in the school library.

The Manager of the Eastern lines of the Canadian Government Railways, headquarters at Moncton, N.B., took every means possible to encourage the employees in doing their best to increase production. Advertisements were inserted in the *Employees' Magazine* and circulars sent out inviting the cultivation of tracts of land along the right of way in the various sections. Last year, as a result of this campaign, 434 gardens averaging three-fifths of an acre each were cultivated on the right of way. In district No. 2, the centre of which is Campbellton, N.B., 182 permits were granted to persons who cultivated sections of land varying from small garden plots to stretches of over two acres. In No. 1 district, in Quebec province, 41 permits were issued. In district No. 3, Moncton being the centre, 26 permits were issued and in No. 4, New Glasgow, N.S., 18 were issued. In Prince Edward Island 20 permits were issued. Altogether a total of 243 acres were cultivated. A nominal sum of one dollar is charged cultivators, which can be remitted if circumstances warrant such remission. Adjacent property owners to right of way are also given permission to cultivate the lands.

The St. George Industrial School and Farm, established at Lytton, British Columbia in 1900 for the instruction of Indians in agriculture, possesses a farm of over 600 acres where mixed farming is carried on under the guidance of a skilled manager, who spent his earlier life in New Zealand, where the experience he gained in irrigation specially qualified him for farming in the British Columbia dry belt. About 135 acres are under cultivation in grain, roots, clover, and alfalfa. Fifty head of cattle are kept. Originally the majority was Shorthorns, but lately special attention has been paid to Holsteins. A registered Holstein bull is kept for the use of outsiders, Indian and white. Both boys and girls are taught at the school. Last year, with the assistance from the Agricultural Department of Victoria, a silo with a capacity of 90 tons was erected, and filled chiefly with corn. Butter-making is a prominent feature. The boys stay until they are eighteen years of age, and are taught farming in all its various branches and gardening, that is, if they are Lytton and Thompson River Indians. If they come from districts where there is no farming land, such as the Lower Nass and near Prince Rupert, they are taught to milk and to garden. They are also given instructions in carpentry and blacksmith work. Two of the Indian lads recently secured employment in the coast shipyards at $4 a day. A good grade Percheron stallion has been placed on the farm by the Indian Department for the benefit of the Indians to grade up the cayuses to a size more suitable for farming. An apple-packing school was one of last year's features, and it is intended to hold another class this year, with the expectation that both girls and boys will be able to help in fruit picking.

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The British Columbia Farmer, Vancouver, B.C., May, 1918.

Neglected Bees to Increase Honey Production, F. W. L. Sladen, Dominion Apiarist, Ottawa, page 35.

A substitute for the Pasture Lot, E. W. Hogan, B.S.A., Soil and Crop Instructor for British Columbia, page 12.

Mixed Grains for Poultry Feed, W. H. Hicks, Experimental Farm, Agassiz, B.C., page 38.

Gardening for the Home, H. M. Eddie, F.R.H.S., Growing Department, British Columbia Nurseries, page 42.

The Canadian Countryman, Toronto, Ont., May 18, 1918.

Cutting Costs on the Dairy Farm, Professor H. H. Dean, Ontario Agricultural College, page 657.

May 25—Protect your Buildings against Lightning, Professor W. H. Day, Ontario Agricultural College, page 687.

June 1—The Tractor on a Dairy Farm, Professor H. H. Dean, Ontario Agricultural College, page 715.

June 8—Increasing Bees, F. W. L. Sladen, Dominion Apiarist, page 179.

The Canadian Home Journal, Toronto, Ont., June, 1918.

The Canadian 'Teen Age Army, Isabel M. Ross, Educational Division, Canada Food Board, page 21.

The Canadian Horticulturist and Beekeeper, Peterboro, Ont., June, 1918.

Leaf Spot a Dangerous Disease, W. E. Biggar, Chief Fruit Pests Inspector, Hamilton, Ont., page 150.

Marketing Basket Fruits, P. J. Carey, Chief Fruit Inspector, Toronto, page 145.

The Farm and Ranch Review, Calgary, Alta., May 6, 1918.

Poultry Diseases, M. C. Herner, Professor Poultry Husbandry, Manitoba Agricultural College, page 519.

June 5—To the Cattle Producers of Alberta, Duncan Brown, Dominion Live Stock Branch, page 615.

Farmers' Advocate and Home Journal, Winnipeg, Man., May 8, 1918.

Fattening Sheep and Lambs on Pastures, Professor Thomas Shaw, page 785.

Starting the Pig in Life, Professor Tisdale, University of Saskatchewan, page 783.

May 22—Barn Construction, Prof. J. MacGregor Smith, Department of Agricultural Engineering, University of Saskatchewan, page 863.

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May 29—The Correct Age to Breed the Heifer, E. S. Archibald, Dominion Animal Husbandman, page 902.

May 29—How to Tell Couch Grass Seed in Seed Grain, Professor V. W. Jackson, page 904.

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June 5—Re-seeding Fields Injured by Winds, T. J. Harrison, Professor Field Husbandry, Manitoba Agricultural College, page 938.

Farmer's Magazine, Toronto, June 1,1918.

Amount of Power Required for Ditching, Professor J. MacGregor Smith, page 54.

The Journal of Agriculture and Horticulture, Quebec, June 1, 1918.

Paper Containers for Honey, F. W. L. Sladen, page 179.

The Nor'-West Farmer, Winnipeg, Man., May 6—Turkey Raising on the Prairie, Professor R. K. Baker, page 626.

May 20—Care of Young Pigs, W. F. Stevens, Live Stock Commissioner for Alberta, page 678.

May 20—Drawbar Horse Power—What it Means, Professor J. MacGregor Smith, page 688.

Ontario Agricultural College Review, Guelph, Ont., May, 1918.

Practical Horticulture in Northern Ontario, W. R. Leslie, B.S.A., Plant Specialist, Fort William, page 412.

PART V

The International Institute of Agriculture

T. K. Doherty, LL.B., Commissioner

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty, International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

1—**International Yearbook of Agricultural Legislation, 7th Year (1916).**—INTERNATIONAL INSTITUTE OF AGRICULTURE. Rome, 1917.

The seventh volume of the *International Yearbook of Agricultural Legislation* has just been published by the International Institute of Agriculture. It contains, systematically classified, all the laws relating to agriculture in the various countries. This publication, is therefore, of great interest under the present war conditions.

The *Yearbook* is divided into 11 parts:—The first (Statistics), second (Commerce), fourth (Industries depending on plant products), and fifth (Industries depending on animal products), are of the greatest interest to those who wish to follow, in all its details, the legislative movement with regard to foodstuffs brought about by the European crisis. In these divisions of the *Yearbook* is included everything bearing on: Statistics of stocks and crops; trade in cereals and supplies in general; trade in other vegetable foodstuffs; seed trade; fertilizer trade; trade in oil-yielding fruits; trade in textile plants and tobacco; trade in live stock and animal products trade in agricultural machinery; facilities granted for imports and restrictions laid on exports; measures for forestalling and dealing with the rise in prices; dishonest competition and fraud in trade; legal measures for regulating commercial contracts; measures for preventing the advance sale of crops; transport of vegetable and animal products; regulation of industries concerning plant products and chemical fertilizers; regulation of crops during the war.

The 7th part, devoted to plant diseases, weeds, and animals injurious to agriculture, gives the text of the Egyptian laws concerning: the protection of plants against diseases from abroad, diseases of fruit trees, the destruction of the cotton bollworm, orange pest (*Aspidiotus aonidum*), the text of the Soudan order concerning the destruction of locusts. It also includes: the orders of the French government with regard to the sale and use in agriculture of arsenical compound; an Australian (Victoria) law concerning the sale of anti-cryptogramic products and insecticides; the order for carrying out the Italian law of June 26th, 1913, No. 881, on plant diseases; the various Italian decrees for the control of field mice.

The *Yearbook* contains many provisions with regard to agricultural co-operation, insurance, and credit.

The part devoted to rural property includes the strictly legal measures defining and regulating the rights of property and the charges on real estate held either in usufruct or by way of security; the provisions to be observed in the transmission of these rights and in the determination of the title to ownership, especially in the interest of third parties; the method of procedure with regard to attachments on movable goods and real estate. It also contains the provisions of a more specially social and political nature, which tend to act directly on the distribution of real estate and to allow a more complete use being made of the land.

With regard to the less important measures, the *Yearbook* only gives the original title together with the French translation; for the others, either extracts from the text or else the whole of the text is given. There is an analytical introduction of 77 pages published in five languages, French English, Italian, Spanish, and German, which gives a summary of the whole volume (1250 pages). There is also a chronological index of the countries and an alphabetical subject index.

2—A Biological Analysis of Pellagra-Producing Diets: (1) The Dietary Properties of Mixtures of Maize Kernel and Beans. McCOLLUM, E. V., and SIMMONDS, N., in the *Journal of Biological Chemistry*, Vol. XXXII., No. 1, pp. 29-61, 24 charts. Baltimore, Md., October, 1917.

The first phase of the studies on nutrition undertaken by the authors and their collaborators at the Laboratory of Agricultural Chemistry of the University of Wisconsin, Madison (1), dealt with the cause of nutritive failure in animals restricted to diets of proteins, carbohydrates, fats, and inorganic salts, all the foods being chemically pure. After a careful consideration of the work of Hopkins, Stepp, and Funk, the authors came to the conclusion that these mixtures were lacking in two substances, or groups of substances, indispensable to the preservation of animal life. One of these (fat-soluble A), is soluble in fats, and found in its most concentrated form in butter fat and egg yolk fats. The second substance is never associated with fats in foods, but is always present in natural foods in relative abundance. It is easily administered in experimental rations by the addition of alcoholic extracts of natural foods, but it is also soluble in water. This is called by the authors water-soluble B.

The authors showed phosphorized proteins to have no superior value to those containing no phosphorus, and it is now known that a long list of substances (including complex lipoids, pigments, sulphatides of the nerve tissues, components of the various prosthetic groups) with which the body proteins are combined, are produced within the tissues, and do not need to be supplied with the food. The synthetic capacity of the animal cells has thus been shown to be immeasurably greater than had been supposed, but all the evidence still points to the fact that nearly all the amino-acids formed during the digestion of proteins are indispensable components of the diets. Moreover, the animal tissues are very dependent upon certain of the finer stereochemical structures in both the amino-acid and carbohydrate groups which serve them as food complexes.

(1) Hart, E. B., McCollum, E. V., Steenbock, H. and Humphrey, G. C., *Wisconsin Agricultural Station, Research Bulletin* 17, 1911; Hart and McCollum, *Journal of Biological Chemistry*, 1914, Vol. XIX, p. 373; McCollum and Davis, *Ibid.*, 1915, Vol. XX, p. 415 Vol. XXIII, pp. 181 and 231; McCollum, Simmonds and Pitz, *American Journal of Physiology*, 1916, Vol. XII, pp. 333 and 361; McCollum and Kennedy, *Journal of Biological Chemistry*, 1916, Vol. XXIV, p. 491; McCollum, Simmonds and Pitz, *Ibid.*, 1916, Vol. XXV, p. 105; Hart, Miller and McCollum, *Ibid.*, 1916, Vol. XXV, p. 239; McCollum, Simmonds and Pitz, *Ibid.*, 1916-1917, Vol. XXVII, pp. 153 and 211; McCollum, *Journal of the American Medical Association*, 1917, Vol. LXVIII, p. 1379; McCollum, Simmonds and Pitz, *Journal of Biological Chemistry*, 1917, Vol. XXIX, pp. 341 and 521; Vol. XXX, p. 13; McCollum and Pitz, *Ibid.*, 1917, Vol. XXXI, p. 229.

The second part of the studies was an examination, one by one, of several typical representatives of the classes of natural food substances, such as the seeds, leaves, fruits and tubers of plants. The exact nature of the additions of the factors A and B necessary to complete one of these food substances from the nutrition standpoint was shown. Some of these studies are still in progress.

The results show that serious errors may be made in the choice of foods, especially by the poor. Beri-beri, scurvy, rickets, and pellagra, have all been proved to be due to defective diet, although different opinions still prevail as to the etiology of the last disease. Funk attributed each of the above-mentioned syndromes to the absence of a specific chemical substance which he called "vitamine." The work of the authors and their collaborators on the nature of the dietary deficiencies of any natural foodstuffs has lead them to conclude that, under the present existing conditions, there are three other dietary factors causing malnutrition in both man and animals.

The third part of the studies, described in the present papers, consisted in a close experimental enquiry into the properties, with regard to the several dietary factors, of the diets usual in human nutrition and derived from all the more important food materials (except milk and eggs) in common use in the United States. Eggs, and more particularly milk, are a wonderful safeguard in human nutrition, and a valuabe addition to all rations used in animal production.

In a previous paper were discussed the points of resemblance in the dietary properties of seeds in general as contrasted with those of the leaf of the plant. The most important generalizations which can be made concerning the seeds as a group are the following:—

1) None of the seeds studied, when forming the sole source of nutriment, can produce growth or prolonged well-being in a young animal. Mixtures of seeds are more satisfactory for keeping animals in a good state of health, without growth, than seeds of a single species as a sole food· mixtures of seeds fed with distilled water (salt-free) will not support growth in young rats.

2) The inorganic content of each of the seeds studied (wheat, oat, maize, rice, wheat germ, bean, pea, flax and millet) is so constituted with respect to the total quantity and relative quantities of its constituents that certain salt additions are essential before growth can proceed in young animals. This applies both to mixtures of seeds and to seeds of a single variety.

3) The seeds of wheat, oat, maize, rice, bean and pea are too low in their content of a dietary essential, the nature of which is still unknown, to supply the needs of a young animal during growth. This substance is present in abundance in certain fats, such as butter and egg yolk fats, and the fats extracted by solvents from animal organs, such as the liver and kidney, free from visible fats. It is also found in abundance in the leaves of plants and in considerable quantities in the seeds of flax and millet. The authors have provi·ionally called this dietary essential "fat-soluble A". It is not extracted from plants with the fats by solvents such as ether, chloroform, benzene or acetone, and is, therefore, not found in any fats or oils of plant origin. Hot alcohol does not remove it from plant tissues.

4) All the seeds studied contain prtoein mixtures of a relatively poor quality when the proteins of a single kind of seed serve as the sole source of proteins.

5) Each of the seeds studied can be supplemented by highly purified protein, pure inorganic salts, and one of the growth promoting fats, so as to form a satisfactory ration for growth and maintenance. 15 to 20% of any one of the seeds mentioned, when fed with a mixture of purified food substances, will serve to supply all unidentified dietary factors soluble in water or alcohol. So far there is evidence of only one such indispensable substance—water soluble B—which is never associated with fats of either animal or plant origin.

6) Generalising from studies of three types, clover, alfalfa and cabbage, the leaf differs from the seed in having a high content of inorganic elements, and is particularly rich in those elements, calcium, sodium and chlorine, which are found in but small amounts in the seed. The leaf is much richer in the fat-soluble A than are such seeds as wheat, oat, maize, bean and pea, Leaf and seed supplement each other with respect to these two dietary factors. Since, in many cases at least, the leaf and seed mixtures have been shown to yield adequate protein mixtures, there is probably always some supplementary relationship between them with respect to the amounts of the various amino-acids which they yield on digestion.

In the studies quoted no systematic data were given showing the dietary properties of mixtures of cereal and legume seeds. The present paper describes the nature of the purified food additions which must be made to combinations of the maize kernel and the white (navy) bean in various proportions in order to make these seed mixtures dietetically complete. The experiments described aimed at making clear the value of each dietary factor in the maize bean mixtures as compared with several of the most important seeds, especially maize, wheat, and navy bean. These last were thoroughly studied separately so as to show the nature of their dietary deficiencies.

The results, obtained with rats, are given in a set of charts and summarized as follows:—

1) The two seeds mixed, as when separate, contain too small an amount of fat-soluble A to induce optimum well-being in growing animals.

2) The mixtures of maize and beans furnish a great abundance of the second unidentified dietary factor, water soluble B.

3) The most satisfactory protein mixture obtainable with these two seeds consists in about 80% of maize and 20 % of bean. This protein mixture has a slightly higher biological value than an equivalent amount of maize kernel proteins. In smaller quantities (e. g. 7% of the food mixture) the proteins of the wheat and the maize kernel have about the same value. When a ration is properly constituted with regard to other factors and contains 9% of wheat proteins, growth may be practically normal over a period of 5 months, after which an injurious effect is apparent in stunting and lack of fertility. It is highly probable that if the maize protein content were raised to 12 %, approximately normal growth would result. Better results are obtained by adding pure casein to a ration composed of a mixture of 12% of maize (63% of the mixture) and beans (37% of the mixture).

In a previous paper the authors showed that 6% of milk proteins in a food mixture just suffice to support normal growth in rats. The protein mixture from 80% maize and 20% beans has, therefore, just about one-half the biological value for growth that the total protein mixture in milk possesses.

4) A detailed study was made of the exact nature of the mineral deficiencies of the maize and bean mixtures. The results confirm others previously obtained in which sodium and calcium were shown to be the elements determining the unsatisfactory character of the mineral content of seeds in general. This is of great importance in human nutrition and agricultural practice in districts where the drinking water is nearly free from lime and sodium chloride. Efficient utilization of food by growing animals is not possible when the diet is deficient in these elements.

As regards human nutrition in districts where the water is low in calcium and sodium, the ration may be completed by milk or leaves of plants. The use of leaves in almost strictly vegetarian diets maintains life, as they supply the mineral deficiencies and the shortage of the fat-soluble A in the seeds.

The investigations carried out by the authors by special methods, show how near the danger line is the faulty diet of some classes of people, even in the United States. Goldberger (*Journal of the American Medical Association*, 1916, Vol. LXVI, p. 471) obtanied experimental pellagra with a diet typical of that eaten by pellagrins—wheat flour (patent), corn meal, corn grits, corn starch, white polished rice, standard granulated sugar, cane sugar, sweet potatoes, pork fat (fried out of salt pork), cabbage, collards, turnip greens, and coffee. Calculated on a wet basis the sweet potatoes, cabbage, and collards made one-fifth of the diet, but, on a dry basis, only 4% of the total solids. This quantity is insufficient to make good the serious shortage of calcium and sodium in the remainder of the diet. Sodium is supplied by the salt added, but there is still a deficiency of calcium. The work of the authors shows that there is far from an adequate quantity of fat-soluble A in Goldberger's diet, the protein content of which was not above 8% of the food mixture. In an experiment carried out by the authors a diet containing 12.5% of protein, supplied by 63% of maize kernel and 37% of beans, was insufficient for rats. As the animals developed normally immediately casein was added to their diet the deficiency of the diet can only be attributed to shortage of proteins. In the light of such experimental evidence it is entirely unnecessary to attribute the cause of pellagra to the absence of a hypothetical "vitamine."

125—The Distribution in Wheat, Rice, and Maize Grains of the Substance, the Deficiency of which in a Diet causes Polyneuritis in Birds and Beri-beri in Man.—CHICK, HARRIETTE and HUME, E. MARGARET, in *Proceedings of the Royal Society*, Series B, Vol. LXXX, No. B. 624, pp. 44-68. London, December 1, 1917.

The experiments described were carried out at the Lister Institute, and the results obtained led to the following conclusions:—

Wheat endosperm, which constitutes white flour, is deficient in anti-neuritic vitamines (the substance whose deficiency in a diet causes polyneuritis in pigeons and beri-beri in man); when fed to pigeons as an exclusive diet it caused polyneuritis in a manner identical with polished rice.

In both the wheat and rice grain, the anti-neuritic vitamine is concentrated mainly in the germ or embryo; it is present in less quantity in bran (pericarp and aleurone-layer), probably in the aleurone-layer. The embryo of maize grain also possesses marked anti-neuritic properties, both in the scutellum and in the plantlet. For this reason it is important to include the germ in the flour from which wheaten bread or biscuit is made, especially when the diet may consist largely of preserved foods, which are deficient in the vitamine.

The daily ration of wheat-germ that must be added to a diet of polished rice in order to prevent the onset of polyneuritis is equal to the amount which, administered by the mouth, will cure a pigeon acutely ill with polyneuritis, brought on by an exclusive diet of polished rice. This relation is not peculiar to wheat-germ, but applies to other foodstuffs, such as yeast, containing anti-neuritic vitamines. The addition of wheat-germ to a diet of polished rice in quantity (3 gm. every second day) sufficient to prevent polyneuritis, also maintained the weight and general health of the bird. Rations in excess of this (2 to 3 gm. every day) led to a great increase in body weight and in the general well-being and vitality of the birds.

Exposure of wheat embryo to a temperature of about 100° C (212° F.) for two hours caused an insignificant loss in anti-neuritic vitamine; therefore, if it be included in the flour from which bread or biscuit is made, it can be relied upon to retain its anti-neuritic properties after baking.

At temperatures in the neighbourhood of 120° C (248° F.), however, there was a swift destruction of anti-neuritic properties. This fact must be borne in mind dealing with diets largely composed of preserved and tinned foods previously sterilized at temperatures above 100° C.

3—**War Bread (Unsalted Lime Bread).**—DUBOIS, RAPHAEL, in *Comptes Rendus des Séances de la Société de Biologie*, Vol. LXXX, No. 17, pp, 818-821. Paris, November, 1917.

The French nation eats bread containing from 15 to 20 grms. of salt per kg. In Paris the proportion is sometimes as high as 22, and even 25 grms. Those eating 1 kg. of bread, therefore, consume an average of 20 grms. of salt in the bread alone. The amount of salt mixed with other foods may, on an average, be placed at 10 grms. Finally, according to Gaude (*Cours de Minérologie*, 1st Series, 2nd Ed., pp. 65-66) the amount of salt contained *naturally* in the food eaten is not less than 20 grms. a day.

These facts show that, on an average, an adult person consumes 50 grms of salt daily. The figure seems excessive, since the amount of salt excreted daily, without decomposition, is estimated at from 18 to 20 grms. only. This would mean that 30 grms. of salt remain to supply the hydrochloric acid of the gastric juice, which seems hardly admissable, even for hyperhydrochloric subjects. It is true that vegetarians require a larger quantity of salt, since, according to Bunge, it helps to remove the potassium, contained in large quantities in vegetables, but, in proportion to people living on a mixed diet, there is but a small number of vegetarians.

An excess of salt in seasoning causes the assimilation of the food to be destroyed to too great an extent, and this can only be compensated for by an increased consumption. The author's experiments show that the amount of unsalted bread eaten is less by one quarter than that of salted bread. The same would probably apply to other foodstuffs, a very important fact from an economic point of view. Moreover, an excessive consumption of solid foods is accompanied by an excessive consumption of liquids, and, among those using alcoholic drinks, the salt becomes accessory to the alcohol.

In view of the great benefit derived in therapeutics by the *elimination of chlorides* in many cases of arthritis, it is probable that the *preferentiative* partial elimination of chlorides by the use of unsalted bread would be advanta[illegible]

There is no danger tha[illegible] of unsalted bread would [illegible] eaten by the public. In [illegible] for example in some of [illegible] Italy, Tuscany in particular, salt [illegible] not added to the bread. Many people prefer it to salted bread; others soon get accustomed to it.

The author recommends what he calls *unsalted lime bread*, because, to every kg. of bread are added from 15 to 20 grms. of calcium carbonate, which, unlike lime water, does not "kill the yeast" by preventing the dough from rising. Washed chalk or precipitated calcium carbonate answer the purpose equally well, but the author prefers prepared chalk. The chalk is mixed with water, and with it is made the dough, which gains in whiteness, rises perfectly, is never acid, and has a very appetizing smell. The excess of calcium carbonate has no ill effects, as the author proved by eating large quantities of it.

The author does not believe the idea of adding chalk to bread to be new, but has been unable to find any published reference to it.

216—**On Chalk Bread.**—LEPICQUE, L. and LEGENDRE, R., in *Comptes rendus des Séances de la Société de Biologie*, Vol. LXXX, No. 19, pp. 896-897. Paris. December 8, 1917.

With reference to M. Raphael Dubois' note (see above article) in which he proposes to add to coarsely bolted flours used

in breadmaking calcium carbonate instead of caustic lime water which he said "kills the yeast," the authors state that, in their opinion, caustic lime is preferable

Lime water, they say, does not kill the yeast, save when mixed with it directly before it is added to the dough. If, however, the amount of alkali is so calculated as to neutralize the flour incompletely, the lime method gives the dough a slightly acid reaction which appears to be the optimum condition for the yeast, whereas the acid fermentations are inhibited by a preceding decrease of acidity. When the leaven only is used there is no danger, with lime water, of exceeding the point of neutralization. If the leaven is strengthened by the addition of grain yeast, it is sufficient to dilute this yeast in tap water; it is then added to the dough, from which the alkalinity of the lime has disappeared.

The difference between the quantities of chemical product added is:—with lime water, a maximum of 30 cgms. per kilogram (2.2 lb.) of bread; with calcium carbonate 15 to 20 gms.; even if reduced by half this last proportion will doubtless appear excessive for a food such as bread.

4—**The Nutritive Value of the Soy Bean.**—DANIELS, AMY L., and NICHOLLS, NELL B., in *The Journal of Biological Chemistry*, Vol. XXXII, No. 1, pp. 91-102. Baltimore, October, 1917. (1 page in Institute Bulletin.)

127—**Agricultural Education in the United States.**—PORRITT, EDWARD, in *The Quarterly Review*, No. 453, pp. 315-333. London, October, 1917. (7 pages in Institute Bulletin.)

CROPS AND CULTIVATION

128—**The Relation of Movement of Water in a Soil to its Hygroscopicity and Initial Moisture.**—ALWAY, F. J. and MCDOLE, G. R., in the *Journal of Agricultural Research*, Vol. X., No. 8, pp. 391-428, bibliography of 17 publications. Washington, August 20, 1917. (3 pp. in Institute Bulletin.)

...n Swamps and Marshes ...r of the Quality of Peat ...ltivation.—DUNNEWALD, T. J., in the *Journal of the American Society of Agronomy*, Vol. IX., No. 7, pp. 322-324. Washington, October 22, 1917. (2 pp. in Institute Bulletin.)

133—**Practical Information for Beginners in Irrigation.**—FORTIER, SAMUEL, in *U. S. Department of Agriculture, Farmers' Bulletin*, No. 864, pp. 38. Washington, September, 1917.

9—**Construction and Use of Farm Weirs for Measuring Small Streams of Irrigation Water, in U. S. A.**—*U. S. Department of Agriculture, Farmers' Bulletin* 831, 18 pp., bibliographical index of 20 publications. Washington, June, 1917.

10—**Electrocultural Experiments in Great Britain and France.**—I. BLACKMAN, V. H., and JORGENSEN, J., The Overhead Electrical Discharge and Crop Production, in *The Journal of the Board of Agriculture*, Vol. XXIV, No. 1, pp. 45-49. London, 1917.—II. JORGENSEN, J., in *The Electrical Review*, pp. 452 and 454, October, 1916; pp. 499-501, November, 1916; pp. 21,23, July, 1917. London.—III. ANGOT, A., PETIT, H., SAGNIER, H., MANGIN, L., and SCHRIBAUX, in *Comptes rendus des Séances de l'Academie d'Agriculture de France*, Vol. III, No. 37, pp. 1054-1062. Paris, 1917.

The first of the above articles, by Blackman and Jorgensen, was published in the August, 1917, number of THE AGRICULTURAL GAZETTE, page 728.

II.—An account of other electro-cultural experiments carried out in various districts of England in 1916. The following are the principal results:—

Strawberries.—The electrical discharge produced an increase in yield of 80% for young plants, and of 25 to 30 % for old plants.

Potatoes.—Increased yield of 20 to 50% bearing, not on the number of tubers, but on their size.

Carrots, Beets, Tomatoes.—Increased yield of from 25 to 50%.

Leguminous Plants.—The immediate effect of the discharge was somewhat harmful to these plants, which fix atmospheric nitrogen, whilst they benefited from the *after-effect* of the previous year's discharge, as was seen above for clover.

The Electrical Review for July 6, 1917, describes a portable outfit containing all the necessary apparatus for producing discharges over a area of from 1½ to 2½ acres. The maker offers to supervise the installation personally, and supervise the working of the apparatus.

III.—At the meeting of the French Academy of Agriculture on November 28, 1917, M. Angot described Messrs. Blackman and Jorgensen's experiments, as well as other trials carried out in England. The communication was followed by a discussion, summarized below.

M. PETIT: The good effect of the electrical discharge appears to be due to a greater *mobilization* of the elements necessary to plant-life. If the leguminous plants only profited from it the second year, it is because they derive no benefit from the nitrification of nitrogenous manures during the first year; in fact, they suffer from excess of nitrogen. In continuing these experiments attention should be paid to this danger: in using the soil, good results might be obtained at first, but negative results might be obtained after some years' time.

M. ANGOT: The authors of the Lincluden experiments make all necessary reserves themselves. It is not the soil that is electrified, for the wires are seven feet above the ground; the discharges act directly on the plants.

M. H. SAGNIER: The question of the agricultural use of electricity is not new to France. Several sets of experiments have been made concerning the action electricity on plants. Thus, Grandeau carried out experiments in a metallic cage; a professor of the Agricultural Institute at Beauvais invented a system similar to a lightning-conductor and which gave results varying from good to mediocre.

M. L. MANGIN: Many attempts have been made in France to utilize atmospheric electricity; but it has but a feeble influence, and its use is limited, while in the experiment in Great Britain powerful currents were used, obtained by induction coils, which is very different, especially in the intensity of the action on the plants.

M. Schribaux has made thousands of experiments with large metallic cages; he found no marked difference between plants growing in the cages and those growing outside; the differences found seem due rather to experimental errors, and atmospheric electricity does not seem to have produced any noteworthy effect on the Gramineae experimented with. The poor results obtained in previous attempts were probably due to the agriculturist's lack of electrical knowledge and the physicist's lack of agricultural knowledge. The two experts should combine their efforts.

Finally, M. Angot considers that previous experiments cannot be compared with those made recently in Great Britain. In using atmospheric electricity only a feeble potential is obtained; the current only increases by 30 or 40 volts per yard of elevation; when the wires are placed from 12 to 16 ft. above the soil, less than 150 to 200 volts are obtained. On the other hand, industrial currents producing up to 90,000 volts were used in the trials in Great Britain, so no comparison whatever can be made between the two procedures. Plants sheltered under a cage are simply submitted to the action of atmospheric electricity, which also influences the plants outside the cages, but the difference is very small. At a few inches from the ground, the difference of potential between air and soil does not exceed a few dozen volts; this would explain the contradictory results obtained by M. Schribaux.

11—**The Cultural Methods Applied to Winter Wheat in the Great Plains Area, U.S.A.**—CHILCOTT, E. C., COLE, JOHN S., and KUSKA, J. B., in *United States Department of Agriculture, Bulletin* No. 595, 36 pp. Washington, October 11, 1917.

The bulletin analysed compares the returns obtained with different methods of cultivating winter wheat, using for the purpose the results of 75 annual cultural experiments carried out on 1137 plots by 13 Stations which had made cultural experiments for a period of at least four years.

The preparation of the ground after harvest: furrowing with a lister, and levelling the ridges preparatory to seeding, have resulted in an average increase of 0.9 bushel per acre over early ploughing and 2.2 bushels per acre over late ploughing. As it is a cheaper method of preparation than ploughing, it has consequently been more profitable.

Subsoiling has increased the yields over ploughing without subsoiling at 5 Stations out of the 10 at which it has been studied. In the other Stations, this method has been the least remunerative.

Disked maize ground has given consistently high yields. This, together with the low cost of preparation, has resulted in this method showing the highest net returns of any of the methods at all the 11 stations where it has been tried, except at Huntley and Amarillo.

Summer tillage has given the highest average yields of any method under trial. However, on account of its high cost, due to extra labour and alternate-year cropping, it has not netted the highest returns, except at Huntley.

Green manuring is the most expensive method under investigation. It has given the smallest net returns of any of the methods at all the stations, except Huntley, where the profit from it is slightly greater than from either autumn ploughing or subsoiling.

14—**The International Trade in Fertilizers and Chemical Products Employed in Agriculture (Half-Yearly Review).**—*Bulletin of Agricultural and Commercial Statistics*, Year VII, No. 9, p. 731-786. International Institute of Agriculture, Bureau of Statistics. Rome, September, 1917. (5 pp. in Institute Bulletin.)

This Review comprises nearly sixty pages, with a great number of data, either official or from trustworthy authorities. Separate

headings are devoted to each of the principal fertilizers (*phosphatic, potassic,* and *nitrogenous*) and chemical products employed in agriculture. The more important data are given in the Institute Bulletin, including the world production of the various fertilizers, also the international trade and wholesale prices.

137—**Saltpetre: Its Origin and Extraction in India.**—HUTCHINSON, C. M., in *Agricultural Research Institute, Pusa, Bulletin* No. 68, 1916, pp. 24. Calcutta, 1917.

15—**The Fertilizing Value of Some Household Wastes.**—BROWNING, P. E., in *Journal of Industrial and Engineering Chemistry,* Vol. 9, No. 11, p. 1043. Easton, Pa., November, 1917.

19—**The Collection of Kelp in the United States for Potash Production.**—*American Machinist,* Vol. 47, No. 14, pp. 599-600. London, November 17, 1917.

21—**The Effect of Different Methods of Inoculation on the Yield and Protein Content of Alfalfa and Sweet Clover.**—Arny, A. C. and Tatcher, R. W., in the *Journal of the American Society of Agronomy,* Vol. 7, p. 172-185; Vol. 9, p. 127-137. Washington, 1915 and 1917.

138—**Inventory of Seeds and Plants Imported by the Office of Foreign Seed and Plant Introduction During the Period from April 1 to June 30, 1914.**—*U.S. Department of Agriculture, Bureau of Plant Industry, Inventory* No. 39, pp. 183. Washington, 1917. (4 pp. in Institute Bulletin.)

139—**The Effect of Different Rotation Systems and of Fertilizers on the Protein Content of Oats.**—THATCHER, R. W., and ARNY, A. C., in the *Journal of the American Society of Agronomy,* Vol. IX, No. 7, p. 344-348. Washington, D.C., October 22, 1917. (3 pp. in Institute Bulletin.)

142—**The Effect of Greenhouse Temperatures on the Growth of Cereals.**—HUTCHESON, T. B. and QUANTZ, K. E., in the *Journal of the American Society of Agronomy,* Vol. IX., No. 1, pp. 17-21. Washington, D. C., January, 1917.

The results are given of studies on the effect of different temperatures on the growth of wheat, oats, barley, and rye from the date of sowing, December 21, 1915, till May 27, 1916, when the experiment was discontinued owing to the extreme heat in the houses. Four temperatures were chosen and kept constant, so far as possible, throughout the experiment: 75° F., 65° F., 62° F., and 58 F. An appended Table shows that the temperature has a considerable influence on the period of heading, flowering, and ripening of the different varieties. The order of maturity was sometimes almost reversed; thus at 75° F. oats headed first, at 58° F. rye was the first to head and oats came last. The Table also gives the number of tillers and heads for each plant and the average length of the culms and heads.

25—**The Viability of the Seeds of Raphanus sativus L. as Affected by High Temperatures and Water Content.**—WAGGONER, H. D., in the *American Journal of Botany,* Vol. IV., No. 5, pp. 299-313. Lancaster, Pa., May, 1917. (2 pp. in Institute Bulletin.)

143—**The Selection of Cereals in Sweden and the Increased Production thus Caused.**—NILSSON, N. HJALMAR, *Sveriges Utsadesforenings Tidskrift,* Year XXVII, Pt. 4, pp. 172-203, 14 tables. Malmo, 1917.

Already before Mendel's theory, taken up anew by De Vries, Correns, Tschermak, had given a new impulse to the improvement of cultivated plants by selection and hybridisation, Prof. Nilsson Ehle, in his work on hybridisation at Svalof, has admitted clearly the existence of hereditary units which are transmitted integrally and independently of each other, and from 1900 onwards, in his selection experiments by pure lines, he applies the methods and conceptions enunciated by Johannsen.

It has thus been possible to create, among the different varieties of cereals, various types, all of which are good producers and adapted to different and well-defined meteorological and agrogeological conditions. Thus Primus barley does well in cold, moist, heavy soils, whereas the varieties Gull and Hannchen prefer a dry climate and light soils; Guldregn oats, which are the most widely cultivated, owe their popularity to their earliness and a capacity for adaptation almost equal to that of the native varieties, whereas Fyris oats are suited to clay soils, and the Klock variety to peat or marsh soil rich in organic matter.

The author gives, in chronological order, the results obtained during the 25 years 1889-1915, in the selection of wheat (winter and spring), rye, barley, and oats (white and black). Numerous tables (the most important of which are summarized in the article in the Institute Bulletin) give the details necessary to judge the work done; the yields in grain of the best varieties successively created and propagated by the Svalof Station are all compared with the average yield of the native varieties, taken as 100.

148—**The Relation of Cob to Other Ear Characters in Maize.**—GRANTHAM, A. E., in *Journal of the American Society of*

Agronomy, Vol. IX., No. 5, pp. 201-217, bibliography of 4 publications. Washington, May, 1917. (2 pp. in Institute Bulletin.)

149—**On Abnormal Ears of Maize Obtained from Seeds Treated with Copper.**—JUNGELSON, A., in *Revue Générale de Botanique*, Vol. XXIX, No. 344-345, pp. 244-248. Paris, 1917. (1 page in Institute Bulletin.)

30—**The Indirect Effects of Certain Selections in Breeding Indian Corn.**—RIETZ, H. L., and SMITH, L. H., in the *Journal of Agricultural Research*, Vol. XI, No. 4, pp. 105-146. Washington, 1917. (2 pp. in Institute Bulletin.)

34—**Results of the Inquiry of the Office of Agricultural Information of the French Ministry of Agriculture on Manitoba Wheat.**—*Feuille d'information du Ministère de l'Agriculture*, Year 22, No. 45, p. 10. Paris November 6, 1917.

The Manitoba wheat distributed in the spring of 1917 among the different departments was grown under very varying conditions. The results of the enquiry made by the Office of Agricultural Information lead to the following conclusions:—

Soil.—Manitoba wheat does well in all wheat soils, that is to say, medium loams, calcareous loams, and rapidly drying silt soils. As a rule it does not do well in calcareous soils or in heavy clay. Nevertheless, in the limestone districts of the Meuse department satisfactory results were obtained. As a general rule, however, healthy soils, sufficiently rich in water at the time of sowing are to be recommended.

Climate.—Manitoba wheat appears to be very resistant to drought; scorching was reported from the Ain department only. It does well in the mountains, at a height of 5,250 feet in the Upper Alps and 2,300 feet in Upper Savoy.

Cultural Methods—Preparation of the Soil.—Manitoba wheat requires a very clean tilth in order to give good results. In spite of its rapid growth it easily becomes weedy. Information obtained from all over France shows that the yield is satisfactory only if the ground is thoroughly prepared by two autumn ploughings and shallow cultivation in spring before sowing.

Manuring.—Farmyard manure mixed with superphosphates seems to have given better results than chemical fertilizers alone.

Sowing.—Careful sorting of Manitoba wheat seed appears indispensable; the seed used in 1916 included at least four varieties, two of which were bearded. The small seeds only gave medium results. All directors of agricultural departments recommend close sowing in perfectly healthy and thoroughly drained soil. This condition explains the differences noticed with regard to the dates considered best for sowing. The department of Côte-d'Or, Drôme, Gard, Rhone, Manche, Meuse, Morbihan, Vienne, and Gironde, advise sowing before the end of March. The February sowing in Upper-Vienne did exceptionally well, but the results obtained with late sowing were very good in the departments of Eure-et-Loire, Orne, Eure, Calvados, Indre, Nièvre, Pas-de-Calais, Sarthe. In the departments of the Eure and Orne it was possible to sow late as as May 15th.

Resistance to Rust.—The enquiry showed clearly that Manitoba wheat is very resistant to rust. In the districts in which rust was rife, this wheat was either completely immune or much less attacked than the local varieties.

General Results.—The results were mediocre in Ariège, Aude, Dordogne, Doubs, Finistere, Meurthe-et-Moselle, Morbihan, Upper Pyrenees, Lower Pyrenees, Seine-et-Oise, and Tarn-et-Garonne. In all the other departments the results were good or very good, and the yields better than those of the local spring varieties, though not so high as those of the local autumn varieties.

155—**The Colour Classification of Wheat.**—HAYES, H. K., BAILEY, C. H., ARNY, A. C., and OLSON, P. J., in the *Journal of the American Society of Agronomy*, Vol. IX, No. 6, pp. 281-284. Washington, D.C., September, 1917. (2 pp. in Institute Bulletin.)

156—**The Effect of Sodium Nitrate Applied at Different Stages of Growth on the Yield, Composition and Quality of Wheat.**—DAVIDSON, J., and LE CLERC, J. A., in the *Journal of the American Society of Agronomy*, Vol. IX., No. 4, pp. 145-154. Washington, D.C., April, 1917.

157—**Experiments with Wheats at Verrieres Seine-et-Oise, France.**—DE VILMORIN, JACQUES, in *Comptes rendus des Séances de l'Academie d'Agriculture de France*, Vol. II, No. 38, pp. 1077-1085. Paris, December 5, 1917. (3 pp. in Institute Bulletin.)

159—**"Kanred," a New Wheat for Kansas.** JARDINE, W. M., in the *Journal of the American Society of Agronomy*, Vol. IX., No. 6, pp. 257-266. Washington, D.C., September, 1917. (1 page in Institute Bulletin.)

165—**The Eragrostis of the Argentine and Uruguay: Their Value as Fodder Plants.**—GIROLA, CARLOS D., in *Boletin del Ministerio de Agricultura de la Nacion*, pp. 20. Buenos Aires, 1917. (1 page in Institute Bulletin.)

166—**Important Range Plants: Their Life History and Forage Value.**—SAMPSON, ARTHUR, W., in *U.S. Department of Agriculture, Bulletin No.* 545, pp. 63. Washington, October 8, 1917. (2 pp. in Institute Bulletin.)

49—**Tobacco Growing in Ireland (The Experiments in 1916).**—KELLER, G. N., in *Journal of the Department of Agriculture and Technical Instruction for Ireland.* Vol. XVII, No. 3, pp. 461-466. Dublin, 1917. (2 pp. in Institute Bulletin.)

52—**A Simple Method for Forcing Rhubarb in the Open Air.**—DUFOUR, AUGUST, in *Bulletin de l'Association des Maraichers de Geneve*, Year XXVI, No. 52, pp. 12, 13. Geneva, November, 1917.

Among the many methods for forcing rhubarb in the open air, a very simple one consists in using an old cask, the bottom or end of which has been removed, the other being left.

After having dressed the foot of the rhubarb in November with fresh horse manure, the cask is placed over the roots and surrounded with a sufficient quantity of stable manure and litter to warm the plant and help the leaves to grow. A heat of from 25 to 30 C. (77° to 86° F.) is thus obtained. If too great a heat is to be feared air is let in through the bung-hole.

The following English and American varieties are distinguished by their earliness and are well adapted to forcing:—Early Laxton Rhubarb, deeply coloured; Hotdays Giant; Hanke's Champagne; Caw's Champion; Johnston St. Martin; Dancer's Early Scarlet; Mitchell's Royal Albert; etc.

The Forest Industry in Sweden.—AROSENINS, E., in *International Review of the Science and Practice of Agriculture*, Year IX., No. 1, pp. 1-8. Rome, January, 1918.

LIVE STOCK AND BREEDING

182—**Physiological Effect on Growth and Reproduction of Rations Balanced from Restricted Sources.**—HART, E. B., MCCOLLUM, E. V., STEENBOCK, H., and HUMPHREY, G. C., in the *Journal of Agricultural Research*, Vol. X., No. 4, pp. 175-198. Washington, D.C., July 23, 1917.

This paper summarizes the results of further studies on the physiological value of restricted rations. The early work of the writers demonstrated clearly the inadequacy of the accepted theory as to what constitutes a balanced or complete ration. Up to that time total protein (without reference to quality), energy, and ash materials were considered the essentials of a ration. The latter, however, occupied no position in the expression of the standards developed which have been stated only in terms of total digestible protein and energy. It is, however, probably true that, in a practical sense and with the generally accepted knowledge of the quality of feeding materials accumulated from a long and varied experience, such standards have had and will continue to have a very great value; but their limitations are also made evident by this earlier work of the writers, and are emphasized by what they have done since.

To-day a ration can be considered complete and efficient only when it contains protein of adequate quantity and quality, adequate energy, ash materials in proper quantity and proportion, and two factors of unknown constitution (vitamines) which the writers have designated as "fat-soluble A" and "water-soluble B." In addition to these normal factors, there may be introduced with natural foodstuffs the important factor of toxicity. This can be wholly absent or so mild in its effects as to be entirely obscured when the other essentials of a ration are at an optimum adjustment.

EXPERIMENTAL WORK STARTED IN 1910 ON WHEAT AND CORN RATIONS.—In order to locate the deficiencies of the all-wheat-plant ration (wheat grain, wheat gluten, and wheat straw), which had given fair growth, but was a failure in reproduction with grade Shorthorn heifers, a new series of experiments was again started in 1910, using for the purpose vigourous grade Holstein heifers of initial weights of from 200 to 400 pounds. It was also proposed that one group should receive its nutrients wholly from the corn plant, another from the wheat plant, a third from corn grain and wheat straw, a fourth from wheat grain and corn stover, while a fifth group should receive its nutrients from corn grain with the roughage equally divided between alfalfa hay and wheat straw. These rations were closely comparable in digestible proteins and net available energy, and were balanced in the ordinary sense of the standards. The animals were fed what they would consume of this mixture, and, in addition, received common salt and natural water. They were allowed a daily run to an outside paddock free from all vegetation. Their records of growth and final status are given in Table I.

Restriction to the wheat plant as a source of "balanced" nutrients did not sustain the growth of the heifers. Such animals also failed to show oestrus, and

could not be bred. Marked pathological conditions resulted, such as blindness, feeble and emaciated condition, and abnormal excitability followed by collapse. The critical factors in this ration were poor mineral content and toxicity. This statement is based on records made by other animals of this species, and on records with rats and swine.

In contrast to the all-wheat-ration group stood the all-corn-ration group. The latter not only showed continuous growth, but became physiologically active and produced strong calves. The decline in weight at the end of two years shown by No. 575 was due to slow recovery after calving.

By the use of corn stover as a roughage in place of the wheat straw, growth was sustained, but reproduction was only partially successful, dependent upon the stamina of the mother. Where reproduction was successful in the first gestation period, it failed in the second, owing to the cumulative effect of the wheat toxicity.

By the use of alfalfa hay to take the place of the one-half of the wheat straw, results similar to those with corn stover were secured. Growth was splendid, reproduction normal in the first gestation period, but weakness appeared in the second gestation.

TABLE I.—RECORD OF GROWTH OF HOLSTEIN CALVES 1910-1912.

No. of Animal Ration	Weights in pounds.					Condition after 2 years
	Initial (June 2, 1910)	After 6 months on ration	After 1 year on ration	After 18 months on ration	After 2 years on ration	
—Ground wheat, 8 pounds....	—					
629—Wheat gluten, 0.3 pounds....	— 377	655	569	610	452	Miserably emaciated.
—Wheat straw, 5.7 pounds....	—					
639 do.....	406	722	683	630	519	Do
—Wheat grain, 6.7 pounds....	—					
637—Wheat gluten, 0.3 pounds...	— 206	369	533	656	790	Fairly strong.
—Corn stover, 7 pounds	—					
641 do.....	207	377	594	783	820	Do.
—Corn meal, 5 pounds.....	—					
575—Gluten feed, 2 pounds.....	— 349	664	970	1139	974	Strong and vigorous.
—Corn stover, 7 pounds.....	—					
594 do	270	496	735	905	923	Do.
—Corn meal, 5 pounds.....	—					
635—Gluten feed, 3 pounds.....	— 208	301	480	591	690	Poor growth and poor condition.
—Wheat straw, 1 pound.....	—					
636—do.....	220	384	541	684	642	Do.
—Corn meal, 5 pounds.....	—					
942—Gluten feed, 2 pounds.....	— —	a 613	686	911	1161	Strong and vigorous.
—Wheat straw, 3.5 pounds....	—					
—Alfalfa Hay, 3.5 pounds . ..	—					
643 do.....	—	a 537	602	800	788	Do.

The alfalfa and corn stover introduced a better salt mixture, a little different protein mixture, and probably a more plentiful supply of growth-promoting substances, all of which, according to the writer's hypothesis, would either individually or collectively improve the ration, but not necessarily make it perfect. It might still fail if the mass of toxicity was too large.

Baking the wheat grain did not improve it. The particular effect of these all-wheat-grain rations was to cause marked histological changes in the nervous tissues of the offspring. The motor cells partly degenerated, and the spinal cord showed a more or less oedematous condition. This was analogous to the writers' observations on swine with wheat-grain feeding. On wheat-grain and wheat-straw rations growing heifers also showed symptoms of nerve degeneration, as evidenced by blindness and great excitability. The cause of the disturbance was due to the inherent toxicity of the wheat-grain and not to the "deficiencies of vitamines."

Corn grain plus wheat straw allowed sustained growth, but at a slow rate. The offspring were weak or dead. Addition of salt to this ration made it normal, indicating that this was the only factor needed for perfect nutrition with this ration.

A physiologically complete ration such as the corn-grain and corn stover mixture could not be disturbed, at least in a single gestation, by altering the calcium-magnesium ration through the addition of magnesium salts. Even the addition of mineral acids to this ration, in such quantities as to make the urine of the individuals receiving it acid to litmus and rich in ammonium salts, did not disturb its nutritive completeness.

The addition, however, of wheat embryo to a corn ration did cause disturbances, bringing about early abortions. This was due to its high content of the toxic material of the wheat kernel.

Considering the influence of these investigations on practice, the writers point out that there is already much trouble with reproduction by cows in the Dakotas, wherever much wheat straw is fed with

corn grain. In many cases where the breeding stock was only fed wheat grain and certain roughages, the calves were born either dead or weak, with great financial losses to many breeders. No one would have suspected that the ration was a factor in these disasters, but it undoubtedly was the direct cause of the trouble.

The data presented include also the study of the influence of these factors on milk secretion.

184—**Influence of Date of Cutting on the Food Value of Hay: Experiments Carried out in Demnark.**—KAISTEN, IVERSEN, and KRISTENSEN, R. R., in *Tidskrift for Planteavl*, Vol. XXIV, Pt. 3, pp. 405-435. Copenhagen, 1917. (2 pp. in Institute Bulletin.)

186—**The Insufficiency of Maize as a Source of Protein and Ash for Growing Animals.**—HOGAN, ALBERT G., in the *Journal of Biological Chemistry*, Vol. XXIX, No. 3, pp. 485-493. Baltimore, April, 1917.

63—**On the Impossibility of Watering the Milk by Giving Large Quantities of Water to the Cow.**—PORCHER, CH., in *Annales des Falsifications et des Fraudes*, Year 10, Nos. 105-106, pp. 304-320. Paris, July-August, 1917.

On account of the large number of experts and chemists who still believe in "polylactie" or "mouillage au ventre," and the danger of such a belief from the point of view of the repression of fraud, the author (Professor at the Veterinary School at Lyons) shows how incorrect that idea is, according to which, the ingestion of large quantities of water by a lactating female is followed by a veritable watering of the milk.

He recalls the physiology of lactation, insisting on the fact that milk is secreted not excreted. The researches, experiments, and conclusions of Malpeaux, Mallèvre, Regnard, etc., are quoted.

The note concludes that "polylactie" (watering the milk through the cow) does not exist, and that it is nonsense, both physiologically and experimentally, that could not be used as the basis for any reasonable judicial decision.

65—**Food Value of the Waste Leaves of Different Varieties of Cabbage; Investigations in Holland.**—DEVRIES, J. J. OTT, in *Nederlandsch Landbouw-Weekblad*, Year 26, No. 45, Supplement p. 1, Schiedam, November 10, 1917.

In 1912 the cauliflowers grown in Holland covered an area of 6,000 acres, red cabbage 4,774 acres, and white cabbage and common cabbage 4,885 acres. Estimating the quantity of waste leaves per acre at 5½ tons for cauliflower and from 8 to 8½ tons for white and other hearted cabbage, about 120,000 tons of such leaves are produced annually in Holland.

In order to estimate the food value of this waste, analyses were made at the Hoorn Agricultural Experiment Station. The results obtained are given in a table.

These analyses show that:—

1. The food value of waste cauliflower leaves may be compared to that of brewers' grains.

2. Waste leaves of red cabbage have a food value double that of clover hay.

3. Waste leaves of white cabbage have a food value double that of good meadow hay.

According to calculations based on present day values, the value of such leaves as a food exceeds their value as a fertilizer.

Feeding experiments carried out with this waste on two cows at the Hoorn Experiment Station, show that leaves of cauliflower and white cabbage produce hardly any disagreeable smell or taste in the milk; red cabbage leaves seem to have a greater influence in this respect, but it is probable that the milk takes the characteristic taste and smell of the cabbages as a result of being left too long in the byre where the cabbage waste is kept.

The taste and smell of the cabbage may also be passed to the milk from the hands of a milker who has touched the leaves.

Cabbage leaves seem to have no bad influence on the fat content of the milk. During the experiments the cows out at pasture ate an average of from 66 to 88 lb. of cabbage leaves daily. No bad effect was noticed on the cream. Further experiments will be made at the Hoorn Station to determine the food value of these leaves when kept in silos.

68—**The Value of Cider Apples, Perry Pears, and Their Respective Pomace as Food for Farm Stock.**—I. BARKER, B. T. P., and GIMINGHAM, C. T., The Use of Pressed Apple Pomace, in *The Journal of the Board of Agriculture*, Vol. XXII, No. 9, pp. 851-858. London, December, 1915.— II. BARKER, B. T., and WALE, B. N., The Value of Cider Apples and Pomace as Food for Farm Stock. *Ibid.*, Vol. XXIV, No. 5, pp. 530-539. August, 1917.

188—**Increased Cattle Production on South Western Ranges of the United States.**—JARDINE, J. T., and HURTH, L. C., in *U.S. Department of Agriculture, Bulletin* No 588, pp. 1-32. Washington, D.C., November 15, 1917.

This bulletin presents the results of experiments made by the Forest Service on the Jornada Range Reserve, a unit comprising 200,000 acres in New Mexico, with the purpose of working out a system of range management and improvement, practicable for large grazing units, which will build up the depleted areas and ensure the maintenance of the whole range in

good condition. The article, which covers four pages in the Institute Bulletin, concludes as follows:

In order to provide for extra range for the breeding stock in poor years, one third of the stock on a range unit should be steers. It is then possible to reduce or increase the stock according to years without interfering with the breeding stock.

To provide against loss in extremely bad years some kind of roughage to supplement the range forage, for feeding with cottonseed cake or other concentrated feed, would be a decided advantage on south-western ranges.

Ensilage made from soap weed (*Yucca elata*) has been tried, and the results are promising but not extensive enough to warrant definite conclusions.

Range feed not more than 2½ miles from water is a big factor in cutting down loss from starvation, especially where little or no supplemental feeding is done.

71—**Milking by Machinery.**—HOPPER, J. J., and NUTTER, T. W., in *The Field Illustrated*, Vol. XXVII, No. 10, pp. 755, 806, 810 and 812. New York, October, 1917.

Since 1913, at the Kentucky Experiment Station, 30 cows a day are milked by machine. Occasionally, when through some accident to the motor, it is necessary to milk by hand, 2 men can milk the herd in 1¼ hours, but more usually they need 1½ hours, or three hours a day for the two milkings. With a machine the work can be done in 45 minutes, or 1½ hours a day, but washing and attending to the apparatus before and after milking require another 1½ hours. An expert workman can milk by hand as quickly as the machine, which takes four minutes to milk a cow, but, with a machine, two cows can be milked at once, and the milkers prefer the machine.

Mechanical milking is advantageous with a herd of 30 cows, and the larger the herd, the more necessary it becomes. With a herd smaller than 30 there is less to be gained by the use of a machine.

The four machines at the Kentucky Experiment Station cost $568; in four years, repairs and new rubber parts have cost about $448. The electric power used costs about $3.90 a month or $1.56 per cow annually. The combined cost of repairs for the machine and for power amount to $5.31 per cow per year. Possibly a small gasoline engine would decrease the expense.

From data obtained from the Station and from the Elmendorf dairy, where 400 cows are kept, it was seen that the lactation period was extended from 11 to 16 months. Frequently mechanical milking was replaced by hand milking during 1 or 2 weeks, during which little or no change was noticed in the milk flow. It should be noted that, unless the cows are carefully stripped by hand after machine milking, they dry off very rapidly.

By hand stripping a small quantity of milk, varying from a half teacupful to half a pint, is obtained. Hand stripping has the advantage of allowing the condition of the teats to be observed; it is carried out while the machine is milking another cow. To obtain perfect results the machine must work perfectly, faulty pressure may do harm, and the presence of blood in the milk may be attributed to it, but it is easily remedied. During 4 years, only 5 cows were found which did not take to mechanical milking.

As many as 5% of the cows in a herd may not be satisfactorily milked with a machine, but the other 95% are accustomed to it after 2 or 3 milkings. Milk was obtained with as few as 50 to 100 bacteria per cc., and the bacterial count rarely exceeded 2,000 to 4,000. The average bacterial count of station milk published by the Lexington Health Board for July was 500.

The machines are cleaned with warm water, washing powder, and a hard brush. The detachable parts are then rinsed and placed in an anti-septic solution. Just before milking, the teat cups and tubes are washed with water. Vigilance and care in cleanliness are absolutely essential both in machiue and hand milking

The advantages of mechanical milking may be summarized as follows: it makes the work easier and the workman better satisfied. It does not decrease the amount of labour required, but makes it less hard

190—**The New Zealand Sheep Returns in 1917 and the Progress of Crossbreeding in New South Wales.**—*The Pastoral Review*, Vol. XXVII, No. 11, pp. 1040-1041. Melbourne, November 16, 1917. (1 page in Institute Bulletin.)

191—**The Importance of Hogs for the Meat and Hides Supply.**—FISH, P. A., in the *Journal of the American Veterinary Medical Association*, Vol. LII, No. 3, pp. 245-247. Ithaca, N.Y., December, 1917.

It is estimated that at present there are in the United States 4,000,000 hogs less than there were a year ago. Outside of the United States there has been a decrease of 39,525,000 hogs. This number has been exceeded only by sheep. Cattle are not far behind the hogs in their diminishing numbers (1).

(1) According to the report of the U. S. Department of Agriculture there were 71,374,000 pigs in the United States on Jan. 1st, 1918, compared with 67,503,000 on Jan. 1st, 1917, an increase of nearly 4,000,000. The official estimates of live stock in different countries were given in some detail in the February 1918 issue of the AGRICULTURAL GAZETTE at page 213. Instead of a decrease the figures for the latest dates available for the countries covered show a slight increase over the estimates for earlier dates.

To assist in meeting the great demand for meat the U.S. Department of Agriculture estimates that the number of hogs should be increased 15 per cent. for the entire country. In some states the increase needed is only 5 per cent., in others, as much as 50 per cent. This policy seems completely justified, because among the domesticated animals there are none so prolific; none which produce so great a return in so short a time; none in which so wide a variation in diet is possible; none more useful in the variety of products afforded.

Nevertheless, there is one important product of the hog which does not seem to be used to its best advantage, under modern methods of curing ham and bacon, and that is the hide.

The deficiency in leather is becoming serious, and pig skin is the only substitute, in large quantities, available for cowhides. The skins of the millions of hogs slaughtered annually could be converted into the finest kind of leather. Such leather is superior to cow hide in resisting surface wear, and has been used for years, but in limited quantities, in making the finest saddles and fancy leather goods. It has been tested and found thoroughly practicable and satisfactory for shoes.

It is stated that there is a shortage of three million cowhides to meet in the open market. The pigskins would make up this deficiency twice over, considering that the presence of the skin is not indispensable in preserving the meat, under the modern methods of curing.

In the supply of meat and leather, the hogs, as quick breeding animals, seem therefore to meet the need. Unfortunately, they are susceptible to diseases which annually take a toll of millions from the supply. But the use of anti-hog cholera serum is to-day far beyond the experimental stage. It has checked the disease in the infected herds, and immunized healthy hogs exposed to the disease; therefore, with a greater educational interest and with proper co-operation on the part of the producers and of the veterinarians, it seems only a question of time and organization to avert the menace of hog cholera.

FARM ENGINEERING

80—**The Tractor in Relation to the Farm and its Machinery.**—KRANICH, F. N. G., in the *Transactions of the American Society of Agricultural Engineers*, Vol. X., No. 2, pp. 101-108. Ames, Iowa, March, 1917.

According to the writer, there exist, between the tractor and its environment, relations of three types:—

1. Relations to draft machines;
2. Relations to belt-power machines;
3. Relations to the economics of the farm.

These factors are equally important, but, unless the tractor's utility can be divided equally among them, it is not a success on the farm.

Draft Machines.—Considering the actual horse power required, ploughing constitutes the heaviest work of farming, though not the longest in actual hours of work. Milking requires at least an hour morning and evening for one man, which totals to 73 days of 10 hours per year. Ploughing on the average farm requires less than 20 days per year. Farmers often consider tractors as merely ploughing machines; to this end the horse drawn gang ploughs have been adapted for use with tractors, as the other farm draft machines will probably be. The disc harrow, the spring tooth harrow, clod crusher, etc., are best used right behind the plough.

Most of these machines are usually drawn by 2, 3, or 4 horses; too much power would be wasted were they hitched alone to the tractor. Several of these machines should be combined, or one large machine should be constructed, to form a sufficient load for the tractor.

But it remains to be seen if that is desirable, for each binder or mower would require a man, so that the measure would defeat its usefulness. Moreover, the extra expense of these machines would cost too much per unit of production. Again, the small tractor is limited in power, and the size of the farm for which it is suited would not require 2 or 3 binders mowers, or harvesters. Drawing a manure spreader, a tedder or rake is ordinarily work for two horses. The tractor's relation to either of these machines is questionable. The tractor can, of course, do this work, but is it economical? A spreader is empty half the time, and then it is not even a load for a 2-horse team. To draw 2 or 3 spreaders by a tractor might be economical, on account of the time lost in loading, hitching, and handling. Harrows, manure spreaders, etc., might be adapted to tractors, but it would increase the machinery cost to the farm, as well as necessitating changes to provide accommodation for them. Would this be considered economic farming, and would the method lower the cost of production? In the next few years, the tractor will certainly reach such a stage of development as to render it still more useful. Farm machines will be built in sizes to suit

economical working to the tractor, and they will be of better design and construction. The tractor does not need to replace all the farm horses, but it must replace some to prove its economic value. If the tractor replaces horses of value equal to twice its cost, it has served a great part of its intent.

Belt-power Machines.—The tractor should be able to drive the belt or power machines of the farm; but the tractor and the machines (grain separator, huller, saw, etc.) should be so arranged as to work at the maximum capacity consistent with efficiency. Convenient belting should be provided as well as proper speeds without unnecessary pulley changing. A tractor suitable for belt work only would not be considered an economic farm machine. It is probable that few of the gas or steam tractors used in the United States represent a profitable investment for their owners, for they remain idle so much of the year, because belt work, primarily threshing, was their purpose.

It is the variety of things done economically by the tractor during the year that makes for its close relationship to the farm and its machinery. If belt work is the principal aim, the portable engine will solve the problem at half the cost of a tractor, for most of the expense of a tractor lies in its transmission parts, which are for draft work.

Farm Economics.—The economic relation between the tractor and the farm in general is very important. Although closely related to the draft machines and power machines, the tractor may prove rather an expense than a saving, if it is not in proportion to the whole farm. Thus, an 80-acre dairy farm, with 5 horses, would obtain no economic advantage from the purchase of a 15-30 HP. tractor, which, although of first-class construction, would be more suited to a 600-acre farm.

The tractor will bring about a new era in farm machinery. Its value is only just beginning to be recognized. Farm machinery will be redesigned to meet the needs of tractor farming, as well as being constructed to give better and longer service. At present it is often of poor quality. It should work more efficiently, have a longer life, which would give better profit and reduce the unit cost of production.

81—**Machine Cultivation Tests at Noisy-Le-Grand, France.**—RINGELMANN, MAX, in *Feuilles d'Information du Ministère de l'Agriculture*, Year 22, Nos. 39 and 41, pp. 7-9 and 12-13. Paris, September 25 and October 9, 1917.

The author's second report on the trials at Noisy-le-Grand (France) deals with 12 machines indicated in an appended Table, which summarizes the results of the work carried out.

As a supplement to the special trials in 1913-1914, 1915, 1916 and 1917 (which concerned 63 machines) the writer formulated a number of conclusions, the chief of which are given below.

The weight of the tractors should not be more than 6,160 to 6,600 lbs.; such machines are easy to handle and give an average tractive effort of from 1,320 to to 1,540 lb. Above such a tractive effort the machine does not last long, the axles are strained, thus resulting in greater wear and tear, with a reduced length of life.

When the work (breaking up or deep ploughing) requires a tractive effort of more than 1,320 to 1,540 lbs., recourse should be had to a winch tractor.

To provide for good steering, about one third of the total weight should be carried by the steering wheels and two-thirds on the driving wheel or wheels. Two steering wheels are more effective than a single one.

The weight of the tractor in relation to the width of the wheels should not be more than 170 to 180 lb. per in. of tyre width (figure obtained and checked at trials). Neither the width of the tyres nor the diameter of the driving wheels (43 to 55 ins.) should be increased too much.

In the case of exterior transmission to the driving wheel or wheels (gears or chains) a clearance of at least 10 to 12 ins. should be left between the ground level and the lowest point of the drive or gear box.

A differential should be dispensed with, one driving wheel or two driving wheels placed close together being used instead. With one driving wheel working in the furrow and the other on the unploughed land, the strain falls constantly on one side of the differential, one of whose gears wears more quickly than the other.

As regards grips fixed to the driving wheels strakes of various forms damage the ground much less than grouts and other types of grip which tend to pack the soil.

The strakes should be run on the unploughed ground; turning the last strip of ground destroys the compressed part, which does not take place when one of the driving wheels runs on the furrow-bottom; in the last case, the packed parts covered in ploughing remain unchanged in hard blocks; the difficulty does not occur in sandy soil. One driving wheel may run in the furrow, but it is inadvisable.

Motors of 20 to 25 HP., with several cylinders of the automobile type and running at high speed, are preferable.

The circulating pump should be gear-driven, while the fan should be driven by a belt.

Endless-track devices (caterpillar treads) should be avoided on account of the difficulty of steering and the rapid wear of the many articulations.

The front-bogie tractors act almost like motorploughs; steering the driving wheels is difficult on account of their weight on

the soil, especially if one wheel, provided with grips, runs in the furrow. The steering of the wheelbarrow type of motor plough is also difficult.

The double-brabant windlass plough, which has been largely tested, is of interest for average cultivation.

With a pull of from 1,320 to 1,520 lb., an average speed of 3,250 yards per hour seems suitable; the speed may be increased up to 4,300 yards per hour, but on further increasing it, steering becomes difficult and the traction of the implement becomes too heavy. Under similar conditions of work, period, soil, plough, the tractive effort increases from 100 to 118 when the speed increases from 1 to 2.5.

The use of the tractor is best suited to furrow lengths of not less than 500 feet. The time required for turning is about half-a-minute (20 secs. with a good driver, one minute with an inexperienced man).

Two men are required; one mechanic on the tractor and an ordinary assistant on the implement being towed; this latter does not exclude automatic lifting.

More than 50 minutes of actual work per hour cannot be relied upon.

A traction buffer should be placed between the tractor and the implement being towed. In this way an economy of 33 to 54% is gained on the starting-pull, and 19 to 30% on the average tractive effort, which only affects a part of the hourly consumption of the tractor while reducing the wear of the machinery.

It is worth while hitching a harrow to the plough for ploughing before autumn sowing and for that of spring.

The great advantage of the tractor, resulting from the area it can cover per hour, is that the farmer can immediately utilize the favourable opportunity for ploughing.

The tractor is used to best advantage on furrow lengths of from 3,250 to 5,000 feet., in fields with slopes of not more than 7 to 10%.

Travelling by road should be reduced as far as possible, unless the grips are removed from driving wheels, and other precautions raken.

199—**Tractor Trials in Scotland in 1917.**—*The North British Agriculturist*, Vol. LXIX., No. 49, p. 740. Edinburgh, December 6, 1916.

The official report of the Reporting Committee of the Highland Agricultural Society of Scotland on the tractor trials held at Edinburgh, Glasgow, Perth and in October, 1917, gives the following classication of the 29 machines that took part in the trials:—

1. *Wheels:* 15 ran on 4 wheels; 6 on 3 wheels; 4 ran on caterpillars, and 4 were single-unit machines.

2. *Driving:* 18 tractors were handled by 2 men, while 18 were one-man outfits.

3. *Fuel:* 25 were operated by paraffin; 3 by petrol; and 1 by steam.

4. *Weight:* 2 weighed over 80 cwt.; 3 over 60 cwt.; 6 over 50 cwt.; 7 over 40 cwt.; 3 over 30 cwt.; 8 less than 30 cwt.

The report does not class the tractors in order of merit, but it gives observations that will be of use to both farmers and engineers; these observations are given below.

WEIGHT.—Light machines, suitably provided with spuds, grip the ground and perform the work better than the heavier machines. Every drawback, such as slipping in soft land and inability to climb gradients was aggravated by increase of weight above a certain limit. A heavy tractor is, moreover, at a disadvantage for the lighter forms of cultivation, such as grubbing, cultivating, seeding, and harrowing, and also for harvesting. The light tractor is quite suitable for all the farm operations, including driving a threshing-mill and other farm machinery. The only class of work for which the light tractor does not appear to be suited is road haulage. The conclusion was reached that, to suit conditions in Scotland, an efficient tractor need not exceed 30 cwt. in weight.

HORSE-POWER.—For various reasons, such as inexpert drivers, loss of power due to soft ground and clogging of the wheels and moving parts with mud, etc., the tractor should have a minimum of 20 b. h.-p., so that it can haul a 2-furrow plough under the worst conditions, and a 3-furrow plough under ordinary conditions; it should also be capable of driving a 4 feet 6 in. threshing-mill.

CATERPILLAR VERSUS WHEELS.—While this arrangement distributes the actual dead weight and thus reduces the intensity of pressure on the land, it appears certain that there must be excessive wear and tear on the caterpillar. As far as the Committee could observe the caterpillar has no advantage as regards gripping power over the best type of wheel machines.

SPIKES, BARS, AND SPUDS.—A stout spud 3 in. to 4 in. in width and 4 to 5 in. in length appears to be more satisfactory than spikes or bars, especially when these spuds are so arranged in relation to the circumference of the wheel, that the full gripping power of one spud is always in operation.

ACCESSIBILITY AND PROTECTION.—The report notes the importance given to rendering the vital parts of the machinery more accessible, and also to providing protection against the weather.

BRAKES.—For transport purposes, all tractors should be provided with adequate brakes.

RELIABILITY AND DURABILITY.—Seeing that only one machine failed to complete the 6 days' work, it seems that a fair degree of reliability has been attained. In spite of the bad state of the ground, the

tractors overcame all difficulties. Two defects were noted as tending to impair durability. These are the exposed gear drives on some of the wheel tractors, which fill with mud and grit, and the already-mentioned excessive wear of the caterpillar arrangement.

SPRING AND OTHER CONNECTIONS.—The Committee are of the opinion that the drawbar should be provided with some spring appliance, which would relieve the strain on the plough in the case of encountering minor obstacles. With this might be incorporated a release device, which would completely detach the plough under the strain of a heavy shock. This attachment should be an integral part of the tractor and not merely a casual device inserted in the draft connections. Provision should also be made for altering the point of attachment of the plough to the tractor in a vertical direction. This, is important as different implements require different heights of attachment.

SPEEDS.—It is suggested that speeds of 2½ and 4 miles per hour should meet the requirement of a tractor for use on the land.

FUELS.—Although no test of fuel consumption could be carried out, it was found that the carburettors of many of the tractors were not capable of thoroughly and completely vaporizing paraffin, and that the combustion was, in consequence, defective in many cases. Under normal conditions, it may be found that petrol is more satisfactory to use than paraffin.

PLOUGHS.—They should be made so as to be easily adjusted to varying widths so as to suit the depths and the class of work. Automatic lifting should be provided. They should be provided with a device for regulating the width of the leading furrow.

The Committee further suggest that:

1. If the last unit of the plough could be made so that it could be thrown out of action by being raised with a lever or otherwise, then 2 furrows could be ploughed on an up gradient and 3 on a down.

2. The introduction of a one-way plough would obviate the necessity of having feerings and finishes, most of which, under present circumstances, must be performed with horses.

HANDLING.—The handling of the tractors did not appear to present any great difficulties. The single-unit machine has the advantage that the implement operation was directly under the observation of the driver. The light tractors and single unit machines were able to turn more quickly at the headlands.

PRICE.—The question of price is a difficult one under the present abnormal conditions. Manufacturers should, however, aim at putting a tractor on the market at a price not exceeding $1,500.

200—**Ploughing and Harrowing with a Tractor.**—RINGELMANN, MAX, in the *Journal d'Agriculture Pratique*, Year LXXXI., Vol. CXXXI., New Series, Vol. XXX., No. 25, pp. 487-489. Paris, December 13, 1917. (1 page in Institute Bulletin.)

201—**Harvesting with a Tractor.**—RINGELMANN, MAX.: I. *Journal d'Agriculture Pratique*, Year LXXXI, New Series, Vol. XXX, No. 19, pp. 366-368. Paris, September 20, 1917.—II. *Bulletin de la Société d'Encouragement paur l'Industrie Nationale*, Year CLVI., Vol CXXVIII No. 5, pp. 314-318. Paris, September-October, 1917. (1 page in Institute Bulletin.)

207—**The Use of Wind Engines for Irrigating Semi-arid Soils in the Western United States.**—FULLER, in U.S. *Department of Agriculture, Farmers' Bulletin* 866, pp. 38, bibliography of 32 Bulletins concerning Irrigation. Washington, 1917.

This bulletin is a new and revised edition of bulletin 394, published in 1910 by the U.S. Department of Agriculture, with the object of showing how to irrigate small tracts of land cultivated without irrigation by means of wind engines. Information is given as to:—sources of water; boring hydraulic wells; power required to lift water; friction of water in pipes; method of calculating the dimensions of the wind engine to be bought.

209—**Industrial Alcohol in South Africa.**—*The South African Journal of Industries* Vol. I., No. 1, pp. 46-48. Pretoria, September, 1917.

89—**The "Alpha" Apparatus for the Discovery of Metallic Objects in the Soil.**—*Le Génie Civil*, Vol. LXXI; No. 19, pp. 312-313. Paris, November 10, 1917.

From the data of M. Gutton, who devised a machine for tracing projectiles buried in the soil, M. Chanoit, Engineer, of Villeneuve-Saint-Georges, has constructed a new "Alpha" apparatus (so called because of its A-shape), by means of which a 75 shell buried 16 to 20 inches in the soil may be located.

By means of the apparatus, any metallic object weighing 22 lb. and burried up to 20 inches deep in the soil may be located.

RURAL ECONOMICS

91—**The Milk Producer's Problem in the United States.**—GILLETTE, L.S., (Iowa State College), in *Hoard's Dairyman*, Vol. LIV, No. 11, pp. 324. Fort Atkinson, Wis., October 5, 1917.

There is no industry which is suffering

as severely in the present crisis as that of milk production, while one-fifth of the total food supply of the United States is the dairyman's task.

The accompanying table shows the average price which the dairy farm operated by the Iowa State College was compelled to pay for feeds during the years July 1, 1914, to June 30, 1915, and July 1, 1916, to June 30, 1917, as well as the market quotations oi the same feeds August 1, 1917. It shows that in the two year interval the price of feeding stuffs has increased from 70 to 205%, as in the case of corn. Alfalfa hay is not quoted, but it will reach the highest price this winter to which it has ever soared. The problem of the dairyman, therefore, seems to be the utilization of feeding stuffs that have increased 100 to 200% in cost for production of dairy products that are selling for only 25% more than formerly.

Dairy farming has never been noted for large returns; its popularity is based upon the certainty of the income, usually at a small profit. Now, the great increases in the cost of production brought about largely by the rise in cost of labour, increased value of cows, and price of feeding stuffs, transform the profit to a loss. The relief must be sought principally in—

1. Higher prices for product.
2. Elimination of the boarder cow.
3. Economical selection of concentrates.

Of these factors, the first one is of primary importance, and will be achieved through education of the consumer and organization of the producer. The second factor determines the degree of profit of the dairyman regardless of the price received for the product. A too large percentage of boarder cows will make any dairy a financial liability. The last factor is one which varies rather widely with the locality, season, and year. While roughages are more expensive than formerly, they are still the cheapest source of food nutrients In those herds which are kept for commercial milk production the more limited use of concentrates is the practical policy to pursue Silage is a cheaper source of energy for all kinds of dairy stock than alfalfa, and no dairyman with even a small herd can afford to be without it because of its succulence, palatability, and economy.

PRICES OF FEEDING STUFFS PER CWT.

Feed	July 1, 1914 June 30, 1914	July 1, 1916 June 30, 1917	August 1, 1917	% increase
Corn meal	$1.525	$2.25	$4.65	205
Bran	1.1375	1.73	2.65	132
Cottonseed meal	1.50	2.10	3.00	100
Oil meal	1.48	2.28	3.25	119
Ground Oats	1.156	2.24	2.60	124
Gluten feed	1.35	1.86	3.15	133
Unicorn	1.60	—	2.75	71
Alfalfa hay	0.80	1.20	—	185
Corn silage	0.175	0.30	0.50	—
Dried beet pulp	1.25	—	—	—

211—**Value to Farm Families in the United States of Food, Fuel, and Use of House.** —FUNCK, W. C., in *U.S. Department of Agriculture, Bulletin* No. 410, pp. 1-36. Washington, D.C., November, 1917.

The scope of this survey was to determine the value of those things which the farm furnishes to the farm family without money cost, namely the use of a house, food, and fuel. The data were secured from nearly 1,000 families, representing widely separated sections in 14 States. Figures were gathered covering the value of all food, fuel, and shelter, itemized to show what part was bought and what part was furnished by the farm. Data also were collected bearing on the value of household labour on the farm.

Following is a brief abstract of the more significant averages established by this inquiry. The figures given are based on reports from 950 families, averaging 4.8 persons per family.

ANNUAL VALUE OF FUEL, FOOD, AND USE OF HOUSE:—
Average per family, $642: Furnished by farm ... $424 (66 per cent.); Bought ... 218 (34 per cent.)

ANNUAL VALUE OF FOOD:—
Average per family, $448: Animal products 58 per cent.; Groceries ... 25 " "; Vegetables ... 11 " "; Fruits ... 6 " " "
From farm, 58%. Bought, 42%.

ANNUAL VALUE OF FUEL:—
Average per family, $62: Wood (9.4 cords) ... $36.30; Coal (2.6 tons) ... 17.85; Oil (55 gallons) ... 6.33
From farm, 54%. Bought, 46%.

ANNUAL VALUE OF USE OF HOUSE:—
Average per family, $132.

ANNUAL VALUE OF HOUSEWORK:—
Average per family, $228: Furnished by family $217 (95%). Hired ... 11 (5%).

It was found that the average annual value of meats (other than poultry) consumed per family was $107.25; of poultry products, $55.40; and of dairy products $98.36. (The quantity of dairy products consumed was equivalent to 2,640 quarts of milk.)

Meats constitute the most important

group of foods. As it increases relative to the other groups the total value of food consumed per family increases.

Those families having a relatively greater consumption of either groceries, vegetables, or dairy products use relatively less meats, and their total consumption of food is less in value.

Families living on their own farms reported higher consumption of food and a larger proportion of food derived directly from the farm than did those living on rented farms. The average quantity of fruit canned annually per family was 122 quarts; of vegetables 32 quarts. The cost of the board (as of hired hands) in food, fuel, and house work, was shown to be $129 per year. Thirty-one per cent of this represents cash oultay.

The survey includes the following counties and States: Oxford, Me., Lamoille, Vt., Otsego, N.Y., Bucks, Pa., Gloucester, N.J., Gaston, N.C., Troup, Ga., McLennan, Tex., Champaign, Ohio, Jefferson, Wis., Montgomery, Iowa, Cloud, Kans., Cass, N. Dak., Santa Clara, Cal.

AGRICULTURAL INDUSTRIES

221—**Investigations into the Proteolytic Activity of Lactic Ferments—III. The Influence of the Method of Milk Sterilisation; IV. Lacto-culture in the Selection of Lactic-Proteolytic Ferments.**—GORINI, COSTANTINO, in *Atti della Reale Academia dei Linci, Ser. V., Rendiconti di Scienze fisiche, matematiche e naturali*, Vol. XXVI Pt. 7 and 8, pp. 195-199 and 223-227. Rome, 1917. (1 page in Institute Bulletin.)

222—**The Dairying Industry in South Africa** BAYNES, JOSEPH, in *The South African Journal of Industries*, Vol. I, No. 2, pp. 124-126. Pretoria, October, 1917.

223—**Photographic Analysis of Dried or Fresh Eggs.**—LE ROY, GEORGES A., in *Comptes Rendus des Séances de l'Académie des Sciences*, Vol. CLXV, No. 25, pp. 1026-1028. Paris, December 17, 1917.

In the trade, to differentiate eggs as regards freshness or more or less good state of preservation, the candling method is used, i.e., an optical examination by transparency, based chiefly on the size of their air space.

For legal purposes, the author devised a new method which is more exact, allowing the size of the air space to be gauged, and a graphic record to be taken, so as to form a convincing proof which will be both lasting and suitable for purposes of comparison. The result is obtained by photography, together with special adjustment of the light and arrangement of the eggs, which are fully described, and extremely sensitive plates. By this method it is possible to obtain life-size photographs, by transparency, of groups of eggs and their air spaces, which may be measured by a graph placed over, or forming part, of the photograph.

The use of radiography for this purpose only gives deformed images very inferior to those obtained by the photographic method.

224—**Dried Eggs.**—(1)LINDET, in *Comptes Rendus des Séances de l'Académie d'Agriculture de France*, Vol. III., No. 40, pp. 1116-1119. Paris, December 19, 1917.

226—**The Handling and Storage of Spring Wheat.**—BAILEY, C. H., in the *Journal of the American Society of Agronomy*, Vol. IX., No. 6, pp. 275-281. Washington, D.C., September, 1917. (1 page in Institute Bulletin.)

227—**Substitutes for Tin Cans.**—*The Tea and Coffee Trade Journal*, Vol. XXXII., No. 6, pp. 536-540. New York, June, 1917.

(1) See also AGRICULTURAL GAZETTE, July 1917, page 631.

AGRICULTURAL STATISTICS

BROOMHALL'S FOREIGN CROP CABLE, JUNE 18, 1918

France.—Good weather has prevailed and crop conditions are reported as generally favourable, with the outlook for larger yields than last year. Supplies keep scanty, but there is sufficient to go around.

Russia.—Crop news from this grower is conflicting and most unreliable. It is known, however, that there are disorders in the Ukraine and fighting is going on in Caucasia, which unsettlement would not make for any great cultivation of the land. Peasants appear unwilling to part with their grain for the depreciated paper money.

Spain.—Favourable weather continues to prevail and crop conditions have improved. The outlook is much better than earlier indications.

Italy.—Some improvement has been noted in the weather of late, which has been fine and dry.

United Kingdom.—Weather conditions for the most part have been seasonable. The outlook for cereals is favourable, although in some isolated sections damage has been caused by wire worms and other insects.

Australia.—Further rains have been reported in Victoria, New South Wales, and Western Australia; these rains will give the new crops a favourable start. Soil is reported as good.

AREAS OF CEREAL CROPS IN THE NORTHERN HEMISPHERE

COUNTRIES	Area.				
			Five years' average	1918 compared with	
	1918	1917	1912-16	1917	Five years' average
WHEAT:	Acres	Acres	Acres	%	%
Denmark	141,000	138,000	144,000	102.4	98.4
Spain	9,997,000	10,134,000	9,827,000	98.6	101.7
France	11,360,000	10,569,000	14,179,000	107.5	.....
England and Wales	.....	1,918,000	.....	115.0	.....
Scotland	67,000	55,000	.....	121.8	.....
Ireland	.....	124,000	56,000	.....	.....
Canada (a)	16,233,000	14,756,000	12,557,000	109.0	128.0
United States	58,881,000	45,941,000	52,558,000	128.2	112.0
India	34,469,000	32,856,000	30,554,000	104.9	112.8
Japan	1,458,000	1,236,000	1,193,000	118.0	122.3
Tunis	1,513,000	1,310,000	1,353,000	115.5	111.8
RYE:					
Denmark	537,000	455,000	565,000	118.0	95.0
Spain	1,989,000	1,829,000	1,883,000	108.8	105.6
Canada (a)	236,000	212,000	126,000	110.6	186.5
France	1,955,000	2,046,000	2,508,000	95.6	78.0
United States	5,435,000	4,102,000	2,712,000	132.5	200.4
BARLEY:					
Spain	4,248,000	3,839,000	3,649,000	110.7	116.5
France	249,000	270,000	1,689,000	92.2	.....
Japan	2,721,000	2,738,000	3,106,000	99.4	87.6
Canada (a)	2,412,000	2,392,000	1,642,000	100.0	145.9
United States	9,108,000	8,835,000	7,549,000	103.1	120.6
Tunis	1,504,000	1,038,000	1,162,000	144.9	129.4
OATS:					
Spain	1,512,000	1,168,000	1,347,000	128.9	111.8
France	1,612,000	1,608,000	8,502,000	106.8	.....
Canada (a)	13,859,000	13,313,000	10,803,000	103.0	127.2
United States	44,475,000	43,572,000	39,413,000	102.1	112.8
Tunis	144,000	124,000	132,000	116.9	109.4

(a) The estimated yield of cereals in Canada for 1918, as indicated by the reports on condition on June 1st are: wheat 312,230,000 bushels, rye, 4,075,000 bushels, barley 65,727,000 bushels, oats 498,924,000 bushels.

UNITED STATES JUNE CROP REPORT

The total crop of wheat in the United States was estimated from June conditions at 931,000,000 bushels compared with 651,000,000 last year, 636,000,000 in 1916, and the record crop of 1,026,000,000 in 1915. The production of oats is estimated at 1,500,000,000 bushels compared with the record crop of 1,587,000,000 last year. The yield of barley is forecast as 235,000,000 bushels compared with 209,000,000 in 1917 and the yield of rye as 81,000,000 bushels compared with 60,000,000.

CROPS OF THE SOUTHERN HEMISPHERE 1917-1918.

Countries	Area			Production		
	1917–18	1916–17	Five years' average 1911–12 to 1915–16	1917–18	1916–17	Five years' average 1911–12 to 1915–16
WHEAT:	Acres	Acres	Acres	Bushels	Bushels	Bushels
Argentina	17,876,000	16,089,000	16,454,000	218,625,000	70,225,000	160,996,000
Uruguay	1,014,000	780,000	852,000	12,860,000	5,390,000	6,714,000
So. Africa	925,000	755,000	737,000	8,833,000	6,039,000	6,520,000
Australia	9,857,000	11,530,000	9,238,000	122,584,000	152,088,000	94,297,000
New Zealand	294,000	219,000	218,000	6,274,000	5,037,000	6,405,000
	29,966,000	29,373,000	27,499,000	369,176,000	238,779,000	274,932,000
OATS:						
Argentina	3,500,000	2,525,000	2,803,000	74,568,000	29,911,000	60,387,000
New Zealand	484,000	563,000	330,000	6,157,000	6,275,000	15,390,000
BARLEY:						
New Zealand	31,000	30,000	30,000	833,000	769,000	1,095,000

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DEPARTMENT OF AGRICULTURE

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FEDERAL LIVE STOCK FEEDING POLICY

OWING to the scarcity of feed for live stock in extensive areas, more particularly in the southern part of Alberta, Saskatchewan, and part of Manitoba, and to the more plentiful supply in other sections of these provinces, the Honourable the Minister of Agriculture of Canada has entered into an arrangement with the railway companies that has for its object assistance in the transportation of live stock from areas of scarcity to those in which feed is more abundant, and also the transportation of feed into the short-crop areas.

The section of country affected includes that part of the three provinces east of Cochrane and Lundbreck south line of the Canadian Pacific Railway, running from Red Deer to Lacombe, to Kerrobert, to Wilkie, to Saskatoon, and, by Grand Trunk Pacific east of Saskatoon to the eastern boundary about 100 miles west of Winnipeg.

The railways agree to move cattle and sheep to the north at half rate, subject to the minimum rate of 5c. per 100 pounds on cattle, and 6½c. per 100 pounds on sheep, up to November 15th, 1918, shipments to be returned at half rate in reverse direction prior to October 1st, 1919, provided they are returned by the original owner to the original point of shipment.

Hay and straw in carloads are to be carried at half rate in reverse direction from the movement of cattle and sheep, as here described, up to May 1st, 1919.

All movements under this arrangement are subject to a certificate signed by the Deputy Minister of Agriculture in the province in which the shipping originates. On its part the Dominion Department of Agriculture undertakes to pay the remaining half of the freight rate. This means that live stock and feed will be carried to points within the three provinces free on certificates from the Deputy Ministers.

This policy is in line with that applying to the return of feeding and breeding cattle and sheep from stock-yards to the farmers in eastern and western Canada, as outlined in THE AGRICULTURAL GAZETTE of Oc-

tober last—that is to say, the railway companies agree to carry the stock and feed for fifty per cent of the regular transportation rates, and the Federal Department of Agriculture undertakes to pay the remaining portion of the cost.

This agreement was reached after the situation in western Canada had been carefully canvassed by both federal and provincial officials, and it had been found that feed was extremely short in the area herewith outlined, from which large numbers of thin young cattle, sheep, and swine were going to the markets of Calgary and Winnipeg.

REARRANGEMENT OF PUBLIC SERVICE ADMINISTRATION

AFTER very mature consideration, covering a considerable period of time, a re-arrangement has been made of certain public services formerly within the jurisdiction of the Department of Agriculture, Up to the present year, Canada's participation in international expositions abroad, quarantine regulations and matters connected with the public health, the Trade Marks and Design Act, the Timber Marking Act, and the law relating to Patents and Copyrights, have been under the administration of the Minister of Agriculture. These divisions have now been transferred to other departments, as will be seen from the following provisions contained in orders-in-council:

Order-in-council of the 3rd June, 1918, orders that the management of Canada's participation in International Expositions abroad, the administration of quarantine regulations and matters connected with Public Health, be transferred from the Department of Agriculture to the Department of Immigration and Colonization.

Order-in-council of the 3rd June, 1918, orders that the administration of the Trade Marks and Design Act and the Timber Marking Act, be transferred from the Department of Agriculture to the Department of Trade and Commerce.

Order-in-council of the 17th June, 1918, orders that the administration of the law in regard to Patents and Copyrights be transferred from the Department of Agriculture to the Department of Trade and Commerce.

REFUSE SCREENINGS

THE exportation from Canada of refuse screenings produced from cleaning wheat or other grains being prohibited, except by license to be issued by the Collector of Customs when approved by the Canada Food Board, the Canada Food Board under date of July 17th, 1918, made the following regulation under which approval may be obtained:

1. That before the holders of such refuse screenings shall apply for a license for exportation from Canada to be issued by the Collector of Customs, approved by the Canada Food Board, the said refuse screenings shall be offered for sale in the same manner as grain is offered for sale on the open floor, during trading hours, on the Winnipeg or Fort William Grain Exchange, and a record shall be kept by the secretary of the said exchange, and that no approval of the Canada Food Board for exportation will be given until the record be authenticated by the secretary of the grain exchange on which same was offered for sale certifying same to have been a *bona fide* sale at the highest price obtainable on said exchange at the time of sale.

2. All other orders made by this Board relative to refuse screenings are hereby cancelled.

THE MEAT AND CANNED FOODS ACT

THE INSPECTION OF PRESERVED FRUITS, VEGETABLES, AND MILK

HIS Excellency the Governor-General in Council, on the recommendation of the Minister of Agriculture, has been pleased to order under date of June 15, 1918, that the regulations covering the inspection of preserved fruits, vegetables, and milk, approved by Order in Council on July 6, 1910, be repealed and revised regulations substituted in lieu thereof.

The first two regulation of the new order are the same as those previously in force. Section 3, which is entirely new, provides that every establishment operating under the provisions of the Meat and Canned Foods Act shall, within one month after the date upon which the regulations come into force, mail to the Minister of Agriculture by registered letter, an application for a permit to continue in operation; and, in case no permit is received within sixty days from the date of mailing such letter, the establishment must discontinue export or interprovincial business. No establishment can hereafter commence operating without first obtaining from the Minister a permit. In case the Minister has reasonable ground to believe that any establishment has committed a violation of any of the provisions of the Act, or of these regulations, he can upon ten days' notice cancel the permit.

Sub-section (b) of the thirteenth regulation provides that a true and correct description of the contents of the container, as is, or may be, defined in the appendices to these regulations, shall be given on the container. Sub-sections (c) and (d) of the same section have been added. They provide that all packages must be marked as required in the section with the names and addresses of the firm or corporation, of the packer, or of the first dealer obtaining the package directly from the packer, together with the permit number which has been assigned to the establishment, and that owners or managers of establishments shall supply to the Veterinary Director General duplicate copies of all labels, stencils or lithographed designs used in the establishment, one copy to be filed with the Veterinary Director General and the other copy to be retained by the owner or manager and to be produced when required by an inspector.

Section 16, which refers to importations, has been added and is of such importance to both officials and shippers that it is herewith given in full as follows:

No person shall import, nor shall there be imported any fruit, or vegetables, or fruit or vegetable products, canned, bottled, dried, evaporated or otherwise preserved for food, or any milk, condensed, evaporated, dried, or otherwise preserved for food, unless the requirements of this section are strictly adhered to.

(a) Collectors of customs shall not clear any importation of fruit, or vegetables, or fruit or vegetables products, canned, bottled, dried, evaporated, or otherwise preserved for food, or any milk, condensed, evaporated, dried, or otherwise preserved for food, unless such shipment is accompanied by an affidavit taken before a Justice of the Peace, or other person duly authorized (in the country of origin) to attest such declarations in the following form:—

Place.....
Date.....

To the Collector of Customs,
Dominion of Canada,

I, (or we).....hereby declare that the shipment described herein was

manufactured from sound, raw materials, and that its manufacture was carried on under the sanitary conditions provided for in these regulations, that the products are at the time of shipment sound, wholesome, and fit for human food; that the containers and packages show thereon the true name and address of the manufacturer, and that the description of the contents is true and correct and conforms to the requirements as set forth in the appendices of the regulations made under the Meat and Canned Foods Act of the Dominion of Canada.

.....
(Signature and address of shipper)

Name and address of consignee.....
No. of packages.....
No. of containers in each package.....
Name of product .....
Sworn to before me this.....day of..19..

.....
(Signature of Commissioner, or Justice of the Peace)

(b) All fruit or vegetables, or fruit or vegetable products canned, bottled, dried, evaporated or otherwise preserved for food or any milk, condensed, evaporated, dried, or otherwise preserved for food, shall be subject to such inspection in the Dominion of Canada, as may be deemed necessary or advisable, and any fruit, or vegetables, or fruit or vegetable products, canned, bottled, dried, evaporated, or otherwise preserved for food, or any milk, condensed, evaporated, dried, or otherwise preserved for food, that does not conform to the requirements of these regulations and the appendices thereto, shall, upon condemnation by an inspector be forfeited to His Majesty, and may be disposed of as the Minister may direct.

(c) Collectors of customs shall attach the certificate referred to in this section to their B-1 entry form and forward same to the Commissioner of Customs.

Section 17, which is also new, provides that these regulations shall apply to all products that may be manufactured or imported on or after July 1, 1918, and that manufacturers may have until January 1, 1919, to dispose of any product covered by these regulations which they have on hand July 1, 1918.

Section 18 requires that collectors of customs shall see that the various exigencies and provisions of these regulations are fulfilled before granting any permit and shall report at once any infraction of the regulations to the Minister.

Following the regulations are appendices containing a definition of the terms used. These, in the first place refer to the containers, the label, standards of quality, head space, and the degree of syrup. Appendix (a) has reference to fruits and vegetables and certain of their products and contains notes relative to experimental work and the manner in which it should be conducted. Appendix (b) has reference to milk and its products and the standards adopted by the Department of Inland Revenue which have been included in the regulations. Appendix (c) has reference to grades of quality and quantity of apples, raspberries, cherries, peaches, pears, strawberries, beans, corn, peas, tomatoes, beets, pumpkins, and squash.

THE INSPECTION AND SALE ACT

THE GRADES OF HAY AND STRAW

AN Act was passed at the recent session of Parliament in amendment to part X of the Inspection and Sale Act (Chapter 85 of the Revised Statutes of 1906), having reference to hay and straw. Sections 340, 341, and 342 of the said Act were repealed and are partly re-quoted in the amending Act.

Section 340 is amended by providing the grades of hay for the eastern provinces; instead of the one set of grades being applicable, as formerly, to the entire country.

THE EASTERN DIVISION

Ontario, Quebec, Nova Scotia, New Brunswick, and Prince Edward Island constitute the Eastern Division, with the following as the grades: Prime Timothy, No. 1 Timothy, No. 2 Timothy, No. 3 Timothy, No. 1 Clover, No. 2 Clover, Mixed Hay, No Grade, and Shipping Grade.

To the sub-section referring to "No. 1 Clover," "No. 1 Clover Mixed" is added and described as "timothy and clover mixed, with at least one-half timothy of good colour and sound."

Sub-sections are also added as follows:

No. 1 Dyke shall be timothy and couch with not more than one-eighth of clover or other tame grasses mixed.

No. 2 Dyke shall be timothy and couch with not more than one-third of clover or other tame grasses mixed, of fair colour, sound, and well cured.

Another addition provides that "rejected" shall include all hay that is musty or heated. There is some further reorganization of the section by the adoption of provisions taken from Section 342.

THE WESTERN DIVISION

Section 340 (b) gives the Western Division for the grading of hay as Manitoba, British Columbia, Saskatchewan, Alberta, and the North West Territories. For this division, tame grasses are described as including, Choice Timothy Hay, Nos. 1, 2, and 3 Timothy Hay, Nos. 1 and 2 Timothy Clover Mixed, Nos. 1, 2 and 3 Rye grass, Brome, Orchard grass, or Alfalfa, and "No Established Grade," the last mentioned taking in all the hay not otherwise classified. The wild grasses for this division are described in the Act as Choice Prairie Hay and Nos. 1, 2, 3 and 4 Prairie Hay. "No Grade Hay" is defined to comprise all hay that is damp or otherwise unfit for storage, and "Rejected Hay" as consisting of hay containing more than twenty-five per cent of foxtail or spear grass, or hay heated, or containing must or mould, or otherwise damaged, and including all hay not good enough for other grades.

STRAW

Section 340 (c) describes the grades for straw as Nos. 1 and 2 Straw, No Grade Straw, and Musty and Heated Straw, the last named being graded as "rejected."

Section 340 (d) explains the duties of the inspecting officers.

IMPORTATIONS

Section 340 (e) provides that when hay is imported into Canada, it shall be inspected and graded in accordance with the provisions of the Act.

TAGS REQUIRED

Section 340 (f) requires every

seller of baled hay or straw to affix a tag bearing his name and address and the weight of the bale.

Section 340 (g) provides a fine of five dollars for failure to affix this tag.

THE FEES

Section 341 gives the Governor-in-Council power to prescribe the fees that are to be charged for the inspection of hay and straw.

FRAUDULENT PRACTICES

Section 342 provides that any person who puts foreign matter into any bale of hay intended for sale which improperly increases its weight, or which prejudicially affects the quality, shall be liable to a fine not exceeding forty dollars for the first offence and not exceeding one hundred dollars for every subsequent offence; also that any person who puts any foreign matter into a bale of straw for sale which improperly increases the weight, or which prejudicially affects the quality of the bale, shall be liable to a fine not exceeding twenty-five dollars.

THE LIVE STOCK AND LIVE STOCK PRODUCTS ACT

THE GRADING AND MARKING OF EGGS

HIS Excellency the Governor-General in Council, on the recommendation of the Minister of Agriculture, and under and in virtue of the provisions of sub-section (c) of Section 9 of "The Live Stock and Live Stock Products Act, 1917," has been pleased to approve the regulations herewith given respecting the grading and marking of eggs:

1. Canadian eggs for export out of Canada and eggs for domestic consumption intended for shipment from one province to another, but not including eggs intended for incubation, shall be classified and graded as follows:—

Class (1))Fresh eggs which have not been held under refrigeration at a temperature of 40° or less except when in transit or subjected to artificial preservation

Grade (a) Specials—Eggs of uniform size, weighing 25 ozs. to the dozen or over or 47 lb. net to the 30-dozen case; clean and free from stain, strong and sound in shell; air cell small, not over 3-16 of an inch in depth; white of egg to be firm and clear and yolk dimly visible.

Grade (b) *Extras.*—Eggs of good size, weighing at least 24 ozs. to the dozen or 45 lb. net to the 30-dozen case; clean; sound in shell, air cell less than 3-8 inch in depth; white of egg to be firm and yolk slightly visible; maximum allowance at time of inspection not to exceed 2 p c. variation from the grade stated.

Sub-grade (1) *Pullet Extras*—Eggs which have the quality of extras but which fall short in weight shall be known as pullet extras, providing they weigh at least 20 ozs. to the dozen, or 37½ lb. net to the 30-dozen case.

Grade (c) *No. 1's or Firsts*—Eggs weighing at least 23 ozs. to the dozen or 43 lb. net to the 30-dozen case; reasonably clean; sound in shell; air cell less than ½ inch in depth; white of egg to be firm; yolk may be distinctly visible but mobile; air cell stationary; maximum allowance at time of inspection not to exceed 2% variation from the grade stated.

Grade (d) *No. 2's or Seconds*—Eggs sound in shell; may contain weak, watery eggs and eggs with heavy yolks, and all other eggs sound in shell and fit for food.

Class (2) *Storage Eggs* which have been "held" under artificial refrigeration at a temperature of 40° or less.

Class (2a) *Preserved Eggs* which have been subjected to any process, liquid or otherwise, intended to preserve their quality.

Grade (a) *Extra Eggs* of good size, weighing at least 24 ozs. to the dozen or 45 lb. net to the 30-dozen case; clean; sound in shell; air cell less than 3-8 inch in depth; white of egg

to be firm and yolk slightly visible; maximum allowance at time of inspection not to exceed 2% variation from the grade stated.

Grade (b) *Extra Firsts*—Eggs weighing at least 23½ ozs. to the dozen or 44 lb. net to the 30-dozen case; clean; sound in shell; air cell less than 3-8 inch in depth; white of egg to be firm; yolk may be moderately visible but mobile; air cell stationery; maximum allowance at time of inspection not to exceed 2% variation from the grade stated.

Grade (c) *No. 1's or Firsts*—Eggs weighing at least 23 ozs. to the dozen or 43 lb. net to the 30-dozen case; reasonably clean; sound in shell; air cell less than ½ inch in depth; white of egg to be firm; yolk may be distinctly visible but mobile; air cell stationary; maximum allowance at time of inspection not to exceed 2% variation from the grade stated.

Grade (d) *No. 2's or Seconds*—Eggs sound in shell, may contain weak, watery eggs and eggs with heavy yolks, and all other eggs sound in shell and fit for food.

Class (3) *Cracked and Dirty*—Eggs, shells of which have been checked or broken, smeared, soiled, or damaged in shell, but fit for food.

2. Every case containing Canadian eggs intended for export out of Canada shall be marked on both ends in a legible and indelible manner, with the class and grade of eggs contained therein, and the words "Canadian Eggs", and every case containing eggs that are to be shipped from one province to any other province in shipments of 100 cases or more, shall be marked on both ends with the class and grade of the eggs contained therein, and with the name of the country of origin when other than domestic product. The Minister may from time to time prescribe the form and the size of the letters that are to be used in such markings. Such marks may be accompanied by other trade designations or brands, providing such designations or brands are not, in the opinion of the Minister, inconsistent with or marked more conspicuously than the marks prescribed in these regulations.

3. Canadian eggs for export out of Canada shall be tightly packed in Canadian standard cases in new white fillers and flats, with kiln dried excelsior or corrugated cushions at top and bottom, or one-third fillers on bottom with flats over top and under bottom fillers.

4. Canadian standard cases shall be made to contain thirty dozen eggs. They shall be made of clean, dry and odorless wood. The ends and centre partition shall be not less than five-eighths of an inch thick, the sides, top and bottom not less than three-eighths of an inch thick.

5. Cases containing Canadian eggs in lots of twenty-five cases or more intended for export out of Canada, and eggs intended for shipment from one province to another province in shipments of 100 cases or more, shall not be shipped until they have been inspected and marked by an inspector.

6. The mark of approval to be placed on each case, hereinafter called the "Government Mark," shall include the Maple Leaf and the words "Canadian Eggs," and "Government Inspected," together with the inspector's number, the device to be in such form as the Minister may approve.

7. Before the Government mark is placed upon any case, the inspector shall draw samples of at least five per cent of the cases to be marked and shall examine at least one-half of the eggs in each case. The inspector shall satisfy himself that the samples taken are representative and shall take any further samples and make any further examination that he deems necessary.

8. No cases containing eggs shall be marked with the Government mark unless the warehouse or rooms in which the eggs are held are in a clean and sanitary condition, and, further, no cases shall be marked unless suitable accommodation is provided for inspectors to make the necessary examination, such accommodation to include a dark room, facilities for candling, and such fittings as may be required to insure a proper examination.

9. No person other than a duly appointed inspector shall apply any Government mark to any cases containing eggs.

10. After the contents of any case bearing the Government mark have been removed, such mark shall be obliterated. This shall be done by the person or persons removing the eggs from the case.

11. Collectors of Customs throughout Canada shall not allow any Canadian eggs to be shipped for export out of Canada that are not marked in accordance with these regulations.

PART I

Dominion Department of Agriculture

THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF CHEMISTRY

THE COMPOSITION OF BRAN AND SHORTS AS MILLED UNDER THE REGULATIONS OF THE CANADA FOOD BOARD*

BY FRANK T. SHUTT, D.Sc., AND R. L. DORRANCE, B.A.

THE tremendous and ever-increasing demand for Canadian flour for military and civilian use overseas has compelled the Canada Food Board, in order as far as possible to meet these requirements, to issue regulations "lengthening" the milling extraction, which means that the Board has ordered the production of more flour from a given weight of wheat than was customary in pre-war times, indeed, until April of the present year, the date of the new regulations.

Hitherto, it has been the practice of Canadian millers to make 196 pounds of flour from about 270 pounds of wheat—approximately 72.5 per cent extraction—10 pounds of which flour (of lower grades) being generally used in the preparation of middlings. This resulted in, approximately, 81 pounds of offal—bran, shorts and middlings—from 270 pounds of wheat.

Under the new regulations it is required that as regards spring wheat of the Prairie Provinces—196 pounds of flour shall be made from 258 pounds of wheat—practically a 76 per cent extraction—this flour being known and sold as "Government Standard Flour." The making of feed flour, commonly known as Red Dog, and of middlings, is prohibited. The result is that about 59 pounds of bran and shorts are milled from 258 pounds of wheat—a reduction of approximately 25 per cent in the amount of feed, compared with that made before the regulations came into force. These facts explain in a large measure the present shortage of, and difficulty in, obtaining bran and shorts and, further, explain why the floury, mealy middlings, so valuable in pig and calf feeding, are no longer obtainable.

Fifteen years ago a collection of samples of bran and shorts, representative of the output of the leading flour mills of the Dominion, was analysed in the laboratories of the Experimental Farm, the series affording the following data:

AVERAGE COMPOSITION OF BRAN AND SHORTS, 1903

	Bran	Shorts
Moisture	11.07	10.34
Protein	14.52	15.93
Fat	4.37	5.24
Carbohydrates	54.19	59.58
Fibre	10.14	5.23
Ash	5.71	3.68
	100.00	100.00

*Contribution from Laboratories of Dominion Experimental Farms; summary of paper read before Section III, Royal Society of Canada, May, 1918.

Bran.—In this series the protein varied from 13.25 per cent to 15.31 per cent; the fat from 3.60 per cent to 5.19 per cent, and the fibre from 9.28 per cent to 10.93 per cent.

Shorts.—Corresponding figures for the shorts were, protein from 15.15 per cent to 17.00 per cent; fat from 3.98 per cent to 6.23 per cent, and fibre from 3.82 per cent to 7.51 per cent.

During the autumn months of last year (1917) further and larger collections of these feeds were made and analysed, with the following results:

AVERAGE COMPOSITION OF BRAN AND SHORTS, 1917

	Bran	Shorts
Moisture	9.51	9.81
Protein	15.09	16.03
Fat	4.38	4.97
Carbohydrates	55.73	58.04
Fibre	9.62	6.90
Ash	5.69	4.25
	100.00	100.00

Bran.—The limits of variation are, protein 13.23 per cent to 16.75 per cent; fat 3.21 per cent to 5.49 per cent; fibre 7.64 per cent to 11.68 per cent.

Shorts.—Corresponding results for this feeding stuff are, protein 15.04 per cent to 18.06 per cent; fat 3.80 per cent to 6.04 per cent, and fibre 5.83 per cent to 8.88 per cent.

Comparing these two series, collected thirteen years apart, the differences in composition are not, on the whole, such as to call for extended comment, though in the 1917 series the higher percentage of fibre in the shorts, appear to be significant of certain milling changes that have taken place during that period.

Subsequent to the coming into force of the new regulations (April, 1918) samples of bran and shorts were obtained direct from the mills of a number of the leading firms, and submitted to analysis.

AVERAGE COMPOSITION OF BRAN AND SHORTS SUBSEQUENT TO NEW REGULATIONS OF CANADA FOOD BOARD, (76% EXTRACTION)

	Bran	Shorts
Moisture	7.13	7.22
Protein	15.83	17.67
Fat	4.98	5.16
Carbohydrates	55.20	57.25
Fibre	11.51	8.52
Ash	5.35	4.18
	100.00	100.00

Bran.—The series showed the following limits: protein, 15.69 per cent to 16.03 per cent; fat, 4.85 per cent to 5.09 per cent; fibre 11.08 per cent to 12.18 per cent.

Shorts.—Corresponding limits in the series of shorts samples were protein 16.84 per cent to 18.41 per cent; fat, 4.77 per cent to 5.65 per cent; fibre 8.23 per cent to 9.12 per cent.

It may first be observed that in both the bran and shorts the samples of the 1918 series show less variation in composition than those of the two preceding series, indicating the closer standardization of the milling process under the new regulations. This will be apparent from the following table:

LIMITS OF VARIATION

	1903	1917	1918
Bran—			
Protein	2.06	3.52	.34
Fat	1.59	2.28	.24
Fibre	1.69	4.24	1.10
Shorts—			
Protein	2.17	3.02	1.57
Fat	2.25	2.24	.88
Fibre	3.69	3.49	.89

Comparing the composition of the bran and shorts milled under the regulations with these feeds as previously manufactured we find:

1. That the bran now made (regulations of April, 1918), is approximately, .75 per cent richer in protein, .5 per cent richer in fat, and contains 1.5 per cent more fibre.

2. That the shorts under the new regulations are approximately 1.75 per cent richer in protein, very similar in fat content, and contain about 2.5 per cent more fibre.

These results are in the direction that might have been anticipated, for the closer extraction of the floury particles (essentially starch) under the new regulations would more particularly increase the percentage of protein and fibre, which are characteristic of the bran coats constituents of wheat. The greatest difference is found in the shorts, which now more closely approach fine bran, and from which are absent the small percentages of low grade flour which hitherto gave them their mealy, floury condition.

Bran and shorts are legally defined under Section 26 of the Food Adulteration Act. They must conform to the following limits of composition to be accounted genuine:

LEGAL LIMITS OF BRAN AND SHORTS

	Bran %	Shorts %
Protein, not less than...	14	15
Fat, not less than.....	3	4
Fibre, not more than....	10	8

While the standards may have been sufficiently fair in pre-regulations times, the results of our recent analyses would indicate that they are not well suited to the bran and shorts milled under present regulations. The following may be tentatively suggested, as apparently meeting these products under the new milling:—

	Bran %	Shorts %
Protein, not less than...	15.	16.5
Fat, not less than.....	4.5	4.5
Fibre, not more than....	12.0	9.0

Nothing very definite can be said about the digestibility of the new bran and shorts, as no digestion experiments have been made with these feeds, but the probability is that, as far as dairy cows and steers are concerned, there will be very little difference from the pre-regulation feeds—the somewhat higher protein content may be largely offset by the larger percentage of fibre, but, in the case of young pigs and calves, it may fairly be concluded that the new shorts, owing to their more fibrous character, will not be so nutritious or suitable.

THE WOLFRYN ELECTRO-CHEMICAL PROCESS FOR THE TREATMENT OF SEED GRAIN

BY FRANK T. SHUTT, D.SC., DOMINION CHEMIST

DURING the autumn of 1916 and the early months of 1917 we received a number of letters from the patentees of this process, setting forth the advantages to be obtained by its use in increased yields of grain and giving data from experiments conducted in England and Scotland which showed gains from its employment from 25 to over 100 per cent.

Briefly, the process consists in passing a current of electricity through a solution of common salt (or other chemical) in which the seed grain is immersed, the treatment being made in a water-tight rectangular tank with ends covered inside with sheet-iron plates carrying terminals for affixing the wires for the conduct of the electric current. For 10 bushels of grain, which would require 50 gallons of solution, the instructions of the patentees read as follows: "After the solution (1 pound of salt to 1 gallon of water) has been made ready in the tank and before the grain is placed therein, it should be submitted to an electric current 50 gallons to 6 kilowatts for 5 minutes, or 3 kilowatts for 10 minutes, or 1½ kilowatts for 20 minutes, or 1 kilowatt for 30 minutes. After this preparatory treatment of the solution the grain should be placed therein and treated with 4 watts per gallon of

solution (200 watts for 50 gallons—that is, 1 ampere at 200 volts, 2 amperes at 100 volts, or 4 amperes at 50 volts and so on). Wheat should be treated for 2½ hours, barley and oats for 4½ hours". Presumably, "direct" current is intended, but no statement to that effect is made.

On writing the patentees as to what the underlying theory of the treatment might be, they replied: "We have so far reached only a provisional theory, that our process is bacteriological. We use antiseptics or disinfectants, which check or destroy the vital activity of two groups of organisms that exist in the soil. One of these, which is included in the protozoa and is inimical to plant life, is more readily destroyed by the above chemicals than are the nitrogen-assimilating bacteria which are beneficial to plant life. By submitting solutions of these chemicals to electrolytical decomposition their antiseptic value is increased and when grain is treated in these solutions, it becomes saturated with them, which aids the germination of the embryo plant, supplies it with additional nutriment and with a means of combatting its enemies in the soil, etc."

Our trial of the process was made with Marquis wheat in 1917 on the Central Farm, Ottawa. A series of four plots, each 1/7 acre, was used for the experiment. On No. 1, untreated grain was sown; on No. 2, grain was sown that had been immersed in water; on No. 3, grain that had been immersed in a 10 per cent solution of common salt, and on No. 4, grain treated by the Wolfryn process. The following table gives the essential particulars of the experiment, including the yields of grain and straw obtained:

THE ELECTRIC TREATMENT OF SEED-WHEAT BY THE "WOLFRYN" METHOD, 1917

Plot No.	Treatment of the Seed Grain	Duration (in hours) immersion and treatment	Date treatment	Date seeding	Date of harvesting	Yield (in bus.) of grain per acre	Yield* (in lb.) of straw per acre
1	Untreated	—	—	May 16	Aug. 15	14.23	2506
2	Immersed in water	2½	May 8	"	"	14.00	2730
3	Immersed in 10 p.c. solution of sodium chloride	2½	"	"	"	13.41	2590
4	Immersed in 10 p.c. sodium chloride and subjected to direct electric current. Total volume of solution 40 gallons, (⅓ kilowatt hours)	2	May 9	"	"	11.55	2842

*Unfortunately, the plots were somewhat weedy, and in consequence the weights of straw, as above, are to be regarded as approximations only.

Plot No. 4, sown with the electrically treated wheat, gave the lowest yield of grain in the series. We do not, however, attribute this lower yield to any injurious effect of the treatment, for the grain on this plot germinated well and made a good stand in the early part of the season. It would seem very probable that the differences in yield were due rather to lack of uniformity in the quality of the soil and possibly in some measure to the somewhat greater weed growth on plot 4.

On the other hand this experiment furnished no evidence that the treatment is beneficial. Neither the appearance of the standing crop, nor the weight of the harvested grain, lent any support to the claim made by the patentees that the treatment stimulates growth and produces con-

ditions which result in increased yields.

We admit that these results have not been obtained under the most favourable of plot conditions for a strictly scientific and critical study of the process; a further experiment might very well place the yield from the "processed" seed higher up in the series. But in our opinion there are no indications, either from a consideration of the theoretical basis of the treatment or of our field results, that would justify at present the patentees' claims. It will be necessary to bring forward further, and more satisfactory, evidence before it can be said that the process has an economic value.

NOTE.—The electrical treatment of seed tested by Dr. Shutt should not be confused with the "Overhead Electric Discharge" for increasing crop production—an entirely different matter and one that promises well, judging from certain results obtained in England and Scotland.—Editor.

THE DIVISION OF FORAGE PLANTS

THE WINTERING OF ALFALFA

BY F. S. BROWNE, B.S.A., ASSISTANT TO DOMINION AGROSTOLOGIST

THE winter of 1917-18, although unusually severe, has not caused any extensive loss of alfalfa on any of the Dominion Experimental Farms and Stations where alfalfa has been a dependable crop in the past. Generally speaking, alfalfa has wintered perfectly where the seed has been home grown, or where hardy variegated varieties, such as Grimm's Baltic, Liscombe, etc., have been used. The prairie farms and stations have also had excellent success with the Turkestan variety. The data secured during the past has clearly shown the superiority of northern grown seed from a standpoint of winter hardiness, and, accordingly, such seed has been almost entirely planted by the Dominion Experimental Farms system.

ALFALFA PLOTS AT THE CENTRAL EXPERIMENTAL FARM, OTTAWA; GROWN FROM HOME-GROWN SEED

HARDY ALFALFAS IN PRINCE EDWARD ISLAND

BY J. A. CLARK, B.S.A., SUPERINTENDENT OF EXPERIMENTAL STATION, CHARLOTTETOWN

MANY varieties of alfalfa have been tested at the Charlottetown Station. The different strains of Grimm, Baltic, and Ontario Variegated have proved to be equally hardy, and quite superior to common alfalfa, Turkestan, and Northern Michigan. We have invariably secured a good stand of alfalfa the first year after seeding, and when sown in rows it has usually wintered well for two or three seasons.

In the spring of 1917 our plots of alfalfa, and also the different lots that were sown in rows, started nicely in April, grew two or three inches, and then were attacked by some disease which killed them at the crown, the root remaining firm and sound. The decay caused by the disease gave a distinct odour, like rotten potatoes. Some of these plants have lived through the present winter, and are looking strong and vigorous. An acre and a half of Grimm alfalfa, sown last year, has come through the winter in good condition, and looks quite promising. It was sown with barley as a nurse crop, the barley being seeded at the rate of one bushel per acre.

Our experience with alfalfa for some nine seasons has led us to think that the crop is about as sure as red clover is in this province; and while on an average it has not lived longer than you would expect red clover to stay in the soil, there is always the possibility that it will remain for years. On the lighter soils of Kings County, alfalfa is more satisfactory than it is in the western part of the province.

THE DIVISION OF POULTRY

THE LATE VICTOR FORTIER

BY the sudden death of Mr. Victor Fortier, which happened recently, the Experimental Farms Branch has been deprived of the services of an officer who filled the important position of Assistant Dominion Poultry Husbandman. At the time of his demise, Mr. Fortier was delivering a series of lectures on poultry topics in Eastern Quebec and the Maritime Provinces. Born in the county of Soulanges fifty-one years ago, after serving some time as collector of Inland Revenue at St. Therese and St. Jerome, he joined the staff in 1903 of the Dominion Department of Agriculture, where his knowledge, obtained by practical experience as poultry keeper, fancier and exhibitor, led to his appointment to the position which he occupied at the time of his death. He was particularly closely in touch with the poultry situation in Eastern Canada and made frequent tours as judge and lecturer in that section of the country. He was the author of several publications on poultry raising and was a frequent contributor to the agricultural press on the same topic. Only a few days before his passing, he completed the manuscript of a bulletin on "Rabbit Raising," which is being published.

THE ENTOMOLOGICAL BRANCH

SOME NOTES ON THE NATURAL CONTROL OF THE CHERRY-TREE UGLY NEST TORTRICID, *Archips cerasivorana* FITCH

BY A. B. BAIRD, DOMINION ENTOMOLOGICAL LABORATORY, FREDERICTON, N.B.

THE Choke Cherry, (*Primus virginiana* Linn.), is familiar enough to most of us in both eastern and western Canada. Everyone who has driven along our country roads during late June and early July must have seen the large tent-like webs of the ugly nest tortricid, (*A. cerasivorana* Fitch). Occasionally, this insect becomes very abundant over large areas, (Fig. 1) and makes the cherry trees unsightly, but its depredations are usually confined to rather local areas. Although there are numerical fluctuations from year to year, yet over periods of years the insect remains more or less constant in numbers. This constancy is brought about by means of various natural agencies, some of which will be discussed briefly in the following pages. For convenience the various factors will be taken up in the order of their attacking the insect from egg to adult. The studies which form the basis for these notes were made largely at Fredericton, N.B., although a small amount of data was secured from material gathered at Red Deer, Alberta.

FIG. 1—A ROADSIDE SCENE NEAR A BEAVER MEADOW, QUEBEC PROVINCE, JULY 1, 1915. WEBS OF THE CHERRY-TREE UGLY-NEST TORTRICID

CONTROL IN THE EGG STAGE

The insect spends about nine months of the year in the egg stage. The eggs are deposited late in July or early in August, and very little development of the embryo takes place until the following spring. They are laid in flattened masses, which may contain anywhere from twenty-five to two hundred eggs and are placed on the bark of the cherry trees, chiefly on the smaller ones near the base of the trunk. More than seventy-five per cent of the masses are usually deposited within four inches of the ground (Fig. 2).

Parasites.—Only one species of egg parasite has been reared by the writer. This is a minute hymenopterous fly described by Girault, (Can. Ent. Vol. 48, page 268), as *Trichogrannatomyia tortricis*. Its full life-cycle has not as yet been studied, but it probably spends about four or five weeks in the host egg, as the adults emerge during the end of August and beginning of September. Occasionally, this parasite is very

effective. In 1917, for instance, it killed between seventy-five and eighty per cent of the host eggs. More often, however, the usefulness of this parasite is curtailed through the killing of the eggs by another cause.

Other factors.—As a rule, more than seventy-five per cent of the eggs are destroyed by an agency, the nature of which is not yet clear. The affected egg masses become deadened and whitish in appearance and microscopic examination shows the contents to have entirely disappeared without there being any apparent openings in the exposed surfaces. Several specimens of a tiny mite have been found in the eggs, but it was not possible to determine whether or not they had been feeding on the contents.

Several masses collected at Fredericton, N.B., shortly after decomposition, in 1916, showed numerous tiny, brownish mite-like eggs on the underside of the insect eggs next the bark, but these may have had no significance in connection with the egg mortality. The work of destruction takes place in New Brunswick between the middle of August and the latter part of September. Another possible cause of this destruction is that early frosts may kill the eggs before the winter snows come to afford them more equitable conditions for hibernation.

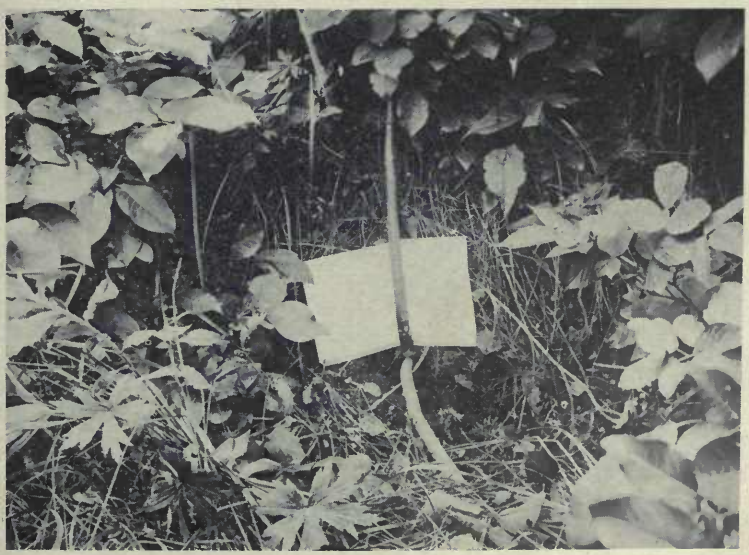


FIG. 2—SEVERAL EGGS OF *A. CERASIVORANA;* MASSES AT THE BASE OF THE CHERRY TREE

CONTROL IN THE LARVAL STAGE

The eggs of the Ugly Nest Tortricid hatch in the latter part of May and during early June, varying somewhat according to their location. The larvae from an egg mass all emerge, as a rule, within twenty minutes, and immediately crawl to the top of the main stem or one of the larger branches where they congregate in the opening leaves, spin a web about themselves and commence to feed, (Fig. 3). The larvae always feed under protection of the web and when fresh food is required they extend their web over the foliage before eating it. Fig. 4 shows several larvae engaged in the process of extending the web. This habit is of great importance in the control of the insect as the web affords excellent

protection from adverse weather conditions, as well as from the attacks of parasites and predators. Until after the third moult the larvae merely skeletonize the leaves in feeding but after that they devour the entire leaf tissue. Practically all the excreta or frass is kept in the web and as soon as there is a sufficient accumulation of this the larvae construct among it silk-lined cells in which they live individually when not at work. There are six larval instars. Most of the larvae are full grown by the middle of July, but larvae from late hatched eggs are found up till the end of August or even later. The chief food plant of the insect is the choke cherry but the larvae occasionally feed on other species in the same genus.

FIG. 3—THE BEGINNING OF THE NEST

Parasites.—Some eight or nine species of parasites have been recorded from the larvae, four of which have been reared in Canada, and these will be considered in the order of their attack.

Apanteles sp. Several specimens of this parasite were found by Mr. J. D. Tothill in British Columbia, having issued from early stage larvae. No further data regarding this species have as yet been secured. The species is non-gregarious and can easily be found in the pupal stage as its small whitish cocoons are attached to the web of the host.

Dichaetoneura leucoptera Johnson is a small tachinid fly, the wings of which are remarkable for being milky colored. The maggots of this fly are found on the host larvae during the first three weeks of July. They are situated in the body cavity just behind the head and are attached by means of integumental funnels through which they breath. The maggots moult twice and become full grown in about three weeks. They then eat their way out through the side of their victim and either pupate in the nest or fall to the ground and pupate under rubbish. The host larvae may live for some time after the parasites have escaped, but none live to reach maturity. The adult flies emerge in from ten to fourteen days. One female fly was kept alive in a cage for over a month which suggests the possibility of their wintering in this condition. In some years as many as forty per cent of the larvae have been parasitized by this species.

Erigorgus prismaticus Nort. is a medium-sized honey-yellow hymenopteron which usually destroys from twenty-five to thirty per cent of the larvae. The eggs are deposited in the body cavity of the host, generally in the neighborhood of the fourth or fifth segment when the larvae are about two-thirds grown. The larvae on hatching feed a little and grow very slowly until after the host has pupated when they greedily devour the broken down tissues and become full grown in a few days. The larvae were invariably found feeding with the anal end directed anteriorly in their host, but when full grown they turn around in the now empty pupal case and pupate in this position.

The adults issue in from a week to ten days and mating takes place soon after. They probably winter as adults since a large number of them were kept alive in breeding cages for

over five weeks, without any apparent development of eggs in the females.

Exorista boarmiae Coq. is a tachinid parasite, which, like the foregoing hymenopteron, extends its period of feeding over both the larval and pupal stages of its host. Its maggots also pupate in the empty pupal cases of the tortricid, the contents of which they have devoured, and the adults issue in about two weeks. The parasitism by this species was not more than five per cent in many cases noted.

Predacious insects.—The protection afforded by the web and the habit of living in cells in the nest seems very effective in preventing attack by other insects. Ants were seen in large numbers around and on the nests but they seemed unable to penetrate to the interior and the same is probably true of other predators as well.

Predacious birds.—Birds were very frequently noticed near the nests and no doubt some of the larvae were carried off by them. No nests were found torn open, however, until some

FIG. 4—NESTS SHOWING LARVAE AT WORK ENCLOSING FRESH FOOD MATERIAL

Weather.—While the larvae are in the first instar weather enters into the control to some extent. The young larvae are very tender, and although they are protected by the web and do not seem to be killed by the cold directly, yet they do not feed in cold wet weather and in some seasons quite a large percentage are killed by cold and starvation together. Weather may also be considered an indirect factor in that it influences the parasitism by tachinids as these work only in fine warm weather.

of the larvae had pupated and the percentage of larvae destroyed by them must be relatively small.

CONTROL IN THE PUPAL STAGE

When full grown the larvae transform to pupae within their cells in the nest. This stage continues over a period of about ten days and when the adults are nearly ready to emerge the pupæ wriggle out of their cells aided by the spiny scales of the segments of the pupal skin and become attached by the little hooks on the

anal end to the outside of the web. The adults usually emerge within a few hours leaving the empty pupal cases still attached, as shown in Fig. 5.

Parasites.—The pupæ are so well protected in the cells within their web that very few are attacked by parasites. *Erigorgus* and *Exorista*, as before mentioned, are in a sense pupal parasites since they emerge from the pupae, but only one true pupal parasite has been reared by me, namely, *Scambus conquisitor* Say. This parasite accounted for less than five per cent of the pupae. The adult is a black hymenopterous fly which parasitizes the pupae of a great many of our common insects.

Predacious birds.—It is very difficult to reduce the part played by birds in the control to a percentage basis. Birds, however, evidently take many more of the pupæ than of the larvae owing probably to the fact that the web becomes withered and more easily penetrated. Their effectiveness is reduced somewhat by the destruction of parasitized pupæ but they are unquestionably important, especially where the insect is not very abundant.

Dead pupae.—For some reason, not yet clear, about twenty-five to thirty per cent of the pupæ become almost fully developed adults and then die before issuing. Such dead pupæ are usually found within the interior of the nest, which often becomes extremely dry. It seems possible that death is due to the drying up of the pupal case to such an extent as to prevent the adult issuing.

FIG. 5—NEST SHOWING EMPTY PUPAL CASES FROM WHICH ADULTS HAVE EMERGED

FIG. 6—MALE AND FEMALE MOTHS RESTING ON A CHOKE CHERRY LEAF

THE ADULT STAGE

The moths on emergence do not tend to disperse very far unless carried by high winds. They rest on leaves during the day (Fig 6) and mating usually takes place soon after

the females emerge. The length of time in coitu may vary from one to three or more hours. Unmated females may live for two or three weeks but eventually die without depositing any eggs. The mated females usually deposit their eggs within a few hours but a period of several days may elapse if conditions are unfavorable. Each female deposits from one hundred and twenty-five to two hundred eggs, and these may be in one or several masses. Winds may often prove an important factor in control in this stage by blowing large numbers of the adults away from their host plant or from one section of the country to another.

SUMMARY

Taking the average progeny of a pair of moths as one hundred and fifty, the following table shows approximately the percentage in numbers destroyed, by the several known factors mentioned in the foregoing notes, in New Brunswick, where most of the observations have been made:

*T. tortricis	.5	1	149
*Egg predators	77	115	34
D. leucoptera	40	14	20
E. prismaticus	30	6	14
E. boarmiae	2	2	12
S. conquisitor	2	2	10
Dead pupæ	30	3	7
Birds	?	?	?
Weather	?	?	?

*These factors may sometimes be reversed.

From this table it may be seen that the control brought about by insect parasites and other factors which can be reduced to a percentage allows a total of seven, or more than three pairs of moths, to reach maturity from the progeny of one pair. In order to keep the insect at par, and it is usually held more or less at par, over periods of any length only one pair can reach maturity and deposit eggs for the next generation, so that further control must be attributed to adverse weather conditions and to the work of birds throughout the season.

THE SEED BRANCH

AMPLE SEED CORN FOR 1918 PLANTING

BY E. D. EDDY, B.S.A., CHIEF SEED INSPECTOR

UNDER the system outlined in the April number of THE AGRICULTURAL GAZETTE, p. 351, an abundant supply of seed corn was secured for Canada's requirements. From March 22nd until April 25th, the Canadian Government Seed Purchasing Commission maintained a representative in Washington to expedite the securing of export licenses for Canadian orders of both field and sweet corn. During the first part of the season the arrangements made in February with the Seed Stocks Committee of the U.S. Department of Agriculture and the U.S War Trade Board, were adhered to, and export licenses were granted only for the later varieties of corn grown in or south of the states of Kansas, Missouri, Tennessee, and Virginia. Later in the season, when the distribution of seed corn in the United States was well advanced, applications for export licenses covering early varieties that were then available were considered. On April 12th approval was secured for the exportation of 10,000 bushels of corn grown in the State of Delaware. This corn, which was an exceptionally early Yellow Dent type of a flinty nature, was ordered for a private concern for the production of matured grain in Essex County, but later was taken over by the Seed Purchasing Commission and distributed mostly in Essex and Kent counties.

On April 20th announcement was made to the Seed Trade Committee

that the U.S War Trade Board would consider applications for export licenses for such early varieties as were available, and licenses would be granted unless the shipments were from districts where the corn was especially needed. Under this arrangement, Canadian dealers were able to obtain limited quantities of Early Dent and Flint varieties. The Seed Purchasing Commission secured 3,000 bushels of White Cap Yellow Dent grown in New Jersey and northern Maryland, which was offered to the trade at cost. This, with the Delaware corn, made a total of about 13,000 bushels of early maturing corn purchased directly by the Commission.

Orders for field corn were placed by the Commission for Canadian dealers amounting to a total of about 334,000 bushels, which, with the direct purchases of the Commission, made a total of about 347,000 bushels ordered. Of this amount, orders for about 22,000 bushels were cancelled. In addition to the above, a few thousand bushels were imported in lots of 100 bushels or less, for which the Commission order was not required.

Owing to the threatened scarcity of seed corn, retail dealers and farmers placed their orders early, and apparently in many cases duplicated them and afterwards cancelled many orders when their actual requirements were filled. This, together with the reduced acreage planted to corn on account of labour scarcity, caused the wholesale dealers to overestimate the demand, and in some cases to place orders in excess of their requirements, with the result, that instead of the threatened shortage of seed corn materializing, there was an abundant supply, and considerable quantities are being carried over or disposed of for feed or milling.

The shortage of good sweet corn seed was even more pronounced than with field corn, and great difficulty was experienced by Canadian dealers in securing seed of strong vitality. Early in the season, export licenses were approved covering the estimated requirements of the Canadian canning factories and wholesale seedsmen. Owing in part to the low germination of the corn delivered, these orders were later very much increased, and others were placed which had not been included in the list originally submitted and approved for export. The applications were very much in excess of estimates, but export licenses were granted for all orders.

MAKING WEED SEED COLLECTIONS—SUGGESTIONS FOR TEACHERS OF RURAL SCIENCE

BY JOHN R. DYMOND, B.A., SEED ANALYST

THE purpose of this article is to list the weed seeds to which attention should be directed in making collections in schools.

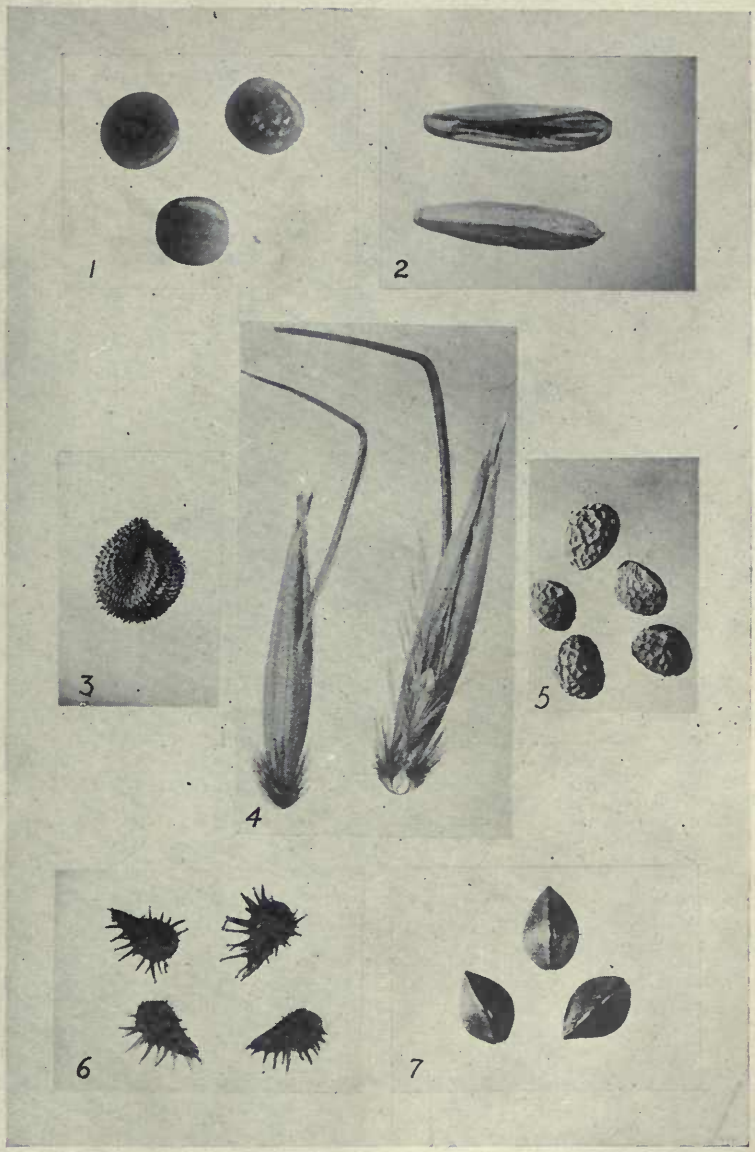
IMPORTANCE OF SEED STUDIES

No subject in agriculture is better adapted for presentation to school children than the study of seeds. The collection, identification, and study of seeds give scope for the training of a wide range of faculties, and the intrinsic value of the information so derived is of real value to anyone engaged in crop production. It is, therefore, advisable that those responsible for directing children in collecting and studying seeds should understand the seeds it is most important to know, and their relationship to the different branches of crop production.

DISTRIBUTION OF WEEDS

Unfortunately, it is not difficult to make a fairly large and representative collection of weed seeds in almost any district in Canada.

There are a number of weeds which occur practically everywhere. On the other hand, a great many are associated with certain crops, or with certain types of soil, or are limited to particular sections of the country. The weed seeds which may be found in almost any district include lamb's quarters (*Chenopodium album L.*), wild buckwheat



Photos by H. B. Sifton

EXPLANATION OF PLATE.

1—Wild vetch (Vicia angustifolia (L) Reichard) X5.
2—Chess (Bromus secalinus L.). X5.
3—Purple cockle (Agrostemma Githago L.) X5.
4—Wild oats (Avena fatua L.) X5.
5—Ball mustard (Neslia paniculata (L) Desv.) X5.
6—Stickseed (Lappula echinata Gilibert).
7—Wild buckwheat (Polygonum Convolvulus L.) X5.

(*Polygonum Convolvulus L.*), wild oats (*Avena fatua L.*), and wild mustard (*Brassica arvensis* (L.) Ktze).

WEED SEED IMPURITIES OF GRAIN

The following list includes the most characteristic impurities of grain grown in different parts of the country. It should be possible to secure all of the seeds here listed in any school section in the province or district indicated. It will be noticed that most of these weeds are annuals:

*Wild buckwheat.
*Lamb's quarters
*Wild mustard
Wild oats—very common except in Prince Edward Island
†Ball mustard (Neslia paniculata (L) Desv)
†Stickseed (Lappula echinata Gilibert)
†Western false flax (Camelina sativa (L) Crantz).
†Hare's-ear mustard (Conringia orientalis (L) Dumort).
†Stinkweed (Thlaspi arvense L.)
†Cow cockle (Saponaria Vaccaria L.)
†Tumbling mustard (Sisymbrium altissimum L.).
Purple cockle (Agrostemma Githago L.)—Very common especially in wheat.
Perennial sow thistle (Sonchus arvensis L.)—One of the worst weeds. Its seeds are found to some extent in grain from Eastern Canada and Southern Manitoba.
Lady's thumb (Polygonum Persicaria L.) One of the commonest impurities of grain except on the prairies.
Spurrey (Spergula arvensis L.)—Characteristic of grain from the Maritime Provinces, Quebec, and British Columbia.
Hemp nettle (Galeopsis Tetrahit L.)—Especially common in Prince Edward Island, Nova Scotia, and Quebec.
Wild vetch (Vicia angustifolia (L) Reichard)—A very common impurity of grain in Ontario and Quebec.
Chess (Bromus secalinus L.)—Very common in Ontario fall wheat.
Darnel (Lolium temulentum L.)—Occurs commonly in Red River Valley and occasionally throughout the Prairie Provinces.
Great Ragweed (Ambrosia trifida L.)—Wheat from some districts of the West often contains considerable quantities of these seeds.
Chicory (Cichorium Intybus L.)—Frequently found in Quebec seed.
Worm-seed mustard (Erysimum cheiranthoides L.)—A very bitter seed that renders chopped feed made from grain containing it very unpalatable to some kinds of stock, especially hogs. Often found in grain and sometimes in timothy seed.

*Common impurities of grain everywhere.
†Prevalent on the prairies, and not infrequently found in other parts, especially where low-grade Western grain has been used as seed or fed without being first cleaned and ground.

CHARACTERISTIC IMPURITIES OF GRASS AND CLOVER SEEDS

Red clover, alsike, alfalfa, timothy, western rye grass, awnless brome grass, and blue grass are grown for seed in one or more of the provinces. The enforcement of the Seed Control Act has made it unprofitable to grow low grade or rejected seed. On the other hand, the demand for No. 1 seed is greater than the supply, and consequently the production of pure seed is very profitable. Hence the importance of making farmers acquainted with the weeds whose seeds lower the grade of their seed, especially in districts where grass and clover seed production is being attempted. The most objectionable weeds in seed production are those the seeds of which are so near the size of the seed in which they occur, that they cannot be removed by ordinary cleaning machinery. Canada imports considerable red clover, timothy and alfalfa seed. There are two good reasons why we should produce as much as possible of these seeds at home. First, home-grown seeds produce better crops under our conditions than imported seed, especially of southern origin, and, second, for economic reasons we need to buy as little as possible abroad and export all we can. From the standpoint of maintaining soil fertility, there is no more important crop than red clover in those parts of Canada where it can be successfully grown, and it is most important that farmers in those districts be given every possible information on clover seed production. The preparation of a collection of weed seeds objectionable in red clover, timothy, alfalfa, or whatever seed crop the district is fitted for growing, should be an interesting

and valuable piece of work. The following list includes only the most prevalent impurities of seed from the districts indicated:

Ribgrass or Buckhorn (Plantago lanceolata L.) one of the most frequent and injurious impurities of Canadian-grown grass and clover seed; especially common in red clover; difficult to remove by ordinary cleaning machinery.

Green foxtail (Setaria viridis (L) Beauv), very common in red clover seed and difficult to remove.

Night-flowering catchfly (Silene noctiflora L.), the commonest impurity of alsike, found also in timothy and red clover.

‡Docks (Rumex species).

‡Canada thistle (Cirsium arvense (L) Scop.)

‡Sheep sorrel (Rumex acetosella L.)

‡Black medick (Medicago lupulina L.)

‡Pale plantain (Plantago Rugelii Dcne.)

‡Common plantain (Plantago major L.)

‡Lamb's quarters.

Cinquefoil (Potentilla monspeliensis L.), the commonest impurity of timothy seed.

Chickweed (Stellaria media (L.) Cyrill), *stitchwort* (Stellaria graminea L.) and *mouse-ear chickweed* (Cerastium vulgatum L.) occur commonly in timothy and less frequently in alsike.

Peppergrass (Lepidium apetalum Willd) common in timothy.

Ox-eye daisy (Chrysanthemum Leucanthemum L.), frequently found in Quebec timothy, and not uncommon in Ontario and Prince Edward Island timothy.

Chicory (Cichorium Intybus L.), found in Quebec red clover.

Northern gentian (Gentiana Amarella L. var. acuta (Michx) Herder) and *blue-eyed grass* (Sisyrinchium angustifolium Mill), frequently found in Alberta timothy seed.

‡Very frequently found in red clover, alsike and timothy seed, especially in the East.

IDENTIFICATION OF WEED SEEDS

The book "Farm Weeds of Canada," which was distributed by the Seed Branch to the schools a number of years ago, is one of the best publications obtainable for use in the study of weeds. The book is at present out of print. Bulletin S-8 on "Weeds and Weed Seeds" contains illustrations in black and white, and much of the essential information contained in "Farm Weeds." Copies of this bulletin may be had free on application to the Publications Branch, Department of Agriculture, Ottawa. Seeds may be sent for identification to the Seed Commissioner. Department of Agriculture, Ottawa. When so addressed, parcels will come free if not more than 12 ounces in weight. Glass bottles should not be used unless they are well packed in strong boxes. Two or more sorts should be designated by a letter or figure.

THE FRUIT BRANCH

THE 1918 APPLE CROP

BY F. A. GRINDLEY, B.S.A., ASSISTANT TO THE FRUIT COMMISSIONER

A SUMMARY of the present apple prospects in Canada, and a comparison with the crop of 1917, shows a close similarity between the two, as far as the total yield and its ultimate distribution are concerned. So obvious is the similarity that this article would hardly be complete and comprehensive unless preceded by a review of the general situation last year, and a resumé of the difficulties which had to be met in 1917 in order to successfully distribute the crop.

At that time Nova Scotia was confronted for the first time with the problems attendant upon the British embargo. Fortunately, the Ontario apple crop in 1917 was unusually light, and it was quite apparent, early in the season, that many markets in Canada, ordinarily dependent upon Ontario for their supply, would have to receive their

quota from Nova Scotia and British Columbia.

The situation presented many difficulties. Early in August fruit shippers in the Annapolis Valley were making plans to widen their home markets, and it was obvious that, if their crop was to be saved, it would be necessary to move a large proportion of it into Western Canada. At the same time consideration had to be given to the fact that British Columbia would have to market practically her entire exportable surplus in the Prairie Provinces. Care had to be taken that these markets were not over-supplied, and that sufficient fruit reached Toronto, Montreal, and similar markets in the middle east.

TRANSPORTATION DIFFICULTIES

Then there arose the difficulty of adequate transportation facilities, which was forcibly presented to all who were concerned with fruit marketing. There were so many demands being made upon the railway companies that it was doubtful whether the available equipment could meet them. Little or no definite encouragement was offered.

All these problems were the result of a new condition of things. Nova Scotia had always depended upon the British markets to consume the bulk of her crop, and had seldom been obliged to look elsewhere for sales. Then came an embargo shutting off exports. The panic which immediately followed can be readily imagined. Petitions were made to the Government; deputations came post haste to Ottawa; growers saw blue ruin in front of them.

But there was a shortage of apples in Ontario. Far-seeing buyers and speculators were soon in the Annapolis Valley making purchases while the fruit was still on the trees. A new situation presented itself and the Nova Scotia growers were not slow to appreciate it. Instead of the early panic, which had been emphasized by a willingness to sell at very low figures, there was now a rapid advance in prices.

THE DIFFICULTIES OVERCOME

It was at this stage of development that the Fruit Branch, working in co-operation with the Canada Food Board, stepped into the ring. Immediate action was imperative. Unfortunately, prices had already advanced to a high figure, and all that could be done was to make every possible provision for the marketing of the crop, and the prevention of waste. A representative was at once stationed in the Annapolis Valley in order to supervise the distribution and loading of cars. Transportation facilities rapidly improved, and ultimately became so adequate that none of the crop failed to find a market. Too much credit cannot be given to the railway companies for the splendid manner in which they responded to an urgent appeal, and for the continued efforts they put forth to meet an unprecedented situation. During the season of 1917, over two thousand carloads of Nova Scotia apples moved westward. Of these, 600 cars were marketed in the province of Quebec, 950 cars in Ontario, and 350 cars west of the great lakes. At the same time that this westward movement was taking place, assistance was also being given to the shippers of British Columbia, where, too, the pinch of unsatisfactory railway equipment had been felt.

THE SEASON OF 1918

And now we come to the season of 1918. The total available supply of apples in Canada will probably be appreciably less than a year ago. Nova Scotia will produce approximately 400,000 barrels of apples, according to present estimates, which is only 60 per cent of last year's crop of 700,000 barrels. Ontario expects a slight increase over last year's

production and British Columbia a slight decrease. Quebec will have an exceptionally light crop, particularly of fall and winter apples.

The British embargo on Canadian apples is still in effect, and there is practically no likelihood of its removal or modification this year. It will, therefore, be necessary for the Nova Scotia crop to move westward. We may take it for granted, though, that the experience of 1917 will serve as a guide and be of the greatest possible benefit to individual shippers and to distributing agents this year. The efforts which are now being made to encourage the consumption of fresh fruits and vegetables will ensure a steady demand; in fact, the demand will very likely be greater than the supply. No marketing difficulties are, therefore, to be expected.

So far as prices are concerned, it would be unwise to make any definite statement at this date. According to the law of supply and demand, prices should rule high. But we have learned, since the outbreak of the war, not to anticipate results with the same certainty as formerly. If past experience teaches anything, some effort should be made to prevent the unwarranted advance in prices which characterized the commercial apple market a year ago. If that is done, prices need not be any higher than the comparatively light crop would justify.

THE DETENTION OF CARS

In connection with the shipments during the present season a circular has been sent out warning against car detention and relating to other matters appertaining to the transportation services. The warning requires that the Food Controller shall be notified by the railway companies of any freight car containing food or food products that remains under load for a longer period than four days after notice of its arrival, or more than one day for furtherance order. To facilitate a prompt delivery, and to ensure fairness to both consignee and shipper, and to avoid unnecessary waste, the Fruit Commissioner, upon request from either shipper or consignee, will have inspection of such cars made by a Dominion Government inspector, and a copy of his report stating the exact condition of the goods, their containers, and of the cars will be forwarded to the applicant. The inspection service referred to is free, but at present can only be supplied at the larger market centres, such as London, Toronto, Hamilton, Ottawa, Montreal, Quebec, St. John, N.B., Halifax, N.S., Winnipeg, Calgary, and Vancouver.

Every shipper and consignee handling carload shipments is advised to get a copy of the interswitching of freight traffic order which became effective August 1st, 1918.

The consolidated school offers a medium of organization that can not be found otherwise. The value of the county agricultural agent is increased over and over again, through the organization made possible by these schools. For example, every boy and girl studying agriculture has performed the experiment of treating oats for smut and in this way 100 per cent of farmers have treated oats who otherwise would not have done so. The schools have tested hundreds of bushels of seed corn, having at least one ear from each farm from the county, unless that particular farmer was testing his corn for himself. . . . . As a direct result of the teaching of agriculture, agricultural clubs of all kinds are organized and the work pushed through the medium of the school.—*The Banker-Farmer.*

PART II

Provincial Departments of Agriculture

RURAL CREDITS

In recent years a deal of attention has been paid to the subject of "Rural Credits", or the matter of increasing the financial facilities of the agricultural community and of settlers. A number of Acts have been passed by the different provincial legislatures with this object in view, the majority of which have been referred to, or reviewed, in the year of their adoption, in The Agricultural Gazette. Last year was particularly prolific in the passing of such measures. Although, of course, the most recent of these have hardly had time to be tried out, the majority have been put into force with substantial success. In order that each province might know the progress that is being made, the following series of articles have been brought together:

NOVA SCOTIA

BY W. B. McCOY, SECRETARY, INDUSTRIES AND IMMIGRATION

THE Legislature of Nova Scotia in 1912 passed an Act for the Encouragement of Settlement on Farm Lands with the object of affording means whereby settlers would be encouraged to purchase or acquire for themselves farm holdings. While this legislation was intended primarily to serve the interests of agricultural new-comers, the benefits of the measure have been available to native farmers of the province as well who wish to buy land or effect any economic improvement of their farms.

Under the terms of this Act, the money is not granted directly to the applicant by the Government. Arrangements have been made with an established loan company whereby the money is advanced by that corporation, the Government guaranteeing a certain proportion of the loan. When the loan company will agree to advance to a farmer forty per cent of the appraised value of the property he wishes to purchase or improve, the Government will, in approved cases, and to thoroughly experienced farmers, guarantee, if necessary, an advance of forty per cent additional, making eighty per cent in all advanced by the company. The applicant must possess cash to the value of at least twenty per cent of the appraised value of the farm, in addition to what he would require for house furnishing, for stock, implements, and for the maintenance of himself and family. A mortgage is taken by the loan company on the property.

HOW A LOAN MAY BE OBTAINED

A farmer who wishes to obtain assistance under this Act applies for a loan through the Department of Industries and Immigration. His property, or the property he wishes to purchase, is then inspected and a value placed upon it by the Farm Inspector of the Department. The farm is also inspected and valued by the land valuer of the loan company.

Farms on which loans are granted are inspected from time to time by the Inspector of the Department, who is empowered to issue instructions for the guidance of the borrower. The mortgagee must farm, cultivate, manure, and manage the farm in a husbandlike manner, and follow such methods of husbandry as will keep the land in good heart. He must repair and keep in repair all the buildings, fences, hedges, and walls on the place, and must not allow any noxious weeds to run to seed. He must keep his farm well and properly stocked, and, so far as is practicable, must consume with stock on the farm all hay, grain, and root crops grown on the farm. In the event of selling any of these products off the place, he must return to the land either barnyard manure or commercial fertilizer of a value equal to two-thirds of the manurial value of the products sold.

REPAYMENT SYSTEM

By the system of repayments adopted the mortgagee makes repayments by the amortization method. It is generally held that the amortization plan of paying off principal and interest by half yearly or yearly instalments is more favorable to the borrower in the long run than a straight-interest mortgage. It not only makes him save, and thereby encourages thrift, but the actual total cost at the end of the instalment mortgage is considerably less. The mortgages negiotated by the Department of Industries and Immigration are for a definite number of years agreed upon, but the borrower has the privilege of paying off at any time during that period. On the other hand the company cannot call in the mortgage until the end of the term, provided, of course, the borrower pays his instalments with a reasonable degree of promptness. It may be difficult for a newcomer during the first years of his incumbency of the farm to pay much on principal account. This is taken into consideration, and, in order to assist the farmer to get well established, the Government and loan company may agree to a release of payments for a period not exceeding five years. The amortization plan will then immediately come into operation, and the payments thereafter will continue to reduce the mortgage debt.

THE LOANS GRANTED

Altogether up to date there have been 187 applications for assistance. Of these applications 70 have been granted. For the loans granted, mortgages have been taken by the loan company on buildings valued at $94,850, and on 11,079 acres of land valued at $121,658. The total loans granted amounted to $129,765, of which amount the Government guaranteed $56,825. The total valuation of the property given as security was $216,508. The other applications were declined for various reasons, among which were defective title, insufficient security, and unfitness of the applicant. The terms of the mortgages taken ranged from six to fifteen years, with interest at from six to seven per cent, according to the condition of the money market. The purposes for which loans were granted included, not only the purchase of land, but also such improvements as underdrainage, the clearing of additional land, the purchase of stock and implements, and the erection of suitable fencing and outbuildings.

NEW BRUNSWICK

BY W. R. REEK, B.S.A., SECRETARY FOR AGRICULTURE

THE yearly decrease in the rural population, the large number of abandoned or semi-abandoned farms, the steady increase of importation of foodstuffs, and the insistent call for capital by men who were willing to till the soil, induced the Government to pass "An Act to Encourage the Settlement of Farm Lands." Under this Act provision is made for a bond issue, and for the appointment of a board of three to administer the fund, select farms to purchase and resell the same to *bona fide* settlers. The board is a body politic and corporate, and all the transactions are made in the name of the board.

A bond issue of $100,000 was made under the Provincial Loans Act, to run for a period of twenty years; $5,000 is set aside yearly from the current revenues to meet the principal when it falls due. A later issue of $50,000 has also been made.

Farms can be purchased by the board and resold at cost upon the following terms:—

> Twenty-five per centum of the purchase money, if the price being paid for the property is less than one thousand dollars, but, if in excess of that sum, then an initial payment of thirty-five per cent, to be paid when possession is given to the purchaser, and the balance, with interest at five per cent thereon, at such stated periods as the said board may agree upon with the purchaser; the final payment to be made at a date not exceeding ten years from the date of the agreement to purchase, except that in special cases an extension of two years may be given by unanimous consent of the board.

PROCEDURE TO OBTAIN A FARM

The difficulties of sale, arising at the first purchasing of vacant farms, generally because of location, forced the board to adopt the present system. Now, suitable farms for settlement with every obtainable detail are listed, and any one without choice as to location is rendered assistance in proper selection. Immediately a settler decides upon property the Inspector, who is member of the board, makes a caref inspection of the property and repor to the board with a recommendatio as to value, etc. If satisfactory, th property is purchased by the boar and resold to the settler upon th terms laid down in the Act. Th board continues to hold the deed, an the purchaser holds an agreemen from the board until the indebte ness incurred in the obtaining credit is paid by means of yearl instalments, and then a transfer the property is made.

Many young men within the pro ince are desirous of securing propertie near relatives; in such cases the appl cant chooses the nearest vacant far suitable for his purposes, and make an application for assistance to th board. The regular procedure followed, and in nearly every cas such men are assisted. Were it no for this assistance large numbers these young men would move t other parts.

PROTECTION TO SETTLERS

Incoming settlers who deal with th board are protected against the pur chase of homes in out-of-the-wa places. Many districts which at on time had a goodly number of settler have been vacated, due to unsuit ability for agriculture, or to the lac of transportation, discontinued be cause of cessation of industry inci dent to lumbering or mining. Th urgent need for food materials in duced many to clear and cultivat land near such points. Speculatio in land is also eliminated. The earl settlers naturally cleared much hig and very rolling land which shoul have remained under timber—suc farms should remain vacant and b reforested..

CASES OF DEFAULT

Should any purchaser default in the payments agreed upon, the board is at liberty to dispossess and arrange for another settler. However, in such cases, if unfavourable circumstances have caused the inability to pay, every consideration and assistance is given in order not to discourage. If, however, wilful neglect or endeavour to defraud appear to be the cause of default, the farm is immediately taken by the board.

The Act was passed in 1912. Up to date, 345 farms have been purchased; 333 have been resold for $275,644, which also represents the purchase price. The purchasers have repaid by instalments $130,600.74. In practically every case the loan assists in the purchase of the land.

QUEBEC

BY G. E. MARQUIS, CHIEF OF THE STATISTICS OFFICE

ALTHOUGH there are as yet, properly speaking, no rural credit associations in the province of Quebec similar to the western associations, there are a large number of "Caisses Populaires" (credit banks) constituting real institutions of savings and credit, open to the agricultural and manufacturing classes.

Such banks were organized under the Quebec Syndicates Act, 1906, (Revised Statutes, Quebec, 1909, amended by 1 Geo. V., 2nd session and 5 Geo. V.).

The object of the association is defined as follows by the statute:—

R.S.Q. 1909, Art. 6767. The object of the association shall be to study, protect, and defend the economic interests of the labouring classes. For that purpose it may buy for re-sale to the associates only, such articles as are necessary for the support of life, or for the works of their industry; open up credits for them and make loans to them; establish works in common for the associates, or allow them to devote themselves to processes of production, and to sell the products thereof, either collectively or individually. 6 Ed. VII., c. 33, s.5,

No one but the members can do business with the association. The shares must not be less than a dollar each; usually, they are $5. There is a limit to the number of shares that may be purchased by a shareholder, but this number is considerable.

Not a cent is contributed to the funds of these banks by any municipal council or by the Government.

METHOD OF OPERATION

The loans are made on the security of first mortgage, when the amount is considerable, or on promissory notes, when the amount borrowed is comparatively small. Refunds are made monthly—capital and interest.

Profits are divided between the shareholders in the shape of dividends at the end of the association year, after previously deducting at least ten per cent of the total amount of profits to make a collective credit amount for covering possible losses. The dividend paid to the shareholders varies between 3½ to 7 per cent of the capital they have subscribed; the interest paid to the depositors varies between 3 and 4 per cent of their savings.

THE SAFEGUARD

Since 1915, these banks have been under the obligation to prepare a statement in triplicate of their operations at the end of the fiscal year; a copy of this statement is handed to the secretary of the province, another one to the office of the clerk, or of the secretary-treasurer of the municipality, and the third one is kept in the office of the association. The

correctness of such a statement is certified under oath by the manager before a justice of the peace. This is the only supervision—if it is one—exercised by the Government of the province.

The Quebec Statistical Year Book contains in its last volume (1917) a special chapter filled with elaborate statistics on credit banks. This chapter is divided into two parts, one being a retrospective and summary account of the operations of all banks, and the other one a complete financial statement for 1916.

The following information is taken from this volume for the year 1916:—

Number of banks reporting	94
Number of members	25,028
Number of depositors	15,613
Number of borrowers	6,696
Number of loans agreed to	11,200
Amount of loans made	$1,641,258
Total profits accumulated	$100,945

The operations of the banks in 1916 amounted to $5,534,246.44, divided as follows as receipts and expenditures:—

Receipts:	
Cash on hand, first day of the year	$ 326,176.09
Social capital	118,195.56
Admission taxes	3,088.68
Savings	3,543,462.76
Loans postponed	1,423,445.01
Profits	119,878.34
Total	$5,534,246.44

Expenditures:	
*Share capital paid up	$ 61,733.40
Savings refunded	3,142,982.14
Loans outstanding	1,771,247.38
General expenditure	16,230.06
Dividends	31,562.50
Interest on savings	32,026.50
Cash on hand the last day	478,464.46
Total	$5,534,246.44

*Six Caisses Populaire did not report.

The previous year the transactions of the banks amounted to $4,490,953.41. This is an increase of $1,043,293.03 for 1916, which is conclusive evidence of the development and the usefulness of these financial institutions.

POPULARITY OF THE SYSTEM

Mutuality is one of the main characteristics of the organization. The "Caisses Populaires" are a social rather than a financial institution. This fact, which has been particularly emphazised by their founder, Mr. Alphonse Desjardins, of Levis, in the many lectures that he gave on the subject, is what makes these credit banks so popular among the labouring classes of the cities and of the country.

The truth of the above statement is clearly shown in a table given in the Quebec Statistical Year Book. Out of 11,201 loans made during the year 1916, for amounts, most of which were under $1,000, the loans of $100 to $200 have been the most numerous. There have been, for instance, 579 loans of $5 to $10; 725 loans of $20 to $25; 875 loans of $40 to $50; 1,620 loans of $100 to $200; 118 loans of $500 to $600; and finally 85 loans of $900 to $1000.

If the total sum loaned in 1916 is divided by the number of loans, it is found that the average is $146.53 per loan.

Out of the 100 banks existing in 1916, 19 were found in the cities—of which 4 were in Montreal and 5 in Quebec— and 81 in the towns. A few others have been established in 1917.

To sum up, the system of the credit banks, after being thoroughly tested for several years, has now gained the confidence of the public, especially of the small wage-earners, who may not have any property, and whose credit is measured by their moral value. And this confidence will yet grow stronger, and exercise an effect more and more beneficial on the public mind by encouraging our people to save, and by creating reserves of capital for the needs of less fortunate classes, who may call upon these reserves in their hour of need in proportion to their frugality, their honesty, and their activity.

ONTARIO

AT the 1916 session of the provincial legislature, an Act was passed authorizing the making of loans to settlers in the Northern and North-western districts of Ontario.

The maximum amount of any loan to be made to a settler was placed at $500, with interest at the rate of six per cent per annum, upon such terms and conditions as the Loan Commissioner might think proper.

Any loan made is registered against the land; in the case of unpatented lands, in the Department of Lands, Forest, and Mines; and, in the case of patented lands, in the property Registry or Land Titles Office, and constitutes a lien against the land.

Settlers desiring to secure a loan are required to call upon the Crown Lands Agent for the district in which they are located, where an application form can be filled out giving details as to location of lot, the amount of loan required, the period of years over which it is desired to have the loan, and the proposed terms of repayment; the interest being paid annually. Full information must be given as to the purpose for which the loan is required, as the intention of the Government in providing a loan is to assist the legitimate settler in making further improvements in the way of erecting buildings, purchase of live stock and farm implements, the clearing of the land, etc., and one of the conditions governing the disbursement of any loans advanced, is that the money must be expended for the specific purpose set out in the application, except the consent of the Loan Commissioner in writing has been first obtained, covering any change in the proposed expenditure.

In addition, the application form provides for detailed information regarding the number of acres of land cultivated, number of acres ready for cultivation, number of acres chopped or burnt, total number of acres of arable land, number of acres of standing timber, class or kind of timber, and as to the dimensions and material of buildings on the lot, and also as to the amount of live stock and farm implements on hand.

Under the arrangements as above outlined, the total of the sums advanced up to the year ending October 31, 1917, reached $300,000, the number of loans made was 1,167, and the average of each was $257. The applications for loans ranged in amount from $50 to $500.

THE FARM LOAN ACT

In 1917 the Farm Loan Act reviewed in THE AGRICULTURAL GAZETTE, Vol. IV., page 484, was passed. This measure authorizes the provincial Treasurer to loan money to the township corporation against debentures of the township, to enable the corporation to make loans to farmers, principally for permanent improvement.

MANITOBA

IN Volume IV of THE AGRICULTURAL GAZETTE, page 489, is given a brief summary of the Rural Credits Act, passed by the Manitoba legislature at the session of 1917. As the Act came into force at once, it is possible to give some account of the success achieved in the first year of its operation.

As previously stated in THE GAZETTE, the Act provides for the organization by Manitoba farmers

of Rural Credit Societies, through which the individual shareholders of such societies may be enabled to secure short-term loans for carrying on or extending their farming operations. The security for the loan granted will be the crops produced by the use of the money loaned, the live stock, or machinery purchased therewith. The money is loaned by the bank to the societies at 6 per cent, and the individual borrower is charged 7 per cent, the difference going to pay the expenses of the society and to augment the guarantee fund.

METHOD OF CAPITALIZATION

Each member of the society is required to take stock to the amount of $100, and his liability is limited to that amount. The provincial Government takes stock to an amount equal to half that subscribed by the members of the society, and the municipality within the boundaries of which the members of the society live, and carry on their farming operations, takes stock to the same amount as the Government. The proceeds of this stock form a guarantee fund as the basis for credit, and the society will be enabled to secure credits for individual members to a total of many times the amount of the subscribed stock. It is provided that the municipal subscription need not be in actual cash, but may be in bonds of the municipality. With a capital of $10,000 accruing from the subscriptions of fifty farmers at $100 each, and from the municipality and the provincial Government each subscribing half as much, and the society becoming responsible for each loan made to its members, it is figured that loans to a total of at least $100,000 could be secured from the bank, or banks, with which it is arranged the society shall do business.

PROCESS OF ORGANIZATION

The Act provides that when at least fifteen farmers in any district have decided to organize a Rural Credit Society, they shall make application by petition to the provincial secretary for permission to be incorporated. The Government then appoints an officer to act as secretary and treasurer of the society until the organization of the society has been completed and a permanent secretary and treasurer appointed. No society can commence business until it has received subscriptions from not less than 50 persons actually engaged in farming, or who have agreed to engage within one year in farming operations, and these must subscribe for stock to the amount of not less than $5,000, of which not less than 10 per cent must have been paid up. When the organization of the society is complete the management is vested in a board of nine directors, three being elected by the members of the society, three named by the municipality, and three appointed by the Government of Manitoba. The last-named must include a graduate in agriculture, who becomes Government supervisor of agriculture in the district. One of the directors is to act as secretary and must be a capable accountant. He will be the only officer paid by the society. The Act provides that the loans shall be for the purchase of seed, feed, or other supplies; the purchase of implements and machinery; the purchase of live stock; the payment of the cost of carrying on farming, ranching, dairying, or other like operations, and the payment of the cost of preparing land for cultivation.

PROMOTION OF CO-OPERATION

The Credit Society is also given permission to act as agent for the members in purchasing supplies and selling products, and may take steps to promote co-operation for the improvement of conditions of farm life, and to extend the application of the society's activities to all

residents of the district. Notes covering loans will mature not later than December 31st of the year in which the loans are made. If the loans cannot reasonably be realized by that date, they may be renewed. The security will be the property purchased, together with the offspring of live stock, and the crops or other products grown upon the lands for the working of which the loan is secured.

The directors of the society will be responsible for passing upon applications for grants. The Act provides that all municipal, provincial, or school buildings may be used by any society for any meeting free of charge.

THE FIRST YEAR'S PROGRESS

At the present time there are seventeen societies chartered with an organized capital of $20,000 each. As indicating the progress that is being made under the Act, the following particulars of transactions carried on by two of the societies may be mentioned:

The Roblin Rural Credit Society with headquarters at Roblin in the municipality of Shell River, has granted 49 credits, totalling $33,297, to date. Loans are for the following purposes:—

Implements and machinery..	$2,460.00
Putting in and taking off crop	10,021.00
Seed grain	4,621.00
Stock	5,655.00
New breaking	6,615.00
Feed for Stock	790.00
Improvements to farm	3,105.00
Total	$33,267.00

The Lawrence Rural Credit Society, in the rural municipality of Lawrence, with headquarters at Freedale, a municipality without a railroad, has passed 52 loans, totalling $12,670, for the following purposes:—

Machinery	$3,175.00
Live stock	2,790.00
New breaking	4,615.00
Putting in and taking off crop	2,090.00
Total	$12,670.00

ALBERTA

BY J. McCAIG, M.A., EDITOR OF PUBLICATIONS

WE have three Acts passed in 1917 that are devoted to the securing of funds for agricultural purposes. The first of these is called "An Act to encourage the increased raising of stock in the province of Alberta," commonly called "The Cow Bill." This Act is administered under the Live Stock Commissioner's office. It provides for the establishing of co-operative borrowing associations of farmers to the number of five up, who may borrow to the limit of $500 each for the purchase of stock, subject to the approval of the commissioner as to the amount borrowed and the stock purchased.

The stock must consist of cows and heifers, but provision is made for the joint purchase of registered bulls. A dollar fee is collected from each member for every $100 borrowed. The interest must not exceed 6 per cent. The money is secured from the banks, and repayment guaranteed by the Government. The sale of stock and offspring is subject to the approval of the commissioner. No female stock can be sold. The loan covers a period of five years, but may be paid before that time. The Government guaranteed over half a million dollars to twelve hundred borrowers under this Act in the year 1917.

The second Act is called "An Act respecting co-operative credit." It authorizes the formation of co-operative credit societies which shall loan money on joint municipal and Government guarantee to borrowers. The

credit association is organized after the manner of stock companies. It has eight directors, four named by the organization meeting, two named by the Lieutenant-Governor in council, and two by the municipality giving the guarantee. The purpose for which money is loaned include the following:—

(a) To procure short term loans for its members for paying the cost of farming operations of all kinds and increasing the production of farm products and particularly for the following purposes:

(1) The purchase of seed, feed, and other farm supplies;

(2) The purchase of implements and machinery;

(3) The purchase of cows, horses, sheep, and other live stock;

(4) The payment of the cost of carrying on any farming, ranching, stock-raising, dairying or other like operations;

(5) The payment of the cost of preparing for cultivation.

(b) To act as agent for the members in purchasing goods, chattels, effects, stock, grain, coal, wood, lumber, merchandise, or any other article or commodity required by subscribers and in selling any products produced by subscribers;

(c) To promote co-operation among its members for the improvement of conditions of farm life.

Loans are secured by making application to the secretary, who takes the application before the board of directors. The board may require such securities as they think necessary for the protection of societies against loss. The rate of interest is that agreed upon between the borrower and the lender. The interest charged must include a proportion for carrying on the business of the association.

The third Act is called "An Act to foster and encourage agricultural development by means of standard forms of investment upon farm mortgages and the equalization of rates of interest." It is not a co-operative Act in the ordinary sense, but is co-operative in this sense, that it is an organization of the credit resources of the province based on agricultural lands through Government initiative, and, by it, the holders of land may secure through the Government long term loans at low rates of interest, and running over a period of thirty years subject to annual repayments on the amortization plan. This Act is controlled by the Treasury Department of the province. It is administered by the Commissioner of Farm Loans and a board called the Alberta Farm Loan Board. This third Act is not operative at present. It requires large sums of money, the source of which has been up to the present the United States. With the entry of the United States into the war, these supplies have not been available, and loans at present are not being made under this Act.

Consolidation is one of the first steps in bringing to the country the educational advantages of the town. The consolidated school means concentrated educational efforts. It makes possible an extent of school provision that is unthinkable in the small one-teacher country school. It is a war measure, because it will mean better teachers, better agriculture, and better facilities for helping the Government in its need for trained men.—*P. P. Claxton, U. S. Commissioner of Education.*

HARDY ALFALFAS

Where alfalfa succeeds the success of agriculture is assured. To discover the varieties suitable for the different altitudes and areas of Canada, experimenters have been diligent in the selection of those possessing hardiness and productivity. The past severe winter has eliminated many sorts that were previously considered hardy, as is shown by the following reports:

NOVA SCOTIA

BY JOHN M. TRUEMAN, B.S.A., PROFESSOR OF AGRICULTURE

WE have used two varieties of alfalfas in our field plots at the Nova Scotia Agricultural College,—Grimm and Ontario Variegated. Both varieties came through the severe weather of last winter in good condition, while common red clover in adjoining plots was killed out completely. In addition to these two varieties, we planted last summer (1917) seed from plants obtained two years before from Prof. N. E. Hansen, of the South Dakota Agricultural College. Prof. Hansen is the well known explorer who has secured a great many varieties of hardy plants from Northern Russia for the United States Government. We raised a small amount of seed from a number of these plants and sowed it in August, 1917. The plants grew well last fall, and came through last winter without being killed, but are not in a vigorous condition. We have not gone far enough as yet with this test to gain any information of value.

QUEBEC

BY REV. PERE ATHANASE, O.C.R., OKA AGRICULTURAL INSTITUTE

THE common field alfalfa which has been grown here for several years has not in the least been damaged by the hard frosts of last winter.

During the last two years we have been trying eight varieties of hardy alfalfa, six for the production of seed and two for the production of fodder. Varieties grown for seed are the following:—Lyman's alfalfa, Grimm No. 130, Grimm No. 338, Grimm No. 72, Montana, Dry Land. Varieties grown for fodder are: Ontario Variegated and Grim. Although last winter was extremely cold, none of these varieties was damaged, and the growth is very healthy. The average height of the alfalfa is about six inches now, and, if the weather keeps on being favourable, four crops are anticipated instead of the usual three.

BY BROTHER M. LIGUORI, SECRETARY, EXPERIMENTAL UNION

DURING the last five years over a thousand pounds of alfalfa seed of various varieties were distributed throughout the province of Quebec by the Quebec Farmers' Experimental Union. The result of these experiments has already been published, and we are

glad of this opportunity to state again that alfalfa thrives well in all parts of the province and under all climates, under the climate of Montreal as well as under that of the Abitibi and of Lake St. John districts, in the Eastern Townships as well as on the Gaspé coast.

But the ordinary condition of success must not be neglected: deep soil, well tilled, well drained, by natural or artificial means, free from acidity and free from weeds, specially couch-grass.

Of the varieties that have been tested, the following have given the best results and proved the hardiest-:

1. A variety imported from Belgium, but which can no longer be secured.

2. The Grimm variety, produced in North Dakota. When grown under good conditions, practically no failures have been recorded with this variety during the last four years.

3. The Grimm variety, purchased from ordinary tradesmen, but at lower prices, 30 to 35 cents a lb., has proved inferior to the preceding one.

4. A variety known as Dakota Black Hill proved to be fairly hardy, but not generally as satisfactory as the Grimm. The causes of this inferiority have not been positively ascertained as yet.

5. Owing to the difficulty to secure seed of the Ontario Variegated alfalfa, this variety has been tried only once and on a very small scale.

However, the small quantity of this seed which we were able to secure did very well at the Oka Agricultural Institute, where it was grown, however, under exceptionally good conditions. We are anxious to secure a further supply of seed of this variety in order to have it tried throughout the province of Quebec.

It should also be stated that the object of our efforts has been to find out whether alfalfa could grow and live in the various parts of the province, and not so much to ascertain the comparative yields of the different varieties.

It should also be stated that poultry men are particularly pleased with the results given by alfalfa, which is rapidly gaining in favour among them.

MACDONALD COLLEGE

BY R. SUMMERBY, B.S.A., LECTURER IN CEREAL HUSBANDRY

THE winter of 1917-18 bore with more than ordinary severity on alfalfas, grasses, and clovers at Macdonald College. Several plots of orchard grass, and most plots of red clover have been winter-killed, while a number of blocks of alfalfa sown broadcast and in rows, that have survived all winters since they were seeded in 1912 and 1913, have been from 75 to 90 per cent winter-killed. Other plots of alfalfa that have come through a number of severe winters with little injury have this year been more seriously damaged.

The autumn of 1917 was marked by showery weather, which continued until the middle of November, when a sudden drop on temperature resulted in the land freezing up on November 19th. Extreme cold weather, accompanied by frequent strong winds, prevailed from this time and continued throughout the winter months. An abundant supply of snow kept the ground covered, although rather unevenly, until late in March, when it disappeared somewhat rapidly, leaving meadows and pastures practically bare. Two severe frosts occurred in April, which did much damage to crops that are apt to suffer during this season of the year.

A deal of the alfalfa at Macdonald College was allowed to go to seed in 1917, with the result that it was cut late, and had little aftergrowth when winter set in. This afforded little protection to the crowns, held little snow, and, together with the satu-

rated condition of the soil at the time of freezing up, made conditions extremely good for winter-killing.

Although more than the usual amount of snow fell during the season, the frequent winds, where no aftergrowth was present, made certain spots bare at times, and in such cases the crop has been largely killed. Then, too, a considerable amount of alfalfa that came through the winter was seriously damaged through the effect of the heavy frosts occurring during the latter part of April.

The results of the tests this year under these severe conditions again strongly emphasize the importance of leaving a good growth to freeze down to hold the snow and to protect the crowns.

In previous work with this crop a number of varieties, including the Grimm, showed themselves to be particularly hardy. This variety has again shown hardiness, but has been more severely winter-killed than ever before. A number of new and improved strains that are in the row tests seem to be completely resistant to conditions as they have existed this year, for, although on heavy soil with little aftermath, and, where ordinary alfalfa has frozen out almost every year, these new strains have not been winter-killed at all.

Hardy varieties, given good condition for wintering by making provision for aftergrowth and drainage, seem to be the most important factors in preventing winter-killing.

ONTARIO

LANARK COUNTY

BY F. FORSYTHE, B.S.A., AGRICULTURAL REPRESENTATIVE

IN the county of Lanark we have several alfalfa demonstration plots. These are planted with the Grimm variety, so that we have no evidence as to the relative vitality of different sorts. The plots were put in two or three years ago and today will average an eighty-five per cent stand. The purpose of these demonstrations is to prove to farmers that alfalfa will stand our climatic conditions providing the right variety is sown. Many farmers had tried to grow alfalfa, but failed. The demonstrations, it is hoped, will encourage many to again begin raising this crop. The plots are scattered fairly widely throughout the county, and are thus demonstrating to a wide circle of farmers, the lessons they were established to teach.

WATERLOO COUNTY

BY J. S. KNAPP, B.S.A., AGRICULTURAL REPRESENTATIVE

THE Grimm and the Ontario Variegated are the only varieties of alfalfa that have given satisfaction in the county of Waterloo. Farmers who have been able to secure seed of these varieties have fairly good stands. Our farmers have practically given up sowing alfalfa, except where they can secure seed of these varieties.

MANITOBA AGRICULTURAL COLLEGE

BY W. SOUTHWORTH, M.S.Agr., F.L.S., AGROSTOLOGIST

THE weather conditions during the recent winter, if not so severe as usual, had an unusually destructive effect on our winter crops. One of the causes of this excessive winter-killing was the want of protection, owing to the limited snowfall. Yet, when we consider that our recorded snowfall during 1917-18 was only about three inches less than that of the winter of 1916-17, there must have been influences other than simply deficiency of snowfall to cause such a difference in the killing effects during the two winters.

From meteorological reports supplied by Professor S. C. Lee, of the Physics Department, we find that in the winter of 1916-17, 23.4 inches of snow fell before the end of December, and the mean monthly temperature for the month of December was 1.92 degrees F. Comparing this with the record for the last winter, we find that up to the end of December only 11.45 inches of snow fell, and the mean temperature for December was about 9 degrees lower than that recorded for December, 1916. Also, owing to the prevalence of high winds, the snow which did fall was practically all swept from the open fields, thus leaving the crops exposed to a comparatively low temperature, with practically no protection from the snow.

On comparing the mean temperatures of 1917 and 1918, during the months of January and February, we find that in 1917 the average mean temperature for these two months was about 12.0° F., that is 7 degrees F. lower than the average mean temperature during the corresponding months of 1918. Hence we may conclude that a study of the weather during the past two winters indicates that a bare statement of the mean temperatures and total snowfall may not, in themselves, furnish a very satisfactory explanation of the real cause of winter-killing in any given winter. But in order to obtain a reliable interpretation of weather effects, the incidence of snowfall and temperatures and wind should be studied in correlated manner.

Observations on the injury caused by winter-killing have shown that, on the plant breeding plots, the most marked effect was seen on alfalfa. On some parts of the row plots sown in 1915, fully 80 to 90 per cent of the plants were killed. One of the outstanding features observed in these plots was that, out of about 40 different strains from various sources, it was found that Grimm alfalfa was more resistant to winter-killing than any of the other commercial strains. On the selection plots similar results were obtained. Out of about 20 selections from various sources, sown in 1916, nearly all were killed out very badly. The only one which showed any real capacity to resist winter-killing was one from a Grimm strain, and, even in this strain, a high percentage of plants were destroyed or considerably weakened.

The alfalfa plants showing most resistance to winter killing we find in the Yellow-flowered or Falcata variety, or in hybrids between this and common alfalfa. A plot adjoining the hardy Grimm strain mentioned above was planted with these Falcata hybrids. Over 90 per cent of the plants came through the winter and are growing vigorously. Other hybrids between alfalfa, sweet clover, and Black Medick are also showing very hardy characteristics, and, on the whole, have come through the past winter in a creditable manner. As these hybrids have only been through two winters, it is as yet too early to venture an opinion as to what extent they will resist our severest winters. However, we may

assume that those plants not materially injured by the trying conditions of last winter are reasonably hardy, but it yet remains to be seen if their seeding properties, and crop producing capacities, are of sufficient merit to warrant them being classed as desirable mother plants for the production of select strains for general farm purposes.

SASKATCHEWAN

BY L. E. KIRK, B.S.A., SCIENTIFIC ASSISTANT IN CHARGE FORAGE CROP WORK

THE spring condition of our alfalfas this year indicates that the past winter was one of the most trying we have ever had. Observations on the experimental plots bring out the following points:

(1) Excessive winter killing of the hardiest commercial varieties, including much of the Grimm.

(2) The greatest injury was sustained by the oldest plants, those planted in 1917 suffering very little.

(3) The efficient protection afforded by a fall growth was very marked. The small amount of winter killing where there was even a light fall growth as compared with the same variety where the plots were cut late seemed to be out of all proportion to the protection given.

(4) Winter killing was much more extensive and complete where the plants were more or less injured by the previous winter. There is no question that partial injury sustained during the winter of 1916-17, although it did not prevent the growth of the plants, contributed largely to complete destruction during the past winter.

(5) Many of our hardy selected strains out of Grimm sustained no injury under the same conditions. These together with a few falcatas are the only alfalfas that completely survived under exposed conditions.

(6) Alfalfa seeded in 1917 in rows three feet apart survived the winter much better than that seeded in drills six inches apart. Owing to the exceptionally dry season, the latter made only a small growth with consequent little protection, and two-thirds of the plants winter-killed.

(7) Plots of Grimm that were left for seed last fall, suffered more than any others of the same variety, and the injury was in direct proportion to the yield of seed.

Altogether the results serve to further emphasize the need of hardier strains of alfalfas, and also to justify the use of Grimm as our hardier stock. Some sort of protection appears at present to be the best way to insure against winter-killing. When two severe winters follow one another, with a dry summer in between, the need of securing a considerable fall growth after the last cutting seems essential.

ALBERTA

BY J. McCAIG, M.A., EDITOR OF PUBLICATIONS

REGARDING the hardy varieties of alfalfa, our experience leads to the conclusion that the best varieties for Alberta are Grimm and Baltic and these are equally good. This applies to all parts of the province, though most of our alfalfa has been grown in Southern Alberta so far. Turkestan has given very moderate results, even under the best conditions. Siberian is not recommended. The method under which these succeed best is the sowing in rows, thirty-six inches apart, at the rate of two and a half pounds per acre. No seed of any account has yet been produced on the Demonstration Farms, or on the experimental plots of the Schools of Agriculture. The best seed available at present is the Grimm seed secured from Mr. McGregor of the Canada Land and Irrigation Company.

PLOUGHING MATCHES

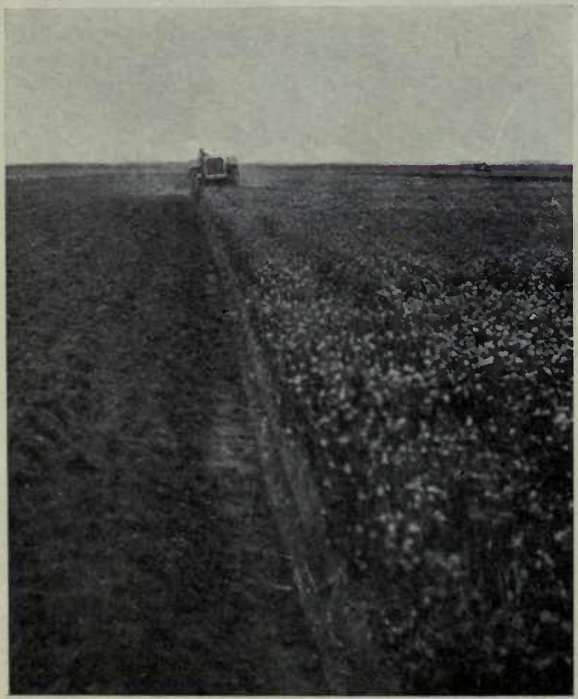
MANITOBA

BY S. T. NEWTON, DIRECTOR, AGRICULTURAL EXTENSION SERVICE

OWING to the scarcity of help it was considered by many that the ploughing matches should not be held this year, but so popular is this feature of agricultural society work that, with very few exceptions, matches were held as usual, and the interest shown by both spectators and contestants proved the wisdom of continuing the matches.

Altogether 24 matches were held, the number of contestants ranging from 10 to 80, and the number of visitors from 150 in one place to close on 2,000 at Crystal City and Beresford, and 4,000 at Portage la Prairie. At the latter place, the first day was devoted to contests in which horses provided the motive power, while, on the second day, gas tractors drawing two or three ploughs took the place of horses, and the concensus of opinion was that the work done by the tractors was equally as good as that done by the horses. Several of the men who stood high in the contest with horses on the first day excelled also on the second day, thus showing that the farmer of to-day is a versatile individual.

TWIN FURROW FINISH AT THE PLOUGHING MATCH, PORTAGE LA PRAIRIE



A STRAIGHT AND EVEN FURROW TURNED BY A TRACTOR DRIVEN BY A 13-YEAR OLD BOY AT THE PLOUGHING MATCH, PORTAGE LA PRAIRIE

It is frequently said that a boy loves a man's job, but never was that fact more clearly demonstrated than on the second day at Portage, when Clarence Yuill, aged 13, on a Heider tractor, drawing two Rock Island ploughs, won third place in a field of over 30; and he deserved to win, as the work, including the strike out and in, and out at the ends, the most difficult feature in tractor ploughing, was almost perfect.

THE SCORE CARD

The score card in use at all of the matches is as follows:—

AGRICULTURAL SOCIETY..... CLASS.....

	Possible Score	1	2	3	4	5	6	7	8	9	10	11	12	13
Crown	15													
Straightness	15													
In and out of ends	5													
Depth and width of furrow	15													
Evenness of top of land	10													
Finish	15													
Covering weeds and stubble														

SASKATCHEWAN

BY THOS. M. MOLLOY, SECRETARY, BUREAU OF LABOUR

IN no time in this province within the last seven years, at least since I have been in charge of the work of encouraging ploughing matches, has there been any prizes offered for narrow guage, high cut ploughing. The effort has always been made to encourage superior work with implements which cut and cover the ground, not more rapidly, but more perfectly. It is only in a few of the older localities where old country ploughmen still compete for supremacy that the up-to-date working plough is used. Some very excellent work has been done with these implements, and I personally regret that these are not more in use. Some of the ploughmen from year to year have secured very high averages with our score cards. In the locality of Saltcoats, where they have a ploughing match every year, as high as 99 per cent has been awarded to some of the ploughmen with a walking plough. For a number of years we have had sixty ploughing matches per annum in the province of Saskatchewan, although this season and last there has been a slight falling off owing to the fact that a number of our younger ploughmen have had to enlist. Nearly all the ploughing at the competitions at the present time is being done with sulky ploughs and gangs, the gangs being in the preponderance. However, in the last two years there has been a strong development in the ploughing with tractors. This feature has become very popular indeed, and most excellent work is being done, especially with the smaller tractors which will pull three bottoms. Here is a list of rules and regulations which were compiled by myself as a suggestion to organizations wishing to undertake ploughing matches:

SUGGESTED RULES FOR PLOUGHING MATCHES

The following rules have been compiled from those in force at numerous ploughing matches. They are intended as a guide to the agricultural societies, and may have to be changed to suit the particular ideas

and conditions of any society. For instance, rules 9 and 10 may be changed to mean the opposite.

The three following suggestions are given as to who shall compete.:—

(a) Competition open to all comers.

(b) Competition open to all members of the agricultural society.

(c) Owners of teams or their *bona fide* servants must run ploughs.

The last condition prevents an outsider (possibly a prize ploughman) coming in, hiring a team, and winning the prize.

RULES

1. Entry fee of $1.00. Boys under 16 free. Any one contributing $2.00 or over to the prize fund will be allowed an entry for himself or servant.

2. All entries must be made before 9 a.m. on the day of the match, but intending competitors are especially requested to notify the secretary at least three days in advance, so that the ground may be staked out in time.

3. All ploughmen must be on the grounds before 9.30 a.m., when lots will be drawn for position. Ploughing will start by signal at 10 a.m., and must be completed by 4 p.m. Any ploughman coming after lots are drawn will be obliged to take his lot in rotation with those who have drawn and finish not later than the time limit. Any ploughman not finished when time is called will be ruled out.

4. The land to be ploughed shall not be more than ¾ acre for single-furrow ploughs and 1½ acres for two-furrow ploughs.

5. Each ploughman will make one strike out and one finish. All crowns must be opened out not less than three inches deep. Five rounds shall constitute the crown. The two first furrows thrown out against the adjoining crown shall not be judged. The judges may call a short stop to judge the crowns, but an equivalent in time shall be allowed the ploughman.

6. No person shall be allowed to interfere with, or help, the ploughman except in setting up and removing poles, and no person will be allowed to accompany the ploughman.

7. In all cases the crowns must be opened out and finished with the same plough and team that are used throughout.

8. The depth of the ploughing to be five inches and the width of the furrow the same as the width of the plough used. Two rounds to be allowed to attain proper depth. The sole furrow is not to be lifted, and ploughmen are not required to finish a furrow of full width.

9. Guage wheels to be allowed in all classes.

10. Chains or other devices for covering weeds to be allowed, but all weeds must be cut.

11. No pulling or covering of weeds with either hand or foot, or tramping of land with feet allowed. Anyone not conforming to this rule will be reduced one point for each offence.

12. In any class where not more than one entry is made, the judge shall decide what prize, if any, shall be awarded. The judges have a right to withhold a prize if 50 points have not been made.

13. Any ploughman not conforming to these rules will be disqualified.

14. Protests must be lodged with the secretary by noon of the day following the match, and must be accompanied with a deposit of $2.00. The decision of the committee in charge of the ploughing march shall be final.

SUGGESTED CONDITIONS

1. Men's 14-inch walking plough.
2. Men's 16-inch walking plough.
3. Men's 16-inch sulky plough, 3 horses.
4. Men's 2 furrow gang; 14-inch, 4 horses
5. Men's single disc plough, 3 horses.
6. Boys under 16, 14-inch walking plough
7. Boys under 16, 16-inch walking plough
8. Boys under 16, 16-inch sulky plough, 3 horses.
9. Boys under 16, 2 furrow gang, 14-inch, 4 horses.
10. Boys under 16, single disc plough, 3 horses.

Similar prizes may be arranged for young men from 17 to 21, or 24.

If little work is done in the district with walking ploughs, drop them out and give prizes for the kind in general use, so that it does not put a man about to practice for the match.

The rules and suggested prizes have been framed for stubble land. Why not have a ploughing match altogether on breaking? Reduce the area to be broken, and test the gangs and disc also.

PRINCE EDWARD ISLAND

PRODUCTION ACTIVITIES OF WOMEN'S INSTITUTES

BY HAZEL L. STEARNS, SUPERVISOR OF WOMEN'S INSTITUTES

EVER since the need for greater food production has been brought to our notice, the women's institutes have worked zealously towards this end, as well as towards the conservation of food.

The canning and drying of fruits and vegetables have been fully discussed and demonstrated and bulletins containing complete directions have been distributed.

At the fall exhibition in Charlottetown, demonstrations were given by the Women's Institute Branch in the canning and drying of fruits and vegetables. The methods of using the various substitutes in bread making were explained. A number of varieties of war breads were exhibited, and pamphlets dealing with war time cookery were distributed.

Last October a new household science kitchen was opened in Charlottetown. The work carried on here was under the direction of the Women's Institute Branch, and included the teaching of household science to the public school classes, together with the short course classes held during the winter months, and open to the women of the country districts. Special classes were held each Saturday for the teachers of the Charlottetown schools. With every class, war time cookery was dealt with and the utilization of the substitutes for sugar, wheat, and fats was particularly emphasized

This year the demonstrations on canning and drying will be continued, and at the present time demonstrations, dealing particularly with the use of the wheat, sugar, and butter substitutes, are being given to every institute.

QUEBEC

MACDONALD COLLEGE

WORK IN SHEEP HUSBANDRY

BY H. BARTON, B.S.A., PROFESSOR OF ANIMAL HUSBANDRY

DURING the charge of the sheep industry by Mr. A. A. MacMillan, who recently severed his connection with Macdonald College, and who was an appointee remunerated from funds derived under THE AGRICULTURAL INSTRUCTION ACT, of the Dominion, the sheep industry received a great impetus in the province of Quebec. Mr. MacMillan was placed in charge of the work in 1914. In THE AGRICULTURAL GAZETTE, Vol. IV, page 582, Mr. MacMillan gave a descriptive article on demonstration sheep flocks in which he described the progress that was being made. He speedily recognized that there was need for local organization in sheep work, and, to meet this need, arrangements were made for organization within the different counties. Considerable work had been done in Pontiac county in connection with sheep, so that it was

decided to make that county the starting point. Together with the college demonstrator at Shawville, Mr. MacMillan organized an association, after spending a great deal of time cultivating the ground for it. Following this association, a number of smaller organizations within the county were formed, all of which were linked to the parent association. The objectives of the association were three from the outset—the preparation and marketing of wool co-operatively; the purchase and exchange of pure-bred sheep, especially rams, co-operatively; the marketing of lambs co-operatively. The Live Stock Branch was asked to assist in this work in furnishing graders for the wool. On this basis the Pontiac association made a start in 1914, when 11,796 pounds of wool were marketed at a price of 21 to 23 cents per pound, this being an advance of from 5 to 7 cents on the prevailing prices.

The next year other counties were cultivated and associations formed. The success of the movement along all three lines has been marked and has been reported from time to time. When this work was commenced the average man had little or no conception of how to market his wool. Last year pure-bred sheep were sold from Quebec to practically every province in Canada. A real start was made in the marketing of lambs co-operatively, so that when Mr. MacMillan left the sheep industry was progressing rapidly on a sound business basis.

THE AUTOMOBILE AND THE AGRICULTURAL REPRESENTATIVE

BY F. N. SAVOIE, SECRETARY FOR AGRICULTURE

IN order to facilitate the work of our Representatives and enable them to better answer the needs of the agricultural communities, it was decided this year by the Minister of Agriculture to authorize them to purchase automobiles. Experiments and investigations on the various means of transportation have shown that the automobile is not only the quickest, but also the cheapest, way of travelling, in proportion to the number of miles travelled, and the one giving the greatest satisfaction to the farmers. Agricultural Representatives travel from four to six days per week. They may, at times, have to go quickly from one end of their district to the other.

The large number of requests that are received for the services of the Agricultural Representatives make it necessary to place each Representative in charge of two or three counties. Some of them have to cover a large territory, where communications by water or rail are often unsatisfactory, while country roads may be good enough to permit the use of the automobile. With the development of agriculture, the increased interest which farmers are taking in their work, the services of the Representatives are becoming more and more appreciated. Requests for visits and information, the needs of agricultural organizations are more numerous than ever, and the time of the Representative becomes more valuable. It was necessary, therefore, to adopt a rapid means of transportation, which would enable more work to be done and save time.

There are now twenty Agricultural Representatives representing thirty-seven rural counties of the province.

Representative	District	Residence
Albert, J. N.	Bonaventure and Gaspé	Bonaventure.
Belanger, A. J. M.	Chicoutimi and Lac St-Jean	Roberval.
Blondin, E. N.	Beauharnois, Chateauguay, and Huntingdon.	Huntingdon.
Brunel, P. A.	Montmorency and Quebec	Quebec.
Cloutier, Henri	Chambly, Iberville, and Rouville	Richelieu Village.
Delaney, Wilfrid	Rimouski and Temiscouata	Rimouski.
Fortin, J. A.	Champlain	St. Stanislas.
Gagnon, Roger	Kamouraska and L'Islet	Ste. Anne de la Pocatière.
Hodge, C. H.	Pontiac	Shawville.
Landry, Arthur.	Bellechasse and Montmagny	St. Charles.
Leclair, J. M.	Abitibi	Makamik.
MacDougall, W. G.	Sherbrooke and Stanstead	Lennoxville.
Magnan, J. C.	Portneuf	St. Casimir.
Parent, L. V.	Richmond and Shefford	Richmond.
Plante, J. A.	Nicolet and Yamaska	Nicolet.
Raymond, Abel	Arthabaska and Megantic	Plessisville.
Rousseau, R. A.	Bagot and Drummond	Acton Vale.
Roy, L. C.	Compton and Frontenac	Lac Megantic.
St. Arnaud, Rod	Maskinonge	Louiseville.
St. Hilaire, Pierre	Beauce and Dorchester	Beauceville West.

In order to encourage the Representative to take care of his auto, while making use of it to the fullest extent, the Minister has decided to give each the choice of two systems, by which the Representative owns his auto, but receives complete refund of the value for the use which he makes of his motor car in official trips. The first of these systems applies to Representatives having sufficient means to purchase a motor car without borrowing. The second enables the Representatives who have no such means to purchase a machine without being compelled to borrow.

FIRST SYSTEM—REFUND BY MEANS OF ANNUAL DEPRECIATION

The Representative is entitled to an allowance for yearly depreciation of twenty per cent, with interest at six per cent on the amount paid, payable half at the beginning of the season and the other half at the end. The annual license, fire insurance premium, expenses in gasoline, and repairs are paid by the Department.

SECOND SYSTEM—REFUND OF TWO-THIRDS OF PURCHASE PRICE

The Representative is entitled to a refund of two-thirds of the purchase price of the motor car and of the cost of shipment to destination. The remaining third is paid by himself. The annual license, the fire insurance premium, and expenses in gasoline and repairs are paid by the Department, as in the other system. The Department reserves a right of ownership on the machine equivalent to the amount paid to the Representative for the purchase of the same. After each year of service, this right of ownership decreases in the proportion of 20 per cent of the purchase price, until the third year. Then the motor car is the entire property of the Representative. If the latter desires to sell it, he can purchase another with one or the other system of refund. If he keeps the same machine, he cannot receive any refund for depreciation or interest.

These two systems are based on the price of a motor car not exceeding $1,200, in addition to the cost of shipment.

THE REQUIREMENTS

Conditions to be fulfilled in order to take advantage of these two systems of refund:—

1. Any expenditure of gasoline, oil or repairs, appearing on the monthly statement of expenses, must be accompanied by a voucher.

2. The Representative must show on his monthly statement of expenses, the number of miles travelled in official trips during the month, and certify that the expenses on account of motor car were necessitated by his official duties.

3. The Representative must not rent or lend his motor-car to any one. He must not make trips with or without charge for private parties.

4. The Representative must undertake to carry free of charge the officials or the guests of the Department of Agriculture, providing such trips are done for agricultural purposes.

5. The Representative must, as much as possible, take the time necessary, once a week, to make an examination of the machine, to see that it is in good order, well oiled, and that each vital organ is intact.

6. The Representative is supposed to use his machine from the 1st of May to the 1st of November. If, in the meanwhile, he has to use a livery owing to certain conditions, he must produce a voucher for each livery expense mentioned in his statement of expenses.

7. The Representative must fill a questionaire giving a description of his auto, number of manufacture, and the number of tires on the machine and of repair tires. At the end of the season worn-out tires must be returned to the Department of Agriculture, the numbers of each being checked.

Both these systems were tried last year and the results were most satisfactory, in spite of the unfavourable temperature which prevailed in the districts where Representatives were stationed. Some Representatives have travelled over 10,000 miles during the season, and have succeeded in satisfying, by this conveyance, the majority of requests coming from the farmers of their districts.

All our Representatives, with the exception of the one in Abitibi, where the condition of the road does not allow the use of an automobile, were able to purchase a motor car by one of the afore-mentioned systems of refund. Four have chosen the system of refund by annual depreciation, and the others have preferred the two-thirds system.

ONTARIO

LOCATING UNDERGROUND STREAMS

BY WM. H. DAY, B.A., PROFESSOR OF PHYSICS, ONTARIO AGRICULTURAL COLLEGE

SUBTERRANEAN streams usually provide the best supplies of water, both as to quality and quantity. The difficulty is that the striking of them is generally a matter of pure accident. From early ages, certain individuals have claimed the power of being able to locate such streams by aid of a forked twig from various trees, such as plum, cherry, hazel, etc. And it is undeniable that in many instances, phenomenal wells have been struck by digging or drilling on sites selected by these "water diviners," in spite of previous failures in the locality. For many years scientists as a class have stoutly denied the possibility of there being any virtue in this method of locating water, but in recent years, as the result of some investigation on the subject, a considerable change has come about, many not only admitting the possibility of the method being genuine, but actually expressing their belief in it. We understand the French Department of Agriculture has a staff of diviners, whose services are available on application. The chief drawback to the method is the opportunity given for trickery.

A WATERFINDER

Another method has come into vogue recently, viz., by using an instrument known as a waterfinder, a photograph of which is shown. This is an electro-magnetic instrument, patented by an English firm. In the lower compartment, according to the English letters patent, is a coil

of fine iron wire about six inches long and five inches in diameter. The coil has no metallic core. The ends of the wire are free. The layers are separated by paraffin wax and interspersed occasionally by sheets of lead foil. In the upper chamber is a very slender, delicate magnet 5 inches long, turning on a pivot at its centre. It is magnetized so as to have a north pole at each end, one being the least shade stronger than the other. This method of magnetizing the needle is patented. When preparing for a test, the coil is set by compass

AN ELECTRO-MAGNETIC WATERFINDER

with axis north and south. The needle is then placed on the pivot and points in a north and south direction when it becomes steady. If no underground stream runs below, the needle will lie almost motionless, but if there is a stream underground then the needle will suddenly swing out to one side and then oscillate back and forth, the oscillations gradually diminishing in amplitude. It may come back to rest or it may receive another impulse before doing so. There is no regularity of impulses either in time or strength.

THE PRINCIPLE

The principle of the instrument apparently is not definitely established. Those who have studied it are pretty well agreed that the action is in some way due to fluctuations in the earth currents of electricity which follow the underground streams of water. Some believe that these fluctuations cause momentary changes in the magnetism of the coil, which disturbs the magnetic equilibrium of the needle, causing the oscillations. The makers of the instrument claim that the oscillations are due to "earth air currents of electricity"—perhaps electric waves would be a better term—originating in the fluctuations of the electric current in the stream. And some even claim that there is no virtue in the instrument whatever. Water Supply Paper 416, U.S. Geological Survey, Washington, pages 23-25, concludes with this opinion: "In the present state of knowledge any claim that the oscillations of a magnetic needle indicate the occurrence of available ground water is purely speculative." If the author of this paper had related details of tests with the waterfinder made by himself or others, and which resulted negatively, his opinion would have carried more conviction. One thing is certain, the needle does oscillate in some locations and not in others —we have proven that over and over again by actual trial. And in India, under the direction of Dr. Harold H. Mann, Principal of the Poona Agricultural College, at least sixteen wells have been sunk on sites selected by the instrument in the trap region of Western India, where water is proverbially hard to find, water being struck in every one of the sixteen, and Dr. Mann's conclusions, quoted from his Bulletin No. 72 of 1915 entitled:"Experiments with the Automatic Waterfinder" is as follows:—

> The position as a result of our work is, therefore, that in a country where at least forty per cent of wells under normal circumstances are failures, even in selected sites, wherever the automatic waterfinder has indicated water, and a careful test, including boring, has been made, water has

been found. As a rule the supply indicated has been within the depth of well sinking; in a few cases, sub-artesian water has been found by boring, at depths varying up to 126 ft. Only one criticism can be made of these results, I think, and that is, that similar borings would under almost all circumstances reach a water supply of some sort. Other borings, in what were considered likely sites, do not justify this conclusion. These have only given 66 per cent of successes, as against complete success when the waterfinder has been used and has indicated water.

It must be confessed, however, that we have so far found no method of using the instrument which enables us to say with certainty the depth at which the water will be found, or its quantity. Messrs. Mansfield & Co., the makers of the instrument we have used, state that they can tell, within small limits, the quantity of water to be obtained, but we have not been able to do this.

It would seem, however, sufficiently proved that under the conditions which prevail in the trap areas of Western India, where underground water occurs in well-defined streams flowing in rock fissures, sometimes under little or no pressure, and sometimes under considerable pressure, the automatic waterfinder can be used with advantage in locating streams of water which can be tapped either by well digging or by boring.

Mr. G. B. Brooks of the Department of Agriculture, Queensland, Australia, has also done some very interesting work with the waterfinder, combining it with the divining rod method, and tracing underground streams by both. In spite of the fact that water is very scarce in the areas where the waterfinder has been used by him, no failures are recorded on sites selected by the instrument.

CHILD WELFARE WEEK IN BRAMPTON

BY J. W. STARK, B.S.A., AGRICULTURAL REPRESENTATIVE, PEEL COUNTY

CHILD Welfare week in Brampton was conducted by the Peel Department of Agriculture, co-operating with the Ontario Board of Health, the local doctors, Women's Institute, Red Cross society, girls' club, and the schools.

First of all a meeting of the local doctors was called in my office, where the whole matter was dealt with by a representative of the provincial Board of Health. The doctors promised their fullest support to the movement.

A meeting was next called of six representatives from the local women's organizations. On the plan being outlined to them, they passed a resolution pledging their support. In order to systematize matters, it was decided to have each organization take some definite part. The Women's Institute was asked to prepare an exhibit dealing with the whole question of feeding. This included six sections: diet for a baby 12 to 18 months, showing six meals; diet for a baby 18 to 24 months, showing four meals; diet for a child 2 to 3 years, showing three meals; diet for a child 3 to 6 years, showing three meals; a nutritious cold lunch properly prepared for school children, and a small equipment that would be suitable for use in a rural school for preparing one hot dish to supplement the cold lunch.

The Red Cross society's exhibit was entitled, "A model sleeping and play room for growing a healthy baby." This showed the right type of baby carriage, kiddie-koop, toys, etc., etc.

The girls' club prepared a baby's layette, all of which was home made.

All the exhibits were supervised in a general way by the staff of the Agricultural Representative, who gave assistance to the local organizations by supplying them with literature on the subject. The local dairy planned out a pure milk exhibit.

METHODS AND RESULTS

The local ministers either preached a sermon on child welfare, or made a

full announcement regarding it. A letter was addressed to each mother in Brampton having a child under three years of age, inviting her co-operation, and pointing out the objects sought to be attained and the reasons for the movement. Clinics were held on two days, June 25 and 26, the town being divided in half for this. Seventy-six babies were brought the first day and ninety-eight the second day. Most of the children were from the town, but a few came from the country, some coming from as far as 10 to 14 miles. Each child was weighed and measured by the nurses and examined by one of the doctors; we had two doctors and two nurses all the time and three or four women assisting the nurses. A prize was offered for the healthiest child under 18 months of age brought on each day.

The provincial Board of Health sent out a large exhibit, including some electrical displays. On Tuesday evening, June 25th, a public meeting was held to which everyone was invited. The speakers at this were Dr. J. W. S. McCullough, Chief Officer of Health for Ontario, who spoke on "Public Health," and Miss Ethel M. Chapman of *The Farmer's Magazine*, who spoke on "The Child in the Community." A playlet and drill were put on by the school children. The Board of Health showed a few reels of moving pictures relating to health matters.

ONE OF THE EFFECTS

One of the by-products of the Child Welfare week is the interest that has been aroused in the matter of the local milk supply. I had previously taken samples of the milk delivered in the town, and was surprised to find that, with one exception, every sample was below the standard in butter-fat and total solids, and contained *colon bacilli*. At different times I had made an attempt to interest some of the council in a better milk by-law, but they thought the milk supply was quite satisfactory, and now assurance is given that a by-law will be passed immediately. Much interest has been awakened in the whole matter of health, and it is hoped to establish in Brampton a public health nurse whose business it will be to visit all the homes.

AGRICULTURAL REPRESENTATIVE ACTIVITIES

THIRTY-SEVEN members of the Shorthorn Cattle Breeders Club organized in Bruce county, Ontario, by the Agricultural Representative recently, made an excursion, when they visited seven prominent herds in adjoining counties.

The Agricultural Representative in Lanark county, Ontario, in co-operation with the Local Production League, prepared forty gallons each of blue stone and milk of lime for the use of potato growers in the town of Perth. These ingredients are kept at proper strength at the office of the Agricultural Representative. The townspeople who wish to spray their potatoes were allowed to obtain their Bordeaux mixture free.

A COUNTY WINTER FAIR

The Agricultural Representative in Lambton county has brought about a plan whereby the Lambton Corn Grower's Association, the Lambton Pure-bred Live Stock Breeders' Association, and the Lambton Poultry Association will unite to hold their respective shows all during one week. While the executives of the associations will work independently of each other, the programme will be arranged to make a successful county winter fair. The dates set for the three shows are the first Wednes-

day, Thursday, and Friday of February, 1919.

A COMPETITION PICNIC

The West Wellington Board of Agriculture held a picnic on June 15th, the special features of which were stock-judging contests for boys of fourteen and under and boys between fourteen and eighteen. Twenty boys in all took part. Ten boys participated in a potato-judging contest. A girls' knitting contest followed, fifty per cent of the awarded points being given for speed, 25% for the way the needles were handled, and 25% for the completed work. The picnic was held at Moorefield, where there is a girls' knitting club. These girls had a booth at the picnic and took in $33, which is to be spent in yarn to be used in knitting socks for the soldiers. Mr. R. H. Clemens, the Agricultural Representative, took an active interest in the picnic. Addresses were delivered by Professor Wade Toole of the Ontario Agricultural College and Mr. N. Keith, director of the Y.M.C.A.

CONFERENCE AT GUELPH

During the whole week commencing July 15th, there was held at the Ontario Agricultural College a conference of Agricultural Representatives. Almost every Representative was present during the entire week. The object of the conference was to enable the Representatives to exchange ideas and relate experiences in connection with the various activities that engage their attention, and to listen to federal and provincial officers and others who dealt with important departmental work of special interest to farmers in the present crisis. Much of the time was occupied with considering questions that concern the Representatives in their work. Other subjects taken up were "The Soil Survey", "Wool Grading", "Stallion Enrolment", "The Feed Situation", "Farm Labour", "Co-operative Associations", "The Potato Seed Trade", etc. The conference concluded with an examination of potato plots that had been planted with seed from local, imported, and diseased stock on the College farm, and a visit to, and inspection of, the Horticultural Experiment Station at Vineland. The Hon. Geo. S. Henry, Minister of Agriculture, attended several of the sessions and addressed the conference.

MANITOBA

CONFERENCE OF EXHIBITION AND COMPETITION JUDGES

BY GEORGE BATHO, EDITOR OF AGRICULTURAL PUBLICATIONS

ON June 27th and 28th, a conference of forty judges who will officiate at agricultural society fairs and field contests, was held at Manitoba Agricultural College. Prof. T. J. Harrison, the secretary of the conference, had prepared the following report of the findings:

LIVE STOCK CLASSES

PROPER CLASSIFICATION

It was decided that the judge should classify animals with which the exhibitor was in doubt as to the proper classification at a stated time in the judging ring before the actual judging started. As there seemed to be some confusion in regard to classes, a committee was appointed to go into the matter of classification of live stock and report to the Superintendent of Extension Service, this report to be taken up at the Agricultural Societies' Convention in February.

UNSOUNDNESS IN THE HORSE

It was decided to consider in all breeding stock all hereditary unsoundness, such as bone spavin, ring bone, periodic opthalmia, and roaring. Any breeding animal being afflicted with any of these unsoundnesses should not be placed over a sound animal, even of much lesser merit, and, in the larger

shows, all breeding animals with these unsoundnesses should be turned out of the ring.

SIDE BONE

It was decided that in breeding stock a sound horse with a contracted hoof head should often be placed below a horse with a large, open hoof head and small side bone.

All unsoundnesses in utility horses should be considered, including the hereditary unsoundnesses mentioned above, the side bone, bog, curb, navicular disease, etc. A utility horse with any of these unsoundnesses should not be placed over a sound horse. In light horses, this is even more important than in the heavy classses.

SHOULD THE JUDGE GIVE REASONS FOR HIS PLACING

It was realized that it is difficult for the judge to give reasons for his placing, but it was decided that it should be done when asked for, after the consent of the exhibitor had been secured.

CLASSIFICATION OF HEAVY HORSES

In the classification of draft horses, type and weight are to be the deciding factors, the type to be of more importance than the weight. The minimum draft weight should be 1,600 lb., the condition of the horse to be considered. In judging draft and agricultural horses, especially in pure-bred classes, more attention should be paid to weight, depth of body, and strength of constitution than in the past. The placement of legs must have more consideration; for example, the closeness of hocks must not be sacrificed for having the legs placed squarely under the body. Length and slope of pastern are not to be essential in the hind legs, but very necessary in the front legs; the collar seat also to have more consideration than in the past.

In judging stallion classes, a coarse head is to be more desired than the feminine head; the opposite to be the standard with brood mares.

DAIRY COWS

Place all breeds of dairy cattle according to the standards of an ideal dairy cow, paying some attention to breed characteristics. All should have general angular appearance, sharp shoulders, width of constitution, deep middle, an udder well attached, long and deep, but not pendulous or meaty. Milk veins to be numerous and large, the number more important than the size; symmetry of type then to be given consideration.

SUMMERFALLOW COMPETITIONS

WEEDS

Four worst weeds to be considered: Quack grass, perennial sow thistle, Canada thistle, and wild oats. Cut ten points if the smallest patch of either of the first two can be found, eight points for the smallest patch of the other two. In regard to weed seeds, it is only possible to detect wild oats in the soil. Where ungerminated wild oat seeds are found, the cut should be severe.

MOISTURE

There are two methods of determining moisture in the soil, by sight and feeling, the general method being to bore down to a depth of two feet with an auger and test the amount of moisture by squeezing a handful of the soil, noting the colour, the cool feeling, and its ability to stand up. The determination of the surface soil moisture can be made by using a shovel. Fifteen points out of twenty-five might be allowed for the surface moisture and ten points for the sub-surface moisture. Different districts have different moisture problems. A judge will have to decide his basis for scoring according to the district.

AVAILABLE PLANT FOOD

It was decided there was no way of determining the amount of available plant food. Therefore, it should be struck out of the score card.

WELL PREPARED SEED BED

The seed bed should be level, fine, firm, moist and deep.

MEANS OF PREVENTING DRIFTING

The presence of fibre, corrugated surface, lumpy mulch, straw, manure and cover crops. The presence of sufficient of the first or last three to entitle a man to a full score, the others to be about one-half to three-quarters.

A committee was appointed to work out a score card, as it was felt the old score card was not satisfactory. The following was the score card adopted:—

SCORE CARD FOR SUMMERFALLOW COMPETITIONS

	Points
Freedom from harmful weeds, ungerminated weed seeds, and live roots	30
Moisture in top two feet of soil	15
Well-prepared seed bed—level, fine, firm, moist and deep	15
Means of preventing drifting, fibre, corrugated surface, lumpy mulch, top dressing of straw or manure, and cover crops	20
Feed or pasture produced on land	10
Headlands and field corners clean, strike outs and dead furrows free from weeds, and not two high or deep	10
Total	100

WEED VALUES

In standing crop competitions, it was decided to have a statement of weed values. It was felt that the scoring which is used in judging at seed fairs might well be used in judging standing crop competitions.

ELECTRIFICATION OF SEED

BY J. B. REYNOLDS, M.A., PRESIDENT MANITOBA AGRICULTURAL COLLEGE

THE Departments of Field Husbandry and Physics have been working on the problem of the influence of the electrification of seeds upon their germination and the subsequent growth. A treatment is now under way which is being run in three sections, each section dealing with a separate crop, the first being wheat, the second alfalfa, and the third mangles. The treatment in so far as it relates to germination is carried out in triplicate in a cloth germinator and in soil. That is to say, triplicate samples of one hundred seeds each from each treatment are taken and germinated in a cloth germinator while the same number of samples and seeds in each case is taken and germinated in soil under pot culture.

SASKATCHEWAN

QUESTIONABLE GAMES AT EXHIBITIONS

THE Director of Agricultural Extension has drawn the attention of the agricultural society officials in the province to the revised regulations governing the payment of Government grants. Under these regulations, no society which permits the operation of questionable games in connection with any of its activities will be paid the grant which it would otherwise receive. Further than this, it is pointed out that no grant will be paid to any society located in any town in the province where games of a questionable nature are allowed to operate at the time of the annual exhibition.

ALBERTA

RETURNED SOLDIERS' COURSE AT OLDS

BY W. J. ELLIOTT, B.S.A., PRINCIPAL SCHOOL OF AGRICULTURE

THE course put on here for returned soldiers last year was made as practical as possible for those taking it. It is apparent that the returned soldiers who were desirous of securing information that would help them on their farms at once would have little time to devote to the sciences pertaining to agriculture. For this reason we put on a course that would be of interest to men on the land. This kind of a course was also made necessary because of the fact that the soldiers had such a short time in which to secure this information.

In April last year the returned soldiers began to arrive, and our first work was the preparation of the gardens, the setting of hundreds of eggs, and in a general way getting ready for the spring work. Each soldier was given a particular plot of ground of his own, and was held responsible for it. In addition to this, the group of soldiers had an acre of potatoes in common. Needless to say the interest was keen among the soldiers taking the work, and this interest continued during the summer.

In the fall another group of soldiers entered the institution, and, while the work in the plots of the practical nature was impossible during the winter, yet a course was put on dealing with the feeding and care of live stock, the study of soils and crops, the study of gasolene engines, and also some light blacksmithing and carpentry work. The course was evidently appreciated by many of the soldiers, as we have received letters from them expressing their appreciation of it.

VETERANS WHO ARE TAKING A COURSE IN AGRICULTURE AT OLDS, ALTA.

BRITISH COLUMBIA

SEED PRODUCTION COMPETITION

THE Provincial Department of Agriculture has made provision for provincial seed production competitions, at which prizes of $15, $10, and $5 will be offered for the following: One acre each for seed of wheat, oats, barley, clover, alfalfa, vetch, rye, corn, and field peas; half an acre each of potatoes, garden peas, beans (dwarf), and rape; a quarter of an acre each of mangels, turnips, carrots, garden beets, radish, onions, kale, and parsnips; one eighth of an acre each of cabbage and lettuce.

The rules and regulations provide that any member of a farmers' institute may compete; that plots entered for competition must be clearly defined and marked with stakes, and that when a competition is conducted with crops which mix readily, or where there is a danger of cross pollination, preference shall be given to plots devoted to single varieties.

INCREASED PRODUCTION ACTIVITIES

BY W. T. McDONALD, B.S.A., ACTING DEPUTY MINISTER OF AGRICULTURE

IN the July number of THE AGRICULTURAL GAZETTE, on page 680, there appeared a general statement respecting the activities in this Department to increase production. The following statement provides fuller information as to the special lines being carried out this year:—

1. Fifty thousand dollars has been used in the distribution of first-class seed grain, which has been sold to farmers in various parts of the province and their notes taken in payment. This work will be continued during the fall as applied to seed wheat.

2. Special field men have been at work to encourage greater production, especially along the lines of hog-raising and dairying.

3. Assistance is being given to fruit and vegetable canning clubs.

4. The Government purposes taking over certain land settlement areas which have been held by land speculators, and placing these lands on the market on terms and conditions that will be attractive to settlers.

5. Special efforts are being made to encourage seed production for which various portions of British Columbia are especially adapted.

FLOWER SHOWS CONDUCTED BY WOMEN'S INSTITUTES

BY WM. J. BONAVIA, SECRETARY, DEPARTMENT OF AGRICULTURE

TO encourage the holding of flower shows by women's institutes throughout the province, the Department of Agriculture is providing grants to be used for prizes and other expenditures. Both money and book prizes will be granted as follows:—

(1) A per capita grant of 25c. in addition to the grant given under the terms of the Agricultural Act, 1915, will be made to institutes holding a flower show, or an exhibition of women's work, or a combined flower show and such exhibition.

(2) Book prizes will also be offered by the department for competition at such shows for collections of bulbs, sweet peas, roses, dahlias, perennials, or other varieties of flowers, as may be decided upon by the institute. The prizes will be as follows:—Adults; 1st and 2nd prizes; juveniles, 1st, 2nd, and 3rd prizes.

The Department recommends that in the case of adults, no prizes should be awarded where there are less than three entries, and no second prize where less than four entries. In the case of juveniles, no prize should be given where there are less than two entries, no second prize with less than three entries, and no third prize with less than four entries.

The purposes of consolidation are as follows:

1. To give high school advantages to rural pupils.

2. To provide opportunity for rural pupils to receive instruction in domestic science, manual training, and agriculture.

3. To provide for departmental instruction and organized play that will lead to a better physical development of the school children.

4. To meet community needs by providing an auditorium for community gatherings and community activities.—*J. C. Muerman, U. S. Bureau of Education.*

PART III

Junior Agriculture

DEMONSTRATIONS, COMPETITIONS, AND CLASS-ROOM STUDIES IN RURAL LIFE FOR BOYS AND GIRLS

THE AGE LIMIT OF AGRICULTURAL COLLEGES

Recently the question has been raised as to the advisability—in view of the depletion of the number of students in consequence of the war—of lowering the age of admission to the colleges and schools of agriculture. In several instances the matter has not as yet been taken into consideration, but the subject, it will be seen by the following notes, has engaged the attention, among other institutions, of the Manitoba College of Agriculture, the Oka Agricultural Institure, and the School of Agriculture at Ste. Anne de la Pocatière:

STE. ANNE DE LA POCATIERE

BY REV. NOEL PELLETIER, PRINCIPAL

ON account of the present situation, it has been decided and announced that for the duration of the war, boys of 14 years of age shall be admitted to the courses of the school of agriculture.

OKA AGRICULTURAL INSTITUTE

BY FR. JEAN DE LA CROIX

HERETOFORE, no student under 17 years of age was admitted at our regular course, but as the number of our students will probably be reduced by the new military law, which takes young men of 19 years of age, it has been decided to take this fall young men of 15 years for the regular course and of 14 years for the practical course of two years.

MANITOBA AGRICULTURAL COLLEGE

BY J. B. REYNOLDS, M.A., PRESIDENT

IT has been decided this year to open a special class to accommodate fifty junior students of the ages of fourteen and fifteen years. This class will enter at the same time as the regular students on September 22nd, and the course will close at the same time, March 29th. This class will have the opportunity of taking the regular first year work or selecting special subjects. As an inducement to any student re-entering the college this autumn, a reduction of $5.00 on account of tuition will be granted for every new student, either junior or regular, whom he or she induces to take a winter course.

NOVA SCOTIA

RURAL SCIENCE SUMMER SCHOOLS

THE rural science summer school at Truro, N.S., opened on July 10th with an attendance of 130 and will continue until August 8th. Extra classes are being given this year in canning and milk testing. Two sessions of the class are held during the year. the first opening about the first of May and the second early in July. The subjects include agriculture, horticulture, meteorology, chemistry, biology, plant diseases, entomology, nature study, geology and minerals, wood-work, birds, botany, and physics.

QUEBEC

SUMMER COURSE IN AGRICULTURE FOR BOYS

BY REV. NOEL PELLETIER, DIRECTOR, SCHOOL OF AGRICULTURE, STE. ANNE DE LA POCATIERE

A number of citizens realizing the seriousness of the situation have asked if it would be possible to have their boys trained in farm work, so that they may work on the farm during their holidays, should the war last some years yet. In order to meet this request, the Ecole d'Agriculture de Ste. Ann de la Pocatiére has decided to open a special course, and has made special arrangements to receive during the summer months pupils of classical and commercial colleges and, in a general way, farmers' sons.

Such course started on the 1st of July and will continue until the end of August as follows:

1st to 15th July	Botany	M. Bouchard.
15th to 25th "	Arboriculture and Bee-keeping	Rev. Levasseur.
25th July to 10th Aug	Horticulture	Rev. Létourneau.
10th " to 20th "	Agriculture	Rev. Bois.
20th Aug. to 31st "	Live Stock	Mr. Pasquet.

These courses include class and practical work. Pupils spend their spare time after the daily lectures and hours of study at work on the farm under the direction of the chiefs of the department and of professors.

College students are accepted from 12 to 19 years of age for $6 a month, laundry included.

Several subjects will be taught by means of lantern slides in order to appeal to the eye as well as to the mind, as things that are seen are better understood and remembered.

ONTARIO

MANUAL TRAINING AND HOUSEHOLD SCIENCE IN RURAL SCHOOLS

BY A. H. LEAKE, INSPECTOR OF MANUAL TRAINING AND HOUSEHOLD SCIENCE, DEPARTMENT OF EDUCATION

THERE are ninety manual training centres, and eighty household science centres, in the urban schools of the province. Each of the teachers at these centres instructs from two hundred to three hundred pupils from grades 5, 6, 7, and 8, per week, in varying from one and one half to two and one half hours. The curriculum provides, for the lower grades, lessons in handwork with various materials such as paper, cardboard, clay, raffia, etc. To assist in the establishment and maintenance of these schools liberal grants are given by the Department of Education.

Owing to various difficulties, the attention of the Department was, until the opening of the schools in September last, concentrated on the introduction of these practical subjects into the schools of towns and cities. The rural schools felt that their limited resources and accommodations made it impossible to provide for these subjects.

The Department, however, thinks that the rural schools constitute one of the most urgent educational problems of the province, and, seeing that forty-five per cent of the school population is enrolled in the rural schools, it is convinced that the rural schools should have, as far as it is possible to give them, the advantages of town and city schools.

PRACTICAL EFFORTS AT IMPROVEMENT

In order to promote the introduction of practical subjects, such as manual training and household science, into the rural schools, successful attempts have been made to remove the difficulties that existed. Substantial grants are now offered to assist school boards to purchase equipment, and equipments have been designed that take up but little space in the one-room school.

To assist teachers in this work, a manual, now in the hands of the printer, is being issued. It consists of twenty lessons in the care of the home, twenty lessons in sewing, and twenty lessons in cooking, and, in addition, contains chapters on household science without special equipment, and on the organization and management of the school lunch. Photographs and working drawings are given of the necessary equipment. It has been the aim to make this manual intensely practical, and nothing has been included that is not feasible in the average rural school.

For the past two years the instructions given in the normal schools has stressed the rural application of this work, and this year the summer schools in manual training and household science will devote their attention very largely to the requirements and possibilities of the rural schools.

ESPECIALLY FOR GIRLS

Owing to the necessity for the conservation of food and careful household management at the present time, the work for girls has received the greater attention.

The equipment that has been designed consists of a cabinet which contains a two or three-flame burner oil stove of the most improved pattern, and some of the larger cooking utensils, and a cupboard containing

cups, saucers, bowls, and other serving dishes. The cabinet takes up a floor space of only four and a half feet by two feet, and the cupboard measures three feet by one foot three inches by four feet two inches. Another self-contained equipment only occupies a space of five feet by two feet seven inches by one foot eight inches. These equipments vary in cost from $40 to $75, according to the number and quality of the utensils they contain.

They can be provided almost entirely from the Government grant. When not in use all the utensils are covered, and in their designing the possibilities of the country school and the requirements of the rural home have been kept constantly in view.

In urban schools the children are able to go home to lunch, but in a large number of country schools this is not the case, and in many of them the composition of the lunch, and the conditions under which it is eaten, are conducive neither to sound physical development nor to effective mental work in the afternoon.

In the United States it was found that the percentage of physical defectives, as disclosed by the draft, was seven per cent higher from rural districts than from towns and cities. This may be attributable in part at least to the conditions under which the noon-day lunch is eaten. No statistics are available for Canada, but it is probable that somewhat the same conditions exist in our own province.

THE SCHOOL LUNCH

The average rural school lunch is wrapped in newspaper and packed in a tin box, or pushed in the pocket. It often tastes of the tin, and is flavoured with printer's ink, and, in addition, in the winter time it is badly frozen before the time arrives for its consumption. In winter, the pupils crowd around the stove to eat their lunches, and in summer they are often to be seen chasing around the yard with a dry sandwich in one hand, a stick in the other.

In order to remedy such conditions, the provision of one hot dish, such as a bowl of soup or a cup of cocoa, to suppiement the cold box lunch, is advocated. This is not only a good thing in itself, but it affords an introduction to more formal lessons in household science. (The grants offered by the Department provide in a large measure the supplies necessary. In some cases the trustees contribute, and, in others, supplies are provided by the pupils.) It is not a difficult matter for the rural school child to bring a tomato, a potato, or an egg, and these contributions are combined. When properly organized, the lunch can be prepared without any appreciable loss of school time. The older girls, and boys too, take a delight in doing this work, and get some useful training while doing it. Where the school possesses a large table, it can be set, and the lunch eaten in an orderly manner, or each desk may be set as one unit at a table. In this way the lessons in manners may be given a decidedly practical turn. Lessons are also given on what the lunch box should contain, and the proper method of packing in order that it may have an attractive appearance, and thus appeal to the appetite.

In Saskatchewan, where this movement has been in existence for some time, there are 150 schools where the hot dish is served at noon, and the unanimous opinion of teachers, parents, and inspectors alike, is that the health of the children is improved, and that the afternoon work is made more effective. We have in Ontario at present 20 schools where this work is in progress, and in September many more will be started.

HOUSEHOLD SCIENCE LESSONS

Formal lessons in household science are generally given from three to four-thirty in the afternoon. In this

way only one hour of the usual school time is taken, and it is found that the girls are perfectly willing to remain in school the extra time. The instruction given is kept closely to the needs of the home. Economy, conservation, prevention of waste, and the use of left overs, are urged. The pupils are encouraged to practise at home the work they do in the school. The co-operation of the parents is sought; their advice is asked as to the kind of work to be undertaken, and the connection between the home and the school kept as close as possible. The girls often give practical demonstrations of the work they are able to do by serving refreshments at social functions and meetings of the parents held at the school.

The household science does not consist of cooking only, but also includes lessons in cleaning, general household management, and sewing. The sewing is taught from the lowest grades, and for the older girls consists in the making and repairing of simple garments.

The immediate object aimed at is to instal this work in at least six schools in each inspectorate. These schools will then serve as object lessons, and from them the work should spread throughout the country.

ESPECIALLY FOR BOYS

Manual training for boys consists in teaching simple mechanical drawing, and of the use of tools in making articles for the farm and the farm home, such as feed troughs, hen coops, chicken houses, dog kennels, hen roosts, gates, milk stools, wall shelves, hat racks, foot stools, benches, towel rollers, etc. Mending, repairing, and the preservation of farm implements also receive attention. Locks are repaired, latches are mended, broken harness put into workable shape. The importance of keeping the material equipment of the farm in thorough working order is stressed, and all the work is connected with the requirements of actual life. A new scheme of grants in aid of this work has recently been devised, and it is hoped that they will lead to a rapid extension of the subject throughout the schools. A manual, well illustrated by drawings and photographs, will be prepared, giving full instructions to teachers regarding organization and methods of work, and this, it is hoped, will remove some of the natural hesitation now felt by teachers to take up this work.

Education of this type is both cultural and practical. It not only prepares for work on the farm and in the farm home, but vitalizes the curriculum, and lays the foundation for higher industrial and technical education. The inspector will give all the help possible to schools desiring to introduce these practical subjects, and is available at all times to confer with trustees and teachers, and to address organizations anxious to promote the introduction of these subjects and to make them directly applicable to the peculiar conditions of particuliar schools.

LENNOX AND ADDINGTON COUNTIES PIG CLUB

MR. G. B. Curran, Agricultural Representative in Lennox and Addington counties has introduced the pig club idea into his "Greater Hog Production" campaign. Fifty members have already been enrolled, and each supplied with two young pigs, one a pure-bred Yorkshire sow and the other a grade of either sex. The pairs of pigs are supplied at from six to eight weeks old for twenty dollars a pair. The pure-

bred sow is registered for the member. The Merchants Bank is supplying the money to purchase the pigs at six per cent interest on the note of the boys and girls, endorsed by their parents. At each township fair competitions will be held between pigs raised in the township. It is intended also to hold a county exhibition in which club pigs will compete in a general class.

THE RULES OF THE CLUB

Following are the rules that govern the operations of the club:

1. Any boy or girl between the ages of 10 and 18 may become a member.

2. Each applicant will receive two pigs. The pure-bred Yorkshire Gilt must be retained for brooding purposes. The grade pig is to be sold before December 1st and the money used to pay the loan at the Merchant's Bank.

3. The child's parents must agree to furnish a suitable pig-pen and yard and to supply the child with a sufficient quantity of suitable foods to bring the pair of pigs to maturity.

4. Each member must care for his stock in person, and keep a record of the feed given and the pasture grazed. Where possible a record of the weight of each pig should be kept, weight when received, and at stated intervals, so as to determine the gains. Suitable forms will be supplied.

5. Each member, must, wherever possible, show at least one pig at the school fair, and it is expected the pigs will also be shown at township fairs and at a county pig fair at Napanee.

6. The members of the club must agree to study the instructions issued by the Ontario Department of Agriculture.

7. Each member must furnish the bank with a final report of the season's work, which will include the amount of food consumed, the gains in weight, cost of gain per pound, methods of handling and management.

8. The basis of awards will be:—

Class 1: Feeding and raising.

(a) 50 points for the highest net profit per cwt.

(b) 25 points for type and finish, this being done with the bacon hog score card.

(c) 25 points for the best kept records and most comprehensive report.

Class 2: Exhibition.

Best registered Yorkshire Gilt.

SASKATCHEWAN

BOYS' AND GIRLS' CLUB WORK

MR. John G. Rayner, Director of Boys' and Girls' Clubs in connection with the Extension Department of the Saskatchewan College of Agriculture, in an address before the Homemakers' convention held from June 25th to 28th, 1918, sketched the history of the movement. He said it was a very encouraging feature that the movement had resulted in obtaining the consent of the banks to lend money to boys and girls to purchase contest supplies. He referred to the fact that the editor of an agricultural journal in the United States had lent one quarter of a million dollars to boys and girls on the only condition that the borrowers should join one of the state clubs. In no case, Mr Rayner said, had borrowers failed to fulfil their financial obligations.

Turning to the progress of the movement in Sastakchewan, after referring to his own appointment as Director of Boys' and Girls' Clubs work in Saskatchewan, Mr Rayner said:—

No definite constitution, or set of rules and regulations, was formulated for the guidance of the work this year, in-as-much as it was thought that the work was of such importance that time should be taken to study the movement in other provinces, and to profit by the experience gained there before deciding on a definite policy. However, every encouragement was given any organization expressing a desire to carry on club work. The contests given special encouragement were pig and poultry raising and potato growing. These were specially

emphasized, for the reason that pork products were in urgent demand for military purposes; that poultry could be used as a substitute for the pork at home, as well as having many other virtues, and that potatoes are one of the most popular and nutritious vegetables that can be grown. Leaflets on the raising of each of these crops had been prepared and distributed to all points putting on contests, report forms for use with the same contests being also supplied.

Mr. Rayner referred to the call of the times, and suggested that if we did not pay for this war in lives and money in this generation, the children would have to pay for it in lives and money in the next, and with compound interest. "Why not give them, then," he said, "the organized opportunity now to help pay for the war, and in terms of the healthful employment of their abundant energy and enthusiasm, through the organization of club contests that will contribute something toward the war need. They can assist in two ways: first by increasing production through such projects as pig and poultry raising, grain growing, and gardening, and, secondly, they can conserve what is produced by canning. Hundreds of tons of good fruit and vegetables go to waste every year which might easily be saved by canning." He thought these two great avenues of service could not be too strongly emphasized, and went on to say:—

Apart from this important service, the educational value of the work is something of permanent worth, and we must not let the immediate war demands obscure the fact that the broad and ultimate object of this work is educational—is fitting our young people to live well rounded, efficient lives, in peace times as well as in times of war. This work is based on a principle of great educational worth. It is this—the elevation of the common duties of life, and farm life in particular, from drudgery to the dignity of craftsmanship. It does this because it provides for the free and natural expression of the inborn desires of the boy or girl. Such desires as the joy of ownership, the passion for creating something, the competitive instinct, the craving for responsibility, etc., briefly to own something, to compete with others in taking care of it, and bringing it as near perfection as possible, and to anticipate the fruits of this care and responsibilitiy and ownership. The point is often raised that the boys and girls on the farm have already too much to do, and do not in any case enjoy feeding pigs, chickens, hoeing potatoes, etc. This is because all the environment surrounding such work makes it a matter of drudgery. But introduce the elements already mentioned, and immediately the whole aspect is changed. Wherever these contests have been organized and animated by right motives, the children have rejoiced in their opportunities. One woman writes: 'There is no power on earth that can prevent my soul from holding converse with the angels, even though with my hands I feed the pigs'. We hear much about patriotism these days, but the only way to develop true patriotism in the youth of our land is to provide such an environment that they will enjoy and love and revere the life they are permitted to live in the country where they make their home.

"The union of Danish bacon factories averted a strike which threatened to stop the shipping between the Danish port of Esbjerg and Harwich, by which route most of the Danish bacon was shipped to England, as the dock labourers at Esbjerg intended to assist the stokers who stood out for higher wages by refusing to load the ships. The union arranged so that a sufficient number of co-operators from slaughter houses and dairies were ready to undertake the loading themselves, and when the dock labourers saw this they refused to go on strike."—*"Co-operation in Danish Agriculture", by Harold Faber.*

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications, and Notes

GREATER PRODUCTION ON INDIAN RESERVES

SUPPLIED BY DEPARTMENT OF INDIAN AFFAIRS

The Department of Indian Affairs has during the past few seasons been making a special effort to increase production on Indian reserves, and this policy has, on the whole, been very successful. During the present season the Department's greater production campaign has been even more vigorous and thorough than in the preceding years, and results of a substantial character are expected. The Department has given explicit and urgent instructions to its officers in all parts of the Dominion with regard to this work, and the Indian Agents are actively engaged in giving instruction and encouragement in agriculture to the Indians under their charge.

It is the policy of the Department to assist the Indians in the purchase of their seed grain, and this year greater assistance than usual has been afforded in order that a larger amount of land on each reserve might be cultivated. Wherever it is practicable, land which cannot be worked by the Indians themselves, has been leased to whites.

ACTIVITIES IN ONTARIO

In Ontario, the Department has employed Mr. R. H. Abraham, a graduate of the Ontario Agricultural College, as field agent since 1915. This officer travels from one reserve to another instructing and encouraging the Indians. This method has so far proven very beneficial to the farming Indians of Ontario. Standing crop competitions in corn and oats, and vegetable garden contests are organized each year on many of the reserves under the supervision of the field agent. The crops of Indian oats in Ontario are exceptionally good. Meetings on greater production have been held on many of the reserves in the province. A production club was organized on the Six Nations reserve, the purpose of which was to discover the requirements of the farmers with regard to seed and help, the amount of unplanted land, and the remaining amount suitable for planting. This club has done excellent work in encouraging greater production on the reserve, and last year the Six Nation Indians had the largest crop in their history.

The work conducted at the Indian schools forms an important and interesting feature of the Department's agricultural policy. Reports received indicate that at all the boarding and industrial schools largely increased areas are being cultivated this year. Practically every Indian day school in Ontario is cultivating a school garden. In the other provinces also, wherever the land is suitable, and there is available ground around the school, gardens have been prepared. In addition to assisting the greater production campaign, these school gardens provide excellent training for the pupils, which should encourage them to engage in agriculture later in life. In many cases the activity of the children in gardening stimulates the older Indians to cultivate their land. The Department has sanctioned the hiring of all boys over fifteen years of age who are not required on the school farms, to farmers in the neighbourhood of the various schools, and a considerable amount of agricultural labour has in this way been released.

A COMMISSIONER APPOINTED

The most notable departure in connection with the Department's policy with regard to greater production in the western provinces in the present year has been the appointment of Mr. W. M. Graham, Inspector of Indian Agencies for the South Saskatchewan Inspectorate, as Commissioner for the provinces of Manitoba, Alberta and Saskatchewan. The new Commissioner's duties include the making of arrangements with Indians for the leasing of reserve land that may be needed for grazing, for cultivation or other purposes, and for the compensation to be paid

therefor; the formulation of a greater production policy for each reserve; the issuing of directions and instructions to inspectors, agents, and employees in furtherance of that policy; the making of necesary purchases and engagement or dismissal of any extra employees; the marketing of the yield of grain and live stock, &c., &c. The Commissioner has the sole management of this work, subject to the approval of the Superintendent General of Indian Affairs. This plan of organization is already giving every indication of success, and it is hoped that it will be the means of bringing large areas under cultivation, and the production of grain and meat supplies of great value. The following summary will give some idea of the work that is already being done under Mr. Graham's supervision:—

ALBERTA

Arrangements have been made to start two large farms on the Blackfoot reserve. One of these is located on the surrendered land south of the Bow river, and comprises about fifteen sections. The other is on that portion of the reserve that is situated north of the Bow river. This farm comprises three or four thousand acres of fine land. In addition to these two greater production farms, ten sections have been leased to whites for farming on this reserve at $5.00 per acre per annum, the applicants paying at the time of signing the lease one-tenth of the first year's rental, the balance to be paid in four equal annual instalments. Seven more sections have been spoken for at this figure, but initial payments have not yet been made. This will make a total rental so far of $54,000.

A greater production farm is being started on the Blood reserve. There are three large outfits working and five thousand acres broken. The Indians gave this land gratis. Fifty sections on this reserve have been leased for grazing. On this land will be raised and grazed 25,000 head of sheep and 2,000 head of cattle. In addition, there is a surrender of 9 sections of the reserve proper for five years. The land in question has been leased for approximately $28,000 per annum, which will leave a substantial surplus to meet expenses, so that the work can be carried on without any further assistance from the Government.

It is expected that 1,000 acres of new land will be put under cultivation by the Indians of the Edmonton agency. It is also intended to start a fourth farm in Northern Alberta, possibly in the Edmonton agency. In connection with this Alberta work, Mr. Graham has purchased seven large oil-pull engines capable of ploughing from twenty-two to twenty-eight acres a day, according to the nature of the soil. Competent engineers have been secured to run these engines.

In addition to the departmental farms, extensive arrangement was made to increase grain production by individual Indians. On the Blood and Blackfoot reserves about 4,000 acres have been ploughed by individual Indians.

SASKATCHEWAN

A greater production farm has been started on the Assiniboine agency to the south of Sintaluta. It is smaller than those in Muscowpetung and Crooked Lakes. Mr. Graham expects that 2,000 acres will be broken on this farm. Sixty brood sows have been placed on this agency. The Assiniboine Indians passed a resolution asking for $15,000 for steers and $3,000 for heifers.

A greater production farm has been started on the Crooked Lakes agency, north of Broadview. Around 5,000 acres have been broken on this farm. Sixty brood sows have also been placed on this agency. Temporary bunk-houses, cook-houses, blacksmith shops, and stables have been built.

A greater production farm has been started on the Muscowpetung reserve, which is sirtuated north of Peigan. A total approaching 5,000 acres has also been broken on this farm. Temporary bunk-houses, cook-houses and blacksmith shops and stables have been built.

The Indians of the Pasqua band requested authority to spend from their own funds $15,000 for steers for summer feeding and $10,000 on young heifers.

Six thousand acres have been leased for five years at the Touchwood agency at 20 cents per acre per annum. The Indians surrendered this land on condition that they received $500 at the time of signing the surrender and $500 at the expiration of the five years.

LIVE STOCK

Three hundred and eighty-four stockers and one hundred and fifty sows have been bought from the greater production funds. Thirty stockers and one hundred and nineteen heifers have been bought on account of the Indians themselves from their trust funds. The Commissioner is arranging for other purchases.

WHAT THE RURAL SCHOOL CAN DO

MRS. M. M. HOLMES AT UNITED FARM WOMEN'S CONVENTION, CALGARY, ALTA.

We speak of the rural school problem, but when we try to explain it we discover many problems which differ to such an extent in the various schools that one solution will not do for all. However, what has helped one will give a suggestion to others, since we are all working to the same end.

Let me tell you, then, what has been accomplished in one district, first, along the line of hot lunches. This is just a typical one-room school. You have seen them—with three windows on one side, three on the other, a hall at one end, a door leading outside, and—there you are.

From twenty to thirty children have been attending in grades one to nine, inclusive, their ages varying from six to sixteen. Each child brought a lunch. while the teacher's home was a five-minute walk from the building, where she could enjoy a hot dinner. This left the children alone during the noon hour and to know they were probably rushing around the room with a sandwich in one hand and a piece of cake in the other, devouring each in its turn, doing the whole thing in five minutes and having fifty-five more for all kinds of mischief, was bad enough; but the lunch itself, was worse. I do not mean to say the lunch brought from home was not good. It was. In most cases it was excellent. But lunches brought distances from one to five miles in the winter time are apt to be frozen.

In this school they were brought in and piled in their accustomed place—a shelf in the hall—where they remained frozen. Perhaps at recess they were brought in and put on the floor around the stove—an ordinary heater—and they usually remained frozen. Added to this was the fact that the only available drink was icy water, and I can safely say that, regardless of all laws of health, not much water was consumed.

A SERIOUS SITUATION

When you remember that to get to school in time a child has to get up while it is dark, and, in a good many cases, eat a hurried breakfast, not getting nearly enough for a growing child, then rush off to school; this, together with the cold lunch, makes the situation serious. At least, the teacher of this school looked at it this way and she decided to change matters. After talking over her plan with your secretary, Mrs. Barrett, who declared it feasible, she went to the school board with the request for a cupboard, a supply of cocoa, sugar, and enough cooking utensils to make the cocoa. This school board, when aroused to action, did things properly, and built a cupboard that a good many kitchens would be proud of. They also gave the teacher permission to buy the required articles.

To avoid antagonism in the parents, she proceeded cautiously, buying only a tea kettle, bowl, dishpan, enough white oilcloth to cover the desks, a number of cans of cocoa, and a bag of sugar. Each child brought a cup, saucer, and spoon, and took their turn in bringing milk. The girls in grades 5, 6 ,7 and 8 were taught to make cocoa, and at recess each day one girl, using the back desk covered with oilcloth for a table, would prepare enough cocoa to provide a cupful for each pupil present. This, when it had to be boiled on the school stove, was just ready at noon. Then one child would place an oilcloth on each desk, one would place cups, saucers, and spoons on the desks, one pass the cocoa and two more serve it. After the cocoa was poured, dishwater was put on to heat and, after lunch was finished two girls would wash dishes and put things in order. This went on during the months of that winter, but the next winter the teacher decided to have other hot dishes served, and, for the purpose of experimenting, she purchased the articles necessary to make different kinds of soup, and found they could be made at the school-house at a cost of about one cent a pupil, providing each pupil with a cupful. She approached the school board again, stating facts, and secured their permission to buy the material for the various hot dishes and to add to the cooking utensils, viz., a large stew kettle, a double boiler, a mixing spoon, soup ladle, can opener, a large knife, and a pan for draining dishes.

At a school fair held in the summer, the school earned a sum of money and out of this a two-burner oil stove was purchased for $8.00 and an oven for $4.50. The stove had been used a number of times and was gotten cheaper on that account. Both stove and oven could probably be bought for $15.00.

OPERATION OF THE PLAN

Under the new plan, the lunch was brought from home as usual, the hot dish being merely a supplement, making the rest more appetizing, and supplying that which had formerly been lacking. A number of dishes have been served. I will read to you a list of these soups: cream of pea, cream of tomato, corn soup, split pea soup, string bean soup, cream of cabbage soup, potato chowder, salt codfish chowder; rice and raisins, chocolate blanc mange, apple and tapioca pudding, and baked apples were also prepared. There are many other things which can be served at no greater cost.

The apples baked were brought by the pupils, wiped and cored and the cavities filled with sugar and cinnamon taken from the school cupboard.

To go back to the vegetables; the school of which I have been speaking is planning to raise enough vegetables next year to supply them the following winter for their lunches, and this is where the women of the district can give great assistance. The pupils and teachers can start the garden and care for it until vacation, when the pupils can care for it themselves. It is during vacation that peas and beans are ready to can, and some energetic woman can render two-fold service by having the girls at her home and teaching them how to can these vegetables. Then they are to be stored away, may be in a near-by cellar, and carried to school as they are needed. Some peas and beans could be allowed to ripen, picked and packed away by the children after school opens. Then, in a short time the corn is ready, and it can be canned, too, and after that the roots are ready to be dug, and if there is not some one near the school who would be willing to loan a corner of his cellar for them why couldn't provision be made for storing them at the school-house?

LESSONS THAT ARE LEARNED

There is much more to be gained by the use of a plan such as I have outlined than you would imagine. A school garden has a definite aim; seeds are planted and the plants are taken care of with more enthusiasm on the part of the pupils. Everything raised is saved to be used during the winter, thereby lessening the amount of canned goods consumed, and there we have an excellent lesson in thrift. Then, there is the preparing of the food; domestic science, if you like, and lastly, the good, hot, nourishing cup of hot soup. And that cup of soup works wonders; an orderly noon hour and an afternoon following in which the pupils can learn with greater ease are only two of the effects.

The work of the rural school is, to a certain extent, to prepare the pupils for high school, but what shall we do for those who cannot attend the higher schools? Beside the three r's, they need quantities of hand work, things that teach them to create other things. The rural school should fit them for farm life. The girls should be taught to decorate a house attractively, make their own clothes, and cook. Colour and harmony are taught in art. Sewing can be taught. If the teacher cannot sew, some woman, or may be several, would be willing to teach the girls, and domestic science may be correlated with school lunches.

I have proven to my satisfaction that there is ample time for such things without neglecting any of the subjects, and, best of all, you lose the old grind which was always so noticeable.

FEEDING GRAIN TO MILKING COWS WHILE ON PASTURE

The Board of Agriculture and Ministry of Food of Great Britain have laid down the rule that cows in milk, while on grass, shall receive no cencentrated food before the beginning of August. This rule is based on the result of experiments carried out at different stations in Great Britain which indicate that while on good pasture no benefit is secured by the feeding of a concentrated ration. Writing on this subject in the Macdonald College magazine an authority gives the following results on feeding grain to milking cows of different breeds while on pasture:

JERSEYS AND GUERNSEYS

Produced	20	pounds	of	milk	daily when fed 3	lb. grain.
"	25	"	"	"	4	"
"	30	"	"	"	5½	"
"	35	"	"	"	7	"
"	40	"	"	"	9	"

HOLSTEINS, AYRSHIRES AND SHORTHORNS

Produced	25	pounds	of	milk	daily when fed 3	lb. grain.
"	30	"	"	"	4	"
"	35	"	"	"	5½	"
"	40	"	"	"	7	"
"	50	"	"	"	9	"

It is thus shown that it required six extra pounds of grain to produce twenty-five extra pounds of milk.

CREDIT ASSOCIATIONS

The law governing credit associations in Denmark grants certain valuable privileges and lays down certain conditions for obtaining them. In order to obtain these privileges the law requires the following conditions to be fulfilled:

That before establishing an association borrowers must be registered for a joint amount of at least £55,500.

That no member shall be granted a loan exceeding three-fifths of the value of his property fixed by assessment according to certain rules.

That there must at no time be in circulation a larger amount of bonds issued by the association than the total amount of the members' mortgages deposited with the association.

That members shall be jointly and severally responsible for the bonds issued by the association to the extent of the full assessed value of their property, provided they have obtained a loan equal to three-fifths of that value; and in the same ratio to the amount borrowed, if this constitutes a lesser fraction of the assessed value.

That the members shall, besides interest on the loans, pay a suitable contribution towards the redemption of the bonds.

That bonds shall not be issued to a lesser amount than £5, and shall bear interest.

That the Board shall annually publish the balance sheet of the association, and shall each quarter send an abstract of the accounts to the Minister of the Interior.

That the by-laws shall be altered only with the sanction of the Minister.

"Co-operation in Danish Agriculture", by Harold Faber, published by Longmans, Green & Co.

THE MANAGEMENT OF SCHOOL GARDENS

School gardens should be conceived of educationally as the outdoor laboratory of the science curriculum. When incorporated as a part of elementary science and high school science, school gardening should be placed in charge of a director, especially qualified for that service, or in smaller cities in charge of one of the school officials, who has special interest or equipment in that line.

The teachers of school gardening should, for the most part, be regular grade teachers, especially where the departmental plan of teaching is employed. Then the garden work is programmed in the same way that cooking, shopwork, and physical training are programmed. In any departmental plan the teacher who is assigned to a department will very soon become an expert in that line. She will teach it in addition to other branches even better than the special teacher who may not be a regular member of a given school faculty. It is best that the teacher of elementary science have charge of the garden work wherever possible. Whenever extra vacation time is required for the teacher's service, a bonus salary should be paid to the garden teacher.

The other details of management will adjust themselves naturally out of this initial plan.—*Outdoor Education*, June, 1918.

ASSOCIATIONS AND SOCIETIES

THE PROPOSED INTERNATIONAL LIVE STOCK SHOW

A further meeting of the organization committee of the proposed International Live Stock Show for Canada was held in Toronto on June 11th. Plans were submitted for proposed buildings to accommodate 800 beef cattle, 1,000 swine, 700 horses, 1,000 sheep, 600 dairy cattle, and 10,000 poultry, with a space of 175 feet by 250 feet for seeds, and another space 150 feet by 200 feet for dairy products. After discussion, in which it was suggested that the judging arena should be 106 feet by 220 feet, and that seating accommodation should be provided for 10,000 people, a sub-committee was agreed upon of representatives of the different breeds to report upon the matters of buildings and finances. The sub-committee is as follows: Heavy horses, E. C. H. Tisdale, Beaverton; light horses, George Pepper, Toronto; beef cattle, L. O. Clifford, Oshawa; dairy cattle, D. C. Flatt, Hamilton; dairy products, F. Herns, London; swine, J. E. Brethour, Burford; sheep, Jas. Douglas, Caledonia; seeds, W. J. Lennox, Toronto; along with the chairman, Mr. W. A. Dryden, Brooklin, the vice-chairman, Mr. W. W. Ballantyne, Stratford, and the Secretary, Professor G. E. Day, Guelph.

CANADIAN COUNCIL OF AGRICULTURE

At a meeting of the Canadian Council of Agriculture held in Winnipeg, Man., July 8, Mr. Norman P. Lambert, of Winnipeg, was appointed permanent secretary in succession to Mr. R. Mackenzie, resigned.

BRITISH COLUMBIA WOMEN'S INSTITUTES

The Secretary of the Agricultural Department of British Columbia in his annual report regarding Women's Institutes, states that only one institute was organized during 1917. In 1915 there were 56 institutes with a membership of 2,994; in 1916, 60 institutes with a membership of 3,039; in 1917, 61 institutes wirh a membership of 2,754. Extraordinary efforts had been made by the institutes during the past year to raise funds for patriotic purposes. The total value of cash contributions exceeded $16,000, while some 21,000 articles were sent overseas. The average membership of the institutes was 45 as against 51 in 1916. Forty-one institutes held flower-shows as compared with 43 in 1916. The average cost of the institute had risen to $148.17 as against $104.28 the previous year, the total actual expenditure on the work for the calendar year for 1917 having been $8,742.03. The vote of $7,500 for Women's Institutes for the fiscal year ending March 21st, 1918, had been granted. A "Better Babies" contest was held in Victoria on August 1st and the usual programme and essay competitions were also held during the year. Prizes were given for the best average attendance at meetings.

NOVA SCOTIA DAIRYMEN'S ASSOCIATION BUTTER COMPETITION

The Dairymen's Association of Nova Scotia is conducting a butter competition for prizes to the total value of four hundred and ninety dollars. The rules and regulations require that all exhibits must be the production of the exhibitor; that creameries may compete under their own names; that the scale of points shall be: flavour, 45; body, grain, and texture, 25; colour, 15; salting, 10, and finish, 5; that three judges shall be engaged, and that in the case of two scores being equal the award shall be given to the highest in flavour; that no brand or other distinguishing mark will be allowed. A fourteen-pound box is to be shipped, as directed by telegram from the secretary of the association during each of the months of June, July, August, September, and October, and to arrive in Halifax within seventy-two hours after the telegram is despatched from Truro. It is recommended that the butter be salted at the rate of three quarters of an ounce to the pound. After the judging, the butter is to be disposed of in the best possible way.

CONVENTION OF QUEBEC HOMEMAKERS' CLUBS

At the annual convention of the Quebec Homemakers' Clubs held at Macdonald College June 12th and 13th, Mrs. N. Cameron Macfarlane, Demonstrator for Women's clubs, reported that there were now 37 homemakers' clubs in the province, with a membership of 750, and that their Red Cross work amounted in value to well over $4,000. The year of 1917-18 had been one of marked activity and progress for the clubs. The members were exerting every effort to do their share of the necessary war work, to become thoroughly acquainted with food and food preparation, sanitation, medical inspection, household financing, the school lunch and the better management of work in order to save time and energy. The studies with respect to foods had been well supplemented with practical demonstrations, that on canning being especially appreciated. The secretaries of the clubs had been placed on the mailing list of the Canada Food Board. Forty practical demonstrations on the making of meat and wheat substitutes were given to the Quebec Homemakers' clubs and other organizations by Miss Babb, Assistant Demonstrator. This year the club had planned a gardening campaign.

School fair work received more than its usual share of attention, many of the clubs assisting with the prize list and doing a great deal to encourage children to exhibit. The Macdonald College demonstrators for rural schools gave nearly four months of their time to this work. Sixty-eight practical demonstrations on bread making, cake making, and canning were given in the schools at various centres throughout the province. The work in Pontiac county had increased so rapidly that the demonstrators had had to encroach on time that should have been otherwise occupied. The total number of demonstrations and addresses given by the Household Science Extension Department to the clubs and schools was 140, by other members of the

staff of the school of Household Science, 5, and by the School of Agriculture, 2.

The travelling libraries, established in October, 1914, had been called in and checked over. No books were missing and no damage done beyond that resulting from ordinary wear and tear. The library records showed that 520 books had been loaned to members. The libraries contained standard works on household science. The clubs at Stark's Corners and Wyman are starting libraries on their own account. The report suggested that increased efforts should be made to induce women to join clubs. It was advised that two meetings a year be devoted to subjects relating to education, that the men of the community be invited to attend, and that whenever possible leading educationalists be requested to address these meetings. Reports showed that there had been a great deal more co-operation between men and women in the rural work.

Owing to pressure of work due to war conditions, and the increase of school fair projects, no organization work could be planned by the demonstrators, and the five new clubs organized during the year owe their existence largely to the efforts of individual club officers and others interested in rural work. Time had shown that the homemaker had a large, distinct, and important part to play in deciding the issue of the great struggle in progress. "Here in our province", the report proceeded, "the homemakers' clubs were the first organizations to receive practical demonstrations of school lunches, one of the most important types of service, namely, conserving the health of the child; the canning of fruits and vegetables and the making of meat and wheat substitutes, the last named being put on even before the food pledge cards were issued". Every club was requested to make itself responsible for an organization meeting and to make arrangements for such as early as possible.

Resolutions were passed to the effect that the clubs make a more determined effort to work and study along the lines of their original object, in addition to Red Cross and other forms of patriotic work; that the members of the Quebec Homemakers' Clubs, in order to prepare themselves for their new responsibilities in respect to the franchise, should make a study of the lines relating to women and matters pertaining to civics and government; that further effort should be made to work and co-operate with the Cercles de Fermieres; that the school law of the province be amended so that women may sit on the school boards; that a federal bureau of health be established at Ottawa, and that the name "Demonstrator to the Quebec Homemakers' Clubs" be changed to "Director of Homemakers' Clubs".

SASKATCHEWAN STOCK GROWERS' ASSOCIATION

The sixth annual convention of the Saskatchewan Stock Growers' Association was held at Moose Jaw, June 12th and 13th. Resolutions were passed requesting the provincial Government to establish one or more assembling and sorting centres for live stock; that one of the assembling places should be established at Moose Jaw; that steps be taken to insure the conservation of coarse feed on farms until April 1st of each year; that the Canadian Northern Railway be extended westward from Bengough through districts that at present lack railway facilities; that the provincial Government be impressed with the importance of allowing live stock to run at large in all parts of the province after the completion of threshing, until May 1st of the following year; that the number of provincial police in the range areas be sufficiently increased, in view of the withdrawal of the Royal Northwest Mounted Police, to prevent cattle stealing.

It was decided that the next annual meeting should be held at Swift Current and the following officers were elected: President, Jack Byers, Valjean; vice-president, Olaf Olafson, Mortlach; secretary, Hugh McKellar, Moose Jaw, Saskatchewan.

SASKATCHEWAN HOMEMAKERS' CLUBS

The Homemakers' clubs of Saskatchewan met in annual convention at Saskatoon the week ending June 29th. The annual report of the director, Miss DeLury, states that the number of clubs reported in 1916-17 was 180. During the past year fifteen new organizations had joined, making in all 195 clubs. The Red Cross organization has penetrated into the remotest districts, even where women's organizations already existed, so that now almost always a new organization is likely to be a Red Cross society. Besides four or five of our organizations have disbanded to amalgamate with the Red Cross societies. During the year 49 organizations were visited and 25 short courses held.

Scarcely any club community that has need of such a thing as a rest room is now without one. In many cases, the rest room has developed into a sort of community centre, where social gatherings, lectures,

debates, and so on can be held, and in many of them libraries and reading rooms are conducted.

The clubs still have their sixty free libraries, 47 of which are in circulation. With the assistance of the University grant, 24 community libraries have been established. The libraries are not confined to the Homemakers' clubs, but other women's societies are given the advantage of them. A number of the clubs have secured Government circulating libraries.

The problems of nursing and medical attendance and medical inspection of schools would seem to be solving themselves as rapidly as possible. The Department of Education is doing its part in organizing for medical inspection of schools, and, already in club communities, medical inspection of schools is getting to be general through the activities of the clubs.

The interest in, and work done for, our schools has been making wonderful progress. The individual drinking cup and towel and other sanitary measures for rural schools, that such a short time ago seemed unattainable, are now becoming general. So also with the school lunch, the idea of which was first launched in this province by the Homemakers, and has since continued to be one of their pet activities.

At least in four communities, there is a Homemaker on the school trustee board.

Last year, for war work, an approximation was made, based on the amount raised and a money valuation of the articles made, from the best estimate that could be made from the data presented, and from the number of clubs that reported. The sum of $23,790.08 was the amount raised, and, estimating that 160 clubs out of 180 were doing war work, the total would probably approximate $36,955.20.

This year a separation has been made between moneys and articles made. From 109 clubs reported this year, the sum of $3,308.78 was raised in cash, and the number of articles made totalled approximately 13,045.

STORY OF THE CLUBS

BY MRS. J. DRACAS, PAYNTON, SASK.

In a review of the work of the Homemakers' Clubs of Saskatchewan, I can give but a synoptical view of the growth of the clubs, and some of the subjects discussed at different conventions and their relationship to the home life.

Since every new movement has its origin in thought, it was a splendid idea that germinated in the mind of Dean Rutherford, who realized the need of some organization to supply a necessary recreation for the women that the agricultural society had done for the men, and the Homemakers' clubs were organized to supply that need under the Director of the Extension Department, College of Agriculture, in 1910. When meetings for the women were organized in connection with the agricultural societies along the main line of the C.P.R., east of Regina, representatives from these newly organized clubs met in convention in Regina on Jan. 31st to Feb. 3rd, 1911, at which the constitution was discussed and outlined.

In 1913, Miss DeLury was appointed Director of Homemakers' clubs for Saskatchewan, with Miss Harrison as assistant to act as lecturer and demonstrator. The latter's place has now been supplied by Miss Patrick.

The aims and ideals of the clubs have been to do everything in the best interest of home and community. In the working out of any great aim, there should be room for more than one form of expression. Each club was free to take upon itself the work that proved most necessary in the broadening interests of its particular community. This led to the establishing and maintaining of rest rooms and libraries, the development of district nursing, to medical inspection of schools, and to the study of domestic science, the last mentioned of which is of special importance at a time when we are expected to conserve all foods in compliance with food control. Regarding medical inspection of schools, it is our imperative duty to spend our best efforts in maintaining the health of the children.

The District Nurses have proved an inestimable blessing wherever they have been stationed, but in a number of districts where the nurses had offered their services for overseas, or had resigned to be married, it had been difficult to supply their places. There is no better way in which junior members could prove their patriotism, that is, those who are physically able to undergo the necessary medical examination, than by taking a professional nurse's training course. The war has opened the door to so many occupations for women that there is now no excuse for idleness on the part of anyone. It has proven that there is no sex in talent and no sex in endurance. No responsibility seems so great to the evolving womanhood of our country, both within the clubs and without, as the protection of our young people from the snares and pitfalls set for the innocent. However pure may be the atmosphere of the home, there still remain outside of it the problem of counteracting efforts to undermine the mother's influence. I would strongly recommend that all young people between the ages of fourteen and sixteen be retained as near home as

possible. The franchise has created a subject that will be difficult to ignore in the future existence of women's clubs. In our hand-book of references we are quoted as non-sectarian, non-partisan. We are expected to study the laws of our province relating to women and children and as to citizenship. Seventy-five per cent of the female electorate are women who should have occasion to assist in making the reforms required to meet the needs of the present and future changing conditions, for there is a power that has lain dormant in the female mind for centuries that has not yet become sufficiently awakened for us to recognize our strength in supporting our homemakers' ideals, and in molding them into what we are aiming for.

ALBERTA LIVE STOCK ASSOCIATION

BULL SALE AT LACOMBE

At the annual bull sale held at Lacombe, by the Alberta Live Stock Associations, Calgary, 179 animals were sold. The following table shows the number of each breed, the total value, and the average prices received.:

	No.	*Value*	*Average.*
Aber. Angus...	20	$ 3,355.00	$167.75
Herefords.....	54	12,530.00	232.03
Shorthorns....	103	18,085.00	175.08
Red Polled....	2	280.00	140.00
Totals....	179	$34,250.00	$191.34

BRITISH COLUMBIA HOLSTEIN-FRIESIAN ASSOCIATION

The eight annual convention of the British Columbia branch of the Canadian Holstein-Friesian Association was held at Duncan, B.C., on June 20th. The principal speaker was the Honourable E. D. Barrow, Provincial Minister of Agriculture. A good deal of discussion took place on the productivity of the Holstein, after which the following officers were elected:—President, Dr. S. F. Tolmie, M.P.; 1st vice-president, J. M. Steeves; 2nd vice-president, J. F. Bishop; secretary-treasurer, P. H. Moore; superintendent of Colony Farm, Essondale, B.C.

NEW PUBLICATIONS

THE PROVINCIAL DEPARTMENTS OF AGRICULTURE

NOVA SCOTIA

The proceedings of the Nova Scotia Entomological Society for 1917, have been published, by order of the Legislature, in a pamphlet of 96 pages. Reports of addresses are given by officers of the Dominion and Provincial Entomological services with a number of minute plates.

Two Important Vegetable Pests, by W. H. Brittain, Provincial Entomologist. This is an eight-page circular describing the potato stem borer and the zebra caterpillar, with illustrations and advice as to their control.

Dairymen's Association Annual Report. The report of the 5th annual convention of the Dairymen's Association of Nova Scotia, held at the Agricultural College, Truro, January 10th and 11th, 1918, published in pamphlet form, contains a verbatim report of the various addresses delivered, along with the report of the Superintendent of Dairying, as well as a detailed record of prize winners in the summer butter scoring competition and at the winter dairy exhibition.

NEW BRUNSWICK

Agricultural Report for the Province, 1917. This report makes a publication of 170 pages with numerous illustrations. It gives full details of the activities of the Department for the year, and devotes a large space to elementary agriculture and educational courses.

QUEBEC

How to Save Wheat and Meat. A pamphlet prepared by the inspectors of the school of Household Science, Macdonald College, gives forty tested recipes, by which, in the making thereof, wheat and meat can be saved.

ONTARIO

Fall Wheat Production. Under this title Bulletin No. 2, prepared by Henry G. Bell, B.S.A., has been issued by the Soil and Crop Improvement Bureau of the Canadian Fertilizer Association, with illustrations. Reasons are set forth for increased effort in wheat production and advice tendered as to methods to be pursued. Illustrations and diagrams add to the value of the bulletin.

Ontario Agricultural College, Forty-Third Annual Report. This report which contains a review of all the activities of the college, with statements of the results of experiments, makes a blue book of 72 pages. It also gives details of the work of the Macdonald Institute, along with financial reports covering every department of the college.

Mushrooms in Ontario, by R. E. Stone, Ph.D., Lecturer in Botany at the Ontario Agricultural College. This is a twenty-four page bulletin, No. 263, describing the common table and poisonous mushrooms of Ontario. Elaborate descriptions are given of the different types of mushroom with exact illustrations of the various species. Rules are given to be observed in gathering wild mushrooms and also recipes for the use of edible mushrooms.

MANITOBA

Agricultural College Calendar. The Manitoba Agricultural College Calendar for 1918 is out, and gives full particulars of all the classes in agriculture, home economics, special courses and extension work. The college terms extend from October 15th to December 25, 1918, and from January 4th to April 5th, 1919. Short Courses are to be held as follows: December 1918, cereal crops, (Brandon); January 1919, forage crops; February, creamery course, farmers' annual convention and short course, and stock judging and field crops short course; January 7th to March 7th, steam engineering short course; May and July, teachers' course in agriculture and school gardening; July, B.S.A. and home economics short course; August, Ministers' short course. The exact dates of these courses are to be announced later. Returned soldiers' courses in agriculture and engineering run throughout the year.

The Department of Botany of the Manitoba Agricultural College has issued a coloured poster ten inches by fourteen inches, warning against poison ivy and describing if for identification.

Professor V. W. Jackson of the Biological Department of the Manitoba Agricultural College has prepared for circulation three leaflets; one on "aquatic insects", another on "poplars and willows", and the third on "maple, oak, ash and elm". Each of the leaflets is of four pages and is plentifully illustrated.

ALBERTA

The A. S. A. magazine published by the students of the Alberta Schools of Agriculture contains articles by the Provincial Minister of Agriculture, the Chairman of the Canada Food Board, the President of the United Farmers of Alberta, the Dean of the College of Agriculture, Edmonton, and others, including Mrs. Earna Nelson, who took the full course in agriculture at Olds.

BRITISH COLUMBIA

A little book containing 250 War-Time Recipes has been prepared for circulation by Miss Lexa Denne, Instructor in Household Science, Victoria, B.C., Normal School, and adopted by the provincial section of the Canada Food Board. It is stated that the majority of the recipes have been tested by the Normal School students and used in demonstration classes.

Goat raising. Bulletin 64, issued by the Live Stock Branch of the Provincial Department of Agriculture, gives a complete history of goat raising with descriptions of the best known types of goats, and the care, treatment, and values of the different breeds, with illustrations. It is a bulletin of thirty-six pages.

MISCELLANEOUS

A copy of the New Zealand Official Year Book has reached the office of THE AGRICULTURAL GAZETTE. This is the twenty-sixth year of publication and the book is a compilation of upwards of eight hundred pages. It contains facts in statistical and descriptive form relating to every branch of the government. Its agricultural information is especially full.

Food Laws.—The Canada Food Board has issued a Manual of Orders-in-Council and Orders of the Board relating to the production, conservation, and distribution of food, revised up to June 22nd. The manual gives the constitution of the Canada Food Board and minute details of all the orders relating to licensing and other matters. The Board has also issued a series of little books which are being sold at five cents a copy containing recipes for making bread, cakes, and puddings; cooking vegetables; canning, drying, and storing fruit and vegetables, and cooking fish.

The Report of the Women's War Conference, held in Ottawa at the invitation of the war committee of the Cabinet from February 28th to March 2nd, 1918, recently issued, makes a blue book of forty-six pages.

Farmer's Account Book. The Commission of Conservation is responsible for this book. It is intended in a simple way for the convenience of the farmer, who wishes a general summary of his year's business without going very much into detail. Only a few entries are needed from time to time. The book will show what his farm is making for him or what it is paying him for his time and work.

The annual report of the United Farmers of Alberta for 1917 in its published form of 384 pages, gives a complete history of the organization as well as a verbatim report of the 10th annual convention held at Calgary, January 22nd to 25th, 1918.

Canadian National Records for Sheep. Volume 6 of these records has recently been issued. It includes the records of Shropshires from 15877 to 18959, Leicesters 10416 to 11956, Cotswolds 2644 to 2998, Oxford Downs 6012 to 8058, Lincolns 870 to 929, Dorset Horns 1285 to 1592, Suffolks 2598 to 2938, Hampshires 1294 to 1669, South Downs 1091 to 1349, Cheviots 387 to 475, Romneys 42 to 328. The volume also includes the report of the directors, constitution, and by-laws, rules of entry, list of members and valuable indices specially arranged for breeders and owners.

Holstein-Friesian Herd Book. The twenty-first volume of the Holstein-Friesian Herd Book has recently been issued. It gives the records of bulls from 29,551 to 33,525, and of cows from 46,104 to 54,150. It also contains a list of the members of the association, the constitution and by-laws, a verbatim report of the 35th annual meeting held in Toronto, February 6th and 7th, 1918, and copious indices.

NOTES

Mr. J. P. Sackville has resigned from his position as lecturer in Animal Husbandry at the Ontario Agricultural College and accepted the live stock editorship of the *Grain Growers' Guide*, Winnipeg, Man.

The Veterinary Director General reports four prosecutions under the Animal Contagious Diseases Act in Regina Sask., for feeding garbage to hogs without a license. In three cases the fines were $15.00 and costs, and in the fourth case $5.00 and costs.

As a means of entertaining the delegates to the Western Canada Irrigation Convention held at Nelson, British Columbia, on July 24th, 25th, and 26th, the Nelson Horticultural Society arranged their annual flower show to be held on corresponding dates. The Society not only supplied roses and other flowers in profusion, but cherries also for the pleasure of the delegates.

The annual Live Stock Judging Contest between the provincial schools of agriculture was held at Calgary, Alta., on July 3rd. Three students were chosen from the senior class in each school to compete for a silver cup presented by a Hereford breeder of Crossfield, Alta. The Olds team won, with Claresholm second, and Vermilion third.

It is estimated by the president of the Montreal Cultivation Committee that the value of the vegetables grown in Montreal this year on vacant lots will approximate half a million dollars. There are 18,639 lots under cultivation, including 2,800 in Westmount, Outremont, Montreal West, Lachine, St. Lambert, and Verdun. It is the intention next year to petition the Quebec legislature to follow the Ontario policy and make possible the utilization for cultivation of all vacant lots.

Among the ladies who are taking special courses in agriculture at the Ontario Agricultural College with the teachers, are more than twenty-five teaching sisters from the various Roman Catholic convents in Eastern Ontario. They are from Hamilton, London, Windsor, Chatham, and other places, and are preparing themselves to teach agriculture in the convents. This is the first time these teaching sisters have attended the college.

Accompanied by the Commissioner of Agriculture for Australia, the Honourable H. P. Richardson, the recently appointed Minister of Agriculture for Ontario, Honourable George S. Henry, and the new Minister of Education for the province, Honourable and Rev. Dr. Cody, paid a visit to the Central school at Brampton on June 26th. They were welcomed by members of the school board and 600 children. A special object of interest was the school gardening, which had been conducted by Mr. J. W. Stark, the Agricultural Representative for Peel, who was heartily complimented on the success achieved. There are sixty school lots under cultivation by the pupils.

Mr. Thomas Shaw, Professor of Agriculture and Farm Manager of the Ontario Agricultural College from 1888 to 1893, died at St. Paul, Minnesota, on June 25th, at the age of seventy-five years. After leaving the Ontario Agricultural College, Professor Shaw became Professor of Animal Husbandry at the University of Minnesota, and subsequently took charge of the extension service of the Great Northern Railway. He was the author of a large number of agricultural books, including, "First Principles of Agriculture", "Weeds and Modes of Eradicating Them", "Forage Crops other than Grasses", "A Study of Breeds", "Animal Breeding", "Clovers and How to Grow Them", and "Feeding Farm Animals".

Five women cow-testers have recently been appointed by dairy agents of the United States Department of Agriculture, co-operating with the state agricultural colleges and the state dairymen's associations. One has been placed in Iowa and the other four are in Wisconsin, where the first woman cow-tester in the United States is now starting her second year of work. These women have received training in agricultural high schools, or have taken work in dairying at short courses and all of them have been in close touch with dairy work.

The war-garden movement has swept the west, according to the report of Mr. Fred Abraham, Chairman of the Home Garden and Vacant Lot Section of the Canada Food Board. "It has been a revelation and inspiration to see the growth of the vacant lot movement in Port Arthur, Fort William, Winnipeg, Brandon, Regina, Moose Jaw, Saskatoon, Edmonton, Calgary, Vancouver, Victoria, Nelson, and at smaller points," he writes. "There is now little occasion to educate people to its necessity. All those who can are gardening everywhere. Contrary to popular impression, war-gardening has not put market gardenmen out of business, but has, on the other hand, increased the demand for vegetables, due to the advertising the movement gives this form of diet." Mr. Abraham is advising the breaking of new ground this fall on the widest possible scale, without reference to the demand for lots, leaving such organization for the winter months.

The Demonstration Farm of the Canadian Pacific Railway Company recently sold at Alberta Stock Yards thirty steers rising two years old which brought the provincial record price for similar sales of $16.80 per hundred weight. They were mostly of Shorthorn and Hereford breed. The thirty steers sold for $6,903.12. Their cost from December 1st, 1916, to May 20th, 1918, including selling charges, commission and freight, was $4,450.89, the net profit being $2,452.23 or $81.74 per head.

The Canadian Problems Club of Winnipeg have adopted a memorandum to be forwarded to the different Governments of the Prairie Provinces, suggesting that the owner of each parcel of idle agricultural land shall be required on or before June 30th, 1919, to fix a selling price to be filed with the clerk of the municipality; that if the owner fail to fix the price the same shall be fixed by the Government; that the municipal clerks shall return their report of the price fixed to the municipal commissioner, who shall classify and print the same in pamphlet form ready for distribution not later than November 30th in each year; that the wild land tax shall be levied on the selling price instead of on assessments; that the price fixed shall hold from January 1st, 1920, until December 31st, 1921, and shall continue in force thereafter until changed by the owner, and that the Dominion Government, the Provincial Government, or any individual or corporation, shall have the right of purchase at the fixed selling price provided full payment be made in cash.

INDEX TO PERIODICAL LITERATURE

The Agricultural Journal, Victoria, B.C., June, 1918.

Some results of Cow-Testing, T. A. F. Wiancko, Provincial Dairy Instructor, page 92.

Insects of the Month and Their Control, W. Downes, Field Assistant, Dominion Entomological Department, page 90.

British Columbia Farmer, Vancouver, B.C., June, 1918.

Caring for Cream on the Farm, T. A. F. Wiancko, Provincial Dairy Instructor, page 18

The Canadian Countryman, Toronto, Ont., June 15, 1918.

Re-Stocking Europe with Dairy Cattle Professor H. H. Dean, Ontario Agricultural College, page 771.

July 6.—Preparing Poultry for Market—Market Broilers Early, M. A. Jull, Macdonald College, Que., page 860.

July 13—Producing High Grade Cream During Hot Weather, Prof. H. H. Dean, Ontario Agricultural College, page 887.

Canadian Farm, Toronto, Ont., June 26, 1918.

The Importance of a Pure-bred Sire in a Grade Herd, E. S. Archibald, Dominion Animal Husbandman, Dominion Experimental Farms, page 4.

Spraying for late Blight and Rot of Potatoes, Prof. J. E. Howitt, Ontario Agricultural College, page 4.

July 10—Ice-Cream Manufacture, Prof. H. H. Dean, Ontario Agricultural College, page 4.

Tumbling Mustard (Sisymbruim Altissimum, L.) Prof. S. A. Bedford, Chairman, Manitoba Weeds Commission, page 4.

The Canadian Poultry Review, Toronto, Ont., July, 1918.

Backyard Poultry Keeping, M. C. Herner, B.S.A., Professor of Poultry Husbandry, Manitoba Agricultural College, page 296.

The Canadian Thresherman and Farmer, Winnipeg, Man, June, 1918.

Forage Crops, W. C. McKillican, Superintendent, Brandon Experimental Farm, page 5.

Everywoman's World, Toronto, Ont., July, 1918.

Brightening Rural Life With Government Movies, J. Cameron Secord, page 8.

The Farm and Ranch Review, Calgary, Alta., June 20, 1918.

The Value of Fairs in War Times, Alex. Galbraith, Superintendent Fairs and Institutes, Edmonton, Alta., page 677.

July 5—The Future of Canadian Wool, W. H. Tisdale, Prof. of Animal Husbandry, University of Saskatchewan, Saskatoon, page 773.
The Silo in Alberta, S. G. Carlyle and J. McCaig, page 789.

Farmer's Advocate and Home Journal, Winnipeg, Man., June 12, 1918.
Annual Summer Exhibitions, S. E. Greenway, Director, Extension Department, University of Saskatchewan, page 971.
A Successful Agricultural Society Fair, S. T. Newton, Superintendent of Extension Service, Department of Agriculture, Man., page 972.

June 19—Factors Detrimental to Milk and Cream, Prof. R. W. Brown, B.S.A. Dairy Husbandry Department, Man., Agricultural College, page 1007.

July 3—The World's Wheat Situation, W. W. Swanson, Ph.D., Prof. of Political Economy, University of Saskatchewan, page 1089.
Hereford Bulls That Have Made History, Prof. A. A. Dowell, University of Alberta, page 1096.
"Missionaries to Our Pioneer Schools", On Behalf of the Canada That is To Be, Ira Stratton, Official Trustee for Province of Manitoba, page 1134.
Training for Business Life, A. M. McDermott, B.S.A., Director of School Agriculture, Regina, page 1135.
"Dairy", The Dairyman's Ticklish Questions—How do you Answer Them? Norman James, B.S.A., Dept. of Dairy Husbandry, Man. Agricultural College, page 1166.

Farmer's Advocate, London, Ont., June 13, 1918.
Automobiles, Farm Machinery and Farm Motors—Internal Combustion Engines, W. H. Day, Prof. of Physics, Ontario Agricultural College, page 1008.

June 27—Harvest Prospects in Canada and the United States, Ernest H. Godfrey, F.S.S., page 1093.

July 4—Some of This Year's Corn Problems, T. G. Raynor, Dominion Seed Branch, page 1134.

Farmer's Magazine, Toronto, Ont., June 15, 1918.
What I know about Potatoes, Justus Miller, Assistant Commissioner of Agriculture, Ont., page 6.

July 1—Is Their Life in the Soil? Our Treatment of these Little Creatures may Determine our Crops, Henry G. Bell, B.S.A., page 40.

July 15—The Grain Growers Saved Agriculture, Norman Lambert, Secretary, Canadian Council of Agriculture, page 17.

The Grain Growers' Guide, Winnipeg, Man., June 19, 1918.
Dry Farming in Western Canada, Prof. John Bracken, page 1327, July 7, page 7.

June 26—The Portage Ploughing Match, Prof. T. J. Harrison, page 61.
Tendencies in Grain Growing—Some of the Changes that are taking place in Farm Practice in the West, Prof. S. A. Bedford, page 33.

The Journal of Agriculture and Horticulture, Quebec, July 1, 1918.
Growing Red Clover Seed at Home, R. Summerby, Lecturer in Cereal Husbandry, page 4.
School Demonstrations and Lectures in Compton County, J. Egbert McOuat, Demonstrator to Rural Schools, page 5.
The Farm Tractor in Quebec, J. A. Starrak, Macdonald College, page 5.

The Nor'-West Farmer, Winnipeg, Man , June 20 1918
Couch Grass a Bad Weed, Prof S A. Bedford, page 817.
Sheepmen Busy on the Range, J. McCaig, Editor of Publications, Alberta, page 838.

July 5—What Size Tractor Should I Buy? J. McGregor Smith, University of Saskatchewan, page 881.
The Passing of the Ranges, J McCaig, Editor of Publications, Alberta, page 882.

Ontario Agricultural College Review, Guelph, Ont., June, 1918.
The Relationship of Plant Physiology to Agriculture, Prof. J. E. Howitt, M. S. Agr., O. A. C., page 447.

PART V

The International Institute of Agriculture

T. K. Doherty, LL.B., Commissioner

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty, International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

250—**The Agricultural Wealth of the New Hebrides.**—LARGEAU, T., in the *Revue agricole, Organe de la Chambre d'Agriculture de la Nouvelle Calédonie*, No. 54, pp. 31-52. Noumea, 1917.

251—**Gambusia affinis, a Small Fish Very Useful for the Destruction of Mosquito Larvae.**—RAVERET-WATTEL, C., in the *Bulletin de la Société Nationale d'Acclimatation de France*, Year LXIV, No. 12, pp. 445-451. Paris, December, 1917.

Gambusia affinis Baird and Girard is a very small fish (the largest specimens rarely attain a length of 5 cm.) belonging to the family Cyprinodontidae, which closely resemble Cyprinidae in outward appearance, but are differentiated by several characters, notably the presence of teeth; many of them are ovoviviparous, as is the genus *Gambusia*.

The Gambusias are of no value as food, but are of great utility as their food consists almost wholely in mosquito larvae, of which they destroy great numbers. They are the best fish as destroyers of mosquitoes as they live at the surface of the water (whence the name of "top-minnows", given in the United States) and they can live in water so shallow as to be uninhabitable for other species; large numbers of this fish are often found in ponds where the mud is, at times, only covered by 3 cm. of water.

The fish breed easily, on account of their hardiness and the fact that, as they are born in an advanced state of development, they are less exposed to various dangers. Experiments made in New Jersey have shown that not only are they easy to breed, but they constitute a hitherto neglected means for controlling mosquitoes wherever the water is sufficiently warm.

252—**The Digestibility of the Dasheen.**—LANGWORTHY, C. F., and HOLMES, A. D., in *U. S. Department of Agriculture, Bulletin* No. 612, pp. 11. Washington, November, 8, 1917.

254—**Studies and Investigations of the Imperial Institute, London.**—*Bulletin of the Imperial Institute*, Vol. XV, No. 2, pp. 177-184, 198-270. London, April-June, 1917.

PRODUCTION AND USES OF RICE.—An article on the cultivation and preparation of rice was published in previous numbers of the *Bulletin of the Imperial Institute* (Vol. XI, p. 634, 1913; Vol. XII, p. 85, 1914), in which the varieties of rice, methods of cultivation and preparation, pests and diseases, were described and an account given of the production of this cereal in the British Empire. The article under review deals with the production and commercial movement of rice, especially in the British Empire, and the use of rice and its derivatives.

The production of rice, as shown by official estimates, for nearly all the rice growing countries is given in the appended table. The chief omission is China, for which figures are not available.

World's Production of Rice.

Country	Production (cleaned rice) tons	Country	Production (cleaned rice) tons
India*		Bokhara and Khiva**	40,000
British India (1916-17)	34,079,000	Persia*	250,000
Native States	1,000,000	Mesopotamia*	30,000
Ceylon** (1915)	172,000	Siam*	2,500,000
Malaya**		Dutch East Indies**	
Straits Settlements	35,000	Java and Madura (1914)	3,494,000
Federated Malay States (1913)	46,000	Sumatra, etc.	750,000
Kelantan	35,000	French Indo-China*	3,500,000
Perlis	7,000	Japan (1916)	8,177,000
British North Borneo** (1914-15)	9,800	Korea* (1916)	1,758,000
Hong Kong**	15,000	Formosa* (1914)	647,000
Fiji**	9,000	Philippines** (1915)	491,000
Egypt** (1914-15)	366,000	Madagascar*	450,000
Uganda**	100	United States** (1916)	520,000
Nyasaland (1916)	1,300	Mexico** (1914)	15,000
British Guiana* (1915)	41,000	Guatemala **(1916)	7,500
Trinidad**	1,700	Dutch Guiana** (1914)	3,000
Italy* (1916)	320,000	Ecuador** (1917)	15,000
Spain* (1916)	149,000	Peru** (1915-16)	40,000
Bulgaria** (1912)	3,000	Brazil*	250,000
Greece**	1,200	Argentina** (1916)	7,000
European Russia** (1913)	256		
Transcaucasia and Russian Turkestan** (1914)	170,000	*Approximate World's total (for countries listed)*	59,407,000

*Exporting countries, in which production exceeds consumption.
**Importing countries, in which consumption exceeds production. It is doubtful to which category the countries without any mark belong.

CROPS AND CULTIVATION

256—**The Problem of Agricultural Meteorology** (1).—AZZI, G., in *Bollettino del Ministero di Agricoltura, Industria e Commercio*, Series B., pp. 1-10. Rome, 1916, and in *Bolletino bimensuale della Societa Meteorelogica Italiana*, Series III, Vol. XXXV, Nos. 6-7-8, pp. 25-32; Nos. 9-10, pp. 39-42. Turin, 1917.

THE PRINCIPLES NECESSARY TO THE SOLUTION OF PROBLEMS OF AGRICULTURAL METEOROLOGY. Among the variations in the yields of crops those caused by atmospheric changes hold the first place. These changes are of far greater importance than those due, for example, to the use of fertilizers, to cultivation, etc. For this reason studies aiming at reducing the damage done by meteorological factors deserve the greatest attention. The author has drawn up a very detailed scheme which permits the damage caused by weather to be reduced with certainty, by favouring a more rational adaptation of the various crops to the climates of the different districts.

Three principles are required for the solution of problems of agricultural meteorology:—1) a knowledge of the critical period; 2) phenological maps; 3) weather charts.

Critical period.—From germination to harvest the plant undergoes great modifications which change its form and structure, so that its requirements, even with regard to the various meteorological factors, vary during the growing period.

The critical period with regard to "rain" is the interval, more or less long, of the growing period during which the plant has an absolute need of a certain minimum quantity of water. If, during the critical period, the total rainfall is below the minimum required for the normal growth of the plant, the harvest will be poor, even though there be abundant rain during the rest of the growing period, and, inversely, if during the critical period, the needs of the plant are satisfied, the harvest will be plentiful, even though the rainfall during the rest of the growing period be scarce and badly distributed.

The critical period of cereals falls during the twenty days preceding earing. If, at this moment, there is not sufficient rain to keep the moisture of the soil above a certain limit, the grain harvest will be seriously compromised.

What has been said for rain may be repeated for all the other factors. A plant may, therefore, have more than one critical period, those of rain, frost, temperature, clouds, etc. One or all of these periods may assert itself and assume importance according to the local conditions of the climate.

The necessity of a detailed physiological and meteorological examination is thus obvious when it is desired to ascertain with exactitude in each district the cause of a failure in the crops and the requisite remedies.

Phenological maps.—In a certain number of stations in different parts of Italy the average date is calculated when the

(1) For other articles on this subject see Bulletin of Foreign Agricultural Intelligence, February, March, April and May, 1916.

peach, for example, flowers, and the data obtained is marked on the map at points corresponding to the various stations. All the districts, in which flowering occurs in the the same decade are included in one zone and the various zones marked in different colours. This gives the phenological map of the flowering of the peach tree.

The critical periods referred to above always coincide with some phase of growth (flowering, earing, etc.), that is to say, to a moment when the plant undergoes great modifications which make it very sensitive to the lack of rain or to other unfavourable meteorological phenomena. Thus, at the flowering stage of fruit trees, a drop in the temperature, which at other moments of growth would have no effect, suffices to compromise seriously the fruit crop.

If the average date of the different stages in the growth of a plant (leafing, flowering, ripening of the fruit) are known, it is possible to determine the period of the year during which the plant is particularly sensitive to the harmful action of certain phenomena, or particularly exacting with regard to humidity, temperature, etc. Thus, if the average date of flowering of the peach tree at a station A is February 5, the critical period of that tree with respect to frost will be the first 10 days of February. The phenological maps, then, make it possible to determine the critical period. For each variety grown there should be as many phenological maps as there are important stages of growth in relation to weather. For cereals these are: 1) germination; 2) earing; 3) flowering; 4) ripening of the grain.

Weather charts.—In 1910, in the province of Bologna, there was no rain during the 20 days preceding earing, which took place on May 15; and the harvest was below the average by about 9½ cwt. per acre. On the other hand, there was abundant rain during the first half of April. By earlier sowing and the use of an earlier variety it would have been possible to bring the earing stage to April 25-30 so as to make the critical moisture period coincide with a more favourable meteorological moment. For this, however, it would be necessary to know at the end of October what the weather could be in spring. It is not possible to make a good weather forecast for more than 24 hours, or, at a maximum, 48; *the crops cannot, therefore, be adapted to the weather.* If, however, it is impossible to foretell in autumn what will be the atmospheric variations at Bologna and Sciacca (Sicily) during the second half of April, there is no doubt that drought is much more frequent and likely to occur during this period at Sciacca than at Bologna.

If the crops cannot be adapted to the weather, it is possible to adapt them to the climate, which represents the average weather and is expressed by a series of percentages of probability:—probability of frost, drought, storms, clouds, etc.

The author applies the term "dry decade" to a period of 10 days where the total rainfall does not exceed 5 mm. By calculating for a certain number of districts over a long period (a minimum of 20 years) the number of times a certain decade has been dry, and comparing these figures to 100, the probability of drought for this decade will be obtained. Assuming that, at the station A, the 2nd decade of July has been dry 15 times in 20 years, the probability of drought during this period at A will be 75%.

This percentage is marked on a map at the points corresponding to the different stations. All the points where the probability of drought is from 70 to 100% form one zone, in which drought is certain; those where this probability is from 30 to 70 % form a second zone, and those where it is from 0 to 30 % form a third zone where drought is very rare during the decade under consideration. The zones are marked in different colours. In this way a chart will be obtained for each decade which will enable the distribution of drought for a given period to be ascertained at a glance. Similar charts would be made for *frost* ("cold decade"), *clouds, storms and mist.*

AGRICULTURAL METEOROLOGY STATIONS. The critical period of a plant with regard to a meteorological factor may be restricted to one or two decades. Taking as example the Agricultural School of Imola where agricultural observations are made, and the nearest meteorological observatory that of Bologna, about 20 miles away, it may well happen that, during the critical period of moisture for wheat, a shower may fall at Bologna while the drought continues at Imola, or vice versa. A comparison between the phenological and biological data registered at the school and the meteorological data of the observatory, may, therefore, lead to erroneous conclusions. It is necessary that the biological and meteorological observations be carried out at the same time and place:—the agricultural meteorology station.

The author considers that an entirely new scheme is unnecessary, more especially as in no case should a new station of agricultural meteorology be built, use being made of those stations and agricultural schools already existing by supplying them with building, technical staff and experimental fields. Each station should have the following instruments:—

1) rain-gauge;
2) hygroscope;
3) maximum and minimum thermometers;
4) earth thermometers;
5) bore for taking samples of soil at different depths;
6) balance, oven, and accessories required for determining the moisture in the samples.

How many stations are necessary? Where environmental conditions are uniform, as in Russia, where similar topographical and climatic conditions prevail over long stretches, the number of stations may be relatively limited. On the contrary, in Italy (as in Greece), with the exception of the vally of the Po, wich is fairly uniform, the country varies greatly, even within limited zones, so that it would be necessary to have so many stations that the project becomes almost impossible.

Nevertheless, however variable the geographical distribution of meteorological phenomena harmful to crops may be, the nature and significance of the problems of agricultural meteorology remain the same. Thus, in northern Italy, the district in which wheat suffers from lodging includes all the Po valley, but in central and southern Italy, and in the mountain districts, the action of rain with wind is usually discontinuous, often disappearing entirely, without any regularity, in localities sheltered from the wind, according to the topography of the land. The problem, however, is the same in each case:—to create a wheat which is both resistant to lodging and a good producer. If it be assumed that wheat suffers from lodging in 200 stations, if in one of these a wheat with a resistant culm were produced, this type could be introduced with a great probability of success in all the other 199 stations, wherever they may be situated.

Agricultural research which aimed only at solving well-defined problems connected with analyses of agricultural meteorology could, therefore, be carried out in a relatively small number of stations if it were known at what points and to what extent a certain phenomenon is harmful to a given crop. The agricultural stations, and agricultural schools and institutes forming a network in all the civilized countries of the world could, if adequately fitted up, be used as agricultural meteorology stations. To this list might be added the thermohyetometric stations, convents, agents and directors of farms, etc., situated even in most distant lands, who could take observations and help to solve the important problems of agricultural geography and meteorology. Each first class station of agricultural meteorology (agricultural stations and schools), together with the second class stations (thermo-hyetometric) and points of observation (parishes, etc.) dependant on it, form a *fundamental principle of the system* (*network*).

TABLES OF GROWTH (*their meaning, construction and use in determining a critical period*).—The data obtained in the stations are collected and classified in tables of growth. Plants are modified during the passage from germination to ripening of the fruit, but the modifications which occur are neither gradual nor continuous. There are relatively short phases during which the plant is greatly modified (disappearance of certain organs and formation of new ones—); it then remains anatomically and physiologically stationary for a long period, till another phase takes place. There are, thus, *phases of growth* (flowering ,earing etc.) and *interphasal periods* or *subperiods* between two successive phases. It may be assumed that the structure and requirements of a plant remain constant throughout a sub-period.

This phenomenon may be represented by a discontinuous curve, composed, however, of elements almost parallel to the line of the x joined by almost parallel segments to the line y.

The growing period of cereals is divided in sub-periods as follows:—

1) from sowing till the seedling appears;
2) from this phase till winter interrupts growth;
3) from this interruption till growth restarts in spring;
4) from the restarting of growth to earing;
5) from earing to complete maturity.

For each of these sub-periods there is a special table —table of growth—in which are noted all the meteorological and phenological factors of the plant studied, as, for example:

Table IV.—Wheat. Station..... Year.....

Fourth sub-period—From restarting of growth to earing

1) Variety.....
2) Date when growth restarted in the whole field....
3) Remarks on tillering during the 4th sub-period....

By tillering is meant the emission of lateral shoots, which usually takes place in autumn, but which may occur in a cold, late spring, as is frequently found in the mountains.

4) Lengthening of internodes.....
   a) day when first observed in a few plants.....
   b) day when observed for the majority of the plants.....
5) Degree to which temperature, humidity, sun, etc., favour or inhibit the growth of the internodes.—.....
6) Date of appearance of first ears.....
7) Date of earing of the majority of plants.....
8) Development of this phase, whether uniform, rapid or slow.....
9) Influence of weather on earing.....
10) Duration of 4th sub-period.....
11) Note, during the 4th period:
   1) frosts.....
   2) storms .....
   3) drought.....
   4) clouds.....
   5) other meteorological phenomena.....

Note, in each case:

   a) date and duration.....
   b) intensity.....
   c) damage, caused to plants.....
   d) effect on soil (washing, baking, cracking, etc)...

12) Degree to which the variety grown proved resistant to adverse meteorological factors (drought, lodging, excessive moisture, etc).....
13) Injury by disease or insect attacks.....
14) Degree to which atmospheric variations favoured the appearance of disease or insects.....
15) Cultivation of plot during the 4th, sub-period....

TABLE I.—*Moisture o soil, height of plants and depth of roots.*

Month and day	Moisture of soil (%)			Date of last rain before taking of sample	Depth of roots, inches	Height of plant, inches
	Active layer	Virgin layer	Subsoil			

Soil moisture.—The periodical determination of the soil moisture at different depths is of great interest, increasing with the frequency with which the determinations are made. However, in view of the amount of work required it is best to allow the directors of the various first class agricultural meteorology stations to decide for themselves the frequency with which such determinations shall be made.

Besides the periodical determinations the soil moisture must be taken at two moments—15 days before earing, and at the beginning of this phase.

Height of plants.—The height of the plants before earing is measured from the level of the ground to the base of the highest leaf, and after earing from the level of the ground to the tip of the ear. The day the one method is replaced by the other account must be taken of the two factors bearing on the height of the plant calculated from the ground level to the base of the highest leaf on one hand, to the tip of the ear on the other, as, for example,

(72 Stem).
(76 Ear).

The average height of 10 normal plants taken haphazard here and there represents the average height of all the plants.

Depth of roots.—A lump of soil, together with all the plants on it, is raised about 6 inches, and the depth measured on the vertical section. This determination is made 3 times:—1) when growth restarts; 2) 15 days before earing; 3) at the moment of earing.

TABLE II.—*Number of plants and culms; vigour of tillering; average weight of dry mass of plants: number and weight of weeds.*

Month and day	Grasses Studied									Weeds	
	Number of plants with						Total number of culms	Weight in grams of dry seedling	Vigour of tillering	Number of samples	Weight in grams in dry condition
	one culm	two culms	three culms	our culms	many culms	Total number of plants					

N.B.—This table must be filled in at the moment when the internodes begin to lengthen.

1) *Vigour of tillering.*—This is calculated by dividing the total number of culms by the number of plants.

2) *Determination of the weight of the plants and weeds.*—In four different parts of the plot the plants are uprooted from about ¼ sq. yard; the weeds are separated from the plant studied; the root system is removed and the green part left to dry; when a constant weight is obtained the value is entered in the table.

TABLE III.—*Number of plants and culms; vigour of tillering; vigour of earing; weight of dried mass of the plants; number and weight of weeds.*

Month and day	Grasses studied											Weeds	
	Number of plants with						Number of culms			Weight in grams of dried plants	Vigour of tillering	Number of plants	Weight in grams in dry condition
	one culm	two culms	three culms	four culms	many culms	Total number of plants	plants earing	plants not earing	Total				

N.B.—This table must be filled in at the end of the earing stage.

TABLE IV.

Month	Meteorological observatory													
	Air Temperature							With wet-bulb thermometer			Percentage of relative humidity			
	7h.	13h.	21h.	Total	Average	Maximum	Minimum	7h.	13h.	24h.	7h.	13h.	21h.	Average

TABLE V.—*Temperature of Soil.*

Date	At the surface				In active layer				In virgin layer				In sub-soil			
	7h.	13h.	21h.	Average	7h.	13h.	21h.	Average	7h.	13h.	21h.	Average	7h.	13h.	21h.	Average

TABLE VI.

Date	Rain		Mist				Clouds	Storms	Other meteorological phenomena
	in inches (or mm.)	duration	7h.	13h.	21h.	Average			

The table of growth (composed of the above tables) is reproduced because it contains all the material necessary to a complete study of agricultural meteorology. For each variety there will be a table of growth corresponding to each of the interphasal periods.

DETERMINATION OF THE CRITICAL PERIOD —The yield in fruit is the measure by which the more or less favourable action of meteorological phenomena must be judged. The higher the yield the more favourable was the weather during the growing period in general and the critical periods in particular. If the data concerning wheat at station A from 1901 to 1910 were available the following facts could be deduced:—there is no relation between total precipitation and yield in grain or between yield and total precipitation during the 1st, 2nd and 3rd sub-periods. If, however, the data on the yield and total rainfall during the 4th sub-period are compared, a direct relationship is seen to exist. The critical rain period of wheat is, then, the 4th sub-period.

By limiting in this way the field of research to a relatively narrow scope it is easy to define exactly a critical period. No important phenological action is observed between the restarting of growth and the earing phase. The critical period, then, is the earing phase. At this moment the plant does the greatest amount of work by elaborating the enormous quantity of plastic substances necessary for the formation and development of the caryopses and by consuming a great amount of water. There is an average of about 40 days between the earing and ripening phases. During this time occurs the whole process of growth, the last phases succeeding each other rapidly—flowering, development and ripening of the caryopses.

To assure a good wheat harvest abundant rain is necessary during the decade, or two decades, preceding earing so that the plant may have the moisture necessary for rapid and strong growth. In warm countries, where there is a great probability of drought during the earing period, the critical period just mentioned is very evident and has a marked influence on the harvest. In proportion as the cold northern countries where rain is nearly always plentiful at the requisite time are approached, all relation between precipitation and yield disappears, while other critical periods arise, as, for example, an inverse relation between yield and rain during flowering.

The specific action of all the other meteorological factors could be established in a similar way.

THE MANNER IN WHICH KNOWLEDGE OF THE CRITICAL PERIOD, PHENOLOGICAL MAPS AND WEATHER CHARTS PERMITS AN INCREASE OF YIELD BY ADAPTING THE VARIOUS CEREALS TO THE CLIMATE.—When a scale of the yields has been established (*e. g.* for wheat, cwt. of grain per acre), it is possible to distinguish the zones of good, medium and bad harvests. Thus, the zone of good harvests includes districts where the average yield of wheat exceeds 13 cwt. per acre, that of poor harvests where the yield is less than 9½ cwt. per acre; the medium zone includes the districts with yields between 9½ and 13 cwt.

The aim of agricultural meteorology is to increase the zone of good harvests at the expense of the other two. Statistics are but a statement of facts; the expression "bad harvest" merely means that the meteorological factors during the period of growth in general and the critical periods in particular are unfavourable to the growth of the plant, but does not show which was the unfavourable factor or the means to remedy it. To do this agricultural meteorological analysis is necessary. Many meteorological phenomena may damage wheat, for example, in Italy. In the south there may be:—

1) warm, dry winds (sirocco, "favonio") which, during the ripening of the ear (5th sub-period) cause scorching, followed by hastened ripening, drying up of the grain, and, while the plants are still strong, the caryopses lose food material or do not form at all. This is particularly serious in light soils or where there is only a small layer capable of being cultivated and, in some years, within a few days, the yield is reduced by 25, 30, or even 50%;

2) lack of rain during the 10 or 20 days preceding earing.

3) prolonged drought during the period following sowing.

Rust is little to be feared because excessive humidity in spring occurs rarely and only over very limited areas. Lodging is unknown because in the islands, most of Calabria and in Basilicata hard and semi-hard grain with short, strong straw is grown.

In central and northern Italy, on the contrary, the following facts must be noted with regard to climate:—

1) in the valley of the Po, particularly in the lowest part, wheat almost invariably suffers from excessive moisture which causes rust with a resultant serious decrease of yield;

2) lodging caused by wind and heavy rain at the time of the formation and development of the caryopses may lower the yield by 20 to 25%;

3) considerable damage by late spring frosts.

Such is the knowledge, relatively general, at the present day, when the network of agricultural meteorological stations is to begin its work, aiming at *a*) the determination of the critical period of wheat with respect to the meteorological factors as discussed above, *b*) the preparation of phenological maps, and *c*) weather charts.

Once the critical period is known the comparison of the phenological maps and weather charts allows the suitability of a plant to local climatic conditions to be easily determined. If, for example, at A wheat ears on May 10 on an average, and if, during the last decade of April and the first decade of May, the probability of drought is 75 and 90 % respectively, this will show why the average yields in this district are relatively low. Once the reason of the poorness of the yield is established it may be remedied in three ways:

1) Change the time of the critical period phase and make it coincide with a more favourable meteorological moment.

E. g. the *f* variety of wheat at the station A ears on an average (see phenological map of earing of wheat) on May 12, and the probability of drought during the third decade of April and the first decade of May is 90 and 95 % respectively (see weather charts for drought for the 3rd decade of April and the 1st decade of May). This accounts for a low yield. In the first and second decade of April, on the contrary, the probability of drought at A drops to 10 and 15 % respectively. By earlier sowing or by using an earlier type of *f* wheat, so that earing takes place between April 20 and 25, this drawback could be remedied in part at least.

2) Artificial modification, during the critical period, of meteorological factors, *e, g,* control of frost by smoke, of drought by irrigation, etc. Brilliant results have been obtained with fruit in California by forecasting cold by 24 to 48 hours, thus allowing growers to decrease or even nullify injurious effects by burning heavy oils or other substances which surround the trees with thick, protective smoke.

3) The introduction or production of types of increasing resistance to drought frost, rust, lodging, etc.

Modern experimental research in biology in various countries has clearly shown that, by hybridization and subsequent selection, it is possible to unite in one variety the good characters existing in two distinct varieties and to eliminate undesirable characters. In each particular case the breeder must aim at uniting high yield with resistance to the harmful meteorological character most frequent in the district. Thus, at Svalof (Sweden), M. Nilsson has obtained types of wheat resistant to cold, and at the same time, excellent yielders by crossing the most productive varieties slightly resistant to cold (English Squarehead) with native Swedish wheat very resistant to low temperatures.

This acclimatixation of non-native types and creation of new types by crossing and selection would be the most important work of agricultural meteorological stations of the 1st class. In the choice of these, therefore, use would be made of agronomic and agricultural Institutes already existing and not of the meteorological Institutes which may cooperate with them but cannot form centres for new research.

The following example shows that agricultural meteorological study is not only necessary where soil is cultivated for the first time, but that it may give excellent results in districts where intensive culture has been carried out for a long time by determining a better adaptation of crops to the climate of different districts. In the province of Bologna (northern Italy) each farm may be said to grow three varieties wheat—Rieti, Gentil rosso and Hybride inversable de Vilmorin, distinguished by the following characters:

1) Rieti: resistant to rust but lodges easily; in favourable years, *i. e.* when it does not lodge as a result of storms, it yields about 17½ cwt. per acre;

2) Gentil rosso: very subject to rust and lodging; in favourable years, without excessive humidity and destructive storms, it may yield over 19 cwt. per acre;

3) Hybride inversable de Vilmorin: subject to rust but resistant to lodging; when the humidity is not excessive it may yield 16¾ cwt. per acre.

Gentil rosso and Hybride inversable are of recent introduction, and other varieties, now under observation in various agricultural institutes, will finally be added to the pre-existing varieties, causing a mixture of wheat which is not always desirable. A single variety best suited to the climate had not been adopted because, it is argued, there is no such variety and none which suffers from the same two causes at the same time, therefore, if in any year one variety fails, there is always one which succeeds, thus compensating for the loss. This is false reasoning, Gentil rosso, when it does not lodge, produces up to 19 cwt. per acre, Hybride inversable only 16¾, *i. e.* 2¼ less; but the first lodges easily, whereas the second does not. Lodging causes a loss of nearly 4 cwt. per acre, thus reducing the yield from 19 to 15 cwt. The probability of heavy rainfall and wind during the 5th sub-period in the province of Bologna is, moreover, 80 %. In a period of 5 years there would be:—Gentil rosso 19 + (15x4) = 79 cwt; Hybride inversable de Vilmorin 16¾ × 5 = 83 ¾. Thus, in the province of Bologna, where the probability of lodging is 80%, the Vilmorin hybrid is preferable to Gentil rosso.

When, on the contrary, the probability of storms in the 5th sub-period falls to 20%, Gentil rosso should be preferred:—Hybride de Vilmorin 16¾ × 5 = 83¾; Gentil rosso (19x4) + 15 = 89 cwt.

Agricultural meteorology is, therefore, indispensable if an exact idea of the real productivity of a species in a given district is to be determined.

The mere fact that a given variety of wheat is grown by preference in a given district is no proof that it is the best suited to this district. New types are often on the market which may completely supersede the native types, to be superseded later in their turn by other new types. In all such cases it is the character "productivity" which guides the farmer in his choice of seed; but productivity is infiuenced to a marked degree by climatic conditions, and consequently, varies from one district to another, so that the adoption of new types should be preceded by a careful study of agricultural meteorology.

Agricultural meteorology thus gives a two-fold result:—

1) it allows a better distribution of the different varieties of a cultivated species; *i. e.* it shows the districts best suited to each variety from the point of view of local climatic conditions;

2) it guides the selector in his research aiming at uniting to the best advantage in a single type, productivity and resistance to the most destructive meteorological phenomena of the different districts.

The work of adapting crops to climate is difficult, but it cannot fail to lead, in part at least, to positive results, and considering the size and complexity of the problem, these results, even though they be but small, represent large figures.

Unfavourable conditions in Italy diminish the grain harvest, on an average, by over 3 cwt. per acre, and though only ½ cwt. per acre were gained, the profit would be 9,432,980 cwt., representing a considerable value.

What has been said for wheat applies equally to all other cultivated plants; what has been said for Italy applies to all the countries of the world. On the other hand, it is seen that the network of agricultural meteorology stations is already outlined by the many agricultural schools and institutes and the thermo-hyetometric stations possessing the premises, instruments, experiment fields and technical staff. All that is required is to collect, co-ordinate and develop all this latent or dispersed activity, so that the cost of the formation and upkeep of the new service shall be limited.

257—**The Relation of Winter Temperature to the Distribution of Winter and Spring Grain in the United States; Why Cereals Winterkill.**—SALMON, S. C. I., *Journal of the Ameriacn Society of Agronomy* Vol. IX, No. 8, pp. 353-380; II. *Ibid.*, Vol. IX, No. 1, pp. 21-24. Washington, 1917.

I.—In northern districts winter cereals usually give a higher yield than spring cereals, but they are much less widely distributed because they are naturally excluded from zones where the climate is too severe to allow the young plants to survive the winter. The injurious action of the winter may have four effects:—

1) HEAVING.—This is due to expansion and contraction of the soil by alternate freezing and thawing; the roots are broken and exposed to the air. Shallow sown plants suffer least, as the whole plant will then be lifted without breaking of the underground parts. Heaving is most common in the eastern States, especially in wet, badly drained plains.

2) SMOTHERING.—Alternate freezing and thawing sometimes turn the snow into an ice sheet through which the air cannot pass, thus suffocating the plants by lack of air and accumulation of carbonic acid.

3) PHYSIOLOGICAL DROUGHT.—This occurs when the soil is frozen and the plant can no longer obtain moisture from it. All the anatomical characters which tend to limit transpiration should, therefore, be in correlation with resistance to cold. Turkey and Kharkov wheat, winter rye and winter Turf oats, known for their resistance to cold have marked xerophytic structures—narrow leaves and prostrate habit of growth, which partially protect the plant from the action of wind (Kolkunow, Sinz, etc.). The author and his collaborators in a study on several varieties of winter wheat, rye, barley and oats, found no definite relation between resistance to cold, cell structure, epidermal covering and ability to control transpiration. Recent studies have, however, shown that a reduction of the leaf area in relation to the length of the root as expressed by the ratio of root length to leaf area does influence the resistance of young plants to cold. In Turkey wheat this ratio is 25 % greater than in Fultz wheat, a less hardy variety, and 40% greater than in common oats and barley. Physiological drought may be considered, if not as the only cause of winterkilling, at least as the most important.

4) DIRECT EFFECT OF LOW TEMPERATURE.—This acts in many ways:—

a) Mechanical action.—Injury to the tissues caused by the formation of ice.

b) Desiccation of the protoplasm.—Low temperatures cause withdrawal of water to the intercellular spaces, where it freezes; when later, the ice thaws rapidly the moisture can no longer be absorbed. At—13 C. (+8.6°F) the loss of water is 63.7%; at—15.2°C. (+4.6°F.) 79.2%.

c) Coagulation of the proteids.—In plants resistant to cold this only takes place at very low temperatures; thus for pine needles a temperature of —40°C. (—40°F.) is required, in winter rye —15°C.) (+5°F.) and in begonia, which is very sensitive to cold, —3°C. (+26.6°F.) This coagulation is accompanied by denaturing of the proteids, caused, perhaps, by increased acidity of the sap, so that they can no longer be reabsorbed. This theory is held by Gorke but contradicted by Chandler's experiments, which showed zinc sulphate, one of the salts which readily coagulate proteids, to increase rather than to diminish resistance to cold.

Lidforss, in his studies on *Holosteum, Cerastium, Lamium, Veronica, Senecio, Viola, Fumaria,* etc., observed that, on the approach of winter, the starch in the tissues of these plants changed to sugar, which, by changing the concentration of the sap, reduces the freezing point. These phenomena of the protective action of various substances due to the lowering of the freezing point have formed the subject of much research (Maximov, etc.), which confirms the theory of Lidforss.

II.—The specific action of low winter temperatures on winter cereals is clearly shown by a study comparing the northern boundary of different varieties with the isotherms of the minimum temperatures during January and February.

WINTER WHEAT.—Its northern limit corresponds approximately to the isotherm of 10°F. (—12.2°C.). Cold resistant varieties may exceed this limit if the seed is well protected by a covering of snow.

WINTER BARLEY.—Its northern limit coincides with the isotherm of 20°F. (—6.6° C.) It is successfully grown to the west of the Rocky Mountains and to the south of the Ohio and Platte rivers.

WINTER OATS.—Its northern limit corresponds to the isotherm of 30°F. (—1.1°C). They may be grown, in the north, as far as Central Tennessee and Arkansas and southern Maryland and Oklahoma.

259—**The Proof of Microbial Agency in the Chemical Transformations of Soil.**—CONN, H. J., in *Science,* Vol. XLVI, No. 1185, pp. 252-255. Lancaster, Pa., Sept. 14, 1917.

260—**The Decomposition of Soil Protein Substances Through the Action of Bacteria.**—ROBINSON, R. H., and TARTAR, H. V., in *The Journal of Biological Chemistry,* Vol. XXX, No. 1, pp. 135-144. Baltimore, May, 1917.

261—**Irrigation of Orchards in U.S.A.**—FORTIER, SAMUEL, in *U. S. Department of Agriculture, Farmers' Bulletin* No. 882, pp. 40, Washington, D.C., October, 1917. (2 pp. in Institute Bulletin).

264—**Fermentation of Manure Treated with Sulphur and Sulphates: Changes in Nitrogen and Phosphorus Content.**—AMES, J. W., and RICHMOND, T. E., in *Soil Science,* Vol. IV, No. 1, pp. 79-89, bibliography of 21 publications. Baltimore, July, 1917.

265—**Garbage Tankage, its Composition; The Availability of its Nitrogen and its Use as a Fertilizer.**—SCHROEDER, P. J., in *The Journal of Industrial and Engineering Chemistry*, Vol. IX, No. 5, pp. 513-518. Easton, Pa., May, 1917. (2 pp. in Institute Bulletin).

271—**Influence of Position of Grain in the Cob on the Growth of Maize Seedlings.**—HALSTED, BYRON D., and OWEN, EARLE, J., in the *Journal of the American Society of Agronomy*, Vol. IX, No. 6, pp. 267-275. Washington, D.C., September 25, 1917. (3 pp. in Institute Bulletin).

274—**Experiments in Field Technic in Rod Row Tests**—HAYES, H. K., and ARNY, A. C., in the *Journal of Agricultural Research*, Vol. XI, No. 9, pp. 399-419. Washington, November 26, 1917. (3 pp. in Institute Bulletin).

276—**A Method for Determining the Percentage of Self-Pollination in Maize.**—WALLER, A. E., in the *Journal of the American Society of Agronomy*, Vol. IX, No. 1, pp. 35-37. Lancaster, Pa., January, 1917.

282—**The Selection of Some Varieties of Swede Resistant to Plasmodiophora Brassicae, in Denmark.**—CHRISTENSON, C. I., in *Tidskrift for Planteavl*, Vol. XXVI, Part I, pp. 68-82. Copenhagen, 1917. (3 pp. in Bulletin Institute).

283—**Flaxwilt: A Study of the Nature and Inheritance of Wilt Resistance.**—TISDALE, W. H., in the *Journal of Agricultural Research*, Vol. XI, No. 11, pp. 573-605. Washington, December 10, 1917. (2 pp. in Institute Bulletin).

289—**Some Effects of the Successive Cropping of Barley.**—GERICKE, W. F., in the *Journal of the American Society of Agronomy*, Vol. IX, No. 7, pp. 325-332. Washington, D.C., October, 1917. (2 pp. in Institute Bulletin).

299—**Raspberry Culture.**—DARROW, GEORGE M., in the *U. S. Department of Agriculture, Farmer's Bulletin 887*, pp. 44, bibliography. Washington, October, 1917.

In the United States the raspberry is grown, not only in small plantations for the home and local market, but, in some districts, as the principal commercial crop. Statistics show that, in 1909, there were 48,668 acres of raspberries in the United States.

The methods of cultivation on estates which specialize in raspberries are very progresssive. Detailed information is given on:—choice of plantation; preparation of the land; planting (there are 3 methods of planting—1) the hill system, in which a horse cultivator is used on all sides of the plant; 2) linear; 3) hedges, where the cultivator is used in one direction only); manuring (an average of 10 tons per acre of stable manure, leguminous cover crops to be dug in as green manure); training and pruning; winter protection.

LIVE STOCK AND BREEDING

304—**Screw-Worms and other Maggots Affecting Animals.**—BISHOP, F. C., MITCHELL, J. D., and PARMAN, D. C., in *U. S. Department of Agriculture, Farmer's Bulletin* 857, pp. 20, Washington, September, 1917.

The screw-worm (*Chrysomyia macellaria* Fabricius) is a native of America, and is found from the extreme south to Canada, but is rarely abundant in the Northern States, as the fly is quickly killed in cold weather. The states of North America which suffer most severely are Texas, Oklahoma, New Mexico, Arizona and Southern California.

Practically all animals are attacked by this insect. Probably cattle suffer most; hogs, horses, mules, sheep, goats and dogs follow in the order named. Wild deer (*Cariacus* sp.) and many of the smaller mammals are sometimes seriously infested. Human beings are also frequently attacked. The female lays its eggs in wounds or skin injuries, where the parasite remains throughout the larval stage. The pupa is usually found in the ground. A huge number of eggs may be deposited in a mass by a number of females. In livestock the parasite always causes loss of appetite and emaciation, and sometimes death. In some districts it makes calf-rearing almost impossible (the fly lays its eggs in the naval of the new-born calf, often causing its death) and older cattle have to be bought elsewhere. In sheep it causes emaciation and decreased milk production, and in all cases involves increased expenses for the watching and treatment of animals.

The screw-worm fly is the only species in the south-west of the United States which penetrates the sound tissues of animals, but other flies attack the diseased tissues of wounds and soiled wool. These flies are:—the black blowfly (*Phormia regina* Meigen), green bottle fly (*Lucilia sericata* Meigen), and gray flesh flies (*Sarcophaga texana* Aldrich, *S. tuberosa* var. *sarracenioides* Aldrich, *S. robusta* Aldrich).

All these flies breed in decaying animal matter, especially in carcasses of large animals. If all dead animals were properly disposed of no cases of infection of living animals would occur.

The best method of control is the burning of carcasses. This reduces the danger of infection by anthrax, tuberculosis and similar diseases in the pastures and prevents the breeding of flies in the carcasses. If it is not possible to burn the carcasses they should be buried, covered with quicklime (especially if the death of the animal may be attributed to an infectious disease) and then covered with at least 2 feet of soil.

Methods of controlling the parasite in cattle are:—avoidance of injury, calving at a time when the flies are not abundant (between December 1 and the middle of April, and, in the north, from November 1 to June 1), destruction of ticks, performance of surgical operations (castration. dehorning, etc.) in winter or the beginning of spring, poisoning and trapping the flies. To prevent the larvae from infesting the wool of sheep, lamb early and dip and clip soiled sheep. To avoid dehorning, hornless types may be bred. The animals must be continually watched so as to discover the first symptoms of infection, and the larvae killed with chloroform, the wounds being then treated with pine tar to repel the flies.

305—**The Cause and Prevention of Hairless Pigs, in the United States.**—WELCH, HOWARD, in *Montana Agricultural College Experiment Station, Circular* 71, pp. 37-47. Bozeman, Montana, 1917.

It has been known for some years that, in certain of the Northwestern States, the new-born of all the domestic animals were in some way defective. New-born pigs were hairless and seldom lived; the calves were often hairless and more frequently had goitre. The young of sheep and goats were similarly affected, while new-born foals, though neither hairless nor having goitre, were weak, seldom able to stand and usually died.

In Montana, the loss is probably heaviest in young pigs, for about 10,000 are estimated as dying from this cause annually. In some localities pigs are the only domestic animals affected, while in others, it may be lambs only. It is a disease of definite localities, occurring in Montana in the drainage basis of the Yellowstone, the lower Missouri, the Musselshell and some of the smaller tributaries; outside this zone, a number of scattered cases constitute about 5% of the total loss. In some cases, the pig crop can be saved on moving the pregnant sows a mile or two out of the affected district during gestation. The malady varies curiously: one year it may cause 95% loss, and nothing the year after. There are also variations in a single pen of pregnant sows. Pigs born in March and April are more often affected than those born in May and June, while autumn-born pigs are frequently normal even in badly affected districts.

Amongst causes of the trouble have been suggested:—contagious abortion; alkali in the soil; some particular feed, such as alfalfa, flax, maize, or wheat; or some deficiency in the soil or water. All these causes have been studied by the author, but negative results were always obtained.

Post-mortem examinations showed:—that the hairless pig has a thick, pulpy skin, especially round the head, neck and shoulders; that the thyroid gland was very hypertrophied and the heart not fully developed. The developement of goitre and the hairless condition are of related gravity. This lead the author to suppose that goitre was the cause of the disease, and he found, by analogy with human goitre, that the hypertrophied thyroid glands contained much less iodine than the normal quantity, or even none. He therefore concluded that the cause of the malady is lack of iodine in the food and water given to the animals, and that it was worth testing whether this insufficiency could be compensated for by giving potassium iodide. Tests made with pigs (with 129.5 to 324 mgm, of potassium iodide per head per day), with female breeding stock during gestation, gave positive results. Iodide of potassium given to a pregnant female prevents goitre appearing in the newborn. Therefore, it is advisable to feed iodine to pregnant animals in regions where goitre is prevalent.

320—**On the Use of Certain Marine Algae for Feeding Horses.**—ADRIAN, in *Comptes rendus des Séances de l'Académie des Sciences*, Vol. CLXVI, No. 1, pp. 54-56. Paris, January 7, 1918.

321—**Relation between the Weight of the Carcass and that of the Meat in Beef Cattle**—DECHAMBRE, in *Comptes rendus des Séances de l'Académie d'Agriculture de France*, Vol. IV, No. 1, pp. 25-28. Paris, January 9, 1918.

The meat obtained from an animal is equal to the difference between the net weight and the total weight of the bones, suet, etc. The most important of these factors is the carcass, a knowledge of which would form a sound basis for the selection of slaughter breeds.

The relation between the weight of the carcass and that of the meat is influenced by many factors, such as age, sex, breed, maturity, and, above all, the condition of the animal produced by the degree of fattening. The author's experiments to determine this relation were carried out with a large number of animals, representing a total weight of meat of 51,031 lbs. in quarters containing 9,788 lbs. of bone. The average ratio of bone to meat is, therefore, 19.18%. The extent of fattening greatly influences this ratio. It is usually ex-

pressed by the yield per cent in meat, which is the ratio between live weight and the weight of the quarters. In the meat studied the extent of fattening is dependent on the amount of suet removed for preserving. The author, therefore, determined this amount and calculated its ratio to the weight of the quarters. When this ratio is compared with that between the bone and meat, it is seen that the figures vary inversely:—the fatter the animal the lower the proportion of bone.

The author's conclusions are:—1) in medium fat and fat cattle, which generally give a net yield of meat varying between 55 and 58 %, the ratio between bone and meat is between 16 and 18 %; 2) in animals in good condition, yielding 50 to 52 %, the ratio is, on an average, 20%; 3) in animals yielding less than 50 % (47 to 49%), the ratio rises to 22 %, or a little more (22,63 %), though still below the 25 % generally admitted in the meat trade.

322—**A Statistical Study of Body Weights; Gains and Measurements of Steers During the Fattening Period** —SEVERSON, B. O., and GERLANGH, P., in the *Journal of Agricultural Research*, Vol. XI, No. 8, pp. 383-394. Washington, D.C., Nov., 1917. (6 pp. in Institute Bulletin).

323—**Influence of the Degree of Fatness of Cattle upon their Utilization of Feed.** —ARMSBY, H. PRENTISS, and FRIES, J. AUGUST, in the *Journal of Agricultural Research*, Vol. XI, No. 10, pp. 451-472, bibliography of 8 publications. Washington, December 3, 1917. (2 pp. in Institute Bulletin).

326—**Feeding Pigs on Kitchen Waste.**— PRIME, T. F., in *The Journal of the Board of Agriculture*, Year XXIV, No. 10, pp. 1107-1109. London, January, 1918.

Finding no data on the amount of kitchen waste necessary to produce one pound of pork, the author carried out experiments on this subject. To this end he started in January 1917 to keep pigs on this food and continued during 48 weeks. Three pigs were bought on January 9, two of which were killed on March 5; four others were bought on March 10, one being killed on June 7; on September 1, five more pigs were bought. Throughout the experiment 6,104 lbs. of food were consumed, and 870 lbs. increase in live weight were obtained, or roughly , 7 lbs. of kitchen waste (potato, vegetable and fruit peelings and waste, bits and remains of food) produced 1 lb. increase in live weight. During the whole period the only other food used was 28 lbs. of meal, given during a shortage of waste. The pork obtained was of excellent quality.

FARM ENGINEERING

329—**The Work of a Tractor in Stony Soil.** —PLUCHET, E., in *Comptes rendus des Séances de l'Académie d'Agriculture de France*, Vol. III, No. 36, pp. 1037-1040. Paris, November 21, 1917.

The author advised the purchase of a 10-20 HP. tractor for a large estate at Eure-et-Loire, France, having a number of stony areas. The tractor was chosen, on the recommendation of M. Ringlemann, from amongst those tested at Noisy-le-Grand.

Paraffin was used as fuel, being so much cheaper than petrol; heavy oils of at least 39° Baume could also have been used. The tractor began work on uncultivated ground about July 15, 1917. For various reasons, such as bad weather, harvest work, holidays, etc., the tractor only worked 340 hours, or 45 days of 8 hours, from the above mentioned date up till the end of October. During this time 160.6 acres were worked to a depth of 7 to 8 inches (about 1 acre in 2.2 hours), in very stubborn and stony soil. In these soils, the usual implements and tools wear very quickly and the average work done by 1 man with 3 horses does not exceed 4,200 to 4,800 sq, yds. per day.

The 160,6 acres worked cost about $535 for fuel, lubricants, socks and new parts repairs and upkeep. The working parts of the machine did not seem to have suffered, in spite of the difficult ground The tractor was driven by the estate foremen; in spite of this, the author allowed the drivers the pay of 19 cents an hour ; on adding, for the working hours $66 to the expenses, the total became $602 and each acre worked cost $3.75. The author has only been able to estimate very roughly the depreciation of the machine, etc. Supposing that the tractor, which cost $2500, can last three years if well cared for, the depreciation would amount to about $67.60 a month, giving say $236.75 for the 3½ months of work. The total cost for the 160.6 acres would then amount to $830, or $5 per acre, which is very high for work at 7 or 8 inches deep, but little higher than the cost for the same work performed by animals.

This example again shows the advantage of machine cultivation and the great help it may afford under the present circumstances, even with imperfect machinery.

336—**Investigations of Irrigation Pumping Plants, in Montana, U.S.A.**—MURDOCK, H. E., in: I. *University of Montana Agricultural Experiment Station, Circular* No. 60, pp. 37. Bozeman, Montana January, 1917; II. *Ibid., Bulletin* No. 115, pp. 127-148. Bozeman, Montana, January, 1917. (2 pp. in Institute Bulletin).

RURAL ECONOMICS

339—**Government Lands, Leased Lands and Alienated Lands in Australia.**—*The Pastoral Review*, Vol. XXVII, No. 12, pp. 1137. Melbourne, December 15, 1917.

According to official returns there were to the end of June, 1916, in Australia, 105,422,000 acres of land belonging to private owners, while a further 56,096,000 acres were in process of being sold by the Government to private owners.

Then there were 893,054,000 acres leased, or held under various forms of tenure, and 849,159,000 acres of vacant Government lands, including roads and reserves. The position in each State is as follows:—

	Fully Alienated Acres	Alienation Proceeding Acres	Leased Acres	Unoccupied Acres
1 New South Wales	40,363,316	19,409,656	118,865,868	19,415,580
2 Victoria	24,256,222	8,075,653	13,035,612	10,878,273
3 Queensland	16,447,382	10,776,793	332,824,905	69,070,920
4 South Australia	10,590,756	2,943,395	115,396,433	114,314,216
5 West Australia	8,125,629	13,584,076	196,772,098	406,106,997
6 Tasmania	5,125,197	1,225,924	1,939,905	8,486,574
7 North Territory	474,590	—	113,926,627	220,715,583
8 Fed. Territory	38,961	80,979	292,690	171,030
Australia	105,422,053	56,096,476	893,054,138	849,159,173

340—**Machine Sheep-Shearing and Lack of Labour in New Zealand.**—BRUCE, J. L., in *The Journal of Agriculture, New Zealand Department of Agriculture, Industries and Commerce*, Vol. XV. No. 3, pp. 134-135. Wellington, September 20, 1917.

AGRICULTURAL INDUSTRIES

342—**The Milling and Baking Qualities of Australian Wheat.**—SCOTT, P. RANKIN, and WINSLOW, F. G. B., in *The Journal of the Department of Agriculture of Victoria, Australia*, Vol. XV., Pt. 8, pp. 474-481. Melbourne, August, 1917. (2 pp. in Institute Bulletin).

343—**The Soluble Nitrogenous Matter as an Index of the Baking Quality of Flour.** ROUSSEAU and SIROT, in *Comptes rendus des Séances de l'Académie des Sciences*, Vol. CLXVI, No. 4, pp. 190-192. Paris, January 28, 1918. (1 page in Institute Bulletin).

344—**The Use of Chalk in Breadmaking.**—EFFRONT, JEAN, in the *Bulletin de la Société scientifique d'Hygéine alimentaire et d'alimentation rationnelle de l'homme*, Vol. V, No. 8, pp. 437-446. Paris, 1917.

In opposition to Messrs Lapicque and Legendre (1) who assert that the use of chalk inhibits the action of the soluble ferments contained in bran, which cause the acidification of bread, the author maintains that this acidity is not the result of enzyme action. The germinated grains may be treated with alkalis and acids in quantities 20 times higher than those at which enzymes in solution are destroyed without losing any of their active substances. Similarly, the soluble ferments of flour diluted in water can bear a temporary change in the reaction of the medium without any change occurring in the enzymes they contain. Sharps treated with chalk and then diluted in a mixture of flour and water keep all their active substances which, moreover, have no harmful effect on breadmaking.

The acidity of the flour, bad smell, bad keeping quality and the tendency of bread to go mouldy are not due to the enzymes of the bran, but to bacteria derived from insufficient cleaning of the grain and the presence of a large quantity of bran, the bacterial flora of which is richer than that of flour. The addition of 40 centigrams of chalk, as advocated in the new method has no favourable action on the acidity,

(1) See Agricultural Gazette, July, 1918, page 733.

keeping qualities, or colour of the bread. In the presence of a fresh, strong yeast the amount of chalk advised has no action on the fermentation process. If the yeast is unsatisfactory, the introduction of chalk is certainly harmful.

Everything goes to prove that chalk bread is less easy to digest than ordinary bread, since the mono and tribasic phosphates, so favourable to salivary digestion, are replaced in the new bread by insoluble tribasic phosphates which have no influence on the very important first stage of digestion.

AGRICULTURAL ECONOMICS

A STATISTICAL ENQUIRY INTO AGRICULTURAL ORGANIZATIONS IN THE UNITED STATES.

The farmers' purchasing and marketing organizations of the present time in the United States may be divided into non co-operative capital stock companies and co-operative organizations. It is unfortunate that, as we have several times noticed in this review, so many American farmers' organizations are not founded on a strictly co-operative basis, and their development is undoubtedly hindered in consequence. Among the causes for this state of affairs is the fact that the laws of the various States have specifically provided for the organization of truly co-operative societies only within the last few years, and even now many States have no special laws which do this. The present laws governing co-operation in some States are so general in character that organizations formed in accordance with them do not necessarily embody the underlying principles of co-operation. Therefore a large number of farmers' organizations have been formed under general corporation laws. Among the general public there is no clear conception of the differences between co-operative and non-co-operative forms of organization. The separation of the farmers' organizations in the United States into these two groups is not a simple task. The main point to be considered is the extent to which an organization works for the benefit of the farmer. It may never declare a dividend to those it serves and yet be of profit to them. Many grain elevators, organized as stock companies, are examples of this. They have paid out their profits in the form of dividends on stock, yet have in many cases been of benefit to all those supplying their grain because they have paid a higher price for it than that which the farmers had previously received.

The farmers of the United States have undertaken many different forms of agriculture which have given rise to different kinds of co-operative associations. We will briefly notice these.

a) *Elevators.* —The growth of the movement to establish farmers' elevators was at first very slow but gradually it gained importance. Since 1900 a number of very successful farmers' elevators have been established in the grain growing States of the Middle West. As their position became sure they began to do more than handle grain. In some districts it is usual for them also to undertake the consignment of grain, and many of them have achieved marked success in handling such commodities as coal, lumber, bricks, flour, fodder, salt, twine, oils and other supplies necessary to the farmers.

Practically all the important Middle West grain States now have State associations of farmers' elevators. These associations make it possible for the local companies to keep in touch with each other and effectively promote their interests. A number of the State associations have formed the National Council of Farmers Co-operative Associations, which represents the farmers' elevator companies where matters of interstate or national importance are at stake.

It is unfortunate that many farmers' elevator companies fail to observe co-operative principles.

b) *Creameries.*—There are approximately 5.500 creameries and 3,500 cheese factories in the Uuited States at the present time. Most of them are situated east of the western boundary of Minnesota and Iowa. The organization of cheese factories dates from about the middle of last century and creameries for the manufacture of butter were formed a few years later. The early factories were usually co-operative in form. A number of co-operative factories were established in New England, in New York and the surrounding States. Creameries and cheese factories were not established in the North Central States until later, when the country was settled and farmers in general ceased only to grow grain and produced diversified crops. The first co-operative creamery in Minnesota was established in 1889. There are now more than 600 enterprises of the kind in that State.

The farmers' creameries have had to meet less systematic competition than the elevators, and their failures have been mainly due to deficient organization or their establishment in districts which did not afford them a sufficient supply of raw material. As a rule they observe co-

operative principles better than the elevators, this fact being due to the character of their business. The production of grain is seasonal and the market for it fluctuates, and the farmers are accustomed to being paid for it at the time of delivery. Dairy production is less seasonal and the market for dairy produce more stable, while those who supply the creameries with milk are used to being paid for it once a month. It is therefore a common practice of creameries to deduct the expenses of operation, set aside the necessary reserve, and divide the net proceeds of the business among the suppliers of milk every month in accordance with the amount of butter fat each has delivered. Many of the farmers' creameries are therefore co-operative in the full sense of the word. Some of them set aside an amount which allows interest to be paid on the invested capital while others pay no interest on it. Many of them are non-stock organizations, the capital for building and equipping having been borrowed and being paid back by means of a small monthly assessment on the business done. In a few cases a creamery has bought out the holders of its capita stock with funds obtained by levying a small monthly assessment on the raw material delivered at the factory.

All the farmers' creameries are not, however, as strictly co-operative. Some pay cash for the raw material as it is delivered and therefore, as they must buy their butter fat on a safe margin, cannot work strictly on a basis of no profits. The surplus funds they obtain are divided among the suppliers of material *pro rata*, either quarterly or annually, or among the shareholders as a dividend. In some cases, but less frequently than among the elevator companies, large dividends have thus been paid.

c) *Stores.*—A number of co-operative stores were in existence about the middle of last century, especially in the New England States. The seventy-seventh half-yearly report of the Lowell Co-operative Association, which was established in 1876, shows that in the six months ending 30 June 1914, suppliers' dividends amounting to about $5,000 were distributed.

For various reasons a large number of failures have occurred among the farmers' co-operative stores. The business is less well understood by the farmer than is that of the elevators or the creameries, and he does not take its problems into consideration.

d) *Fruit and Vegetable Produce Associations.*—The marketing of the fruit crop is complicated by the perishable nature of the commodities handled and the fact that many of them are produced within certain restricted areas whereas they have to be distributed all over the United States and abroad. The fruit growers of the States have been attracted by the possibilities of marketing fruit co-operatively; and in the last twenty-five years many successful associations have been formed for this object, especially among the citrus fruit growers of California and the apple growers of the North Pacific States.

Method of enquiry.—In January 1914 the office of Markets and Rural Organization secured a list of the co-operative marketing organizations in the United States. Question forms asking for plan of organization, etc., were sent to the organizations on this list. It is believed that the organizations which reported included most of the active businesses and that the information obtained gives a fairly complete summary of the facts as to co-operation in the United States between 1912 and 1915.

In the article in the Institute Economic Bulletin a table is given showing the total number of farmers' organizations reporting to the Office of Markets and Rural Organization in the several States and in the whole country. Of the 5,424 organizations included in the report 1,637 are grain elevators and warehouses, 1,708 creameries and cheese factories, 871 fruit and vegetable produce, 213 cotton, 275 stores, 43 tobacco, 96 live stock, and 581 miscellaneous associations.

A second table shows the type of organization, the annual volume of business, and the membership of the organizations reporting on those points for each State and for all the United States. Those that conduct their businesses as ordinary stock companies have been placed in one class and those more truly co-operative in another.

NATIONAL MILK PRODUCERS' FEDERATION OF THE UNITED STATES.

The National Milk Producers' Federation was organized and incorporated at Chicago in December 1916 and promises much for the whole milk industry. Its purposes are: an investigation of the conditions, including contracts, under which milk is sold by farmers and wholesalers; the dissemination of information as to prices, markets and grades to members of the federation and producers; the introduction of legislation as to grades and standards; the organization of milk producers' associations; and, in general, the protection of the milk industry. The membership includes organizations of milk producers, particularly those selling whole milk. At present it comprises the milk producers' associations of Chicago, Twin City, Milwaukee, St. Louis, Cincinnati, Michigan, and North Ohio, the Dairymen's League of New York, the New England Milk Producers' Association which covers the six New England States, the Tri-State Milk Producers' Association which covers New

Jersey, Pennsylvania and Maryland, and a few smaller organizations.

The federation met in Washington on 10 October, 1917, to perfect its organization, and to discuss with the Federal Food Administrator the problem of milk prices and contracts and with the Department of Justice the legal status of farmers' associations dealing with the sale of milk.

For the future the federation will maintain in Washington a representative who will devote himself to the interests of dairy-farming associations, especially in so far as the marketing of the whole milk is concerned.

SETTLEMENT OF EX-SERVICE MEN IN CAPE COLONY.

An offer to set aside for British ex-Service men 2,000 acres of the irrigated area known as the Cape Sundays River Settlements was made in March 1915 to Sir Rider Haggard, then on his mission round the empire for the Royal Colonial Institute. The property in question is some twenty five miles from Port Elizabeth, the seaport of the eastern province of Cape Colony, and is served by the main railways from Port Elizabeth to Cape Town and Johannesburg. The company owning it was formed some years ago and has the object of providing land suitable for settlement by desirable British and South African settlers. The climate on this property is entirely healthy, the soil unsurpassed; and the crops which can be cultivated profitably are numerous. Citruses form the main crop and are marketed in Europe in the summer when they are out of season in the northern hemisphere. Lucerne, mealies, apples, pears, beans, figs and olives are other crops; and bees and poultry can be kept as a good secondary source of profit.

The director of Immigration for the Union of South Africa has described the scheme for colonization by soldiers and sailors as "one of the most favourable closer settlement schemes which the Union is ever likely to produce."

The company has now definitely reserved 2,000 acres to be known as the Royal Colonial Institute Block. The land will be divided into blocks of 20, 30 and 40 acres, the latter to be the maximum area allotted although a settler may acquire further land outside this area. There will be a qualified staff of advisers who will keep in touch with the settlers and will, if necessary, arrange for the execution of such preliminary work as first ploughing, fencing and transport, the cost of these undertakings to be added to the purchase price. The settler's initial outlay will thus be reduced.

The special price which British ex-service men will pay is $150 per acre of irrigable land, cleared of bush, stumped and ploughed to a depth of nine or ten inches. The purchase price will bear interest at the rate of 6 per cent; 20 per cent thereof will be paid in the sixth year of occupation and the balance in the four following years. The settler will therefore pay only interest in the first five years in which he is establishing himself.

It is considered necessary that he should have a working capital of $2500.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN.

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the February number of the International Review of Agricultural Economics. Persons interested in any of the articles in this list may obtain the original bulletin on application to the Institute Branch, so long as the supply for distribution is not exhausted.

AGRICULTURAL STATISTICS

AREAS OF CEREAL CROPS IN THE NORTHERN HEMISPHERE

Countries	1918	1917	Five years' average 1912–16	1918 compared with 1917	1918 compared with Five years' average
	acres	acres	acres	%	%
WHEAT:					
Denmark	141,000	138,000	144,000	102.4	98.4
Spain	9,997,000	10,134,000	9,827,000	98.6	101.7
France	11,927,000	10,397,000	14,179,000	114.7	84.1
England and Wales	2,665,000	1,919,000	1.891,000	138.9	140.9
Scotland	67,000	55,000	64,000	121.8	105.4
Italy	10,873,000	10,556,000	11,887,000	103.0	91.5
Luxemburg	23,000	22,000	27,000	104.8	85.1
Sweden	279,000	280,000	284,000	100.0	98.3
Switzerland	203,000	139,000	110,000	146.2	184.5
Canada (a)	15,838,000	14,756,000	12,557,000	107.0	126.0
United States	58,881,000	45,941,000	52,558,000	128.2	112.0
India	35,342,000	33,029,000	30,554,000	107.0	115.7
Japan	1,458,000	1,236,000	1,193,00	118.0	122.3
Algeria	3,186,000	3,222,000	3,382,000	98.9	94.2
Tunis	1,413,000	1,310,000	1,353,000	107.9	104.4
Totals	152,293,000	133,134,000	140,010,000	114.4	108.7
RYE:					
Denmark	537,000	455,000	565,000	118.0	95.0
Spain	1,989,000	1,829,000	1,883,000	108.8	105.6
France	1,942,000	2,001,000	2.508,00	97.1	77.5
Italy	272,000	279,000	299,000	97.3	91.0
Luxemburg	16,000	17,000	25,000	94.8	63.7
Sweden	781,000	813,000	952,000	....	84.2
Switzerland	72,000	55,000	64,000	129.7	112.1
Canada (a)	229,000	212,000	126,000	108.0	182.0
United States	5,435,000	4,102,000	2,712,000	132.5	200.4
Totals	11,273,000	9,763,000	9,134,000	115.5	123.4
BARLEY:					
Spain	4,248,000	3,839,000	3,649,000	110.7	116.5
France	1,396,000	1,474,000	1,689,000	94.7	82.7
England and Wales	1,490,000	1,460,000	1,417,000	102.1	105.2
Scotland	150,000	159,000	181,000	94.3	83.0
Italy	494,000	471,000	607,000	105.3	81.4
Switzerland	22,000	5,000	4,000	440.0	550.0
Canada (a)	2,404,000	2,392,000	1,642,000	100.0	145.9
United States	9,108,000	8,835,000	7,549,000	103.1	120.6
Japan	2,721,000	2,738,000	3,106,000	99.4	87.6
Algeria	2,794,000	2,839,000	3,086,000	98.4	90.5
Tunis	1,238,000	1,038,000	1,162,000	119.3	106.5
Totals	26,065,000	25,250,000	24,092,000	103.2	108.2
OATS:					
Spain	1,506,000	1,168,000	1,347,000	128.9	111.8
France	7,227,000	6,437,000	8,502,000	112.3	85.0
England and Wales	2,820,000	2,259,000	2,030,000	124.8	138.9
Scotland	1,220,000	1,041,000	957,000	117.2	127.4
Italy	1,112,000	1,107,000	1,206,000	100.5	92.2
Switzerland	86,000	70,000	88,000	122.7	98.1
Canada (a)	13,784,000	13,313,000	10,803,000	104.0	127.2
United States	44,475,000	43,572,000	39,413,000	102.1	112.8
Algeria	588,000	682,000	542,000	86.2	108.4
Tunis	156,000	124,000	132,000	126.0	117.9
Totals	72,974,000	69,773,000	65,020,000	104.6	112.2

(a) The estimated yield of cereals in Canada for 1918, as indicated by reports on condition on July 1st are: wheat, 257,367,000 bushels; rye, 3,281,000 bushels; barley, 60,225,000 bushels; oats, 450,036,000 bushels.

UNITED STATES JULY CROP REPORT

The July report of the Department of Agriculture makes the amount of wheat remaining on the farms on July 1st about 1.3 per cent of last year's crop, or about 8,283,000 bushels compared with 15,611,000 bushels last year, and 39,056,000 bushels the average for five years.

The estimated condition and yields of the principal crops were as follows:

	Indicated Yield	Aggregate
Winter wheat	15.3	557,000,000
Spring wheat	14.8	334,000,000
All wheat	15.1	891,000,000
Corn	27.8	3,160,000,000
Oats	32.3	1,437,000,000
Rye	15.0	81,600,000
Barley	25.2	230,000,000
Flax	9.0	15,800,000
Potatoes	98.6	406,000,000
Hay—tons	1.47	102,000,000

Area seeded to corn 113,835,000 acres, compared with 119,755,000 acres last year. Potatoes, 4,113,000 acres, against 4,390,000 acres last year. Flax seed, 1,967,000 acres, against 1,809,000 acres last year.

BROOMHALL'S FOREIGN CROP CABLE, JULY 16, 1918

France.—Condition of crops, as a whole, is excellent. The outlook for winter cereals is good. Further rains have fallen which have benefited the spring crops but more moisture is needed.

Italy.—Moisture has been excessive in parts and due to the heavy rains the crop outlook in some sections is less favourable. This year's wheat outturn is expected to be moderate. Harvesting is in progress in Sicily.

Spain.—Weather has been generally favourable for the maturing of the crop and material improvement is noted over earlier indications. Rains have fallen, but there are many sections still needing moisture.

Sweden.—Much rain and warm weather served to improve the prospects of the coming harvest. The outlook is fair to excellent.

North Africa.—Harvesting in Tunis is well under way and fields are said to be satisfactory. The outlook in Algeria is very good. Expectations point to a larger outturn in Morocco than last year.

United Kingdom.—Weather has been a little cooler with less sunshine, but conditions generally remain favourable. Crops continue to make seasonable progress and the favourable outlook for the wheat crop is maintained. Some spring sown was damaged by pests, but otherwise conditions are satisfactory. Crops throughout the South of England are in full ear.

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DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE

The Agricultural Gazette
of Canada

EDITOR: J. B. SPENCER, B.S.A.

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The Agricultural Gazette

OF CANADA

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THE AGRICULTURAL GAZETTE of Canada is published monthly, in English and in French, by the Dominion Department of Agriculture. It is not intended for general circulation. A limited number of copies, however, are available to subscribers at $1.00 per annum, or 10 cents per copy.

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GRANTS UNDER THE AGRICULTURAL INSTRUCTION ACT

THE grants made to the Provinces by the Dominion Government under THE AGRICULTURAL INSTRUCTION ACT for the fiscal year 1918-19 are herewith given:

Province	Amount
Ontario	$ 336,303 26
Quebec	271,113 76
Nova Scotia	81,716 69
New Brunswick	64,110 80
Prince Edward Island	31,749 22
British Columbia	69,199 06
Manitoba	77,113 11
Saskatchewan	81,728 48
Alberta	66,965 62
Veterinary Colleges	20,000 00
Total	$1,100,000 00

Agreements have been entered into with all the provinces embodying the projects to which the moneys received from the Federal Government are to be devoted.

The work to be carried on during the current year is similar in the object and character to that of previous years. It relates to the following spheres of activity:

First, Assistance to Elementary Agricultural Education. This field includes school agriculture; boys' and girls' clubs and competitions, and school fairs; agricultural schools; short courses, and aid to agricultural colleges. The curriculum of the public schools, particularly of the rural schools, is gradually changing and considerable attention is being paid to nature study and elementary agriculture, including school and home gardening. This is evidenced by the large proportion of the grant being devoted to this class of work. This year the College of Agriculture of the province of British Columbia participates in the grant for the first time.

The second main division of work is that of Instruction and Demonstration. The methods employed by Departments of Agriculture to bring home to those engaged in farming a knowledge of up-to-date agriculture are many

and varied. All the demonstrational and instructional work to which the grant lends assistance has that end in view, and much is being accomplished in this way to improve agricultural conditions. Under this head, the grant gives assistance in the following fields, namely: Agricultural Representatives work; live stock; dairying; field husbandry; seed production; poultry; horticulture; insect and plant disease control; beekeeping; drainage; demonstration farms; co-operation and marketing; demonstration trains; and to the instructional work carried on by the extension services of the respective agricultural departments.

The amount allotted to Women's Work is given in acknowledgement of the difficulties and disadvantages associated with domestic life on the farm and in response to the needs of farm women. In many of the provinces, the grant supplies all the funds employed in the conduct of Women's Institutes, Homemakers' Clubs, and Home Economic Societies. In other provinces, such as Ontario, it provides for the holding of special classes of instruction in domestic science and the household arts.

THE ALLOTMENTS BY PROVINCES

PRINCE EDWARD ISLAND

AGRICULTURAL BUILDINGS:	
Equipment and Maintenance, Agricultural Halls	$ 2,825 00
Director and Agricultural Representatives	5,500 00
Short Courses	300 00
Drainage and Soils	1,000 00
Live Stock and Dairying	2,900 00
Poultry, Beekeeping, Horticulture and Co-operative marketing	300 00
Women's Institutes	3,510 00
ELEMENTARY AGRICULTURAL EDUCATION:	
Agricultural Instruction in Public and High Schools, Training of Teachers, Allowances, Grants, Maintenance of Rural Science Department, Prince of Wales College	11,500 00
Contingencies, including clerical assistance	3,914 22
Total	$31,749 22

NOVA SCOTIA

COLLEGE OF AGRICULTURE:	
Science Building—Interest and Sinking Fund	8,000 00
Salaries and Maintenance	23,000 00
DEMONSTRATION AND INSTRUCTION:	
Agricultural Representatives	10,000 00
Short Courses, including maintenance of Demonstration Buildings and allowances to Students	2,000 00
Dairying	3,500 00
Poultry	1,500 00
Beekeeping—Educational Work	800 00
Drainage demonstrations and Soil Surveys	1,800 00
Soil and Fertilizer demonstrations	1,700 00
Field-crop demonstrations	1,500 00
Fruit-growing	2,000 00
Women's Work—Institutes and Clubs, Domestic Science Short Courses, and allowances	3,000 00
Entomological Work—Investigations and Education *re* Insect Pests	10,000 00
ELEMENTARY AGRICULTURAL EDUCATION:	
Agricultural Instruction in Public, High, and Normal Schools, Teacher Training, grants and allowances	10,000 00
School Children's exhibits and competitions	2,000 00
Contingencies and Miscellaneous	916 69
Total	$ 81,716 69

NEW BRUNSWICK

AGRICULTURAL SCHOOLS:	
Equipment	$ 500 00
Salaries and Maintenance	2,400 00
INSTRUCTION AND DEMONSTRATION:	
Agricultural Representatives	8 860 00
Beekeeping	2,700 00
Soils and Drainage	3,700 00
Horticulture	6,000 00
Live Stock	6,300 00
Dairying	4,600 00
Poultry	4,300 00
Fertilizers	500 00
Entomology	1,300 00
Agricultural Societies	1,600 00
Women's Institutes	6,000 00
Miscellaneous	550 80
ELEMENTARY AGRICULTURAL EDUCATION:	
Agricultural Instruction in Public, High, and Normal Schools, Household Science, Teacher Training, grants and allowances	13,000 00
School Fairs	1,800 00
Total	$ 64,110 80

QUEBEC

COLLEGES AND SCHOOLS OF AGRICULTURE:	
Grants and Allowances—	
Macdonald College, School of Agriculture, Ste. Anne de la Pocatière, Oka Institute	75,000 00
School of Veterinary Science—building extension	5,000 00
INSTRUCTION AND DEMONSTRATION:	
Animal Husbandry	9,000 00
Poultry Husbandry	18,000 00
Horticulture and Entomological work	31,000 00
Experimental and Demonstration orchards	4,000 00
Dairying—educational work in Cheese and Buttermaking	5,000 00
Agricultural Representatives	67,000 00
Seed selection, clover plots and demonstrations	9,000 00
Beekeeping—educational work	7,000 00
Drainage	6,000 00
Maple Industry—maintenance of schools and allowances to students	4,000 00
Short Courses and Lectures	9,113 76
Experimental Union	2,000 00
ELEMENTARY AGRICULTURAL EDUCATION:	
To promote the teaching of Agriculture in Academies, Rural and Normal Schools, Teacher Training, School Gardens	8,000 00
To promote the teaching of Domestic Science in Academies and Normal Schools—grants, lectures and inspection	10,000 00
School Children's exhibits	2,000 00
Total	$271,113 76

ONTARIO

AGRICULTURAL COLLEGES AND SCHOOLS:		
Ontario Agricultural College :		
(a) Buildings, equipment and furnishings	$135,000	
(Re Grant—Payment deferred)		
(b) Salaries and expenses, additions to staff, maintenance.	15,000	
		$150,000 00

ONTARIO—*Continued,*

Agricultural School and Farm :		
(a) Capital expenditure	$ 60,000	
(Re Grant—Payment of $40,000 deferred)		
(b) Maintenance, purchase of stock, machinery, repairs, services, expenses and equipment	20,000	
		$ 80,000 00
INSTRUCTION AND DEMONSTRATIONS:		
District Representatives, including clerical and other assistance in connection with the administration		20,000 00
Extension work in Household Science in rural communities		2,000 00
Co-operation and Markets, educational work in connection with the marketing of farm products including organization of co-operative societies		7,000 00
Demonstration and instruction in vegetable growing		7,000 00
Stock and Seed Judging Short Courses and Institute lectures		2,303 26
Women's Institute work, including courses in cooking, sewing, etc		5,000 00
O. A. C. Short Courses for winners of Acre Profit and Live Stock Competitions, including travelling and living expenses		2,000 00
Lectures in Horticulture		500 00
Demonstration in growing and handling fruit		2,000 00
Demonstration with vegetables and hardy fruits in New Ontario		4,500 00
Vineland Horticultural Experiment Station experimental work		2,000 00
Drainage work		2,500 00
Demonstration work on soils		4,000 00
Beekeeping		500 00
Instruction and special educational work in growing and handling corn		3,000 00
Instruction and demonstration with live stock and poultry		2,000 00
ELEMENTARY AGRICULTURAL EDUCATION :		
To provide for and to encourage the teaching of agriculture, manual training as applied to work on the farm, and domestic science in High, Public, Separate and Continuation Schools, and in Universities, to be available for grants, services, expenses and equipment, and travelling and living expenses of teachers, inspectors and others in attendance at Short Courses, or other educational gatherings, and to be paid out on the recommendation of the Department of Education		40,000 00
Total		$336,303 26

MANITOBA

Demonstration Farm, Killarney	$ 4,000 00
Dairy work	6,000 00
Poultry	5 000 00
Agricultural Representatives	8,113 11
Boys' and Girls' Clubs	19,000 00
Short Courses in Agriculture	16,000 00
Home Economics, including Short Courses in Household Science	15,000 00
Soil Analysis and Survey	1,000 00
Bee-Keeping	2,000 00
Miscellaneous	1,000 00
Total	$ 77,113 11

SASKATCHEWAN

COLLEGE OF AGRICULTURE :	
Staff Salaries—Research and Extension Service	21,476 16
Women's Work—Homemakers' Clubs	5,500 00
INSTRUCTION AND DEMONSTRATION :	
Co-operation and Marketing	6,000 00
Animal Husbandry	6,000 00
Dairying	6,000 00
Field Husbandry	6,000 00
Demonstration Trains	1 000 00
Agricultural Representatives	1,476 16
Veterinary Short Course	500 00

SASKATCHEWAN—*Continued.*

ELEMENTARY AGRICULTURAL EDUCATION :		
Agricultural Instruction in Public, High and Normal Schools; Household Science; Training of Teachers; Nature Study		$ 25,000 00
School Fairs		1,976 16
POST GRADUATE COURSE IN AGRICULTURE :		
Agricultural Scholarships		800 00
Total		$ 81,728 48

ALBERTA

SCHOOLS OF AGRICULTURE :		
(a) Maintenance	$35,000	
(b) Equipment, including Libraries	3,500	
		38,500 00
Demonstration Farms—Maintenance		8,000 00
Publicity		2,500 00
Women's Work		7,500 00
Agricultural Representatives		10,000 00
Miscellaneous		465 62
Total		$ 66,965 62

BRITISH COLUMBIA

Agricultural and Horticultural Instructors and Agricultural Representatives	10,000 00
Field Crop and Dry Farming Demonstration Stations	3,100 00
Seed work	1,000 00
Field Crop Competitions	2,000 00
Silo Demonstrations	3,000 00
Drainage Demonstrations	500 00
Horticultural Demonstrations and Competitions	3,000 00
Fruit Packing and Pruning Schools	2,000 00
Poultry	1,000 00
Dairying	3,000 00
Bee-Keeping	2,500 00
Boys' and Girls' Clubs	1,500 00
Agricultural Journal and Publications Branch	5,000 00
Pathological and Entomological Investigation and Research	3,000 00
Miscellaneous	599 06
Agricultural Instruction in Public, High and Normal Schools, Training of Teachers, Grants	20,000 00
Investigation and Extension to University of British Columbia	8,000 00
Total	$ 69,199 06

CANADA FOOD BOARD RESULTS

COMPLETION OF THE FIRST HALF YEAR OF THE BOARD'S WORK

The first half year of the Canada Food Board's activities was completed on August 11. The Board, during that time, has inaugurated many measures looking to the conservation of food, and economical distribution. It has also co-operated with the agricultural departments, federal and provincial, in encouraging greater production.

The effect of these measures may be noted by increased exports to Great Britain and her Allies. In the case of beef, these exports have increased over the average exports for 1910-1914 by 75,000,000 pounds

per annum, or 6,795 per cent; in the case of pork (including bacon and lard), the net exports have increased by 125,000,000 pounds per annum, or 571 per cent. It is estimated that Canada has exported at least 25 to 30 per cent more wheat during the last twelve months than could have been exported had it not been for conservation and organization of the country's food resources.

Among the measures which have been effective in accomplishing these results are the following:

Flour has been standardized and the milling extraction of wheat has been increased twice. Canada is now using 76 per cent of the wheatberry in its standard flour.

Bakery products have been standardized and the amount of certain ingredients has been limited to prevent extravagant use, while the manufacture of other products involving an excessive use of sugar and fats has been prohibited.

A great saving of wheat has been effected by the licensing and regulating of the trade in package cereals, manufacturers being required to substitute a considerable portion of other cereals than wheat in their preparations.

Before the war Canada was importing butter at the rate of 7,000,000 lb. annually. This country is now producing enough butter to meet domestic requirements, and, in addition, is exporting at the net rate of more than 4,000,000 lb. per annum.

Conservation measures and voluntary saving in the homes have reduced Canadian consumption of flour from 800,000 to 600,000 barrels per month, as compared with pre-war consumption. This means a saving at the rate of 2,400,000 barrels per year, or, counting the saving by lengthened extraction of milling, of 2,640,000 barrels per year. This is equivalent to a saving of nearly 12,000,000 bushels of wheat.

The use of grain for distillation of potable liquors has been prohibited, and the use of malt has also been limited.

The feeding of grain to live stock in stock yards has been regulated, and the feeding to poultry of wheat fit for milling purposes has been prohibited.

Waste of food has been made an offence subject to heavy penalties, and municipalities have been given wide powers in checking such waste.

Arrangements have been made for an abundant supply of fish, at reasonable prices, as a substitute for meat and other foods.

FOOD CONTROLLERS' CONFERENCE

A CONFERENCE of the Food Controllers of the Allied Countries was held in London, England, on July 22nd. After considering all points of the situation, and taking into account the supplies of food products on hand, in transit, and in prospect, it was decided that increased food production and conservation were still vital to the successful prosecution of the war. The following resolution expressing the views of the conferees was adopted:—

Resolved that while the increased production of the United States and Canada rendered it possible to relax some of the restrictions which have borne with peculiar hardship upon our people, yet it is absolutely necessary that rigid economy and elimination of waste in the consumption and handling of all food stuffs, as well as increased production, should be maintained throughout the European Allied countries and in North America; that it is only by such economy and elimination of waste that the transportation of the necessary men and supplies from North America to the European front can be accomplished, and stocks of food stuffs can be built up in North America as an insurance against the ever present danger of harvest failure and the possible necessity for large emergency drafts to Europe; and, further, that we cannot administer the food problems on the basis of one year's war, and that we must prepare for its long continuance if we are to ensure absolute victory.

PART I

Dominion Department of Agriculture

THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF HORTICULTURE

EVERBEARING STRAWBERRIES

BY W. T. MACOUN, DOMINION HORTICULTURIST

INTEREST in everbearing strawberries has increased very much during the past few years, and this has been brought about by the introduction of varieties which are much superior in some respects to those which were formerly available.

The first variety of these comparatively recent introductions which attracted attention is the Pan American, which was shown at the Pan American Exhibition in Buffalo in 1900. The parent plant was discovered by Mr. Samuel Cooper, of New York State, in the Autumn of 1898, in a field of the Bismarck variety, his attention being drawn to it on account of its having fruit in the autumn. From this variety, and through Mr. Cooper, several have been developed; among them are the Autumn, Productive, Superb, Peerless, Onward, Forward, and Advance; but none of these have so far become as popular as those which have been originated by Mr. Harlow Rockhill, of Iowa, who used as one of the parents the Louis Gauthier, one of the best of the European everbearing sorts. Some of his varieties are crosses between it and the Pan American, although the Progressive, which has done best at Ottawa, is a cross between the Senator Dunlap and the Pan American. Some of the best of Mr. Rockhill's introductions are Progressive, Americus, Francis, and Iowa.

The Minnesota Plant Breeding Station has done considerable work in breeding these everbearing varieties, and one of the best which has been introduced is the No. 1017.

The everbearing varieties differ from the ordinary sorts in that they usually continue blooming and bearing fruit from the time when the crop of the ordinary varieties are ripe until severe frosts in the autumn. Sometimes when there is a protracted drought in summer followed by warm wet weather in the autumn, the ordinary sorts will bloom and fruit a second time, but this is unusual.

Most of the varieties of everbearing strawberries are poor plant makers, and, on this account, the price of some of them has remained comparatively high. The Progressive and Americus, however, which are two of the best, make a fair number of runners. The fruit of

these is medium in size, bright red in colour, attractive in appearance, and of good to very good in quality, the Americus being very good. The Superb has larger fruit and is also a good variety.

While there is often a good crop of fruit during late summer and autumn of these everbearing varieties, it is doubtful if they will be grown very generally commercially, as there are so many other fruits at that season of the year; but those who desire to have ripe strawberries for home use until late autumn will find these everbearing sorts produce in most seasons a fairly good crop of delicious berries.

The plants are set out early in the spring like the ordinary varieties, and there will be a crop in the autumn of the same year. It will be better if the first flowers are removed. The removal of the first bloom is not, however, necessary to ensure an autumn crop after the plants are well established.

THE LIVE STOCK BRANCH

THE POULTRY SITUATION IN CANADA

BY W. A. BROWN, CHIEF OF THE POULTRY DIVISION

SOME remarkable changes have taken place in the poultry industry of Canada during the past quarter of a century. From the earliest records, dating back beyond the civil war in America, up to 1907, this country was consistently an exporter of eggs and poultry. Between thirty and forty years ago we were shipping to the United States from twelve to fifteen million dozen eggs per annum. In the last decade of the 19th century a trade with Great Britain of almost similar dimensions developed, the height being reached in 1902, when eleven or twelve million dozens were sent across the seas. From that year until 1906, the export of eggs gradually diminished until in the following year we became importers. This change in the situation continued with slight fluctuations to exist until 1915, when we became as prominent exporters as importers.

FLUCTUATIONS IN TRADE

In the following year, as the table herewith given shows, we exported more than double the quantity we imported. In 1917 there was a decrease in both exportations and importations. In the year ending March 31, 1918, our exports, it will be seen, were 4,896,793 dozen eggs valued at $2,271,299, and our imports 4,274,452 dozen eggs valued at $1,504,234. It will be noticed that the prices commanded by our own eggs were considerably in excess of the prices of those we purchased.

At the same time that the big change took place in our export trade, namely, in 1906-1907, the western boom started and eastern exporters of eggs found a lucrative market in the Prairie Provinces. The year of greatest importation was 1913, when upwards of 13 million dozen eggs, or approximately 1,000 cars, which would cover a distance of between five and six miles, were imported from the United States. At this time, and in the two following years, Canada ranked among the highest-priced egg markets in the world. Following is the table previously referred to giving the exports and imports for the last twenty-four years, returns being made up from 1907 for the year ending the 31st of March in each case:

STATEMENT OF EXPORTS AND IMPORTS OF EGGS

Year.	Exports.		Imports.	
	Doz.	Value. $	Doz.	Value. $
1895	6,500,817	807,990		
1896	6,520,678	807,086		
1897	7,476,636	978,479		
1898	9,369,996	1,255,304		
1899	9,652,512	1,267,063		
1900	9,187,906	1,457,902		
1901	11,363,064	1,691,640		
1902	11,635,108	1,733,242		
1903	7,404,100	1,436,130		
1904	5,780,316	1,053,396		
1905	3,601,427	712,866		
1906	2,921,725	495,176		
1907	2,591,205	556,557	661,104	143,184
1908	1,365,890	301,818	1,149,986	214,994
1909	552,850	124,315	1,136,120	239,127
1910	160,650	41,766	884,078	190,903
1911	92,164	24,676	2,378,640	439,066
1912	203,231	56,724	7,552,248	1,617,774
1913	147,419	35,519	13,240,111	2,783,665
1914	124,002	37,150	11,274,036	2,630,364
1915	3,592,899	965,640	4,493,396	994,919
1916	7,898,322	2,273,412	3,783,952	786,100
1917	5,167,343	1,810,380	3,038,843	942,278
1918	4,896,793	2,271,299	4,274,452	1,504,234

WHAT THE TABLE INDICATES

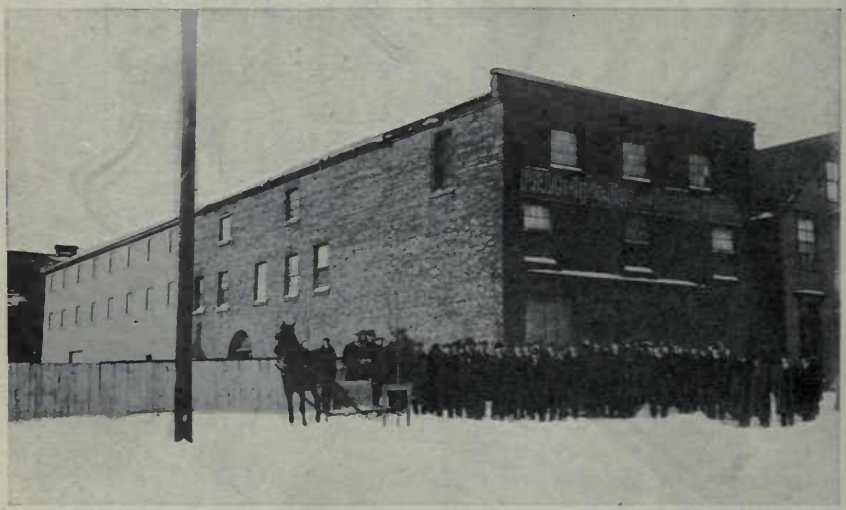
As the foregoing table shows, in the fiscal year ending March 31, 1918, 13,240,111 dozens of eggs valued at $2,783,665 came into Canada from the United States. In the following year the quantity imported had decreased by nearly 2,000,000 dozens, but, proportionately, the value had increased. By the end of 1916, this deficit had been absorbed and we had once more become greater exporters than importers. In the fall of that year we shipped to Great Britain between four and five million dozens, making a net increase in the intervening years of something over 17,000,000 dozens. It is apparent that, but for the demand created by the war, Canada's poultry industry would have suffered a serious setback. From that time on every effort has been made to stimulate production, and with gratifying success, in spite of difficulties in the matter of the supplies of suitable feeds. One very prominent factor in the movement for the increased production of eggs has been the funds derived from grants made through THE AGRICULTURAL INSTRUCTION ACT, a majority of the provinces using a portion of their allotments for that purpose.

VALUE OF THE INDUSTRY

Of an industry so largely and generally distributed as the poultry industry, it is impossible to give exact details of the production and value. It is officially estimated, however, that the value of eggs and poultry produced in Canada, and sold at home and abroad in 1917, reached $75,000,000, of which $58,000,000, or upwards of 75%, must be credited to the trade in eggs. From the census of 1910 it would appear that Canada produced 123,070,034 dozens of eggs, a total which had grown in five years to 165,934,000 dozens (estimated). These figures abundantly show the importance to the country of this great industry. So far as the poultry market is concerned the demand caused by the war has proved advantageous in its vastness.

GOOD AND BAD EGGS

Canada has had her troubles with bad eggs and low grade products and kindred evils, but owing to the Egg Trade Improvement Campaign which has been carried on, these difficulties have been largely overcome. In the West, thanks very largely to the system of inspection that has been put in force, such progress and betterment has been made that, whereas, not many years ago, western eggs were not regarded with any great amount of favour, they now command a large and easy market.



WAREHOUSE OF PRINCE EDWARD ISLAND CO-OPERATIVE EGG AND POULTRY ASSOCIATION, 155 FT. LONG.

The Markets Intelligence Service, which has recently been established, has also contributed very largely to this end, the daily and weekly reports, which are now issued, having had a most gratifying effect. Standardization has also given an impetus to the trade, and it can safely be stated that the general outlook is most promising.

IMPROVED STOCK A NECESSITY

It is hardly necessary to suggest that strong vigorous, pure-bred stock with pronounced utilitarian characteristics is a prime essential and basic consideration in the upbuilding of a permanent poultry industry. Recognizing this, Canada has been making steady progress along utilitarian bred-to-lay lines with due attention to market poultry requirements. This work has been specially fostered through boys' and girls' clubs and school fairs, which work has been carried on almost altogether by the provinces. In a Dominion way stock improvement is being fostered through the medium of the co-operative marketing associations. These associations of their own accord have recognized that pure-bred poultry constitute an important asset in obtaining the highest market prices for their products.

MARKETING AND INSPECTION

In no way has this been more pronounced than in the marketing of poultry. Some members of the associations were able to get more for their eggs and poultry than others. It was suggested that some scheme should be devised whereby the best stocks available in local districts could be made available to all. Special poultry committees were ap-

pointed to carry out the policy of stock improvement. It was announced that the association was going to distribute eggs for hatching from pure-bred stock; that those that wanted to secure them were to place their orders with the secretary; and those who wished to participate in a distribution scheme were to make application to have their flocks inspected, the understanding being that the Government would supply inspectors. The response in this way was most encouraging. Only eggs and stock from approved flocks were recognized by the Association. In addition to the general benefit accruing from culling the flocks, the very form of the organization provided an excellent means for doing effective missionary work, for when a farmer or producer makes a definite request that an inspector visit his farm to tell him whether or not his poultry flock is suitable for a certain purpose, it gives that inspector an opportunity to do missionary work of a kind and to an extent which has been rarely afforded before.

INCREASED CONSUMPTION OF POULTRY PRODUCTS

The Home Consumption of poultry products is an engrossing topic. Egg consumption in Canada has developed enormously and accordingly increased consumption is the subject of this year's egg and poultry exhibit of the federal Live Stock Branch, which has been on display at the fairs in the Western Fair Circuit. This subject was chosen with the view of impressing upon consumers the national and patriotic service they can perform by using more eggs and poultry as substitutes for other meats now required for export to Europe.

The exhibit emphasizes ways and means in which the various egg dishes can be prepared and illustrates graphically and attractively by means of models a number of different egg dishes. The display of eggs in itself is highly educational, but it remains for the particularly efficient imitations of roasted chickens, ducks, and turkeys, to make the strongest appeal to the individual in the way of something good to eat.

The models are displayed in show cases and have as their setting an appropriately draped booth which forms a background for five large paintings, which emphasize increased production, increased consumption, and the importance of conservation and standardization as related to poultry products.

THE GRADING OF WOOL

BY NORMAN STANSFIELD, ACTING CHIEF SHEEP AND GOAT DIVISION

THIS year the same policy which has been conducted by the Live Stock Branch regarding the grading of wool for wool growers has been carried on. During the past season there was a very considerable increase in the amount of wool which has been graded and sold co-operatively. There has also been a considerable increase in the number of grading stations.

New grading points have been made this year, and invariably the amount of wool at all grading points has increased, so that this year approximately 4,000,000 pounds of wool have been graded and sold co-operatively. More than twice the number of graders used before were required to handle the situation this year. The value of grading is becoming recognized by the individual sheep grower more and more each year, and it should not be very long before grading can be done at a few central points throughout the Dominion and thus save considerable expense. The following is a list of collecting points, by provinces, where wool was graded during this season:

Prince Edward Island—Charlottetown, Summerside, Souris.
Nova Scotia—New Glasgow, Kentville, Yarmouth, Port Hood, St. Peters, Sydney, Guysboro, Antigonish.
New Brunswick—Fredericton, Moncton.
Quebec—Lennoxville, Shawville, Magog, Ayer's Cliff, Lake St. John, Beauceville, Gracefield, Farrellton, Wakefield, Kazubazua.
Ontario—Toronto, Guelph, Manitoulin.
Manitoba—Winnipeg.
Saskatchewan—Regina.
Alberta—Lethbridge, Pincher Creek, Calgary, Lacombe, Edmonton, Vermilion.

THE ENTOMOLOGICAL BRANCH

STUDIES ON THE RELATION OF FOREST INSECTS AND OTHER FACTORS TO FOREST REGENERATION

BY J. M. SWAINE, ASSISTANT ENTOMOLOGIST IN CHARGE OF FOREST INSECT INVESTIGATIONS

IT has been recognized that the second growth of balsam and spruce upon much of the cut-over land in Eastern Canada yields a very small number of trees of timber size per acre. In a recent paper by Dr. C. D. Howe, of Toronto University, given before the Conservation Commission, the numbers are estimated at six per acre for spruce and twelve per acre for balsam in parts of the St. Maurice Valley. Such a timber crop is hardly worth cutting and if those conditions obtain over a large part of our old pine and spruce land the outlook for a future timber supply is discouraging.

In connection with our forest insect investigations we have been studying the influence of forest insects upon the mortality of developing timber. We can already explain in a fairly satisfactory way the conditions which result in the small numbers of mature trees per acre; but it seems essential to obtain more definite and detailed information, and for this intensive studies are necessary. The causes are, in addition to the normal selective shading and crowding out of the weaker trees, chiefly injurious insects and fungi. The important insects affecting the spruce are: The Spruce Bark-beetle, *Polygraphus rufipennis* Ky. and several other bark-beetle species, and the Spruce Budworm, *Harmologa fumiferana* Clem.; those affecting balsam are: The Eastern Fir Bark-beetle, *Pityokteines sparsus* Lec. (*Tomicus balsameus*); the Fir Bark-weevil, a species of *Pissodes*; and the Spruce Budworm. The fungi concerned are chiefly species causing heart rot, and these are very destructive, particularly in the old pine workings.

If it could be shown that bark-beetles cause a large percentage of this excessive mortality, and we have considerable evidence indicating that they do, it should be feasible to avoid much of this loss on limits that were being logged, by means of properly conducted slash burning, utilizing the slash as a trap for destroying the swarms of beetles attracted to it during the first summer following the cutting. We have advocated slash burning for sometime as an effective method of controlling many injurious insects in the limits. We have published the statement several times that " Properly conducted slash burning will more than repay its cost through its effect in controlling injurious insects, at least on a limit that is held for future generations as well as our own." Studies in many parts of our forests make us confident that this statement is correct, but we have not the actual figures in percentages to show it. These can only be obtained through careful, detailed intensive studies upon definite forest plots, tabulated annually over a period of years. By means of a series of experiments such as we have now initiated we propose to obtain the

percentage of dying trees killed by insects and by fungi as the trees develop, the percentage of these killed by the individual insect species, and details of the habits of these insects in working on young growth, obtained by an intensive biological study in the field.

Eventually we should be able to state definitely how large a percentage of the growing trees were killed by insects under varying conditions and the particular species responsible; and before that time we could determine by control experiments exactly how effective slash burning is in checking the insects affecting young growth.

The work that has just been outlined deals with the question of insects and fungi, but the studies should be made in co-operation with forestry studies, so that the many problems of forest development could be covered and properly co-ordinated.

In the paper already referred to, Dr. Howe outlined a series of experiments upon forest plots for the purpose of obtaining definite information concerning the rate and methods of development, distribution and reproduction of our different coniferous timber trees. We actually know very little about the factors governing the reproduction of our cut-over lands. Studies of one year or of five years will not give the necessary information. It requires a detailed study made at two or five year periods throughout the life time of the tree from seedling to timber size. The sooner this work is commenced the sooner we shall know where we stand with regard to our future timber supply, and the sooner we shall know where to seek a remedy for the unfortunate conditions which obtain in many sections.

The problems relating to Forestry, Insects and Fungi can be dealt with on the same series of plots, and the work co-ordinated so as to give the best results.

The Commission of Conservation, the Entomological Branch and the Division of Botany of the Experimental Farms Branch of the Department of Agriculture are uniting in the development of sample plot studies of the character outlined in the preceding paragraphs. Through the co-operation of the Laurentide Company of Grand Mere, Que., and the Riordon Pulp and Paper Company of St. Jovite, Que. six sample plots have been selected for the study of balsam, three on the limits of the former Company near Lake Edward, and three on the limits of the Riordon Company about 16 miles above St. Jovite. The plots usually comprise an acre each, and are established in young balsam growing on cut-over land and in as nearly pure stands as could be found. Each plot is fairly even but the six cover different ages, types, and degrees of culling. The previous history of the plots as to cuttings and fire is known in each case.

The initial studies, establishing the plots are being made this summer, including a detailed description and the numbering and labelling of each balsam and spruce on the plots. The forestry problems are being studied by the Conservation Commission, the fungous diseases by the Division of Botany, and the insect injuries by the Entomological Branch. In intervals of one year or more, as the different problems may require, the plots will be re-examined and the condition of each tree recorded. In so far as the insect problems are concerned, it will thus be able to establish definitely in the course of years of study, exactly how many trees die from insect activities and what individual insect species are in any way concerned. Many opportunities will be offered also for the detailed study of particular insect problems. By carrying out the three groups of studies in this way much more effective work can be done. An excellent example of this is found in connection with the balsam blight, now so destructive in many places. One of the plots is located on the edge of an extensive area of this dying balsam and particular attention will be devoted to the problems connected with this injury.

THE FRUIT BRANCH

INSPECTION OF REJECTED CARS OF FRUIT AND VEGETABLES

LOSSES and waste of fruit and vegetables occasionally occur by consignees refusing to accept cars on account of defective conditions of the consignment or other causes, such as careless grading and loading. In order to facilitate a prompt delivery, ensure fairness to both consignee and shipper, and to avoid unnecessary waste, the Fruit Branch, upon a request from either shipper or consignee, will have inspection of such cars made by a Dominion Government inspector. The inspector will promptly report the exact condition of the goods, their containers, and the car itself. This inspection service is free, but at the present time, as previously explained in THE AGRICULTURAL GAZETTE, can be supplied only at the larger marketing centres such as Halifax, St. John, N.B., Quebec, Montreal, Ottawa, Toronto, Hamilton, London, Winnipeg, Calgary and Vancouver.

THE BRITISH EMBARGO ON APPLES

SO many inquiries have been received at the office of the Fruit Commissioner as to the possible removal or modification of the embargo on shipments of apples to Great Britain, that some definite statement seems necessary. Inquiries on this subject have been prompted by the failure of the fruit crop in England, and the English trade is just as desirous of receiving Canadian fruit as Canadian shippers are to get it across. The agitation is, therefore, a double-barreled one.

It appears quite certain, however, that there will be no change in the present situation. Explanations are not necessary. Every foot of available steamship space is required for the transportation of men, munitions, and food. The Canadian apple, as well as many other articles of food, is not considered essential, and, until shipping facilities are in a much more stable condition than at present, all efforts to modify the apple embargo must be futile.

THE LATE COMMISSIONER

MR Donald Johnson, Fruit Commissioner of Canada, died on the farm on which he was born at Forest, Ontario, on August 4th after a brief illness, at the age of forty-one years. Mr. Johnson was appointed Fruit Commissioner on May 1st, 1914, when the Fruit Branch was organized as a separate Branch of the Department of Agriculture. Mr. Johnson came to Ottawa from Lambton County, where he had always lived, and where he, with his brother, operated an extensive fruit farm. He occupied a prominent position in organization work, being president of the Ontario Fruit Growers' Association for two years. He was a

THE LATE DONALD JOHNSON
Dominion Fruit Commissioner

recognized authority on co-operation as it related to the fruit industry. For a considerable time he worked in close relationship with his predecessor, the late Alexander McNeill, in extending the organization of co-operative fruit associations. For six years he was president and manager of the Forest Fruit Growers' Association, which he helped to organize.

THE SEED BRANCH

CANADIAN GOVERNMENT ELEVATORS USED FOR SEED PURPOSES

BY GEO. H. CLARK, COMMISSIONER

THE Canadian Government elevators, the Seed Purchasing Commission has used for seed purposes, are those at Calgary, Saskatoon, Moosejaw, Transcona, Port Arthur, and Quebec. All of these elevators are well equipped with the best modern machines for seed and grain cleaning. Some special equipment was installed for seed-cleaning work at the expense of the Board of Grain Commissioners. This is particularly true in respect to the Calgary elevator, which is fitted for the handling of timothy seed.

The Seed Control Act authorizes the Governor in Council to make regulations. Based on this Act Orders in Council have been passed fixing the quality of seed of the various kinds of cereal grains. The wording of these seed grades conforms as closely as possible to the grades of grain as defined in the Canada Grain Act. Our seed inspectors operate at each Canadian Government elevator where seed grain is being handled. They work only on samples drawn according to law by grain inspectors, who operate under the Canada Grain Act. They accept for seed carloads of grain in an uncleaned condition which, according to their estimate, may be cleaned to conform with the standards of quality fixed by Order in Council, and issue a certificate for car lots accepted, which certificate is provided to the grain inspector, and is made supplementary to the grain inspection certificate, being attached thereto. All of the recleaned seed when shipped ex-elevator is again inspected by the seed inspector, who issues a certificate accordingly, which certificate is used in the trade in a manner quite similar to that of the regular grain inspector's certificate.

This service has now been continued as a measure of co-operation between the Board of Grain Commissioners and the Seed Branch of the Department of Agriculture during the last three years, and has worked smoothly and well. The result has been to create in the Canadian Government elevators a large supply of commercial grain of outstanding purity and vitality and suitable for seed purposes. With wheat alone varieties are kept separate, and in practice only the Marquis wheat is kept for seed purposes, for the reason that other varieties of wheat are not seemingly available in carload lots of a purity that would conform to the standards of quality desired. No. 1 seed oats may not be true to any variety, but may include many of the varieties grown in Western Canada which belong to the long white type of grade.

The services of seed inspectors at these elevators are available to farmers, seed merchants, or grain dealers on the same basis as for the Seed Purchasing Commission, and, although the greater part of the seed grain inspected by them during the past two years has been purchased and sold by the Seed Purchasing Commission, a great deal of the grain inspected by them and shipped ex-elevator under seed certificates was owned by private individuals.

PART II

Provincial Departments of Agriculture

THE SUPPLYING OF FARM LABOUR

NOVA SCOTIA

BY W. B. M'COY, SECRETARY, INDUSTRIES AND IMMIGRATION

EARLY in March the Department of Agriculture instituted an Increased Production Campaign, one of the efforts of which was the procuring of an adequate supply of labour for the farmers of the province. The working out of the details of this phase of the campaign was left largely to the Department of Industries and Immigration. That Department sent an application form for farm help to every farmer in the province. This form asked for such specific details as the character of the labour required, the wages offered, the religious denomination of the farmer and the accommodation provided.

A card was also sent to every householder in the province to be filled out by anyone in the household whose services would be available on the farm. This form asked for the date when those services would be available, the length of service that could be given, together with experience and age of applicant.

These forms all came in to the Department of Industries and Immigration, enabling the officials there to co-ordinate effort, and bring the applicants for farm work immediately into direct communication with farmers requiring their services. The two thousand school boys in the province who enlisted for work on farms were enrolled as Soldiers of the Soil, and, all whose services were not required at home, were placed with farmers under the supervision of the Director of the Soldiers of the Soil movement and his county superintendents.

By these means, simple and yet effective, the surplus of labour in one section of the province was available for distribution in another section where labour was scarce.

QUEBEC

BY A. DESILETS, B.S.A., DIRECTOR OF AGRICULTURAL LABOUR

TO complete the Greater Production division, and make at least an endeavour to solve the problem of agricultural labour, an agricultural labour office has been established by the Minister of Agriculture.

The agricultural labour office is composed of a central bureau connected with each of the 800 local agricultural committees of the province, as well as with the various recruiting sections of farm labourers

and Soldiers of the Soil. The provincial employment bureau in Quebec, Montreal, and Sherbrooke, freely co-operating with the Department of Agriculture, have succeeded, through an efficient and selective system of recruiting, in supplying a large number of competent, or at least willing, workers to the farmers who had lost their customary helpers, drafted for the army.

THE WORK AND THE RESULTS

In accordance with instructions from the central office, the secretaries of the local committees write down on special cards the application for help made by farmers, and on other corresponding cards the names of those who offer their services.

To the middle of July, the number of applications for help presented to the committees was over 6,000. Such is the scarcity of labourers that only 35 per cent of these applications could be filled.

On the 1st and 15th of each month, the secretaries of the local committee forward unfilled requests and applications to the central office. Several hundred engagements are arranged directly by the office during the month. Reduced fares were secured from the railroad companies for agricultural labourers working within the boundaries of the province. On producing a certificate supplied by the director of agricultural labour, the workman pays 1 cent per mile, provided that the distance covered is not over 300 miles. The minimum fare is $1.00.

Special endeavour has been made to place young boys of 15 to 19 years of age, able to do useful work on the farm. Instructions to this effect were given by the Labour Office to the local committees, and Soldiers of the Soil were recruited by the Y.M.C.A. from English educational institutions, and placed by Agricultural Representatives. The direction of this part of the work was given to Mr. Donald McLeod, whose foresight and devotion are a guarantee of success.

SOLDIERS OF THE SOIL

In order to encourage the movement of the Soldiers of the Soil, the Catholic and Protestant sections of the Department of Instruction recommended the extension of the summer holidays, thus enabling the school pupils to help in greater production. Seven hundred engagements were entered into by the local committees and 800 by the Y.M.C.A. The representatives of the latter association have placed 378, and the local committees and the central office have succeeded in inducing 589 Soldiers of the Soil to work on their home farm or elsewhere, with farmers.

Although the results aimed at have not been achieved in their entirety, yet this voluntary recruiting of labour has done much good in making up to a certain extent for the lack of farm help, and we have the assurance that the province of Quebec will rank high in the comparative table of agricultural yields of this country for the present year.

MANITOBA

BY J. H. EVANS, DEPUTY MINISTER OF AGRICULTURE

WE needed about 10,000 men from the east and south to help harvest Manitoba's crop this year, but fearing this number would not be available, the Department of Agriculture launched a campaign to use every man in the province who is able to give some of his evenings in the harvest fields. In every district, what are known as Community Harvest clubs were organized, enrolling the male population of the towns and villages for stooking as soon as the binder gets

to work. Most of the business places in towns close at 4 or 5 o'clock, releasing the men for two or three hours' work, and in many cases doing all a farmer's stooking in one evening. The farmer pays for the work at a fixed rate of about 40c. per hour for stooking, and about a dollar per day for necessary autos for conveyance of men. In the larger towns the club is divided into squads of 12 to 20 men, each under a foreman, while the whole is directed by a club secretary. In this way it was expected that, with the complete organization of the province, a large proportion of the stooking would be done and the crop made safe, some two hundred clubs with a probable enrolment of over 3,000 being in the course of organization.

SASKATCHEWAN

BY THOS. M. MOLLOY, SECRETARY BUREAU OF LABOUR, SASKATCHEWAN

IN Saskatchewan, where the acreage under cultivation on the average farm is very extensive, the necessity for temporary help at harvest is great and, therefore, a large proportion of the employment work of the Department is the supplying of additional help to our farmers during harvest and threshing.

The Department maintains four permanent district employment offices located at Regina, Moosejaw, Saskatoon, and Swift Current. These offices make a specialty of handling farm labour and of keeping in touch with our floating labourers by placing them in bush camps and mining camps during the winter and securing them at the close of winter operations for replacement on farms.

In addition to the work of these offices in handling the temporary additional help required at harvest and threshing we have organized some two hundred local labour committees in all of the towns and villages of the province. These committees accept applications from farmers for help which are forwarded to our district offices to be filled, and in addition, endeavour by an active campaign to induce as many as possible of their local residents to go out on the farms in the immediate neighbourhood for a week or two during the busy seasons in spring and fall.

In the cities, and some of the larger towns, these local labour committees have a woman's section which carries on the same work as the men's committee with the exception of course, that they deal entirely with female help.

The placing of boys on farms was conducted by this department until this year, when the Canada Food Board took charge of this phase of the work, and placed it in the hands of a special organization known as the Soldiers of the Soil.

ALBERTA

BY J. M'CAIG, M.A., EDITOR OF PUBLICATIONS

OUR organization for the securing of labour consists of the operation of a central labour bureau, which is one of the administrative branches of the Department of Agriculture, and four local bureaux in the four cities of the Province—Medicine Hat, Calgary, Lethbridge, and Edmonton. In the spring of the year we had agents in the states of Washington, the Dakotas, and Minnesota, and within a month from the 1st of March we had placed 3,000 labourers and had a surplus supply. These bureaux are still operating, and we had placed to the middle of July. 5,115 labourers.

With regard to the labour of school

pupils, the Department of Education has made the same arrangements as last year, by which those taking qualifying examinations in the high and public schools are permitted to pass on a lower percentage than previously prevailed, and those passing from one grade to another, not for certificates of qualification, are promoted on the recommendation of the principal, and are allowed to leave school before the end of the school year.

STOCK-POISONING PLANTS

NOVA SCOTIA

BY M. CUMMING, B.A., B.S.A., SECRETARY FOR AGRICULTURE

THE only plant growing in Nova Scotia, which is known to have caused considerable loss of live stock, is Senecio Jacobaea, more commonly known as "Stinking Willie". This plant grows extensively in the eastern part of Nova Scotia, and was popularly believed for years to have been the cause of what was known as "the Pictou County cattle disease". The subject was investigated by Dr. Pethick, acting under the Veterinary Director General, about the years 1903-1905.

Although this weed has been the source of so much loss of live stock, it fortunately happens that, so far as it is known, it does no damage to cattle when they are in pasture. The injury is caused from eating the hay containing this plant. Here again, it fortunately happens that the plant will not thrive under cultivation, so that, where regular rotations are practiced, the farmers do not get this plant in their hay, but when hay is harvested from old meadows that are not regularly ploughed. Since a proper rotation of crops is the best means of competing with this weed, we have never deemed it necessary to undertake other measures.

Sheep are very fond of this plant, when it is in the early stages of growth, and we strongly urge the use of sheep as a means of ridding pastures and other fields of the plant.

MANITOBA

BY V. W. JACKSON, B.A., PROFESSOR OF BOTANY

THE investigations and correspondence of the Botany Department of the Manitoba Agricultural College show that live stock poisoning on the prairies is more common than is generally supposed. Most reports of poisoning come from the drier prairies. This is due to, first, the necessity of live stock eating everything when food is scarce. Animals do not take naturally to poisonous plants, but when food is scarce they will eat anything and everything, and some poisonous plants may have a taste for which a depraved appetite craves. Secondly, the prevalence of deep rooted perennials, which are an adaptation of these dry conditions. These old perennials collect the plant waste and poison of years of growth, and thus we have the concentrated form of a poisonous alkaloid, which is common in many plants, but in mesophytic conditions not sufficient to be harmful to live stock.

THE MOST HURTFUL PLANTS.

The results of five years inquiry place the poisonous plants of the prairies in the following order, based on the reports of the number of animals affected:—

1. Cowbane (Cicuta maculata)
2. Horse-tail (Equisetum arvense)
3. Loco Weeds (Oxytropis campestris)
   (" lamberti)
   (" splendens)
4. Death Camas (Zygadenus elagans and gramineum)
5. Ground Cypress (Juniperus sabina)
6. Sneezeweed (Helenium autumnale), Chokecherry and all wild cherries
7. Poison Ivy (Rhus toxicodendron).

In an outcoming bulletin on weeds, by this Department, there will be a section devoted to the above poisonous plants of the prairies, with illustrations. The following is a summary:—

LOW LAND POISONOUS PLANTS

It is during a dry season, when the grazing stock are forced into low pasture land, or out into the swamps to drink, that they get Cowbane, Death Camas, Sneezeweed and Horse-tail. It is the roots that are poisonous, and these are eaten in the search for succulent vegetation.

Cowbane, although not anywhere plentiful, seems to be the worst. Within a few hours after eating it, the animal begins to froth at the mouth, and shows signs of convulsions, and excess of urine. Cowbane is recognized by its white flower, resembling a carrot top, but the leaf much coarser resembling Baneberry, and the root and stem large and hollow with transverse partitions at the bottom.

Death Camas is a wild lily which grows in wet land. When not in flower, it resembles an onion, having a white bulbous root.

Sneezeweed is sometimes called Wild Swamp Sunflower, and grows in swamps and wet places. It gives a bitterness to milk, which is, perhaps, the first symptom one may have that the cattle are eating a weed that may be fatal.

Equisetosis or Poisoning by Horse-tail. Perhaps next to Cowbane or Water Hemlock, Horse-tail causes most poisoning of stock in the West. Many reports have come from Qu'Appelle Valley recently of horse poisoning and in every case it is traceable to Horse-tail or Equisetum. The symptoms are easily recognized and the plant easily identified. The horse-tail is a plant which grows in wet meadows or sandy soil, resembling somewhat a horse's tail. It is a flowerless plant with a solitary stalk. Some call it joint grass because it pulls apart at joints about an inch apart. It has a rough, glassy or scoury feel to the hand, due to the silicon or glass and oxalates which are present in the plant, and which cause scouring in cattle. But there seems to be another poison in the plant which has not yet been determined and which is fatal to horses, particularly colts and fillies; the older animals do not seem so susceptible to it.

The symptoms are,—off-colour, bodily weakness, depraved appetite, wabbly and listless, and, finally, a state of coma or unconsciousness, and the animal falls or lies down and refuses to get up. This is a very dangerous stage and every effort should be made to get the horse on its feet again by means of slings. Cathartics should be given to rid the bowels of the irritant.

From reports of fatal poisoning, it seems that the dried horse-tail is more injurious than the green horse-tail, and that most of the cases of poisoning have resulted through the horses eating the bedding of swale hay. It would seem advisable, therefore, to see that none of the swale hay that is fed to the horses is cut from wet meadows in which horse-tail grows, or that swale hay is not used for bedding young animals. Grain fed horses resist the action of the poison better than horses which have not been fed grain. Nor should horses be allowed to run loose in river bottoms where horse-tail is likely to grow as they develop a depraved appetite for it.

REMEDIES AND PREVENTIONS

As it is only on the drier prairies that the poisoning of live stock becomes a serious matter, it is evident that this poisoning is chiefly due to the scarcity of other food. Stock should, therefore, not be turned out on land where there is little to eat except poisonous plants, nor should they be allowed to wade deep into the swamps to get drinking water. If live stock were better fed, and better provision made for obtaining drinking water, there would be little trouble with the few poisonous plants that are found in the West.

SASKATCHEWAN

BY M. P. TULLIS, ACTING WEEDS AND SEED COMMISSIONER

WHILE there are quite a number of plants native to the Province of Saskatchewan which, if taken into the digestive tract, prove injurious to stock, Water Hemlock (*Cicuta*) and Stemless Loco Weed (*Oxytropis*) are the only ones reported to have caused serious

symptoms of poisoning. The former is believed to have resulted in death in some cases.

Water Hemlock is a perennial found growing in low wet places. It is parsniplike in appearance, having minute white flowers borne in umbels. The plant may be distinguished by its several, short, fleshy, tuberiform roots, which are the most poisonous part. The plant frequently grows to a height of from three to six feet, having a stiff stem. It is not an attractive plant to stock, but may be eaten accidentally.

There are two species of the Stemless Loco Weed commonly found on the prairies, namely, *Oxytropis Lamberti* and *Oxytropis Splendens*. The flowers of the former are mostly pale yellow with a faint green tinge, while those of the latter are purple. The Loco Weed is of the pea family. The flowers are borne in dense spikes of from nineteen to twenty-seven on a single stem. The whole plant is not more than eight inches high. The eating of Loco Weed seems to be an acquired habit and the danger of serious effects lies in these chronic cases.

Bulletin 31, published by the Saskatchewan Department of Agriculture, includes full descriptions of these injurious plants. The symptoms of poisoning in stock are indicated, and steps to be taken where such symptoms are noticed are suggested. Weed inspectors assist farmers in the identification of these weeds and point out their dangerous qualities.

ALBERTA

BY JAS. M'CAIG, M.A., EDITOR OF PUBLICATIONS, EDMONTON

THE plants that give us trouble in the province are Death Camas, Water Hemlock, Larkspur, and Loco Weed. Our Provincial Veterinarian estimates that the losses from poisonous plants are greater than from any other single cause.

In the case of the Loco Weed, horses and sheep seem to be most affected, but all classes of stock eat the weed readily when grass is somewhat scarce. The Loco is succulent in character and agreeable in taste and is more or less abundant all over the prairie.

In the case of Larkspur, the poisoning is chiefly among cattle. The number of cases of poisoning from this plant, however, is not large. Where cattle are known to be affected by Larkspur the treatment adopted is bleeding at the extremities and the administering of melted lard, bacon grease, or oil. No satisfactory treatment has been in use for Water Hemlock, though a good many cattle are poisoned by it.

Death Camas is the worst poisonous plant in the province. It is found in moist places and usually springs up earlier than native grasses. The animals that suffer most from this plant are sheep. The symptoms are uneasiness and irregularity in movement, followed by rapid breathing and spasm with final paralysis and a rapidly decreasing pulse. Bleeding at the mouth and tail has been used in the early stages of the poison, also the administering of equal parts of potassium and aluminum sulphate. A teaspoonful dissolved in water is enough to dose twelve sheep. Usually the chance of saving stock by treatment is not good. If sufficient has been taken the animals die in two or three hours.

MAKING WEED SEED COLLECTIONS

IN making the plate of weed seeds that appeared on page 773 of the August GAZETTE the reduction was greater than was intended by the author of the article. The seeds represented are shown in the plate not five diameters as indicated by X5, but about three and a half diameters.

EVERBEARING STRAWBERRIES

NOVA SCOTIA

BY P. J. SHAW, PROVINCIAL HORTICULTURIST

WE have tried two varieties of everbearing strawberries—the Progressive and the Americus—here on a small scale, and as yet they have not proved satisfactory. They did not yield well the first year, and were winter killed before the next season. It is possible that if these strawberries were treated so as to get the maximum return the first year, and a new plantation set out each season, more satisfactory results would be obtained. We are now setting out a new lot of plants with this object in view.

QUEBEC

BY T. G. BUNTING, B.S.A., PROFESSOR OF HORTICULTURE, MACDONALD COLLEGE

A NUMBER of varieties of the everbearing strawberries have been tried out in the Horticultural Department at Macdonald College for several years and without much success. These varieties to be successful cannot be handled in the same way that other varieties are grown, and in addition they require more care and are more costly to grow on account of the larger number of plants required to plant a given area. The chief difficulty is that they ripen their crop through a long period of time, and very few berries can be obtained at any one picking. This increases the cost, and, in addition, the birds and insects (ground beetles, etc.) eat or damage a large proportion of the crop. The quality of the berries is very superior to the standard varieties, and they are much firmer. Their good quality probably accounts for the fact that birds and insects are very troublesome. One grower at Lachine, Quebec, who has ideal strawberry land, has had considerable success in growing them on a commercial basis and is able to get a fancy price through a high-class retail store in Montreal. They cannot be sold at the same price as ordinary berries and show a profit. For the amateur who cares to take the trouble with them and protect them from birds, etc., they, no doubt, will be favoured and continue to be grown as a fall crop, as well as allowing them to ripen the larger part of their crop during late June and early July. For the commercial strawberry grower, they are not important unless he cares to cater to a very special market, and is convenient to it, or desires to sell plants which are greatly in demand.

Among the varieties the Progressive, Americus, and Forward are probably the best.

MANITOBA

BY F. W. BRODERICK, B.S.A., PROFESSOR OF HORTICULTURE, AGRICULTURAL COLLEGE

WE have not been growing any varieties of everbearing strawberries at the Manitoba Agricultural College previous to this year. We have planted a quantity, however, and expect that they will come into bearing next year. Everbearing strawberry plants are giving very good results in Western Canada, being preferred to the

standard June-bearing sorts. In Minnesota, they have tested these everbearing varieties out quite extensively throughout the state, and from reports received and presented at the annual meeting of the Horticultural Society, I would say that the results were very satisfactory. One of the varieties which has given best results with them is No. 1017, a variety which was originated at their Plant Breeding Station at Excelsior, Minnesota. This variety is now being sent out and tried at a number of points throughout the state.

I have written to Mr. A. P. Stevenson of Morden in reference to everbearing strawberries and take the following quotation from his letter:

> Without doubt, this new breed of strawberries is with us to stay, and I have no hesitation in stating that in a short time they will entirely supersede the June-bearing varieties. We have had them growing and bearing on our grounds for the last eight years with every success. From information received, they do not seem to be a success south of the State of Iowa. Fom Iowa north, they are at their best.
>
> A few of the points in favour of the everbearers are:
>
> 1. They give a good crop the first year they are planted.
> 2. A frost in June does not materially injure the crop, as the bloom is soon renewed again.
> 3. They will bear fruit from July until the first hard frost in the fall; the fruit is of excellent quality and size, and does not break up when preserved.

Their management in the garden is very much the same as with the June-bearing varieties, only, after setting out a new patch in spring, it is of the utmost importance that all blossoms and runners be kept off until after the middle of July. After that, the vines will bear fruit until killed by the frost in the fall. Two crops, and sometimes three, are taken off before being ploughed up and the bed renewed. From our observation of the two varieties, I would say that the plants of the Everbearing varieties are more hardy than the old June-bearing sorts. The following are the names of the varieties of everbearing strawberries we have under cultivation, and are mentioned in order of merit. Our soil is a heavy clay loam, but I have no doubt different results with varieties can be obtained on different soils: Americus, Progressive, Superb, No. 1017 of the Minnesota Fruit Breeding station. We have other varieties under test, but the above-mentioned are the best of our well-tested varieties.

ONTARIO

BY E. F. PALMER, B.S.A., DIRECTOR, HORTICULTURAL EXPERIMENT STATION, VINELAND

FROM our experience here, I would not consider everbearing strawberries to be a commercial proposition, except, possibly, in the case of the truck gardener growing a small quantity for special market. They will undoubtedly find a place, however, in the home garden.

BRITISH COLUMBIA

BY F. M. CLEMENT, B.S.A., PROFESSOR OF HORTICULTURE, UNIVERSITY OF BRITISH COLUMBIA

EVERBEARING strawberries that have come under my observation, and as grown on the experimental plots during the last four years, have been more or less disappointing.

Some varieties, principally the Superb, have done very well. Most varieties yield a fair to good crop during the ordinary picking season, and then during August and September produce a few more berries. I know of no variety that can be said to have proved a marked success during the fall. A few cases of berries have been obtained, but not enough to warrant strong recommendation.

JUDGING AT EXHIBITIONS

PRINCE EDWARD ISLAND

AT CHARLOTTETOWN

BY C. R. SMALLWOOD, SECRETARY-TREASURER, CHARLOTTETOWN EXHIBITION

AS regards the judging of horses, we have a large field which is roped off. Along side of this field we have a stand built, which would seat probably two or three hundred people. The ladies generally sit there. Spectators also stand around the ring in large numbers. For cattle we have a similar ring. Sheep and pigs are generally judged just outside of the shed. All horses and cattle have ribbons and cards, which are placed on the animals at the time of judging and worn afterward. Large numbers witness the judging each day, and we make it as interesting as possible. We also have judging contests of beef and dairy cattle. This judging is done by farmers' sons who are living on farms on Prince Edward Island.

QUEBEC

AT SHERBROOKE

BY SYDNEY E. FRANCIS, SECRETARY-TREASURER

WE are making a special effort this year to bring the judging before the public as prominently as possible; while we are greatly handicapped for the want of a building that can be used as a judging ring in wet weather, if we are favoured with fine weather we feel sure that the judging of horses and cattle, etc., will be one of our most attractive features; we have on each side of the attraction platform a large judging ring with a properly prepared floor. Instructions have been given that all judging must take place in these rings, and during the morning people will be admitted free to the grand stand, and in the afternoon, when our attractions are being presented, the more attractive classes, herds, etc., will be judged, and by this means we feel that the judging will be placed before thousands of people who have never bothered about it in previous years. We also have judging competitions for students and farmers' sons which are carried on under the superintendence of MacDonald College Demonstrators.

ONTARIO

AT OTTAWA

BY J. K. PAISLEY, MANAGER AND SECRETARY

FOR live stock judging at the Central Canada Exhibition there is a special ring with a stand in front where people can sit while the animals are being judged. The prize ribbons are large and conspicuously arranged on the animals when the prizes are awarded. On Friday afternoon, which this year is September 13, a parade is held in which all prize animals are supposed to take part. We have a number of special classes in competitions and contests, among them being the Junior Farmers' Inter-County Bacon Hog Contest, for which the counties are grouped in sections as follows:—Group 1, Northumberland, Peterborough, Hastings and Prince Edward; Group 2, Lennox and Addington, Frontenac and Leeds; Group 3, Renfrew,

Lanark, Carleton and Grenville; Group 4, Russell, Dundas, Stormont, Glengarry and Prescott. Four hundred and seventy dollars is offered in prizes for this contest. There follows a live stock judging competition for farmers' sons from the Ottawa Valley, $500 being divided in prizes for this competition. An egg-laying contest commences on Sunday, September 8, at midnight and continues until Friday evening, September 13, at 6 p.m. Fruit crop competitions include grain in sheaves, grain in sacks, potatoes, and general vegetables. For these competitions upwards of $500 with specials are offered. Another interesting competition is for war-time-food garden products, which is open to members of the Ottawa Horticultural Society and plot-holders of the Ottawa Vacant Lot Association and St. Andrew's gardens; including specials, between $200 and $300 are to be distributed in prizes in this contest.

The foregoing are the particular features in the judging classes which we feel will prove especially interesting and instructive.

AT TORONTO

BY J. B. HAY, CHIEF OF PRESS DEPARTMENT

THE Canadian National Exhibition has set out this year to emphasize the educational side, but, naturally with an organization so large, it cannot accomplish all that it eventually aims to achieve in one short season, but we have impressed upon the judges the necessity of mingling whenever possible with the crowds at the judging ring and explaining the reasons for their decisions. This policy will be carried a little further in the young men's judging competitions, where various judges will address the young men entering the contests, and explain how they have arrived at their decisions in the placing of the various competitors. Lectures and demonstrations will be given by Government representatives and others to the young men, and various other steps taken to perfect them in the art of judging.

THE JUDGING RING

There are two rings devoted to judging at the Canadian National Exhibition: a large one in front of the grand stand, and a smaller one just to the east of that structure, in the centre of the live stock section. As is generally known, the grand stand seats 16,800 people and on the lawn in front half as many more can be accommodated. The horse judging is largely done in front of the grand stand. In the smaller ring the seating accommodation is much less, but we expect to remedy this deficiency some time in the near future, when the indoor judging arena becomes a reality. The winners are identified by a large card system, visible from all sections of the judging ring, and, later, of course, in the stables by the prize cards and ribbons which are usually strung across and above the stalls.

We endeavoured to so arrange the dairy contests as to have the decisions and the reasons made more clear for the sake of the spectators.

EDUCATIONAL FEATURES SPECIALLY EMPHASIZED

We are striving at the present time towards the educational end in all lines of live stock and agricultural displays. This tendency will perhaps be more noticeable this year in the poultry section, where, under the new auspices, several innovations are introduced simplifying the problem of the man going into poultry, particularly the back-lot enthusiast. For instance, we are eliminating the straight exhibition pens and introducing two classes of exhib-

ition yards instead, demonstrating the proper mating, etc. We are showing suitable houses for back-yards flocks. The Ontario Agricultural College will have a culling demonstration, and some other new features. It must be admitted that we have not yet developed along the lines of properly recognizing the importance of the younger members of the farming community, but we hope before another year has passed that there will be several important departures along that line. Last year, of course, we started in the proper direction with the judging competition for young farmers and farmers' sons, and the success met with was gratifying indeed. That competition is being continued this year.

INCREASED PRIZE MONEY

It should be mentioned that several thousand dollars have been added to the prize list, with special reference to the utility breeds and classes. The increased premiums extend from poultry to heavy horses and will to some extent help offset for exhibitors the heavier costs of feed and labour in fitting for the ring.

This has permitted an extension of the classifications in many breeds and classes of live stock, the younger classes being treated with especial liberality both as to the extended classifications and in the distribution of prize moneys.

LABOUR-SAVING MACHINERY

A special effort, too, was planned to d raw attention to the statement made some time ago by Hon. Mr. Crerar in which the Minister of Agriculture pointed out the fact that farmers should turn over as much new land this year as possible in preparation for 1919, when food will be needed just as urgently as at the present moment. In this connection efforts have been made to prepare for the farmer a complete demonstration of how he may, despite the aggravated labour shortage, best follow Hon. Mr. Crerar's advice by the utilization of labour-saving machinery. A special commissioner interviewed manufacturers of tractors and other man-power saving devices the continent over with a view of exhibiting here.

CONSERVATION ENCOURAGEMENT

The farmer having already done his best in 1918, the Exhibition turned to the problem of aiding the conservation campaign and for some time was in communication with the Food Controller at Ottawa to find how this might best be done. The Controller's office revised and approved plans for a food show in which was impressed upon the people the imperative duty of learning food values and the nutritive, palatable nature of the substitutes being recommended by the Government. One whole building was given up to this food-training course, Macdonald college and similar schools supplying expert demonstrators to better drive home the urgent lessons of the moment.

The Ontario Government had special demonstrations of its own along dehydration and similar practical lines with a staff of demonstrators and lecturers in attendance. Moving pictures are utilized and in addition arrangements made for the establishment of a lecture bureau in which food production and conservation subjects form a large part of the programme.

HOUSEHOLD SCIENCE AND ARTS

In the household science and households arts departments the premium lists were given a radical overhauling so as to better reflect the spirit of the times. The domestic science classes after undergoing careful revision by local experts were recently submitted to the Food Controller and wherever possible war time cookery was made to replace the classes of other days. Canning and war time substitutes were given special attention while in the needlework and similar depart-

ments, where girls usually play a big part, the less essential things were put in the background by the splendid premium placed upon the more essential things. National war time efficiency is aimed at in every department of the Exhibition this year and in no departments is this more noticeable than in those where the boys and girls of the country usually exhibit.

ALBERTA

AT CALGARY

BY E. L. RICHARDSON, MANAGER

WE ordinarily use our horse show building for the judging of live stock. It has a seating capacity of 2,600, Since the war, owing to the Militia Department using our buildings, we have had to house cattle in the building, and judge all stock outside. We have a special grand stand and bleachers arranged so that a considerable proportion of the visitors may be seated while watching the judging. We use numbers on the attendant holding the animal so that the visitor may identify the same by the use of the official catalogue.

AT EDMONTON

BY W. J. STARK, MANAGER, EDMONTON

IT will be seen by our 1918 Exhibition catalogue that the entries are given numbers. These numbers correspond with numbers worn in the show ring. As the same animal may be entered in different classes, it frequently wears a different number. We have tried the system of having the animal carry the same number through the entire exhibition, but prefer the system at present in use as being much simpler in operation for our clerks, who are necessarily inexperienced as a rule, as it is difficult for us to secure competent help and get the same clerks from one year to another outside of our permanent staff.

In regard to our arrangements for judging, we have several rings, where those interested may watch the judging. In addition, we have a judging ring in front of the grand stand, where the show horses are judged. We, of course, feature the live stock end of our show. As our Directors feel that Northern Alberta is essentially a mixed farming country, they have done all in their power to encourage the live stock industry.

We held competitions for children in colt raising and pig growing this summer, but have found that the calf-feeding competition at our spring show, and the pig-feeding contest in connection with our sheep and swine sale, are more popular for some reason, though the prize list was not as attractive as that offered in the children's classes at the summer exhibition.

QUEBEC

CO-OPERATIVE AGRICULTURAL TRADING—THE PURCHASE OF FARM REQUIREMENTS

BY JEAN MASSON, ASSISTANT MANAGER, LE COMPTOIR CO-OPERATIF

REPORTS from several provinces published in the May number of THE AGRICULTURAL GAZETTE have shown the various methods used for the co-operative distribution of farm requirements. In the province of Quebec, where co-operative societies thrive in large numbers, mostly every method is employed. In some localities farmers group their orders and place one combined order in the name of one of them; other farmers send in their orders separately. In some places local co-operative societies take orders from their members and forward the total order on to the central; other societies make the purchase and run the risk of distribution later, after a public announcement on reception of the goods. Some locals send all orders to the central; some send a few and make their own purchases for the rest; some send none at all. Orders are usually concentrated at the central before the common purchase is made, though at times the reverse is true. No hard and fast rule is adhered to in that matter.

LE COMPTOIR CO-OPERATIF

The central organization, known as Le Comptoir Co-operatif de Montreal, is organized under the same authority as the locals. The scope of its programme, and its activities in the immediate practical application thereof, are much more extensive and of a different nature. Where the local only buys and sells for its members, and holds meetings to promote local interests, the central is a federation of locals and of farmers' clubs, counting also a large number of individual members. It was founded for the purpose of consolidating, and developing, under capable and experienced direction, the agricultural co-operative movement in the province. It has furnished the necessary link that strengthens local groups, by keeping up the interest and sympathy of the public and of the farming community in co-operation generally, and provides a uniform and intelligent direction for all.

Constant attention is given to the proper training in modern business methods of local secretaries and managers. Circulars are periodically sent to members giving advice, news, prices, and suggestions. Offers for goods are usually accompanied by information on their most economical use, a permanent bureau of information being at the disposal of the members.

FINANCING METHODS

Where every facility is afforded for an intelligent selection by the members, the problem of financing is left for the locals to solve. In many cases, co-operative banks, organized along the same lines as the local co-operative society, provide facilities for all transactions. Settlement between locals and the central are mostly on a cash against delivery basis. Where no such arrangement exists, branch offices of ordinary banking institutions provide the necessary funds, either on collateral notes or on the guarantee of the shares of the society assigned to the bank for the purpose.

More and more, however, individual members, where no co-operative bank exists, do their own financing and pay on delivery or a few days ahead. No difficulty has yet been met to impair the credit of the purchasing locals or individual members.

The co-operative banks, however, are rapidly spreading where co-operative societies work satisfactorily. One is the adjunct of the other, and the main cause of its successful operations, when once the farmers have given their loyal support.

RAPID INCREASE OF BUSINESS.

The increase in the amount of co-operative purchases is very marked. The development of the central may give a fair indication of the general progress, due to the existence of over 230 agricultural co-operative societies and 700 farmers' clubs.

The business transacted in 1914 was ten times that of 1913, that of 1915 almost four times that of 1914, 1916 three times that of 1915, 1917 nearly twice that of 1916, and the first four months this year showed as much business done as during the entire year of 1917.

Closer co-operation is being evolved continuously between the locals and the central, and everything leads one to look for unusual progress during the next year. The following is an incomplete list of the goods purchased by the Comptoir Co-operatif:

FEEDS—
Bran, shorts, middlings, etc.
Wheat, oats, barley, etc.
Flour of all kinds,
Linseed oil cake, cottonseed meal, etc.

FERTILIZERS—
Complete chemical fertilizers;
Basic slags;
Acid phosphates;
Lime, etc.

INSECTICIDES AND FUNGICIDES—
Paris green;
Arsenate of lead;
Lime sulphur solution;
Sulphate of copper;
Formaline.

SEEDS AND SEED GRAINS—
No. 1 Standard, only with Government analysis.
BINDING TWINE—
DRAIN TILES—
WIRE FENCING—
LAND PLASTER—

Both provincial and federal Departments of Agriculture have been pleased to take advantage of our efficient and inexpensive methods of distribution for seeds and feeds.

ONTARIO

LIVE STOCK SHIPPING CO-OPERATIVELY

BY F. C. HART, B.S.A., DIRECTOR, CO-OPERATION AND MARKETS BRANCH

ANY campaign for increasing the supply of live stock as a war emergency measure should rightly be accompanied by some sort of organization of the producers for the purpose of attacking the market problems. Successful live stock shipping associations, both in the United States and Canada, have demonstrated their benefits and some of the marketing questions can best be solved by the producers themselves through organization.

Any group of men desiring to better the marketing of their live stock should survey the conditions of marketing as they obtain in the district and decide whether co-operative shipping is necessary to better such conditions. If organization is decided upon it should be gone into whole-heartedly or not at all.

If co-operative shipping is attempted the following suggestions should be noted:

(1) Where there is already a business organization of farmers in the district suitable for the purpose, the shipping of live stock should be co-ordinated with such, and a special live stock department of the company established. Care should be taken not to over-organize the district especially with a multiplicity of business organizations.

(2) Some most successful shipping

is done by farmers' clubs. Here also a special committee should be appointed to handle the business.

(3) Where there are no local organizations through which to work, a special live stock shipping association might be formed.

In any event a simple set of rules such as the following should be adopted:—

RULES SUGGESTED FOR A LIVE STOCK SHIPPING ASSOCIATION

Name.—This organization shall be called the Live Stock Shipping Association.

Objects.—The object shall be to market live stock in carload lots, and to buy and sell feeds in wholesale quantities.

Members.—Any farmer in district may become a member by paying the annual membership fee and agreeing to abide by all the rules governing the association. A member may be expelled for cause by the members in general meeting.

Fee.—Each member shall pay an annual membership fee of $5.00, which fee may be retained by the association if the member fails to abide by any rule, or rules, of the association. The decision as to retaining such fee, or fees, shall be with the members in general meeting.

Committee.—A committee of three members shall be appointed to have charge of all live stock shipping by the association.

Manager.—A manager shall be appointed by the Committee, and he shall be paid a commission of 1½% of the selling price of stock sold, or at the rate of cents per head of hogs and cents per head of cattle.

Duties of Manager.—The manager shall make arrangements for all shipments, weigh and (where possible) grade each member's shipment, load cars, and sell cars under the direction of the committee, and make returns to members.

Shipping Day.—The committee shall designate the shipping days, or, if the supply warrants it, regular shipping days. Each member having stock to ship shall notify the manager at least three days previous to the day of shipment as to the number and kind of stock he will have for such shipment.

Delivery of Stock.—Each member shall deliver on shipping day the number of live stock agreed with the manager to be delivered. Each member shall mark his cattle with a mark designated by the manager.

Grading.—The manager shall grade all hogs delivered into one of the following grades: Heavies, Selects, Lights, Sows, Stags. Each member's cattle shall be marked and sold separately.

Losses.—Any losses not covered by the regular charges shall be met out of the general funds of the association.

Payment to Members for Stock.—The manager shall sell all stock for cash and shall first deduct the total expenses from the total amount received for each shipment. The remainder of the money received for each shipment shall be paid to the members in proportion to the value of each member's shipment. The manager shall make all payments by check as soon as practicable.

Auditors.—The association shall appoint two auditors who shall audit the accounts of the manager as soon as practicable after each shipment.

Changing Rules.—These rules may be amended by a two-thirds vote in the affirmative of the members present at any regular meeting.

Rules regarding meetings, quorum, voting, etc., may be inserted if thought desirable.

SUGGESTED MANAGEMENT METHODS

It should be further noted:

Capital.—A live stock shipping association can be successfully handled without capital, if members are willing to wait for returns till after sale is made. This is usually only a few days after shipment, and is no hardship. If cattle or hogs are sold on the stockyards the check in payment is made at the time of sale and returns can be made to members almost immediately. When capital is used, however, to pay members at the time of delivery of their hogs, or cattle, care should be taken to make such payment low enough to provide for all expenses, shrinkage, losses, price changes, etc. Preferably, however, no capital should be used and members paid actual money received for their stock, less expenses.

Grading.—It is essential that all shipments of hogs should be graded, and each grade sold separately. This does not mean that only select hogs be shipped, but if inferior hogs be shipped they should be sold as such. A select hog is one weighing 185 to 220 lb., of the bacon type and properly finished. An endeavour should be made to prevent members shipping unfinished hogs.

Supply for the Shipment.—Some method should be adopted to hold members to their agreements to supply stock for any shipment. If arrangements have been made to load a car and enough hogs promised for that car, any member or members failing to live up to their agreement should be required to reimburse the organization in some way. The $5.00 fee suggested is mainly for the purpose of ensuring delivery of stock promised.

The Manager.—It would in many instances be desirable to interest one of the local buyers of the district in this co-operative shipping to obtain his services as manager. The manager should at least occasionally accompany shipments to market.

Payment to Manager.—The manager may be paid a commission, say of 1½% of the sale price of the live stock, or so much per head on the following suggested scale:

	Per head.
Cattle over 1,000 lb..	$1.00
500-1,000 lb.....	75
Under 500 lb.....	50
Calves.....	15
Hogs.....	10
Sheep.....	10

The preferable method is perhaps the percentage basis, as requiring less book-keeping.

Method of Sale.—The stock may be sold (a) F.O.B., shipping point, (b) weighed off cars, or, (c) fed and watered. Stock may be sold direct to packing house or through a commission firm, on the stockyards. The more desirable method for continuous shipments is to sell through a commission firm, as the stock is sold on a competitive market and usually brings its actual market value on the day of sale.

Fixed Charges.—Fixed charges in the Stock Yards market are:

Unloading, $1.00 per car cattle and hogs.
Yardage 6c., hogs and sheep, 25c. cattle, calves 10c.
Feed, varies.
Insurance, 10c. per car.
Commission—
$ 8 single deck hogs and sheep
$13 double " "
$13 per car cattle.

In conclusion, the Department will assist groups of farmers in the marketing of their live stock, especially with putting them in touch with conditions and the trade at the central markets. Because of the existence of central markets, and of the conditions on these markets, the co-operative shipping of live stock is not only comparatively easy, but if adopted generally over the province would give a better tone to the trade and would give the individual producer greater confidence and justice in the sale of his live stock.

STANDARD CATTLE AND HOG FEED

IN THE AGRICULTURAL GAZETTE for July, page 698, is given an account of the standard cattle and hog feed adopted by the agricultural section of the Organization of Resources Committee of Ontario. It has been found necessary to make some changes in the given formula. It was provided that the gluten feed in the cattle ration should contain not less than 18% protein. The use of gluten feed to this extent has now been made optional. The new formula calls for 48% of oil cake meal, cottonseed meal, soya bean meal, velvet bean meal and gluten feed, instead of the 54% originally fixed. Not more than 20% of the feed must be cottonseed meal. Another change made was the reduction of the protein content from 24% to 22%. The original formula in the swine ration provided for 20% of wheat or rye shorts, but as these ingredients have become difficult to secure, the Committee have decided to permit one-half this amount to be composed of finely ground wheat bran. An analysis of the new feed will show approximately 16% of crude protein, 4.5% of fat and not more than 6% of crude fibre. In this connection it can also be stated that the Ontario Government have decided to spend at least one-half million dollars, and perhaps a much larger sum, in feed concentrates, with the object of creating a reserve to tide farmers over the difficult months. The agricultural section of the Resources Committee has approved of an agreement under which a Kingston firm will act as agents of the Government in purchasing supplies in the United States and storing them at convenient shipping points in Ontario. The services of a representative of the same firm have also been secured for the purpose of inspecting the mills manufacturing standard dairy cattle and hog feeds.

46377—3½

JUDGING HENS FOR EGG PRODUCTION

BY W. R. GRAHAM, B.S.A., PROFESSOR OF POULTRY HUSBANDRY, ONTARIO AGRICULTURAL COLLEGE

A SYSTEM has been adopted by the American Association of Instructors and Investigators whereby hens may be judged during the summer months in regard to their laying capacity. This organization, including both Canadian and United States instructors and investigators, constitutes the American branch of the International Association, the British branch of which embraces England, Ireland, and Scotland. The system is of special use for culling flocks during July, August, and September, more especially as the moulting season is approaching. The system was adopted at a meeting of the Association held at Ithaca in July this year. Following are the characteristics of a good laying hen and a description of the indications by which she may be distinguished from others as laid down by the Association:

In order to lay well a bird must have a sound body. As a first consideration a bird must be vigorous and healthy if it is to be able to lay well. Vigour and health are shown by a bright, clear eye, a well set body, a comparatively active disposition and a good circulation.

Further, the bird must be free from *physical defects* such as crooked beak, long, excessive toe nails, eyelids that overhang so that the bird cannot see well, scaly leg, or anything else that would keep the bird from seeing or getting an abundance of food.

Loss of fat due to laying:—Colour or pigmentation changes. (These should be observed by daylight.)

A laying fowl uses up the surplus fat in the body, especially it removes the fat from the skin. In yellow-skinned breeds this loss of fat can readily be seen by the loss of the yellow colour. The different parts of the body become white, according to the amount of fat stored in the body and the amount of circulation of blood through that part. The changes occur in the following order:

The *vent* changes very quickly with egg production, so that a white or pink vent on a yellow-skinned bird generally means that the bird is laying, while a yellow vent means that the bird is not laying. It should be recognized that all yellow colour changes are dependent on the feed, coarseness of skin, and size of bird. A heavy bird fed on an abundance of green food or other material that will colour the fat deep yellow will not bleach out nearly as quickly as a pale, yellow bird.

The *eyering*, that is the inner edge of the eyelids, bleach out a trifle slower than the vent. The ear lobes on Leghorns and Anconas bleach out a little slower than the eyering, so that a bleached ear lobe means a little longer or greater production than a bleached vent or eyelid.

The colour goes out of the beak beginning at the base and gradually disappears until it finally leaves the front part of the upper beak. The lower beak bleaches faster than the upper but may be used where the upper is obscured by horn or black. On the average coloured, yellow-skinned bird, a bleached beak means heavy production for at least the past four to six weeks.

The *shanks* are the slowest to bleach out and hence indicate a much longer period of production than the other parts. The yellow goes out from the scales on the front of the shanks first and finally from the scales on the rear. The scales on the heel of the shank are the last to bleach out, and may generally be used as an index as to the natural depth of yellow colour of the bird. A bleached-out shank usually indicates fairly heavy production for at least fifteen to twenty weeks.

The yellow colour comes back into the vent, eyering, ear lobes, beak, and shanks in the same order that it went out, only the colour returns much quicker than it goes out. A vacation, or rest period, can sometimes be determined by the end of the beak being bleached and the base being yellow.

Body changes due to laying:—

A laying hen has a large, moist vent, showing a dilated condition and looseness as compared with the hard, puckered vent of a nonlaying hen.

The whole *abdomen* is dilated as well as the vent so that the pelvic arches are widespread and the keel is forced down, away from the pelvic arches so as to give large capacity. The more eggs a bird is going to lay the following week the greater will be the size of the abdomen. The actual size of the abdomen is, of course, influenced by the size of eggs laid and by the size of the bird.

Heavy production is shown by the quality of the *skin* and the thickness and stiffness of the pelvic arches. Fat goes out from the skin and body with production, so that the heavy producers have a soft velvety skin that is not underlaid by layers of hard fat. The abdomen in particular is soft and pliable. The sternal processes are very prominent and are generally bent outward. The thicker and blunter the pelvic arches and the greater the amount of hard fat in the abdomen, the

less the production or the longer the time since production.

One of the finer indications, but yet one of the most valuable in picking the high layer, is the fineness of the head and the closeness and dryness of feathering. The head of a high layer is fine. The wattles and ear lobes fit close to the beak and are not loose and flabby. The face is clean cut. The eye is full, round, and prominent, especially when seen from the front. The high layer is thinner, that is, the feathers lie closer to the body, and after heavy production the oil does not keep the plumage relatively sleek and glossy, but the plumage becomes worn and threadbare.

Changes in secondary Sexual Characters: The *comb, wattles* and *ear lobes* enlarge or contract, depending on the ovary. If the comb, wattles, and ear lobes are large, full and smooth, or hard and waxy, the bird is laying heavily. If the comb is limp the bird is only laying slightly, but is not laying at all when the comb is dried down, especially at moulting time. If the comb is warm it is an indication that the bird is coming back into production.

Moulting.—When a bird stops laying in the summer she usually starts moulting. The later a hen lays in the summer, or the longer the period over which she lays, the greater will be her production, so that the high producer is the late layer and hence the later moulter. The length of time that a hen has been moulting, or has stopped laying, can be determined by the moulting of the primary feathers. It takes about six weeks to completely renew the primary feather next to the axial feathers, and two weeks more for each additional primary to be renewed.

Temperament and Activity:—

A good layer is more active and nervous and yet more easily handled than a poor layer. A high layer shows more friendliness and yet elusiveness than a poor bird. A low producer is shy and stays on the edge of the flock and will squawk when caught.

While the characters discussed have dealt specially with the current year's production it should be born in mind that a high producer one year is, generally speaking, a high producer in all other years.

PRINCIPAL OF THE ONTARIO VETERINARY COLLEGE

DR. C. D. McGilvray, who has been appointed Principal of the Ontario Veterinary College, in succession to Dr. E. A. A. Grange, who recently resigned, was born in Scotland in 1872, and with his parents settled at Birtle, Man., in 1886. He served on his father's farm until 1898, when he entered the Ontario Veterinary College at Toronto, where he succeeded in obtaining the gold medal for the highest standing, and graduating with first-class honours on all subjects. After graduation he practised some time at Richmond, Virginia, and then took up a post-graduate course at McKillip Veterinary College, Chicago, again being a first prize man and securing highest honours for the year 1901. Returning to Manitoba he engaged in practice at Binscarth, at the same time continuing his farming operations. In the winters of 1903-1904 he conducted live stock judging classes for the Dominion Department of Agriculture throughout Alberta and Saskatchewan. In 1905 he became Chief Veterinary Officer in Manitoba for the federal Government. His principal work at that time was the eradication of glanders. In 1912 he succeeded Dr. Fred. Torrance, at present Veterinary Director-

C. D. McGILVRAY, V.S., M.D.V.
Recently appointed Principal of the Ontario Veterinary College, Toronto.

General, as lecturer and instructor in veterinary science at the Manitoba Agricultural College. He was Canadian representative on the international committee appointed to investigate the suppression of glanders; he was secretary-treasurer and registrar of the Veterinary Association of Manitoba, and has also been inspector in charge of the meat inspection service under the Meat and Canned Foods Act. He has contributed many articles to the agricultural press on the diseases of animals, and is the author of bulletins on "Blackleg in Cattle," "Care and Management of the Brood Mare and Foal," "Common Diseases of the Foal," "Contagious Abortion in Cattle," and others.

MANITOBA

AGRICULTURAL EXTENSION INSTITUTE MEETINGS

BY S. T. NEWTON, DIRECTOR, AGRICULTURAL EXTENSION SERVICE

A SERIES of close on 250 Institute meetings were held during the last ten days in June and the first week in July, in connection with the Home Economics Societies and the Grain Growers' Association. The different societies were given a choice of subjects and those most generally chosen were as follows:—"Laws relating to Women," "Community Organizations," "Rural Health Problems," "Demonstration Lectures on the Preparation of Wheat and Meat Substitutes," and canning. In addition to the discussion of these important subjects, an effort was made to better acquaint the people with the assistance which the Extension Service is offering, as well as to bring the Extension Service in touch with the needs of the people of the province, in order that closer co-operation could be effected. The speakers were ladies who have been interested in both the town and farm women's problems for several years, besides having a wide knowledge of their own particular subjects. Wherever it was possible the speakers went from place to place by train, but often it was more convenient to motor, and at times it was necessary to depend on the horse. The people demonstrated their interest by driving miles through pouring rain and over bad roads, in order to be present at the meetings. The meetings were intended principally for women, but in a great many cases, notably in the evening, the men attended and took part in the discussions with as much interest as the women.

ORGANIZATION OF COMMUNITIES

An effort was made to organize communities into groups of ten with a captain in charge of each group, in order that, in case of emergency, it would be possible to get in touch with all the women in Manitoba within 48 hours. This grouping also facilitates the ordering of supplies of fish, fruit, wheat substitutes, and is of assistance in many other ways. Some of the societies already had the plan in operation and were enthusiastic over the results they were able to obtain.

The meetings were held in widely different places—schools, churches and halls. At quilting bees, conventions and picnics, the speakers came in touch with very representative gatherings, and the receptions they received were most encouraging. In some places it was found that house-keepers were making every effort to use substitutes and to conserve food. At other places little interest was taken. At a large number of places, fish and wheat substitutes were unobtainable, and a concentrated effort was made to devise ways and means by which this condition could be remedied.

Although the object of the meetings was not for the purpose of organizing new societies, gatherings were held at

points where neither grain growers' organizations nor home economics societies existed,and almost invariably a request was made that a society be organized, with the result that twelve new societies were organized.

It is felt that the opportunity which the Institute meetings gave for the Extension Service to meet the women of the province, has been of great value. A clearer insight has been obtained of local conditions; matters of national importance have been presented and discussed and the value of united effort emphasized.

THE SHORT COURSE SCHOOLS

Between March 31, 1917, and March 31, 1918, twenty-two short course schools were held in Agriculture, Gas engines and Home Economics. These courses extended over a period of two weeks, and were especially planned to meet the demand for instruction in gas engine operation and care, made necessary by the shortage of help. But while the gas engine part of the course was especially featured, interesting lectures and demonstrations were given in live-stock and field crops, and, before the end of the course, it was not unusual to find as deep an interest in these subjects as the gas engine work.

It was found most convenient to organize the schools in three circuits, and a carload of equipment was obtained for each circuit, consisting of three tractors, four stationary engines, a lighting plant, a grain-cleaning outfit, about fifty 16 x 20 enlarged bromides of champion live-stock, and a full supply of the various grains grown in Manitoba as well as all the troublesome weeds.

A staff of expert lecturers was engaged for each circuit, as follows:—Gas engines, two; Live stock, one; Field crops, one; and, wherever the enrolment was over 50, a third practical man in gas engine work was sent.

During the forenoon one gas engine man gave practical instruction in gas engine operation either to a class of women or to the high school boys. The Agricultural lecturers also took advantage of off periods for instruction in the high school.

While probably eight per cent of those taking gas engine work were women, the regular women's classes in Home Economics was well attended. During the first week the subject taken was usually either Dressmaking or Millinery, and for the second week Cooking and Home Nursing.

The short course school work commenced early in November and continued throughout the winter. The last courses were held in April. The average attendance at each place was 48 men and 27 women and the aggregate 19,183 men and 10,780 women.

DAIRYING.

Through the co-operation of the Dairy and Bee Branches, four-day short courses were held at 12 places where dairying is the leading industry. Owing to the fact that the country is not as thickly settled as the districts in which the other courses were held the attendance was not as large. Nevertheless the interest was keen, and the attendance uniformly regular. In women's work home nursing was very popular, and cookery was the second choice. For the most part the instruction was confined to live-stock breeding and care, particular attention being paid to the dairy herd. The care of milk and cream, and bee-keeping were equally popular among the students. At these courses a particularly wide use was made of charts and lantern slides, as well as of the bromide enlargements used in the other courses.

Short courses were held at Narcisse, Bender Hamlet, Oak Point, Ericksdale, Mulvihill, Winnipegosis, Inwood, Teulon, Ethelbert, St. Rose, Makinak, Roblin, Neveton, Ashern, the number in attendance at each session ranging from 15 to 60. The aggregate attendance was 3,152.

HOME ECONOMICS.

In addition to the short courses held in connection with the men's courses a large number of special five-day courses were held in Dressmaking, Millinery, Cookery, Home Nursing, and Canning. The average attendance was 31 and the aggregate 37,811.

MANUAL TRAINING.

During July the services of eight manual training teachers from the Winnipeg and Brandon manual training schools were obtained, and twelve short courses extending over a period of two weeks were held in connection with the Boys' and Girls' clubs. Binder crates were used to make benches and the boys brought with them such tools as they were able to find on the home farm. The material used was to quite an extent of the same character. The articles made were chicken brooders, feed hoppers, exhibit coops, wagon boxes, hog self-feeders, etc. By using this kind of equipment the boys were learning to use the tools, benches, etc., that would be available after the course was over. The aggregate attendance at these courses was over 5,000.

AGGREGATE ATTENDANCE.

The aggregate attendance at all the courses was as follows:—

Short Course schools.....	29,963
Dairy courses.....	3,152
Home Economic courses	37,811
Woodworking courses....	5,000
Grand aggregate.....	75,926

SASKATCHEWAN

DAIRY COMPETITIONS

WITH the object of encouraging a higher average production in Saskatchewan herds, the Dairymen's Association in conjunction with theprovincial Dairy Branch has arranged a competition open to any dairyman in the province. Five substantial prizes are offered as follows: First prize $50, Second $30, Third $20, Fourth $15, Fifth $10.

These are to be given to the proprietors of herds composed of five or more cows, producing the largest amount of butter fat per cow, delivered or shipped to any creamery in Saskatchewan during the twelve months ending the second day of November, 1918. Awards will be made from data supplied by competitors and from creamery records. Private firms have contributed towards these awards.

A dairy cattle judging competition will also be held. This will take place at the time of the Dairymen's Convention, usually held in January of each year. Prizes are being offered for teams of three boys, under 18 years of age, who make the best showing in the judging of dairy cattle. This competition was held last year, and was competed for by four teams. It is expected, however, that this year there will be a much larger number of entries, and a keener competition.

ALBERTA

THE PROVINCIAL COLLEGE OF AGRICULTURE

BY E. A. HOWES, B.S.A., DEAN

THE Faculty of Agriculture, or, as it is popularly called, the College of Agriculture, in the University of Alberta, was established in the spring of 1915. Little need be said as to the difficulty in getting an institution started during the strenuous times in which we now live. Public sentiment was against much expenditure, and students and teachers of this institution in later days will have little conception of the modification and adaptation resorted to by the pioneers in this work. There was plenty of lecture room space in the university, but very little equipment of a direct agricultural nature. The departments of Chemistry, Botany, Bacteriology, English, and Mathematics were well under way in the university proper, and were able to handle the additional work involved in connection with the course in agriculture.

At the time of writing a fair equipment has been gotten together; the first class has been graduated and research work is well under way. Following is a report of three departments, each report prepared by the professor in charge, and no further comment is necessary.

DEPARTMENT OF ANIMAL HUSBANDRY

BY A. A. DOWELL, PROFESSOR OF ANIMAL HUSBANDRY

The work of the Animal Husbandry Department has been outlined with a view to meeting three important requirements. First, among these, is service to the students through the medium of lectures, laboratory work, and practical farm problems. Next in importance is assistance to the many live stock producers by giving proper consideration to experimental work along the lines of breeding and economical methods of feeding. Our third obligation is to maintain herds and flocks of sufficient excellence to assist in raising the standard of the live stock of the province. To fully meet these requirements it is necessary that sufficient equipment, in the way of land, labour, live stock, and buildings, be available to insure complete and definite results. Persons in touch with pure-bred stock

PART OF ANIMAL HUSBANDRY EQUIPMENT, UNIVERSITY OF ALBERTA, EDMONTON SOUTH.
Dairy barn, silo, milk house, scales and scale yard. Addition to main barn is used temporarily as a judging pavilion.

prices will readily realize the difficulties encountered in securing, at a limited figure, animals of sufficient excellence to give proper instruction in modern breed and market types. So it is with other equipment required. Although existing world conditions have made it necessary to temporarily curtail many proposed lines of improvement, it is felt that considerable progress has been made. The herds and flocks are being increased just as rapidly as possible; new housing facilities have been provided; and every effort is being made to carry on the kind of work that will be of service to students and stock men alike.

A beginning in pure-bred horses will be made this year by the purchase of one team of pure-bred draft mares. This number will be added to gradually until all university farm work will be performed by horses suitable for class room work, as well as furnishing the required horse power. The erection of a badly needed horse barn is also under consideration at the present time.

BEEF CATTLE

An excellent foundation herd of straight Scotch-bred Shorthorns was purchased during the past winter. These animals were selected from the leading herds of Eastern Canada and the United States, and represent the most fashionable blood lines of the breed. The herd bull, "Victor Supreme", by Sultan Supreme, by Double Dale, by Avondale, by Whitehall Sultan, and out of a Cruickshank Victoria dam is a big growthy deep roan youngster purchased in Missouri. The females all come from good stock and were mostly secured in Ontario. It is hoped that representatives of the Hereford and Aberdeen Angus breeds can be added in the near future.

This department is endeavouring to encourage the production of high-class beef steers by feeding and exhibiting representatives of the different beef breeds. Steers, of course, are used primarily for judging work, but an annual exhibit is made at the Edmonton Spring Fat Stock Show. In the spring of 1917 a range-bred grade Hereford, fed and exhibited by this institution, won the Grand Championship. This year five two-year-old range steers were exhibited—winning 1st, 3rd, 4th, 5th and 6th in the open class. The first prize animal was reserve Open Champion and sold at auction for 20c. per pound. The other four steers purchased in October, 1917, at 9c. per pound, brought 17c.; 15c.; 14¼c.; and 13½c. per pound respectively. Some good steer calves are now on hand, and others will be added during the year.

DAIRY CATTLE

Holstein-Friesians and Jerseys are the dairy breeds represented at this institution. The Holstein herd consists of one mature cow—Hulda Wayne Johanna Lass, with a record of 15,479 lb. milk and 720 lb. fat—four heifers in their first lactation period, and one bull. Detailed records covering feed consumed and returns in milk and butter fat are kept for every cow in the herd. Rosebud Mutual DeKol freshening at 2 years and 148 days has produced in 11 months and 8 days 12,173.5 lb. milk and 459.59 lb. fat, showing a profit over feed of $142.17 to date. Sady Mutual DeKol freshened at 2 years and 206 days and has produced in 9 months and 1 day 11,659.6 lb. milk and 426.93 lb. fat at a profit over feed of $142.46. These two heifers will complete their 365-day records during the coming summer and give every evidence of making a very creditable showing.

In the Jersey herd are five young cows, four heifers and the herd bull, Brompton Rochette's Heir. Gipsy Eureka freshening at two years and 120 days was milked but 9 months, due to being accidently bred shortly after the arrival of her first calf.

During this nine-month period she produced 6,361.7 lb. milk and 348.4 lb. fat, showing a profit over feed of $104.78. Beginning her second lactation period with 1,039.6 lb. milk, testing 5.6% fat, for the month of May just past, we expect a very favourable record from this young cow this year.

One wing of the permanent stock barn has been erected and for the time being is used to accommodate both beef and dairy cattle. To the south of this modern two-story frame structure is a 14 x 28 stave silo which has been an important factor in reducing feed costs. A temporary judging pavilion, equipped with seats, cabinets for laboratory equipment and facilities for heating and lighting, was provided by a 40 x 40 addition to the stock barn. In connection with the barn and judging room is a newly installed six ton stock scale with scale rack and plank enclosed yard.

SHEEP

Recognizing the importance of the sheep industry in the Canadian West, this department purchased during the spring of 1917 representative ewes of the Hampshire, Shropshire, Oxford, Suffolk, and Leicester breeds. The flock is being increased by retaining all ewe lambs, while the males are either sold to local sheepmen for breeding purposes or castrated to provide high class wethers for class room work. Permanent sheep quarters have not been erected, but two frame sheds have been built to answer present needs. One of these is used to accommodate the rams, lambs, and wethers, while the other takes care of the breeding ewes.

SWINE

Berkshires, Duroc Jerseys, Poland Chinas, and Tamworths have been added to the swine division to furnish suitable stock for judging, breeding, and experimental work. Present equipment for this work consists of a new combination feed and cook house with root cellar, colony houses, farrowing sheds, self feeders, and convenient runs and pastures. For some years past swine producers of Western Canada have suffered heavy losses from the so-called hairless pig. Leading swine men have attributed these losses to such causes as lack of exercise, insufficient sunlight, forcing sows to eat snow, poisonous properties in frozen wheat, too heavy feeding of barley, and the like. The Animal Husbandry Department felt that the question had a direct bearing on the campaign for greater pork production, and so has been giving it considerable attention. During the winter of 1917-1918, 36 sows were divided into 12 lots of three sows each, so that each of the above factors could be given careful consideration. At this writing the experiment has not been completed, but results so far obtained throw considerable light on the question, and will give a more definite basis for future work.

EQUIPMENT

During the past winter a comparison was made as to the suitability of various types of colony houses, frame sheds, and straw enclosures for wintering swine. Regular observations were made and detailed notes recorded regarding the conditions of the different types of houses under weather conditions varying from 40° below to 60° above zero. These results will no doubt be of value to men interested in providing economical housing for use during the coming winter.

Other experiments are under way at the present time, though lack of space and equipment necessarily curtail many lines of investigation that would be of immediate value to students and stock men alike.

Considerable equipment is being purchased to strengthen the lecture and laboratory work. Numerous agricultural books, herd books and magazines have been ordered for the library; enlarged live stock photographs and lantern slides for the

lecture room; and sufficient equipment for the laboratory to insure excellent practical training in modern methods of fitting live stock for show or sale.

DEPARTMENT OF FIELD HUSBANDRY

BY G. H. CUTLER, B.S.A., PROFESSOR OF FIELD HUSBANDRY

The Department of Field Husbandry is being organized with a view of:—

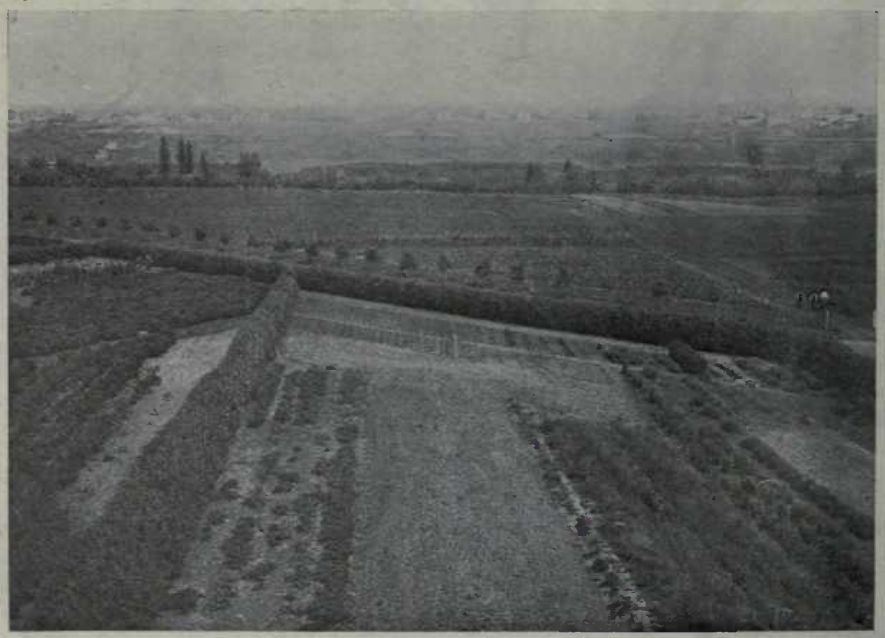
1. Investigating the problems of crop production in Alberta and producing and making available improved strains of all farm crops of economic importance.

2. Teaching the principles of crop production and the practices of successful farming to the regular students in the College of Agriculture and others.

3. Extending the knowledge of the science and practice of successful crop production to the farmers of the Province of Alberta.

Accordingly office space, class room, laboratory, workroom, and store room accommodation has been provided for in Pembina Hall, situated on the university campus. This, together with some eighty acres of land and barn room space for threshing and storing, constitute the major part of the present equipment at the disposal of the Department of Field Husbandry.

In view of the fact that the land intended for investigational work was not set aside until June, 1917, when it was under crop, work only of a preliminary kind was attempted last season. A careful examination of the soil followed by soil borings to a depth of 4 feet systematically taken, together with the laying out of the land for the most advantageous carrying on of plot work claimed much of our time during the season of 1917. Every opportunity was taken advantage of also to study conditions and problems throughout the province.



PROSPECTIVE VIEW OF GROWING CROPS, UNIVERSITY OF ALBERTA FARM.

In attempting to study the problems of crop production in Alberta our investigational work has naturally fallen into four main divisions, namely:

Choice of classes and varieties of farm crops; Crop improvement; Crop management; Soil management. Each of these is again subdivided into more narrow subdivisions, thus giving the department at once a comprehensive working basis for both investigational and teaching work. In this discussion a brief outline of the lines of investigation at present under way will be attempted according to the above classification and in the order named.

CHOICE OF CLASSES AND VARIETIES OF FARM CROPS

The aim of the Department of Field Husbandry is to assist the crop grower in making a more adequate choice of suitable classes and varieties of crops by introducing and testing new varieties from varied conditions approximating these in Alberta, and by testing untried varieties put upon the market by seedsmen and others. Much has been done in this direction, but, when one begins to examine closely into the needs, much still remains to be done. Even in the cereal crops we find there are plenty of sections in central, north central, and northern Alberta where suitable varieties, more especially of wheat, are not available. The forage crop problem too is one of supreme importance, especially in districts where the virgin prairie has become fully settled up, and where the rainfall is normally light. In a permanent system of agriculture, however, Alberta like any community must have hardy grasses and legumes for all parts both as a source of fodder and as a means of maintaining soil productiveness. The widest choice of the greatest number of varieties in each of the following classes of crops has, therefore, been made and is at present under test, as follows:

(a) *Grain Crops*

Spring wheat—30-35 varieties and strains, including types and classes.
Oats—30-35 varieties and strains including types.
Barley—25 varieties and strains.
Peas—15-20 varieties and strains.
Winter Grains—2-3 varieties and strains of winter rye.
2-4 varieties of winter wheat.
Spring Rye—3-5 varieties and strains.
Flax fibre—5 varieties and strains.
seed—15 varieties and strains.

(b) *Roots and Potatoes*

1. *Roots*

Mangels—12-14 varieties and strains, including types and classes.
Turnips—10-12 varieties and strains, including types.
Swedes—10-12 varieties and strains, including types.
Carrots—3-6 varieties, including types.
Miscellaneous—Kohl Rabi.
Kale.
Brussel Sprouts, etc.

2. *Potatoes*

41 varieties and strains.

(c) *Forage and Hay Crops*

Alfalfa—15-20 varieties and strains.
Clovers—5-10 varieties and strains.
Grasses—5-10 varieties and strains.
Corn— 10-12 varieties and strains.
Miscellaneous Crops—Millets, sorghums, etc

(d) *Soiling Crops*

The relative value of different varieties and different combinations of Rye, Oats, Barley, Millet, Rape and Peas, etc., for feeding green to dairy stock and as pasture for hogs during the summer months is being tested.

CROP IMPROVEMENT

Systematic selection work with known useful varieties of the different classes of crops has been inaugurated. A combination of the Mass and Individual Plant system of selection has been adopted for the small grains. This year some 28,000 plants are being grown under control as a basis for intensive selection. In the near future cross breeding will also be employed. Improvement work in timothy, the clovers, alfalfa, and potatoes is also receiving the attention their importance in Alberta deserves. Hereafter is a statement of the material brought together to serve the foundation for intensive breeding work. This list is not included among the variety tests:

(a) *Grain Crops*

Wheat, Oats, Barley, Peas, and Flax, a test of upwards of 50 selections and introductions

from various sources approximating the varied conditions of Alberta.

(b) *Grasses, Clovers and Alfalfas*

Selections of native species made from the vicinity surrounding the university, and introductions from various sources consisting of some 45 Alfalfas, 62 Clovers, 25 Timothies, and 30 miscellaneous grasses are under test.

(c) *Roots, Potatoes, and Corn*

1. *Roots:* A few introductions of special breeding are under test. Root seed production is also being carefully studied.

2. *Potatoes:* A system of potato improvement work where hill selections and tuber selections in potatoes has been adopted.

The Table Talk, Irish Cobbler, and Early Ohio are being selected by this system.

3. *Corn:* New introductions from various sources, with a view of procuring a suitable grain and, as well, a silage variety.

CROP MANAGEMENT

(a) *Grain Crops*

Wheat, Oats, 2 rowed and 6 rowed Barley, Peas and Flax.

Dates of seeding—(5) Seeded at intervals of ten days commencing as early as possible, for each crop—35 plots.

Rates of seeding—(5) for each crop—35 plots.

Dates of cutting—(4) for each of 2 rowed barley and oats—8 plots.

Smut experiments—3 tests.

(b) *Roots and Potatoes*

1. *Roots*—Dates of seeding—5 tests for each crop and such experiments as size of seed, distance apart in thinning, etc.
2. *Potatoes*—Dates of seeding 5 tests, size of set, treatment for disease, distance apart in planting, depth of planting and frequency of cultivation are among the most important experiments.

(c) *Forage and Hay Crops*

1. Mixtures and different combinations of Winter Rye, Spring Rye, Oats, Peas, Barley, Rape, Alfalfa, Sweet Clover, and Summer Vetches for "green feed" or silage purposes—60 tests.
2. Nurse Crop studies for Timothy—
   A study of (a) Nurse crop vs. no nurse crop.
   (b) Relative value of different cereal crops as nurse crops.
   (c) Relative usefulness of green crop vs. crop cut for grain.
   (d) The best rate at which to seed each of these cereal crops as a nurse crop.
   (e) The best rate at which to seed Timothy when seeding down.—301 tests.
3. Legume inoculation.
4. Alfalfa management for seed and fodder.
5. Timothy seed investigations.

SOIL MANAGEMENT

(a) *Tillage of Stubble Land*

Stubble land of each of the following crops will be provided this season when some 15 methods of tilling each will be tested in 1919: Wheat, Oats, Corn, Potatoes, Swedes, Mangels.

(b) *Tillage of Sod Land*

Sod land of each of the following economic grasses and clovers will be provided this season when the problem of tilling each type of sod will be undertaken: Timothy; Mixed Hay (Clover and Timothy); Western Rye and Brome Grass.

(c) *Investigations in the Prevention of Rust*

Some 4 acres of land have been set aside and prepared for systematic work looking toward finding preventive methods of lessening the disastrous effects of rust. The influence upon the growing crop with repect to its susceptibility or immunity to rust is being studied under the following conditions:

1. The date at which a crop is seeded.
2. The rate at which a crop is seeded.
3. The time at which a crop is harvested.
4. The rotation effect of four different annuals upon the succeeding crop.
5. The rotation effect of two different perennials upon the succeeding crop.
6. The influence of four fertilizers, as compared with one receiving no fertilizer.
7. The relative resistance of different varieties.

(d) *Rotations and fertilizers*

It will be observed that a splendid opportunity is offered in the foregoing experiments on rust studies for the investigation of rotations and fertilizers. These will serve a limited but nevertheless highly useful purpose. For the present they will render practical suggestions on the value and utility of fertilizers and the relation of suitable rotations to the maintenance of crop yields and permanent agriculture. As soon as land is put into proper condition, however, much more comprehensive projects will be adopted in which all the suggestions of value derived from these preliminary studies in rotations and fertilizers will be embodied.

DEPARTMENT OF HORTICULTURE

BY G. H. HARCOURT, PROFESSOR OF HORTICULTURE

The aim of the Horticultural Department of the College of Agriculture is to test out the possibilities along various lines and to demonstrate that no home need be without some adornment in the way of grass, flowers, shrubs, and trees.

As shelter is one of the first essentials, shelter belts were started for the trial grounds where protection can be given. This was quickly grown of Box Elder, or Manitoba Maple, as it is commonly called. The trees were planted in a double row and allowed to grow close and thick so as to form a good hedge.

ORNAMENTAL AND FLOWERING SHRUBS AND TREES.

Perhaps no line of work is giving more promise than that with shrubs and trees. Native hardy shrubs have been selected from the wild and planted in the trial grounds to observe what can be made of them as single specimens, in bush or tree form and, where suitable, as a hedge. The trials so far show that the wild plants respond to the care, will stand pruning, and can be transformed into things of beauty suitable for any lawn. Seed has been gathered from the wild plants, and will be grown under nursery conditions to ascertain the behaviour of these plants as compared with specimens lifted from the wild.

Tests are being made of plants related to the wild ones, but introduced from other countries as well as other parts of Canada, also trials with well-known cultivated forms.

The work with the trees is being carried on along similar lines.

THE NURSERY.

As the grounds around the university are all new, having been wild lands a few years ago, and will require many trees and shrubs for decorative purposes, a nursery has been established in addition to the trial plots, where trees and shrubs may be grown in a commercial way. In addition to furnishing the necessary supplies for planting it affords students an opportunity of seeing the manner of growing, pruning and caring for trees and shrubs under nursery conditions.

SMALL FRUITS.

Perhaps the most interesting part of the work is that connected with the growing and testing of the small fruits. It is strange that the average settler pays no attention to the cultivation of these fruits, especially where they are growing wild everywhere. Ground was prepared and a trial plot set out of leading varieties of red, white, and black currants; red, black, and purple raspberries; gooseberries, and a few blackberries. With a few exceptions these have all done well. The plants have grown well, if anything too luxuriantly, and fruited satisfactorily.

Strawberries have been tested in the same way, and while some failures occurred in obtaining a stand of new plants, yet, when once established, there has been general satisfaction. From the results of three years' work and observation, one is led to the conclusion that there is no valid reason why any one who cares to grow them cannot have all the strawberries, raspberries, currants, and gooseberries required for their own use, and, if desired, some to sell. Much remains to be done, many more varieties tested, methods of growing and wintering tried out, as well as work in breeding in the hope of obtaining something peculiarly suitable to Alberta conditions.

LARGER FRUITS.

With the larger fruits the results have not been so satisfactory. Rows of trees of over twenty different hardy

varieties of apples and crab apples, all recommended as suitable for the West, were set out. Some have not done too badly, while others have made but indifferent growth. A long testing period will be necessary before reliable results will be available. Seedling trees have been started of hardy varieties sent out from Ottawa. As soon as material is available experimental work will be started in grafting and hybridizing.

What has been said of apples applies to plums and cherries. Promising varieties of plums were planted, but so far only indifferent results have been obtained. A start has been made with the wild plum of Manitoba. These promise well, and it may be that success will come only through the development of this plum by breeding. A number of forms of the sand cherry have been planted as well as some of the new cross-bred varieties originated by Professor Hansen of South Dakota. A trial is under way with a hybrid grape, developed from the wild grape of Manitoba.

A start has thus been made with the important fruits, and time only will prove which will survive the low temperatures and winds of winter, the dry springs and the many other evils that rise up to destroy the fruit tree.

PERENNIAL FLOWERS

Quite an extensive trial is under way with perennial flowers. Each year new varieties are added to the list, with the result that even now the number that winter successfully is assuming respectable proportions. It is now quite certain that any one may have an exceedingly nice collection of perennials in his flower border, and be saved the necessity of planting the whole of his beds with annuals, as so many have done in the past.

VEGETABLES

The Horticultural Department maintains a large kitchen garden where students may observe the

A VIEW OF SOME OF THE EXPERIMENTS IN THE INVESTIGATION FIELD UNIVERSITY OF ALBERTA.

practical handling of the various garden crops, and where all the well-known varieties of the vegetable world grow side by side, for comparative purposes. Here trials are made of different methods of growing and manuring.

Facilities for winter storage are to be provided where the behaviour of the various vegetables may be observed under varying conditions of temperature, and so complete the study of the plant.

Later, as more facilities are available, the work along all lines will be extended and research work taken up, for the whole field is full of promise.

With the exception of less than half a dozen boys, who have been rejected by the military authorities., all of the students of agriculture have enlisted for military work and practically all of these have entered the Royal Flying Corps.

Perhaps it will be necessary to continue the academic work during the coming winter for the sake of the few who will be able to attend, but it is expected that the staff and equipment will be chiefly concerned in giving a special course in agriculture to returned soldiers who are thinking of taking up the profession of farming. Indeed it is possible that this may be the chief work of the college for the next few years. However the Experiment Station end of the work will not be neglected, but will be a prominent feature of college endeavour, no matter how the course may be modified.

BRITISH COLUMBIA

THE LAND SETTLEMENT BOARD

BY MAXWELL SMITH, CHAIRMAN LAND SETTLEMENT BOARD

UNDER a measure entitled "An Act to Increase Production", there was created in 1917 in the Department of Agriculture, as outlined in Vol. IV of THE AGRICULTURAL GAZETTE, page 570, a board to be called the Land Settlement Board. Mr. Maxwell Smith was subsequently appointed Chairman of the Board by order in council, and the Board of Directors entered upon their duties Aug. 1, 1917. The Land Settlement Board superseded the Agricultural Credit Commission, which was constituted under The Agricultural Act of 1915, and was empowered to carry out the undertakings of the commission.

THE BOARD'S POWERS ENLARGED

At this year's session of the British Columbia Legislature an Act was passed called the "Land Settlement and Development Act Amendment Act, 1918", which very materially increased the powers of the Land Settlement Board. This legislation provides that, where Crown granted lands are being held in a state of non-production, "the Board may from time to time, with the approval of the Lieutenant-Governor in Council, establish a 'Settlement Area' in any part of the province and delimit the area thereof." In such areas, the Board may take over lands from private owners by agreement, or, after appraisal and proper notice, may colonize and settle such lands, unless the owners shall themselves proceed to improve and cultivate the same. In other words, the Board may exercise the powers of compulsory purchase. Two of these areas have already been defined, one of 35,000 acres in the vicinity of Vanderhoof, and another of 13,500 acres near Telkwa on the Grand Trunk Pacific Railway.

From the foregoing, it will be apparent that the Land Settlement Board of British Columbia, while loaning money to farmers for improve-

ment purposes, propose to devote their energies largely to promoting land settlement and development in the unoccupied areas, whether privately owned or otherwise.

POLICY OF THE BOARD

The annual report which was for the year ending December 31, 1917, described the general policy of the Land Settlement Board as follows:—

The general policy of the Land Settlement Board is:—To reduce the money loaning feature to the minimum necessary, and to promote land settlement and development work to the fullest extent, along lines consistent with sound business principles, in accordance with the letter and spirit of the "Land Settlement and Development Act", and with a view to stimulating rapid and judicious development of the agricultural areas of the Province.

(*a*) In the furtherance of these objects, it is our aim, to first direct our efforts to the settlement and development of those agricultural areas situated convenient to transportation facilities, and available for production at the smallest possible cost.

(*b*) To adopt the necessary measures to establish community settlements in the areas suitable for mixed farming, fruit growing and all branches of agriculture requiring intensive cultivation.

(*c*) To cultivate the active and sympathetic co-operation of the faculty of the University of British Columbia, and all other reliable authorities, in determining the products for which specific areas are best adapted.

(*d*) In the active carrying out of our development enterprises, to foster the co-operation of the Department of Lands, the Public Works Department, and all other branches of the public service, in harmonizing and co-ordinating public expenditure in the areas affected.

THE YEAR'S BUSINESS.

A summary of the Agricultural Credit Commission loans granted from its inception to December 31, 1917, reads as follows:—

490 Loans granted for.....	$941,950 00
106 " cancelled or withdrawn.....	153,400 00
384 " granted, amount....	$788,550 00
Less amount paid on same.....	675,486 78
Balance owing on Loans.....	$113,063 22

A summary of the Agricultural Credit Commission applications dealt with by the Land Settlement Board during 1917 shows the following:—

——	No. of Applications.	Applied for.	Granted.
		$	$
Granted.....	149	260,600	222,450
Refused.....	208	322,411	
Pending.....	55	120,700	
Total.....	412	703,711	222,450

There are also Agricultural Credit Commission applications still unappraised numbering 53.

Amount applied for..... $70,200

A summary of the Land Settlement Board applications dealt with in 1917 shows the following:—

——	No. of Applications.	Applied for.	Granted.
		$	$
Granted.....	55	173,926	153,950
Refused.....	36	53,850	
Pending.....	12	15,350	
Totals....	103	243,126	153,950

Under the Land Settlement Board the following returns were made on initial operations from Aug. 1 to Dec. 31, 1917:

163 Loans Granted for.....	$332,650 00
6 " Withdrawn or Cancelled.....	13,500 00
157	$319,150 00
Amount paid on Loans.....	60,576 15
Amount owing to complete loans.....	258,573 85

ACTIVITIES OF WOMEN'S INSTITUTES

BY MRS. V. S. MACLACHLAN, SECRETARY, ADVISORY BOARD, WOMEN'S INSTITUTES

WORK along the lines of greater production and conservation is done individually. The Institutes are used as centres for disseminating information. Scarcely an Institute has not reported lectures and demonstrations on canning, drying, and storing of home produce. Some have had debates on the advisability of keeping a pig. Seed growing, bee-keeping, rabbit raising are being taken up, in addition to poultry, which, of course, is well established. Competitions among boys and girls are organized by a small number of Institutes with encouraging results.

A large proportion of the Institutes this year are holding, ostensibly "Flower Shows," in reality, "Home Products Fairs," in which due emphasis is being laid upon canning, drying, and wheat and meat substitutes. The work is being done co-operatively and with splendid results.

The following extracts taken from reports received from four different sections of the province are, perhaps, the truest index of the work being done and the manner of the doing:

Matsqui, Lower Mainland—21 members have vegetable gardens; 16 have fowls (ducks, hens and geese); 5 have bees; 21 have small fruits; 4 members help with the milking; 11 make butter; 10 cook for haymaking crews; and 25 bottle and dry vegetables, fruit, fowl and, fish.

West Summerland, Okanagan and North Thompson—"All of our members are working, some have both chickens and a cow and gardening, some keep a pig and are gardening. I do not know of a member who is not doing her utmost to assist.

Kaslo, Kootenay and Boundary Districts—"Every one here has a garden of some kind and every inch has been planted with vegetables, etc. Nearly every one keeps poultry, and this year every one who can is keeping one or more pigs. The boys go in for keeping rabbits. Every vacant lot in town is cultivated, also the school garden. At last month's meeting Mrs. Norman gave a demonstration on the canning of fruit, vegetables, chickens, etc."

South Saanich, Vancouver Island—"Canning committee reported the arrival of the canning outfits. The use of a small house had been given free of rent for one month as a canning centre. The sum of $38 had been advanced towards expenses to be repaid in work."

The mention of thrashing reminds us that the U. S. A. Food Administration is taking steps to prevent the waste of grain in thrashing. It is estimated that from 1 to 10 per cent of the American wheat crop is lost to the country by hurried and careless operation and inefficiency of thrashing machines. In some sections, however, losses are materially greater than in others. Waste in thrashing depends largely upon the condition of the machine as it enters the harvest field, and the care with which it is operated. While it is believed that the majority of machines operate satisfactorily, conservative estimates go to prove that on an average one and one-half bushels in every 100 thrashed can be saved by having all machines go in to harvest (1) in excellent repair; (2) with ample power; (3) by providing that during harvest they are efficiently adjusted to meet varying conditions.—*Implement Machinery Review.*

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PART III

Junior Agriculture

DEMONSTRATIONS, COMPETITIONS, AND CLASS-ROOM STUDIES IN RURAL LIFE FOR BOYS AND GIRLS

BOYS' AND GIRLS' CLUBS.

By the introductory article in this number of THE AGRICULTURAL GAZETTE, giving the appropriations made under THE AGRICULTURAL INSTRUCTION ACT of Canada, will be seen that the majority of the provinces devote part of their allotments to the encouragement of children's work in general or to boys' and girls' clubs in particular. To indicate to some extent the character and nature of the activities thus fostered, the following articles have been brought together:

NOVA SCOTIA

BY L. A. DE WOLFE, B.A., DIRECTOR, RURAL SCIENCE SCHOOLS

THERE are no organized clubs, so far as I know, among the school children of Nova Scotia.

About 100 teachers in the province encourage canning, the raising of calves, pigs and poultry. Possibly 400 teachers do something in the line of stimulating home gardens.

The products of the children's efforts along these lines are in evidence each autumn at the county exhibitions and at local school fairs.

There are no contests as such. Each child works for a prize at the exhibition. Local prizes are frequently offered for the best exhibit of canning, or the best poultry raised by a school child. This in a way is a contest, but not an organized one.

Beginning this autumn, we shall have seven travelling teachers in different parts of the province. One of their duties will be to organize clubs. We hope, therefore, to report good progress a year later.

NEW BRUNSWICK

BY T. G. HETHERINGTON, B.S.A., SUPERINTENDENT OF LIVE STOCK

THUS far our activities in this province along the line of club work has been limited to boy breeders' clubs. These clubs are financed by prominent men in the various counties who take an interest in agricultural affairs. The scarcity of breeding stock in the province led us to organize these breeders' clubs. We anticipate that several of our clubs will add sheep to their activities this fall, each boy taking two grade ewe lambs and one boy a pure-bred ram for the use of the club.

We have twenty pig clubs organized at the present time, every county in the province having one club and some having two. Scarcity of foundation material and not lack of finances has limited the number organized this year.

Each club is a separate organization. The various pig clubs hold their fairs in the fall of each year. Whenever possible the pig fair is held in conjunction with the poultry club fair and the school fair.

The initial membership of the pig clubs is limited to eleven boys. Ten females and a male are supplied to the boys.

In regard to the development of the pig club work this year I might say that of the twenty clubs now in operation eighteen were organized in the spring of 1918.

Our method of taking one female from each boy each spring for two years in succession will enable us to double the number of clubs each year. Eventually we plan to have a pig club in each parish. The Yorkshire breed is the most popular, followed by Berkshires and Chesters. The very best breeding stock obtainable is supplied to the boys.

The various clubs are visited as frequently as possible and talks given on swine management. Usually the boy's pig is the best on the farm.

ONTARIO

BY R. S. DUNCAN, B.S.A., AGRICULTURAL REPRESENTATIVE SUPERVISOR

STRICTLY speaking, we have very few pig clubs, calf clubs, and corn clubs in operation in Ontario. Practically all educational work of this nature is carried on through the rural school fairs and is provincial in its scope. There were 302 rural school fairs held in the province last year, and practically each fair was managed by an organization known as the Rural School Fair Association.

Pig clubs were organized this year for the first time in the counties of Lennox and Addington and Peel. The Representatives in the counties of Welland and Wentworth and Lanark have interested the Board of Agriculture, Board of Trade, and Town Council respectively in loaning money to children to buy young pigs. In so far as I am aware, no clubs were organized in these counties. A special committee was appointed at the annual conference of Agricultural Representatives held at Guelph the week of July 15, to make recommendations and draw up regulations in regard to pig clubs.

To my knowledge, there are no calf clubs organized in Ontario. Corn clubs—so called—are in operation in the Corn Belt, particularly in Essex county. Progress clubs have been brought into being through the Educational Department.

BRAMPTON'S PIG CLUB

BY J. W. STARK, B.S.A., AGRICULTURAL REPRESENTATIVE, PEEL COUNTY, ONT.

OUR pig club is rather different to some other clubs of the kind, in that we work with older boys and distribute older pigs. This plan was tried on only a small scale in this county with one of our Junior Farmers' Improvement Associations, as I wanted to be sure how it worked before it was adopted too extensively. We had more applications in the first place than we had finally, the draft interfering with some of the applications until we had only nine members left. They were all young men who attended the annual short course in agriculture. Arrangements were made for the purchase of the pigs from a well-known breeder of Yorkshires. We intend to use only this breed in all of our hog improvement work in this county. The young sows were registered in the name of the boys themselves. They were shipped in by freight to Brampton. The boys called for them on one day, and we had moving pictures taken of the unloading.

METHOD OF PURCHASE

Most of the boys paid cash, but arrangements were made with one of the local banks to take notes. The best rate of interest we could get was 7%, but it is possible arrangements will be made with the Canadian Bankers' Association to allow a lower rate. It was not necessary to make any arrangements for a male, but next fall the club will bring in a suitable animal for use by its members. It is the intention to use the

stock from these pure-bred pigs that have been distributed to start similar clubs, probably in some cases using younger pigs. At one time it was intended to let each club take care of its own district, that is, leaving sale of pure-bred animals to the boys so that their neighbours would buy them, and thus build up the stock in the district. This plan may prove satisfactory even yet. Of course it would be a good thing for the club members financially to have the sales made to clubs from outside points, as they would probably get higher prices in that way, but we should get as many clubs as possible started, and then let them spread out into their own communities a little later.

It might be a good plan if our Government farms, including the agricultural colleges and provincial institution farms, were to raise pure-bred pigs and dispose of them to the clubs. I do not believe that the live stock departments of our colleges could work to better advantage than by raising pure-bred young stock of all kinds to distribute.

IMPORTANCE OF QUALITY

It is most important to see that the quality of pure-bred animals distributed is kept to the highest standard and for that reason we are trying to keep some kind of direction on the stock that the boys have. For instance, in a litter there might be as many as three pigs that should not be used for breeding purpose, and if the executive of the club in co-operation with the Representative had power to insist on a certain degree of culling, it would be the best thing in the long run. Some plan will need to be worked out in the near future for the distribution of sires. The grade sire has been a stumbling block in the way of live stock improvement at all times, and if some regulation could be made prohibiting their use on some plan similar to that of horses, it would be a good thing for everybody concerned.

CONSTITUTION AND RULES

Following are the suggested constitution, rules, and plan of organization:

1. The Club shall be known as the ..... Junior Farmers' Improvement Association Pig Club.
2. The objects of the club shall be:
   (*a*) To distribute to members of the Junior Farmers' Improvement Association on terms of easy payment, pure-bred sows of one bacon breed.
   (*b*) To see that the animals are properly cared for, to provide the best bred sires and to assist members with culling and sale of their stock.
   (*c*) To create a deeper interest in the bacon industry (*a*) by planning for the sale and distribution of pure bred pigs to other farmers in the community, thus improving the quality of the stock throughout the county, and (*b*) by improving the system of marketing of bacon hogs to ensure greater returns for the producer.
3. Only members of the Junior Farmers' Improvement Association shall be eligible to receive pigs, and only one pig shall be allotted to each member.
4. Arrangements for supplying pigs and other details of operation shall be under the direction of the Agricultural Representative working in co-operation with the J. F. I. A. Executive.
5. Each person receiving a pig will at time of its delivery, sign an agreement, covering 2 years, as to care of sow, culling of litter, sale of pigs, use of sires, etc.
6. The sow will be registered in the name of member and he will be supplied with bulletins, etc., relating to care and management of swine.
7. If a member wishes to do so, he may pay cash but arrangements shall be made to give him 6, 9 or 12 months' credit if he so desires. In the latter case money should be advanced by the local bank, and note will be endorsed by parent or guardian.
8. It is desirable that young sows that have been bred be supplied and that they be distributed at such a time that litters will come in spring or fall.
9. In no case shall more than one breed be supplied to any one county.
10. Prizes may be offered to members for best care, records and profit from pigs, and fall fair boards will be encouraged to give special prizes for sows and for their progeny.

MANITOBA

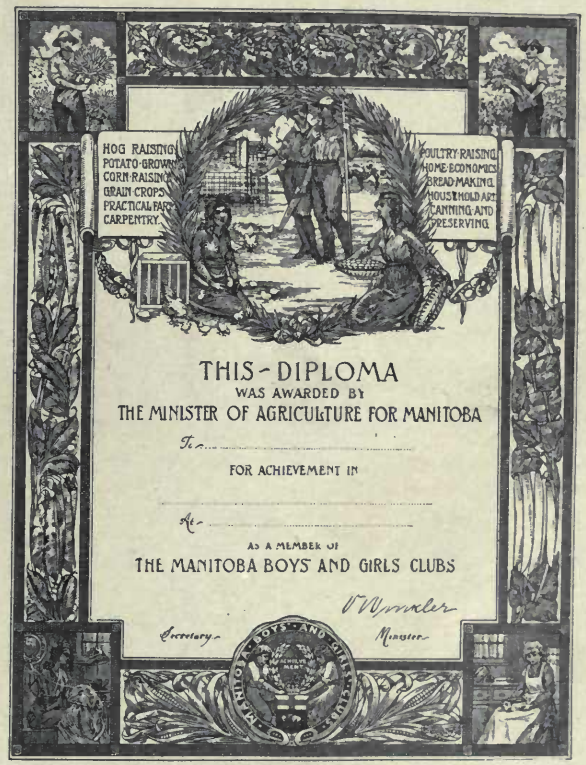
BY S. T. NEWTON, DIRECTOR, AGRICULTURAL EXTENSION SERVICE

IN Manitoba, owing to the difficulty of securing efficient leaders, it has not been found advisable to divide boys' and girls' club work into separate sections, such as " Pig clubs ", " Calf clubs " and so forth. That is, all these divisions have been outlined under the word " contests ", and th se contests have been limited to 1 in order that the teacher and other officers connected with the club may have a thoroughly comprehensive knowledge of all phases of boys' and girls' club work. While there are 12 contests, it is strongly urged that no club member take part in more than 3 or 4 contests each year, as we have found it better to do a few things well than to half do a large number.

Very naturally this year the main emphasis was placed on the food production contest.

THE NUMBER OF COMPETITORS

In some of the contests considerable material was supplied, either free or at reduced rates; consequently we have a full record of the participants. In other contests, where no material was supplied from the Extension Service, it has been difficult to get a full list of the members, but as near as we can possibly get it, a conservative estimate would put the numbers taking part in the various contests as follows:—



FAC SIMILE OF DIPLOMA AWARDED TO MEMBERS OF BOYS' AND GIRLS' CLUBS BY MANITOBA DEPARTMENT OF AGRICULTURE.

Pig raising	2,150
Calf raising	2,143
Chicken raising	7,800
Grain growing	1,053
Gardening	15,730
Cooking	3,475
Canning	4,724
Garment making	4,211
Noxious weeds	2,921
Dairying	1,063
Wood-working	2,779
Essay writing	2,095

Altogether there are 175 clubs, made up for the most part of the town school located at the natural marketing centre of the district and from 5 to 15 of the adjacent rural schools. All of these clubs are in operation, and judging by the reports already received, 98 per cent will hold fairs this fall.

THE ADOPTED METHOD

The plan followed this year in the organization of boys' and girls' clubs, was very similar to that of last year, namely to call a public meeting to which the inspector and all of the teachers, trustees, and secretary of the school board and other people in the district interested in the boys and girls were asked to attend. At these meetings an executive committee of from 5 to 12 was elected, and this committee afterwards appointed, either from their number or otherwise, the club manager, who from that time on became a member of the executive whether he had originally been a member of it or not. In a few cases the club manager is one of the teachers, but more frequently he is a bank manager, agricultural society secretary, or some other prominent resident of the district, for while the principal of the town school usually makes a good club manager, yet we are always sure of his active assistance and, by having a permanent resident of the district as manager, the difficulty which is met with by the frequent change of teachers during the summer holidays, is, to a great extent solved, and the club is able to continue with less interruption than if a new teacher coming into the district has to start right in without knowing local conditions.

HIGH AND CONSOLIDATED SCHOOL STUDENTS

This year for the first time every high and consolidated school in the province is taking part in some form of boys' and girls' club work. The juniors are engaged for the most part in raising chickens and in gardening, while the older pupils find most interest in the pig and calf raising contests, and in growing registered seed. Of the 25,000 who are engaged in boys' and girls' club work fully 3,000 are in the high schools.

Several of the larger clubs have over 50 members raising pigs and 40 raising calves. With these clubs special stock judging exercises are being conducted, and the calf, pig, and poultry judging contests form important features of the boys' and girls' club fair.

DEPARTMENTAL CO-OPERATION

In boys' and girls' club work the Departments of Agriculture and Education co-operate very closely, and an effort is made to correlate the educational and economic phases of club work in such a way that the boys and girls, while complying with the rules formulated to govern the contest, are learning agriculture and home economics.

This year no free material was supplied except about 200 bushels of potatoes to new clubs. About 4,000 dozen eggs were supplied, for which the members paid 40 cents, the Department of Agriculture paying the other 60 cents. Garden seeds were supplied at half price, and in a few districts seed centres were established and registered seed supplied at about two-thirds the cost of ordinary seed. At these centres members are engaged in the acre seed contest, and are complying with all the regulations of the Canadian Seed Growers' Association.

Record booklets were provided for the contests, and the club managers, teachers, and inspectors are encouraging the contestants to keep careful records. Ten per cent of the score at the fair will be based on the record.

SASKATCHEWAN

BY J. G. RAYNER, B.S.A., DIRECTOR OF BOYS' AND GIRLS' CLUBS

IT is a difficult matter to make anything like an authentic estimate of the extent of the boys' and girls' club activities in Saskatchewan this year. In very few places was this work started under the name of boys' and girls' club work, but any organization interested in the boys and girls was encouraged to take up club projects. The agricultural societies have nearly all put on contests for boys and girls, and grain growers' associations, homemakers' clubs, rural education associations, etc., have all given the movement some encouragement. Practically none of these organizations has made any definite report of what it is doing, so that we have no record as yet of the number of organizations taking up club projects, the projects that are being taken up, or the number of members engaged in the work.

THE CONTESTS ENCOURAGED.

Almost all of the club work being taken up this year comes under the following headings:—Calf feeding, pig raising, poultry raising, and potato growing. These are the only club projects given encouragement this year. It is felt that the efforts of the boys and girls, for the present at least, should be concentrated on the production of food stuffs that would help to meet the war needs. At about 35 points contests in calf feeding have been put on. At about ten points pig clubs with memberships ranging from 70 down have been organized. At most of these points the Canadian Bank of Commerce has taken the initiative in organizing the clubs. In addition, many agricultural societies have included pig-feeding contests in their prize lists, and I feel safe in saying that this, in addition to that being done by rural educational associations and school fair organizations, will account for about 100 additional pig-raising contests being arranged. Many of these contests have been made possible through the assistance given by the Canadian Bankers' Association.

The organizations referred to are responsible for some 50 poultry-raising contests and for 50 or more potato-growing contests.

NUMBERS ENGAGED.

Each organization or club may carry on as many projects as desired. That is each project does not require the organization of a separate club. Most of the organizations taking up this work have dealt with pig-raising, poultry-raising, and potato-growing contests. The total number of members enrolled in each of the four contests named would probably reach:

Calf feeding	300
Pig raising	700
Poultry raising	500
Potato growing	600

All of these projects this year have taken a forward step throughout the province. This was brought about by the prominent place which the subject was given at the 1918 convention of agricultural societies, which also resulted in the appointment of a Director of Boys' and Girls' Club Work. With proper organization and adequate assistance, it is confidently expected that the movement in all its branches will make satisfactory strides forward in 1919.

ALBERTA

BY JAS. MCCAIG, M.A., EDITOR OF PUBLICATIONS

THE kind of clubs that are most common with us are Pig Clubs. About thirty of these have been organized in the province this year under the direction of W. J. Elliott, principal of the Agricultural School, Olds, and there are a few others organized in the province usually under the direction of bankers or other prominent business men. The number of members in each of these is from fifteen to twenty. All of these belong to this year except one or two.

In connection with our school fairs, the ladies instructing in domestic science have in some cases organized girls' clubs for different types of work, such as sewing and cooking, though the organization of clubs in relation to school fairs is not general. There will be fifteen or twenty of these in the province.

The Department of Women's Institutes, likewise, is organizing girls' clubs in a few of the junior institutes. About a dozen have been organized this year. The membership is from twelve to twenty. The work they are taking up this year is First Aid.

BRITISH COLUMBIA

BY GEO. PILMER, SECRETARY, LIVE STOCK BRANCH

IN this province we have Boys' and Girls' Clubs devoted to the raising of pigs, poultry, calves, and potatoes. There are thirty-six of these in operation carrying on competitions as follows:

Pig-raising	14
Poultry-raising	24
Calf-raising	1
Potato-growing	4
Total	43

Clubs are not confined to single contests, but may carry on several if they so desire. At present four clubs are carrying on pig and poultry competitions, two poultry and potato contests, and one poultry-raising only. Ten clubs devote their whole attention to pig-raising only and two to the raising of potatoes without regard to other contests.

The membership varies in numbers and averages in this province about ten.

The pig-raising competitions have shown a marked increase this year, as was to be expected, and would have been held in greater numbers but for the difficulty of obtaining pigs and feed. Poultry-raising shows a slight increase, but potato and calf-raising competitions have decreased slightly.

The war cannot last forever, and once it is over those farmers and breeders who have draft horses to sell will reap a substantial reward. However, those who refuse to see the light until a week or a month or a year before the insistent demand develops will not be prepared to meet it. The bloom will be off the rye then. Both preparedness and profit require a little looking ahead.—*Breeders' Gazette.*

SASKATCHEWAN

AGRICULTURE AS A SCHOOL SUBJECT

BY CHAS. H. EDGETT, TEACHER OF PUBLIC SCHOOL

OF the need and value of agricultural courses in the Canadian schools, there can be no doubt. I shall in this paper endeavour to show, in the first place, the great need of agriculture being taught in all our schools—public and high—, and, secondly, how this growing demand for vocational schools is being met.

Canada has long taken pride in her public school system, and yet, as least in some respects, her public school system has been undeserving of it.

The trouble with the system is that it fails to educate the great majority of the pupils. In other respects it is good. A great many people who have given the matter little, if any, thought still believe it is all right. In Saskatchewan during the last year or two the people have shown a greater interest in our schools than ever before. We expect great things from the "Better Schools" movement. Our educators, and, in recent years, our legislators, have shown much interest in school matters. They have felt the great new urge towards a better adjustment of society, and our schools are now entering upon a new development.

The curriculum of the old regime leading through the high to the university was, when it first took shape, just as vocational as a course in cabinet making. It was designed to fit boys to be ministers or followers of other professions; it was designed to give the requisite equipment for an intellectual vocation, and, so well was this function performed, men had begun to think that over this road alone might education and culture be obtained. Since then it has become a fetish, and it has woefully broken down as a means of meeting the needs of our complicated modern society.

THE VILLAGE SCHOOL

Let us take the case of the rural small village school. It is in many cases utterly inadequate to-day. Why?

In the first place, rural social conditions have changed. Boys and girls are leaving the farms and going into cities. Country people have been content to send such of their children as they desired to educate somewhat better than they themselves were educated, to the nearest high schools. This policy has been followed at the sacrifice to farm and country life of thousands of the strongest and most intelligent youth of the land. The town and city schools included little, or nothing, to stimulate the art of agriculture, or to encourage the choice of farming as a life work. To make the farms pay, to counteract this never ending march to the cities, modern scientific methods must be adopted. To make the boys and girls contented they must be brought to see how to make the farms pay, they must be made alert, they must be given fresh interests to compete with the lure of the cities. What is wanted is a development, a broadening of our present regular system of secondary schools, so as to include the best new features of the agricultural and industrial schools and retain all the good features of the regular system.

THE PROBLEM

Can this be done by putting an underpaid and undertrained teacher over an ungraded school, with very little, if any, equipment, no contact with the outside world, no life in the course? Of course it cannot be.

But neither, in many cases, can we have a better school if we leave each

rural community to do the work, because the average rural community cannot afford anything better, and probably would not if it could. Many school districts think what was good enough for their grandfathers is good enough for their grandchildren.

The children from these schools, however, go into the whole Dominion, or, if they remain at home, vitally affect the welfare of the whole province. Therefore, it concerns the entire province to educate them. It is a hopeful sign that, in the past few years, province after province throughout the Dominion has awakened to this fact and passed laws remedying these defects.

WHAT OF THE FUTURE

Agricultural education in our schools is fast becoming a rule rather than an exception. Schools are being consolidated and graded, the teachers better paid and better equipped. What we still need is schools that really educate for farm life and teachers trained to conduct them in a proper and efficient manner.

The farm boy goes to school till he is fourteen, and in ninety cases out of one hundred not a day thereafter. When not needed at home he is sick of school, or wants to go to a city, or can't see what education holds for him that is either attractive or helpful. For a truth there is none. He gets a little smattering of many subjects and that is his education.

Now, consider a vocational course for the same boy. After the elements of geography come questions of soil, transportation, drainage; questions all having a direct local bearing on the problems which face the boy's father, and which he will face if he remains in the district. Arithmetic is no longer a figuring of long, intricate questions in fractions. It becomes a reckoning of how much profit there will be in raising apples, or wheat, and shipping to market, if the transportation costs so much, and Bordeaux mixture so much; or how much loss the farmer incurs if he leaves his mowing machine or reaper out all winter, as many do, and has to spend fifteen or twenty dollars yearly for repairs besides the loss of time.

Doesn't geography, doesn't arithmetic take on a new meaning? Isn't it more, rather than less, educational? What is education if it is not the training to use our brain better to understand and to master our environment?

PRACTICE COMPARED WITH THEORY

Take nature study. What a farce it is in too many of our schools. But suppose our pupils study nature from a garden plot, instead of a book and a few specimens of flowers, etc. He now learns by actual observation the whole germinating process of the seed, he learns the principles of the soil, heat, and fertilization, of plant care. He should study from the object the use of farm machinery, the principles of feeding live stock, the study of plant diseases and insect pests, and how to fight them—these and many other subjects of farm life should be studied.

You cannot study the proper raising of an onion without learning many allied subjects, and all the while it is the boy's own onion that is growing; it is real, it is related definitely to his life and interests. The average boy who is given a garden of his own, and who is assured that the proceeds from its produce are to replenish his own purse, will cheerfully apply himself to the art of cultivation.

HIGH-SCHOOL SUBJECTS

When we get into high school subjects the case for vocational instruction becomes stronger. Take the subject of chemistry. How meaningless it was to many of us in many of its ramifications, at least it was to me!

But suppose chemistry is taught to girls with relation to cooking; suppose it is taught to boys with relation

to soil conditions and crops. Every chemical principle learned is directly applied then, and will be applied in the rest of their lives. They will know chemistry, because they will see its real bearings and grasp its practical significance. They will be truly educated chemically. Try to explain to an old-fashioned farmer the litmus paper test for sour soil, or the action of nitrogen on the growth of peas. If we do we come up bang against the stone wall denseness of the old "red school house". Our new agricultural high school makes litmus paper not a mystery, not a form of insanity, but a necessity, just as it abolishes the open sink, the fly-breeding privy, the air-tight sleeping room, and hot doughnuts for breakfast.

Knowing chemistry the pupils know better how to live, surely the noblest end of all education.

Almost the first thing that strikes the investigator of our school system is the appalling percentage of children who never get beyond the eighth grade. It is said that in the United States more than eighty per cent never get beyond grade eight, and the showing is no better in Canada. Of this number, too, a great many who are mentally deficient or unfortunate through illness reach the age of fourteen without advancing so far as the eighth grade.

If a boy is to enter life equipped with a trade knowledge the school has to give him that knowledge. We want better and more skilful labourers, the state through its schools has to train them. Every boy and girl in city and country should be so taught that if he be compelled to drop out of school to-morrow, his work up to the close of to-day's session would be such as to give him the best possible preparation for life.

PROGRESS IN TECHNICAL TRAINING

Wonderful advance has been made in the United States since 1898 in providing courses in agriculture in the secondary schools, and trade schools have been started and are being successfully carried on in many of the states; in Canada every province has made note-worthy progress in its agricultural courses, in its schools; but as regards trade schools and technical schools, we are far behind the United States.

One of the first aims of vocational instruction is to prolong the period of schooling, to keep boys and girls in school as long as possible, between the ages of fourteen and eighteen, as well as to fit them for life's work. This can be done by making education practical instead of bookish, by showing the pupil that study has a direct bearing on life and can result in a better income, and so a happier future.

To do this properly vocational instruction should begin early in the sixth or seventh grade.

A large proportion of our schools throughout Canada have one to two hours a week of manual training for boys, and cooking and sewing for girls. This is not enough to fit the boy or girl for a vocation if he or she leaves school at fourteen; it is not enough to enable a boy to find where his natural talents lie.

THE PLACE OF THE HIGH SCHOOL

The work of the high school lies between that of the public school and the agricultural college.

The high school must offer certain elemental instruction which every literate man must possess. But of what use is the old time school instruction in Latin, Greek, Algebra, and the other subjects required for college entrance, to the boy or girl who must go to work in a factory, store, or on the farm? None of course. Our rulers are gradually realizing this, hence the changes in our schools; hence our high schools, in most cases, offer courses in physics, chemistry, botany, and zoology; detailed study of plant and animal life, farm crops and animals, soil and

its tillage and farm management, while the last year of the course places greater stress on the economic aspect of the subject and is more practical and technical.

QUALIFICATION OF THE TEACHER

To make the course a success, we as teachers must receive both practical and scientific instruction in the art of agriculture. Such training is being offered at the various courses given by the colleges throughout the land at their summer schools and should be taken advantage of by every teacher.

By gaining knowledge of agriculture and experiences related to this great art of food production, the pupil gradually acquires a sympathetic attitude to it and to those who are engaged in its pursuit. He comes to appreciate its far-reaching possibilities and its relation to mankind generally. In the contemplation of life and in studying its forms and the conditions of their growth and development he secures a true and clear conception of his relation to his and Nature's God.

APPOINTMENTS

MR. A. M. McDermott has been appointed Assistant in Extension Work in School Agriculture under the Department of Education. Mr. McDermott is carrying on most of the work formerly done by Mr. A. W. Cocks, B.Sc., who has received leave of absence to engage in military service.

Two appointments have recently been made in Household Science extension work. The appointments are Mrs. Ada V. Neelands who, for some time conducted the work of Household Science in the Collegiate Institute at Stratford, Ontario, and Miss Isabel Shaw, formerly Supervisor of Household Science for the Moosejaw public schools.

The Department of Education is increasing its supervision of the hygienic conditions in the schools of the province. Two school nurses have been appointed in connection with this service. Mrs. Effie Feeney enters the service after four and a half years' supervision of the work of school nursing in Prince Albert. Miss Annie Morton, the other appointee, organized the work of school nursing in Galt, Ontario, and also served for a short time in the health department of the Regina public schools.

The live stock in the countries of the Allies in Europe has been decreased by 46,000,000 head since the beginning of the war. Forty per cent of the hogs in France have been killed, and 35 per cent of the sheep. It is estimated by French officials that French live stock cannot be restored to the pre-war basis for from five to ten years after the war.—*Canada Food Board Note.*

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications and Notes.

AGRICULTURAL EXTENSION WORK IN THE UNITED STATES

ADDRESS BY C. B. SMITH, CHIEF, STATES RELATION SERVICE, UNITED STATES DEPARTMENT OF AGRICULTURE, AT THE CONFERENCE OF ONTARIO AGRICULTURAL REPRESENTATIVES

Our extension organization at present consists of a little more than 6,000 men and women, practically all of whom have been brought up on farms and had the advantages of a four-year course in a College of Agriculture. Of this number, about 2,500 are county agents located permanently in a single county; about 1,400 are women agents, for the most part likewise located in counties. In addition there are about 1,200 agents in charge of boys' and girls' club work. The remainder of the 6,000 are largely made up of specialists in various lines, with headquarters either at the State College of Agriculture or the Federal Department of Agriculture, and who work in close co-operation with the county agents of the country. We have in the United States approximately 3,000 counties; 2,500 of these now have agricultural agents, and the remainder are covered in a way by district agents, that is a county agent working in two or more counties. It is hoped during the coming year to complete our programme with a single agent in every one of the important agricultural counties, in the United States.

The funds involved in the employment of this extension force are now about $13,000,000 annually, supplied from Federal, State, County and other local sources.

THE KEYSTONE OF THE SYSTEM

In the United States we regard the county agent work as the keystone of our entire extension system. It was begun in peace times in the Southern States, about 14 years ago, and in the northern and western states about six years ago. We were slowly developing the work in accordance with permanent plans and funds which the Federal Government had approved, and had about half of our counties organized, when the war broke out. So valuable a place had the county agent made in the government of the county that in the minds of Congress, when war was declared by Germany, an emergency was believed to exist because of the fact that our county agent system was not completed. As an emergency, therefore, Congress immediately made available something like four and one-half million dollars to the Department of Agriculture for immediately completing the county agent system the country over. Since also in war time it was believed as desirable to take steps to conserve food as to produce it, funds were made available for developing the home demonstration or women's county agent work of the country. To this end, funds were made available for locating women in about half of the counties of the country and extending the work to all of the more important cities. Boys' and girls' club work for stimulating gardening, poultry production, pig production, and home canning were also greatly extended. In developing the county agent work in the United States, which began first in the Southern States, a year ago last April there was in the Northern and Western States less than 500 counties organized. The great bulk of work as regards the development of new counties for county agent work to meet the emergency centred in the northern and western states, and last August, when funds finally became available for this work, the immediate task for us was the finding and placing of about 700 county agents and 600 women agents.

With so large a proposition before us, we necessarily took stock of what had been accomplished in county agent work up to that time, plans and methods which had been successful, methods which had been tried out and failed; for it was our desire in organizing these 700 counties to incorporate the best ideas of both the south and the north up to that time. This leads me to briefly run over the changing point of view with reference to the work that has taken place in the United States since the county agent work was first started.

WHEN THE WORK STARTED

When the work started in the Southern States the authorities at Washington knew quite clearly what they wanted to do. The cotton crop, which is the main crop of the Southern States, had been threatened with the boll weevil, and the thing that it was desired to teach was how to grow cotton in the face of the boll weevil, or, in case that was not possible, to teach the farmers of the

South how to diversify their agriculture and grow food for their own home needs. The work was started in the Northern States in 1912. The first county was organized upon the solicitation of the Chamber of Commerce in Binghamton, New York, and a railroad which ran through the town. In a survey the town discovered that it was importing a considerable portion of its food. The railroad, too, had noted that during the past fifty years agricultural freight was decreasing. They solicited the Department, therefore, to co-operate with them in the establishment of a model farm and experiment station at Binghamton, where farmers might see the most improved methods in handling crops and stock. The experience of the Department, up to that time, had shown that the model farm idea is based on the wrong theory. Farmers learn things, like all other people, by doing them themselves, and the Department's experience has shown that it is much more important to get 500 farmers to grow an acre of corn, on their own farm or spray a patch of potatoes themselves, than it is to do the work for them at a single place and invite the farmers to come in and see the results. The Government, therefore, persuaded the Chamber of Commerce and the railroad at Binghamton that it would be better to employ a man and locate him at Binghamton to work with the farmers than it would be to establish a model farm, and the Chamber of Commerce finally agreed to this plan. At that time, neither the Department of Agriculture nor the State College of Agriculture, had made any study of agricultural needs about Binghamton, so it was suggested at the outset that we employ a farm boy who had been trained in the College of Agriculture, locating him at Binghamton, have him investigate the needs of the county, and then undertake such demonstration work as seemed to be needed. This plan was adopted. In this case I may state that the Chamber of Commerce, as well as the other business interests of the city, were extremely proud of the work that they had undertaken. They were going to improve agriculture—they were going to help the farmer. There had been a feeling of estrangement for many years between the farmers and business interests, and here seemed to be an opportunity for the business interests to aid the farmer in his own work.

COMMERCIAL CONCERNS INTERESTED

What this Chamber of Commerce was doing spread rapidly to other Chambers of Commerce throughout the States, and about that same time a large commercial firm in Chicago, benevolently inclined, offered a thousand dollars apiece to the first 100 counties that might organize in support of county agent work. This was the first stage of county agent work in the Northern States. To make a long story short, it did not prove successful—the farmers resented the idea of business interests teaching them agriculture. They thought that business interests must have some motive behind the work, and they, therefore, sat back and indifferently watched the efforts of business interests to teach them agriculture.

At the end of a year it became apparent that if the movement was to succeed, farmers must take much more active interest in the work, therefore, every effort was made to interest the farmers. Business interests were told plainly that they should keep in the background—that a farm bureau to succeed must be essentially a farmers' organization, supported by farmers, and officered by farmers. Business interests might come in but should play a subordinate role in the enterprise. With this change, came a greater interest in the Farm Bureau by the farmers themselves. As is the case in all new enterprises misunderstandings arose here and there as to the purpose of the Farm Bureau. It seemed to some farmers' organizations already in existence that the Farm Bureau was an attempt, on the part of the Government, to supplant their institutions. Again, it was regarded as an entering wedge for the location of graduates of the Colleges of Agriculture to soft positions at the expense of the farmers. Because of the requirement that there be some local financial support by the farmers in each community before an agent was placed there, the increase in taxes was a hindrance to the work. Others looked upon the movement as an attempt by the Government to locate a man in their midst who would be essentially a Government statistical reporter, who would know conditions of crops and report any substantial increases, which would serve to keep down the prices to the farmer. While I think it would have been possible to have completed our county agent system on the basis of the agent being a Government representative and desirable in war times in each community to co-operate with all departments of agriculture, not only in agriculture but with the War Department, in securing horses and mules and in aiding in the raising of funds, etc., the work we are convinced would have gone slowly and in some communities very reluctantly. Fortunately there had come into existence a new point of view with reference to the work which immediately upon presentation, practically everywhere, met and overcame at once the opposition of farmers. The type of Farm Bureau thus evolved is the type we have put into our 700 new counties in the Northern and Western States during the past year, and I think is fundamentally sound. We regard this Farm Bureau, as now organized, as the foremost step in real democracy that has occurred in America in recent years. The thing is so self-evident that we wonder how it could have taken practically five years to discover so simple a thing—how we could have thought of anything else at the outset.

FARMERS' OPINIONS FOLLOWED

We no longer approach a county with the idea of locating a county agent there. On the other hand, we go to the county to study with the farmers themselves their local agricultural needs. We ask them what their farm problems are; we let them suggest how they think local conditions could be remedied. In a discussion of the improvement of soils, crop yields, or of dairying, it soon appears that if the people themselves get far in any improvement, they will need some kind of an organization and machinery through which to make those improvements. This leads logically to the need of a county organization made up of farmers and their wives to study the agricultural conditions of the county and to delegate to certain of their numbers who have outstanding ability that will show in a vizual way improvements to the community. Very soon it appears that a county thus organized studying its own problems, working from within, is a good deal like a church without a pastor. Some one is needed to guide the self-chosen leaders into the most productive channels. Such a person would seem to be a man who has been trained in agriculture practically, and who has a thorough knowledge of the science of agriculture acquired at our College of Agriculture and our higher institutions of learning. Thus by logical steps the farmers themselves and their wives come to see the need of such an agent to work with them, and they reach out their hands for co-operation with the State and Federal Government for aid in helping them to help themselves.

THE METHOD OF ORGANIZATION

I might give you a hint or two perhaps as to the method of county organization and how it works. An agent from the College goes to a county, gets in touch one way or another with some public spirited farmer who might be interested in county agent work, solicits his interests, and gets him to invite in a half dozen other farmers who might be interested in the Farm Bureau movement. The work is then explained by the College official to these farmers and their co-operation secured. These farmers then themselves draw on their acquaintanceship throughout the county, and issue a call for a larger meeting at which representatives from all parts of the county may be present. At this larger meeting the work is again explained to all who are in attendance and the temporary Farm Bureau committee established; and the representatives from each section of the county go back home with instructions to talk the matter over with the neighbours and to call Farm Bureau meetings. The State organizer then visits these local organizers, and in company with him visits some of the farmers preceding the meeting, which is usually held in the evening. They thus learn the sentiment of the community. Meanwhile, the central committee has been publishing articles in the paper favourable to the Farm Bureau, membership cards have been printed, and, at the end of each of the local meetings, farmers who have agreed beforehand solicit membership. Everyone is given an opportunity to join the Farm Bureau at these meetings, at which time the whole plan is fully explained and the kind of work that the community desires is determined upon. Upon the completion of the local meetings in the county, the temporary county committee call a meeting at the county seat. Officers are elected and a programme of agricultural development worked out for the county—both a long time programme and a programme immediately ensuing. At this meeting it may be decided whether or not to employ a county agent, a home demonstration agent, or a club agent, whether to employ these on part time or whole time—any one or all three. The officers are usually president, vice-president, secretary, and treasurer, and an executive board made up of these officers and five or six additional men, each one of whom may be the head of a line of work which it is desired to take up in the county during the year.

WORK DONE THROUGH COMMITTEES

The Farm Bureau does its work primarily through committees, the leader of each line of work in a local community constituting a member of the county committee which harmonizes and plans the work along that particular line for the entire county. The Farm Bureau is primarily a business organization; it seeks to help farmers increase their efficiency in farming, and especially their net incomes. It is believed that if the net income of farmers is sufficient, the farmer himself will see that conveniences are placed in the home, that better farm papers and magazines will be found on the table, that the boys and girls of that home are sent to high schools and colleges. The Farm Bureau is not unmindful of the social element of rural life, but believes that in most places the present agricultural organizations such as the Grange, the Union, the Farmers' clubs, etc., largely meet this need, and it has been found where the county agent is called upon by more social organizations to aid in their monthly or bi-monthly programme his efficiency as a business agent is considerably decreased.

Summarizing, the big feature of the year's work in the United States, as regards county agents, is the organization of Farm Bureaux on the basis of the largest measure of self-control and self direction, and the rendering of such aid by the State and Federal Government as the local people believe they need. It is a great lesson in democracy when the local people in a community or county come

together and lay out a plan of work for the improvement of their agriculture and their homes. We have gotten away from the idea of believing we know what the farmer wants and asking him to put on a plan of work that we think will benefit him, and have come to the other viewpoint of asking the farmer what he wants, and then getting him the kind of help that the farmer believes will be of the greatest service to him.

THE INFLUENCE OF PIG CLUBS

BY J. D. M'VEAN, U.S. ANIMAL HUSBANDMAN

Not only has the pig club stimulated the demand for better breeding stock, but also it has been the means of introducing community breeding, or breed standardization, in numerous counties in various states where the pure-bred part of the industry was practically new, and where there were not numerous breed preferences to contend with. Louisiana, Georgia, Arkansas, Kentucky, Alabama, and in fact every state where the "endless chain" plan of financing pig-club members has been in effect for one or more years, have many communities where but one breed of pure-bred swine prevails, and even many counties where but one or two breeds are prominent. Kentucky, for instance, reports that "pig-club work has been responsible for the standardization of 14 counties to one breed of swine." Twenty-nine county agents also report that pig-club work was the best single piece of demonstration work conducted by them. The establishment of community breeding has been an ideal toward which adults have striven, but which few have succeeded in reaching, owing to the individualism of adults with whom they had to deal. The value of the demonstrations by the boys is not easily measured.

The pig-club boys have not only taught the adults, where the industry is new, the superiority of the pure-bred over the scrub; they have taught them that good individuals bring good prices. One County Agent expresses the thought in these words: "Before this year it was hard to get a farmer to pay $10 for a good hog, now they pay $50 to $100."

Experience has taught that the participation of children in the activities of a fair, show, or exposition multiplies its educational value. This is because the children themselves learn more definitely in this manner than in any other, and because their presence in the competition lends "human interest", and thereby increases the interest of the adult, In many instances youth has shown the way in live-stock production and by his demonstration has won the respect and emulation of the adult.

Anyone who has witnessed the pig-club exhibits at state fairs will bear out this statement. The intelligence displayed by club members, the responsiveness of the pigs to good care and kind treatment, the high quality of the exhibit, and the businesslike air of the contestants has stimulated men to the point where they, too, want to produce high-class stock and enjoy the thrill that goes with successful achievement. The pig club stimulates adults to greater effort to increase quality and merit in their live stock. It centres public attention and interest on rural affairs. It puts the swine industry on a higher plane.

COUCH-GRASS AS A FEED

Experiments made in England indicate that couch-grass (*Agropyrum repens*, Beauv.) is of substantial value as a food substitute in the existing shortage of feeding stuffs. According to the experiments couch-grass forms a valuable foodstuff for cattle and poultry. After the removal of any soil adhering to it the couch-grass is threshed and dried, and as "couch-hay" has quickly become a valued feeding-stuff among farmers. It is claimed that in feeding value it ranks with good meadow hay. It contains 10.37 per cent crude protein, 4.93 per cent digestible protein and 1.36 per cent fat. During the Thirty Years War, meal ground from the stolons of couch-grass was used to make a very palatable bread. Meal made from young nourishing grass, clover, lucerne, or certain weeds added to rye-meal, has lately been employed with great success in the preparation of a really nourishing and delicious bread which will keep for a considerable length of time. The utilization of couch-grass in these ways is strongly recommended by Strecker during the present shortage of foodstuffs.

Trials upon a small scale recently made indicate that some difficulty may be experienced in getting cattle, sheep, or horses to consume the dried couch roots, but that pigs and poultry consume them freely.—*Journal of the Board of Agriculture.*

ASSOCIATIONS AND SOCIETIES.

THE CANADIAN HORTICULTURAL ASSOCIATION

The Twenty-first Annual Convention of the Canadian Horticultural Association was held in Ottawa on August 13th, 14th, 15th, and 16th. Delegates were present from most of the provinces. The programme consisted of addresses and discussions on subjects closely related to commercial floriculture, and a visit to the Experimental Farm and other points of interest about Ottawa. The following officers were elected: President, George Douglas, Toronto; 1st vice-president, E. B. Hamilton, London; 2nd vice-president, J. McKee, Ottawa; secretary-treasurer, Herbert J. Eddy, Westmount, Que.; executive committee, W. E. Groves, Hamilton, A. H. Walker, Ste. Anne de Bellevue; Charles Craig, Ottawa. The Association chose Toronto as the place of meeting next year.

WESTERN CANADA IRRIGATION ASSOCIATION

BY ROBERT J. C. STEAD, ACTING SECRETARY.

One of the most important gatherings having to do with food production in Western Canada, was the twelfth annual convention of the Western Canada Irrigation Association held at Nelson, B.C., on July 24, 25, and 26. The selection of the city of Nelson for such a convention is in itself an indication of the growing interest which Western Canadians feel in irrigation as a means of increasing agricultural production. President of the Western Canada Irrigation Association for the season of 1917-1918, presided on the first day, and Hon. Senator Bostock, of Ducks, B.C., vice-president, presided during the following days. Among the visitors of note were Hon. Duncan Marshall, Minister of Agriculture, Alberta; Hon. W. R. Motherwell, Minister of Agriculture, Saskatchewan; Hon. John Oliver Premier of British Columbia; Hon. E. D

PROVINCIAL MINISTERS OF AGRICULTURE, DEPUTY MINISTERS OF AGRICULTURE AND DELEGATES ATTENDING WESTERN IRRIGATION ASSOCIATION'S MEETING.

Nelson is not in the arid or semi-arid belt, and yet, even with the generous rainfall which prevails there, irrigation has been found to be of great value. The experience at Nelson seems to indicate that in years to come many districts which do not now recognize the need of irrigation will employ it extensively.

Hon. T. D. Pattulo, Minister of Lands and Barrow, Minister of Agriculture, Victoria; E. F. Drake, Superintendent of Irrigation, Ottawa; Don. H. Bark, Chief of Irrigation Investigation Department of the C. P. R.; M. S. Middleton, Victoria; James White, Assistant to the Chairman, Commission of Conservation, Ottawa; A. Griffin, Supt. of Operation and Maintenance, Eastern Section, C.P.R. Irrigation Block; R. H. Campbell,

Director of Forestry, Ottawa; J. A. Grant, B.C. Markets Commissioner; Dr. Ernest Thomas, Vancouver, and many local authorities from districts in British Columbia. The accredited delegates numbered 182, besides many visitors, which, with one exception, is the largest attendance at a convention of the Association in the last five years.

Although the purposes of the Association is primarily to promote the production of food by means of irrigation, it is also deeply interested in the twin method of agriculture—dry farming. It is now generally recognized that irrigation and dry farming, instead of being rival methods of agriculture, are really closely related, and in many cases both methods are practised by the same farmer. Hon. W. R. Motherwell delivered an address on dry farming. He strongly deprecated the agitation to bring every possible acre under cultivation. Quantity without quality was merely a waste of labour, and in some cases an actual loss of food, as seed was sown which never reproduced itself.

Hon. Duncan Marshall appealed for greater interest in live stock raising. The salvation of agriculture lay in good stock, and the best type of citizen which the country produced was the stock farmer. After the war there would be an inevitable slump in the price of grain, but the depletion which has taken place in the live stock supplies of the world would assure the stockman of continued high prices.

The necessity of making provision for meeting our national obligations—which provision can be made only by increased production—was emphasized by Hon. John Oliver.

The election of officers resulted as follows: Hon. Patron: His Excellency the Governor General of Canada; Hon. President: The Hon. Minister of the Interior of Canada; 1st Hon. Vice President: Hon. W. R. Motherwell, Minister of Agriculture, Saskatchewan; 2nd Hon. Vice President: Hon. Minister of Lands, British Columbia; President: The Minister of Agriculture, Alberta; 1st Vice President: Senator H. Bostock, Ducks, B.C.; 2nd Vice President: G. R. Marnoch, President Board of Trade, Lethbridge, Alberta; 3rd Vice President: Hon. Minister of Agriculture, Canada; Executive, Deputy Minister of Agriculture, Regina, Sask.; G. Sterling, Kelowna, B.C.; Deputy Minister of Agriculture, Victoria, B.C.; Jas. Johnstone, Nelson, B.C.; Walter Huckvale, Medicine Hat, Alberta; F. H. Peters, Calgary, Alberta; A. S. Dawson, Calgary, Alberta; R. J. C. Stead, Calgary, Alberta; F. E. R. Wollaston, Vernon, B.C.; Acting Secretary, Robert J. C. Stead, Calgary, Alta.

Medicine Hat was decided upon as the next place of meeting.

RESOLUTIONS ADOPTED.

Resolutions were passed urging that the irrigation system in British Columbia should be brought under Provincial Government ownership and control; urging the British Columbia Government, before passing legislation, to give opportunity to those interested to become familiar with the proposed amendments; requesting the British Columbia Government to make exhaustive inquiries as to the location of ranges with continuous land suitable for irrigation, and to take steps to bring such land under water; recommending to the British Columbia Government that inquiries immediately be set on foot to describe where at interior points wild grass can be cut for hay, and the best means to make it available for stock during the coming winter; approving the recommendation of the Coal-Dale-Lethbridge Water Users' Association, that legislation be provided whereby water users within the territory served by irrigation waters be empowered to organize similar associations without first obtaining the consent of the company, upon the petition of the majority of water users resident within the proposed district; approving a resolution passed by the Iron Springs Association to request the Dominion Government to carry on services and investigation to provide information as to the possibility, and the probable cost, of carrying irrigation water to as great a number of farmers as possible in the districts that can be supplied from the proposed diversion of the Old Man River west of MacLeod.

PRINCE EDWARD ISLAND WOMEN'S INSTITUTES CONVENTION

BY MISS HAZEL L. STERNS, SUPERVISOR, WOMEN'S INSTITUTES

The Fifth Annual Convention of the Prince Edward Island Women's Institutes was held in Charlottetown July 30 and 31, in the Household Science rooms of the provincial Department of Agriculture.

Since June 30th, 1917, three new Institutes have been organized. In some districts the Institutes have affiliated with the Red Cross Society and their work is done through that organization.

The work accomplished throughout the year by thirty-three Institutes is as follows:

Money raised	$8,271
Red Cross	4,566
School Improvement	345
Community Improvement	494
Halifax Relief Fund	596
Y.M.C.A.	198
Prisoners of War supported	25
Socks	3,700
Boxes to soldiers	400

In addition, a large amount of Red Cross sewing has been done.

Although the war work is taking the prominent place with the Institutes, the interest in the schools is being maintained. In one district the Institute provided new desks at a cost of one hundred dollars, in another district an organ was purchased for the school, while in almost every case committees from the Institutes visited the schools regularly, and the sanitary conditions were improved as a result of their interest. In two districts Institute members have been appointed on the school board.

During the year the number of visits to the Institutes by the Supervisor and Assistant had to be curtailed, as the work of their Department now includes the teaching of Household Science to the pupils and teachers of the Charlottetown schools. These classes were discontinued the last of June,and during July twenty-eight visits were made to the Institutes. Demonstrations in war time cookery emphasizing particularly wheat substitutes were the main topics at these meetings.

The Home Canning of fruits and vegetables was demonstrated at the convention and addresses were given on Rural School Lunches, Red Cross Work, Women's Institutes in New Brunswick and in Nova Scotia, and how the Women's Institutes can assist in the School Fairs.

In spite of the fact that the convention was held at a busy season of the year, the attendance was large, every Institute but two being represented.

ONTARIO VETERINARY ASSOCIATION

The annual convention of the Ontario Veterinary Association was held at the Veterinary College, Toronto, on August 7th and 8th. Besides the hundred veterinary surgeons who were present, a number of prominent live stock breeders were also in attendance on special invitation. Conferences were held on a variety of subjects common to both the breeders and the veterinarians. A resolution was passed by the members of the association requesting the Ontario Government to pass legislation necessitating the registration of members of the veterinary profession under the Ontario Temperance Act, in order to prevent unscrupulous use of the privileges accorded under the Act of giving prescriptions for spirits or alcohol. It was also decided to ask the provincial Government for permission to obtain beer, which, it is claimed, is one of the cheapest and best tonics for animals in case of serious debility. Further legislation was asked prohibiting any but graduates of the College of Veterinary Surgeons from treating animals suffering from disease where and when a veterinary is available. Demonstrations in veterinary surgery were given. The following officers were elected: President, C. S. MacDonald, Toronto; 1st Vice-President, J. A. Campbell, Toronto; 2nd Vice-President, P. R. Engle, Kitchener; Secretary-Treasurer, F. C. Ottiwell, Toronto.

SASKATCHEWAN SHEEP AND SWINE BREEDERS' ASSOCIATIONS

At a joint meeting of the Sheep and Swine Breeders' Associations of Saskatchewan, held in Regina on August 1, it was decided that the annual fall sales of sheep and swine should be held at Saskatoon on October 30 and at Regina on November 1. Consideration was given to a suggestion that the provincial Department of Agriculture should be requested to purchase Rambouillet rams for distribution among range breeders at cost price, in order to increase the wool production of range ewes. It was announced at the meeting that the provincial College of Agriculture intended to make experiments in breeding Rambouillet males to ewes of other breeds, with the object of determining the highest increasing wool yield which can be secured.

BRITISH COLUMBIA SEED GROWERS' ASSOCIATION

The executive of the recently organized British Columbia Seed Growers' Association have taken steps to provide seed-threshing and seed-cleaning machinery for the use of members. No charge is to be made for the use of the machinery, but the users will be expected to defray every expense incurred while operating the same. The officers of the association are: president, L. Stevenson, Dominion Experimental Station, Sidney, B.C.; vice-president, R. M. Palmer, Cowichan Bay, B.C.; secretary-treasurer, H. O. English, Department of Agriculture, Victoria, B.C.

NATIONAL WAR EMERGENCY POULTRY FEDERATION

At a convention of the National War Emergency Poultry Federation held in Chicago on July 17 and 18 and attended by Canadian and United States poultry officials the following resolutions submitted by a committee which included Professor W. R. Graham of the Ontario Agricultural College, were adopted:

WHEREAS, The National War Emergency Poultry Federation, made up of a number of National and State Associations and other allied organizations, being in annual meeting assembled, and

WHEREAS, This Federation has been formed for certain specific purposes first, and foremost to help win the war, to which we pledge our full support, and

WHEREAS, Permanent organization being now completed and a general statement of policy having been announced,

BE IT RESOLVED:

That we affirm and endorse the general statements of aims and objects of this Federation, and that in furtherance of the same we particularize and specially recommend:

1. That, if in the judgment of our Executive Committee, who are duly authorized under our by-laws, it shall seem wise to open an office in the city of Washington, D.C. and station a representative there, we advise this to be done forthwith.

2. That in order to give aid and encouragement to all branches of our industry in all sections of the country under existing war conditions we recommend:

A, That a nation wide publicity or educational campaign be undertaken looking to an increased consumption of poultry and eggs, same to be conducted under the auspices of this Federation working in close co-operation with Federal and State authorities and departments, and with other associations, organizations, educational institutions, the press, other agencies and individuals ,which in the judgment of our officials and representatives may seem proper.

B, That at the earliest practicable date plans be formulated and executed for a comprehensive survey of our national and state poultry resources and liabilities, to include a cumulative study of cost of production and distribution, the same to be worked out in co-operation with Federal and State Governments, educational institutions and organizations, agencies and individuals, thus to determine and promote the best methods of production, conservation and distribution of our products for the benefit of our members and the general public.

3. That we heartily endorse the principles of co-operation in all branches of our industry, and hereby pledge ourselves to stimulate co-operative methods and to help co-ordinate and to support all worthy co-operative movements among the members of this Federation.

4. That it is a first duty of every person in our industry to strive for higher efficiency in the conduct of his business, both to stimulate a larger production and assure a freer general consumption of our products, and also to discover and eliminate all possible waste in production and distribution.

5. That it is our conviction that if any branch of our industry suffers all branches are adversely affected, and that if we are to prosper as a whole we must individually and severally pledge our united support to such a programme as we conceive to be set forth herein for the common good of all.

HOLSTEIN-FRIESIAN RECORDS

The official records of nineteen cows and heifers were received and accepted for entry in the Record of Merit of the Holstein-Friesian Association during July. Jemima Johanna of Riverside is the high record cow of this report, leading the mature class with 30.14 lb. butter and 703.4 lb. milk in 7 days, and 231.96 lb. butter and 5,613.0 lb. milk in 60 days. Manor P. H. Korndyke comes second with 27.52 lb. butter in 7 days and Mercena DeKol Queen third with 26.02 lb. The only senior four-year-old is Colony Lady Aaggie Newman with 23.17 lb. butter in 7 days and 186.80 lb. in 60 days. Katie Abbekerk Fayne is highest junior three-year-old with 20.47 lb., followed by Cloverdale Topsy Posch with 19.28 lb. Belle Korndyke Pontiac with 17.21 lb. is the only senior two-year-old and Colony Vrouka Pride is the only junior ith 12.67 lb.

Sixteen cows and heifers qualified for admission to the Record of Performance during the month of July. In the mature class, Mary Grey is highest with 585 lb. butter from 12,091 lb. milk and Jean Pauline Emma is second with 578.75 lb. butter from 15,330 lb. milk. Madeline Dolly DeKol with 621.25 lb. butter from 14,173 lb. milk is the only four-year-old, while her full sister Madoline Dora DeKol leads the three-year-olds with 748.75 lb. butter from 15,063 lb. milk. Colony Koba DeKol Newman is second in the three-year-old class with 695 lb. butter from 16,642 lb. milk. Highlawn Pontiac Sadie leads the two-year-olds with the record of 637.50 lb. butter from 13,257 lb. milk, and Countess Wayne Colantha comes next with 478.75 lb. butter from 11,893 lb. milk.

NEW PUBLICATIONS

THE DOMINION DEPARTMENT OF AGRICULTURE

THE HEALTH OF ANIMALS BRANCH.

The Report of the Veterinary Director General for the year ending March 31st, 1917, contains records and statistical information of the operations and activities in both the contagious disease and meat inspections divisions. The report makes a blue book of twenty pages.

THE LIVE STOCK BRANCH.

Report No. 10 of the Canadian Record of Performance of Pure-bred Dairy Cattle recently published covers the period from April 1st, 1917, to March 31, 1918. It makes a book of 88 pages and contains rules and regulations covering the record of performance test, the standards of registration for Ayrshire, Brown Swiss, French Canadian, Guernsey, Holstein-Friesian, Jersey, and Shorthorn cattle, the records of all these breeds of cows, a list of bulls qualified for registration, summaries of the records contained in the report, an appendix for cows which have produced sufficient milk and fat to qualify, but which have failed to freshen within fifteen months after the commencement of the test, and an index to owners.

THE PROVINCIAL DEPARTMENTS OF AGRICULTURE

NOVA SCOTIA.

Conserve the Eggs.—Mr. J. P. Landry, Manager of the Poultry Department of the Nova Scotia Agricultural College, is the author of a four-page leaflet giving advice as to the conservation and preservation of eggs.

Report of the Superintendent of Education for the Year ending 31st July, 1917. This report of 212 pages pays considerable attention to manual training and the study of agricultural subjects. It contains the 13th annual report of the College of Agriculture, being for the year 1917, prepared by the Principal, Mr. Melville Cumming, B.A., B.S.A.

QUEBEC.

Culture Potagere, by Franciscue Petrez, Professor of Horticulture, with the collaboration of J. H. Lavoie, Chief of the Service of Horticulture. This is bulletin No. 44 of the Horticultural Branch of the Provincial Department of Agriculture, giving complete details as to vegetable culture, with a number of interesting and instructive illustrations. It makes a publication of 56 pages, and deals with the cultivation of over three score vegetables from the preparation of the soil to the market.

The 36th Annual Report of the Societe d'Industrie Laitiere et de l'Ecole de Laiterie de la Province de Quebec, makes a book of 108 pages. It contains a full report of the proceedings at the convention of the Society, held at St. Hyacinthe on January 22, 23, and 24, 1918, including verbatim reports of the addresses delivered, reports of the provincial Inspector General and his assistants, records of values resulting from experiments in dairy management, lists of the officers, inspectors of divisions, etc.

The Protection of Plants, by Georges Maheux, Provincial Entomologist. This is bulletin No. 42 of the Horticultural Service, Entomological Section, of the provincial Department of Agriculture, and gives particulars of insects injurious to all crops, of insects and diseases injurious to vegetables, and of insects and diseases injurious to fruit trees. It gives advice, with illustrations, relative to the best method of control, spraying, and so on.

ONTARIO.

Report of the Horticultural Experiment Station, Vineland.—A blue book of 84 pages recently published gives a complete report of the operations and activities of the Horticultural Experiment Station at Vineland. With plentiful illustrations, it outlines with some minuteness the many experiments that have been carried on during the two years that are covered in the report.

MANITOBA.

Report of the Department of Agriculture and Immigration.—This Report is for the year ending November 30, 1917, and includes with numerous illustrations and a quantity of statistics, reports of the Deputy Minister, of the Stallion Enrolment Board, on Co-operative Wool Marketing, of the Live Stock Commissioner, on the Settlers' Animal Purchase Act, of the Cattle Brand Registrar, of the Dairy Commissioner, of the Provincial Apiarist, of the Weeds Commission, and of the Publications Branch.

The Provincial Department of Agriculture has issued a very distinct, coloured hanger, urging the importance of cutting hay. The announcement is made that the Department will be pleased to render any necessary or possible assistance to enable settlers to secure permits to cut hay on vacant land.

SASKATCHEWAN

A Survey of Education in the Province.—This is a report made to the Government of Saskatchewan by Harold W. Foght, Ph.D.,

Specialist in Rural School Practice, Bureau of Education, Washington, D.C. After an introduction, Mr. Foght deals with his impressions of Saskatchewan (the land and the people), fundamental educational needs, the present educational system, school organization and administration, school inspection and professional supervision, school population, organization and adaptability of the rural schools, consolidation of rural schools, the rural high schools, and continuation schools for adults, city, town and village schools, high schools and collegiate institutes, the teaching staff, the normal schools, vocational education, separate schools, schools in non-English communities, the examination system, school hygiene and health inspection, and school support, the whole concluding with a summary of recommendations and an appendix giving data relating to the provincial normal schools.

BRITISH COLUMBIA.

Field-Crop and Seed Competitions.—Bulletin No. 79, consisting of 32 pages, gives rules and regulations for field crop and seed competitions, the cost of production survey, and rules and regulations for seed fairs, along with lists of winners during the year 1917.

MISCELLANEOUS.

Stud Book du Cheval Canadien.—The first volume of the stud book of the French Canadian horse has just been published by the Canadian National Live Stock Records. It contains, besides the registrations of mares and stallions from No. 1 to 1677, an account of the organization of the Societe des Eleveurs de Chevaux Canadiens de la Puissance du Canada in 1909, lists of officers, members, and breeders, the rules and regulations of the society, the scale of points in judging, and a full index.

Herd Book du Betail Canadien.—Vol. II of Livre de Genealogie du Betail Canadien has been published by the Canadian National Live Stock Records. It contains the registrations from 1572 to 4215, the officers of the Societe des Eleveurs de Betail Canadien, the constitution and regulations, judging points, lists of members, breeders and owners, records of performance, and an enumerative index.

The Year Book of the United States Department of Agriculture covering 1917 has reached the office of THE AGRICULTURAL GAZETTE and is found to be a volume of 853 pages with many crop survey maps, a vast amount of information, statistical and otherwise, and plentiful illustrations.

NOTES

The Ontario Department of Agriculture has decided to transfer the entire dairy Shorthorn herd from the Agricultural College at Guelph to the Government farm at Monteith in New Ontario.

The Southern Alberta Wool Growers' Association estimate that they will have this year 1,575,000 pounds of wool for sale. Last year the members of the association had 158,000 sheep sheared; this year the number sheared will reach close to 225,000.

On August 1, 1918, came into force that section of the Ontario Stallion Act prohibiting the issuing of certificates of enrolment and inspection to grade stallions. As a consequence no grade stallion can now be legally offered for service in the province, and, if such service be rendered, the fees are not collectible by law.

The Horticultural Branch of the British Columbia Department of Agriculture issues every Saturday morning the Prairie Fruit Markets Bulletin. This is issued by the Fruit Markets Commissioner at Calgary. It is a four-page leaflet containing marketing information on shipping and prices at various market centres in the Prairie Provinces.

The Saskatchewan Clydesdale Breeders' Association at a meeting recently held adopted a recommendation that the Dominion and various Provincial Clydesdale Breeders' Associations should unite in the purchase of six geldings to be shown at exhibitions throughout the country in pairs, four and six. It was thought that such an exhibit would greatly promote the interests of the breed.

Fifty egg-candling schools are being conducted in Kansas by Dean E. C. Johnson of the Kansas State Agricultural College. These schools will travel from place to place where there is need of instruction. They are created because many storekeepers do not know how to candle eggs. Candling is a food-saving measure, and the Food Administration of the United States has ruled that all eggs must be so treated. The state and city laws of Kansas also require candling.

The Huntley Branch of the Ontario Organization of Resources Committee is conducting a series of competitions. One of these is a garden competition, for which a number of money prizes are offered. Others are for boys and girls under seventeen years of age. These include calf, pig, poultry and garden products contests, for each of which money and special prizes are offered. The Agricultural Representative of Carleton, Mr. W. D. Jackson, is the Secretary and is taking a practical interest in the different contests.

At a meeting of the instructors and investigators of poultry husbandry recently held in New York, standardized war rations for poultry, both scratch and mash feeds, were adopted. The scratch feed consists of five parts cracked corn, one part feed wheat, one part heavy oats, and two parts barley. The standardized war-laying mash consists of one part wheat bran, one part wheat middlings, one part corn meal or corn feed meal or hominy, one part gluten feed, one part crushed or ground oats and one part meat scrap.

The outside work of the Department of Physics of the Ontario Agricultural College has, up to the present, been directed chiefly along two lines, first emphasizing the value of drainage and making drainage surveys for farmers, together with some investigational work along this line. In this campaign there has been laid out drains on 130,000 acres since the inception of the work in the autumn of 1905. At the present the department is devoting considerable time to the subject of farm power, also to investigation of spontaneous combustion in barns, and the effects of drainage on the properties of the soil.

The Meat Trades Journal of England says that Birmingham has a way of dealing with old bones which is held up by the National Salvage Council for imitation in other parts of the country. Butchers who sell bones undertake to buy them back after the housewife has made full use of them, paying the customer half the proceeds of their disposal for national purposes. In this way they are saved to the nation, which is urgently in need of the glycerine they contain, as well as of the phosphate for manure, and the valuable pig and poultry foods which can be extracted from them. Housewives are showing themselves eager to respond to the Government's appeal for bones.

In the State of Arizona two new club projects will be organized this coming autumn—a lamb club and a school luncheon club. Through the agency of the lamb club, it is anticipated that lambs that have lost their mothers, or are not claimed by them, will be raised by hand. It is estimated that probably one thousand lambs will thus be saved by the boys and girls of the state. Through the school lunch clubs the children of the school will be encouraged to partake of their mid-day meal together under the supervision of the teacher. The children will be taught the relation of food to bodily needs, the essentials and preparation of a balanced ration, the preparation of a wholesome school lunch, etc.

Regulations have been adopted by an order-in-council of the Lieutenant-Governor of British Columbia providing bounties as follows:—mature coyotes $2, young coyotes $1; mature timber-wolves, black or grey, $10, young timber-wolves, $5; mature cougars, $15; young cougars, $7.50; big-horned owls or snowy owls, $1. The head or carcass of the owl, and in the case of animals the pelt, must be produced. An applicant for a bounty, unless he be an Indian, must offer for inspection his firearms license or badge. Any person purchasing a pelt from an Indian may obtain the bounty for the Indian by producing the pelt. Justices of the Peace or Bounty Commissioners are required to examine both ears of each pelt of every timber-wolf or cougar, and if a hole be found in either ear the application for bounty is to be refused. If the ears are found intact, a hole is to be cut in the left ear. Any Government agent can pay the bounty on coyotes if the application and certificate, together with the pelt, have been produced.

Mr. J. D. McGregor held a dispersal sale of Aberdeen-Angus cattle at Brandon, Man., on July the 26th. Many buyers were present from the United States and Mr. G. H. Hutton, Superintendent of the Experimental Station at Lacombe, Alta., purchased the following females:—Norma Gordon of Glen Logie, 5663, (49513) for $1,250, Blackbird McHenry, 83rd, 5985 (138376) for $875, Queenston Sonnet, (Imp.) 5720 for $800. The Saskatchewan Department of Agriculture purchased Elchies Pride of Woodcote, 2nd, 5487 (122088) for $750, Carrie Bloom, 4000 (97773) for $450 and the bulls Hemlock 3rd 16913 (242824) for $350 and Rugby Noman, a calf, for $400. The University of Saskatchewan also purchased several animals as did the Manitoba Agricultural College. The highest price paid was for the female Eva of Glen Carlock, 2nd, namely $2,750, to go to Missouri. The number sold was 137 and the total price realized was $91,225, an average per head of $665.87.

INDEX TO PERIODICAL LITERATURE

The Agricultural Journal, Victoria, B.C., July, 1918.
- Farmers, Carefully Select Your Seed. Everett Hogan, Soil and Crop Instructor, page 114.
- Agricultural Methods in the Schools, J. G. Readey, District Supervisor, Chilliwack, page 119.
- August—Late Blight of the Potato, J. W. Eastham, Provincial Plant Pathologist, page 136.
- Autumn Farming Essential to Success, H. O. English, Chief Soil and Crop Instructor, page 138.

The Canadian Countryman, Toronto, Ont., July 20, 1918.
- How to Make Money Producing Eggs, M. A. Jull, Macdonald College, Quebec, page 916.
- August 10—The Dairy Industry in Western Canada, Professor H. H. Dean, page 991.
- August 17—The Value of the Tuberculin Test for Cattle, Professor D. H. Jones, Ontario Agricultural College, page 1016.

The Canadian Horticulturist and Beekeeper, Peterboro, Ont., July, 1918.
- The Beekeeper's Midsummer War-Time Problems, Wm. A. Weir, Assistant Provincial Apiarist, Ontario Agricultural College, Guelph, page 181.
- August—Roguing Potatoes, Dr. C. A. Zavitz, Ontario Agricultural College, page 196.
- Marketing Basket Fruits, P. J. Carey, Chief Fruit Inspector, Toronto, page 197.
- Make Handling Fruit and Vegetables Pay, W. A. McCubbin, Canadian Commissioner of War Emergency Board, St. Catharines, Ont., page 205.

Canadian Poultry Journal, Hamilton, Ont., August, 1918.
- The Poultry Industry in Canada as Influenced by the War, W. A. Brown, Chief of Poultry Division, Live Stock Branch, Ottawa, page 227.
- A Back-Yard Poultry House for Northern Climate, M. C. Herner, B.S.A., Professor Poultry Husbandry, Manitoba Agricultural College, page 229.
- Crate Feeding for Market, F. C. Elford, Dominion Poultry Husbandman, page 243.

Farmer's Advocate and Home Magazine, London, Ont., July 18, 1918.
- Automobiles, Farm Machinery and Farm Motors, Professor W. H. Day, Ontario Agricultural College, page 1207.
- July 25—Barley Smut Poisoning in Cattle, Prof. Wade Toole, O.A.C., page 1240.
- August 1—Hereford Bulls that have made History, Professor A. A. Dowell, University of Alberta, page 1268.

Farmer's Advocate and Home Journal, Winnipeg, Canada, August 7, 1918.
- White Tip, V. W. Jackson, Professor of Botany and Biology, Manitoba Agricultural College, page 1289.

The Farmers' Magazine, Toronto, August 1, 1918.
- The Cheese Situation, J. A. Ruddick, Dairy and Cold Storage Commissioner for Canada, page 10.

Farm and Dairy and Rural Home, Toronto, Ont., July 25, 1918.
- What York Has Done for Its Roads, Geo. S. Henry, Minister of Agriculture for Ontario, page 813.

The Farm and Ranch Review and The Country Home, Calgary, July 20, 1918.
- The Evolution of Agriculture, L. S. Klinck, Dean of Agriculture, University of British Columbia, page 836.
- August 5—Wool—Grades and Grading. W. H. Tisdale, Professor of Animal Husbandry, University of Saskatchewan, page 858.
- Dry Feeding in Winter, T. A. Benson, Dominion Poultry Representative for Alberta, page 889.

The Grain Growers' Guide, Winnipeg, Man., July 17, 1918.
- War Time Insecticides, Professor F. W. Brodrick, page 23.
- Effect of St. John's Wort, Dr. C. D. McGilvray, Principal, Ontario Veterinary College, page 18.
- July 31—Better Dry Farming Practices, Address by Hon. W. R. Motherwell, at the Western Irrigation Congress, Nelson, B.C., July 27, 1918, page 1655.

The Journal of Agriculture and Horticulture, Quebec, August 1, 1918.
- Co-operative Wool Marketing in Quebec—1918, A. E. MacLaurin, Extension Animal Husbandman, page 26.
- Efficiency in Farm Practice. Synopsis of an address at a Patriotic Picnic by Professor H. Barton, Macdonald College, page 21.

The Maritime Farmer and Co-operative Dairyman, Sussex, N.B., July 23, 1918.
- Farm Manures and the Most Effective Fertilizer, F. T. Shutt, Dominion Chemist, page 649.
- Buying Meals and Grains for Winter Use, E. S. Archibald, Dominion Animal Husbandman, page 549.
- August 6—Some Constitutional Diseases of the Potato, Paul A. Murphy, in Charge of Potato Diseases Investigations, Dominion Department of Agriculture, page 678.

The Nor'-West Farmer, Winnipeg, Man., July 20, 1918.
- Farming in the War Zone, Geo. E. Butler, B. Co., 2nd Canadian Engineer Batt., page 1019.
- August 5—Conservation of Green Feed, G. H. Hutton, B.S.A., Superintendent, Experimental Station, Lacombe, Alta., page 1059.

Ontario Agricultural College Review, Guelph, Ont., July, 1918.
- Bacteriology in Relation to Agriculture, Prof. D. H. Jones, B.S.A., page 483.

PART V

The International Institute of Agriculture

T. K. Doherty, LL.B., Commissioner

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

375—**Agriculture in Crete.**—FRANCHET, L., in the *Revue Scientifique*, Year LVI, No. 3, pp. 75-81. Paris, February 2-9, 1918. (3 pp. in Institute Bulletin.)

376—**Agriculture and Forestry in Cyprus.**—MIDDLETON J. P., in *The Quarterly Review* No. 451, pp. 401-423, London, 1917. (2 pp. in Institute Bulletin).

377—**A Biological Analysis of Pellagra-producing Diets. II. The Minimum Requirements of the Two Unidentified Dietary Factors for Maintenance as Contrasted with Growth** (1).—MCCOLLUM, E. V., and SIMMONDS, N., in *The Journal of Biological Chemistry*, Vol. XXXII, No. 2, pp. 181-194. Baltimore, Nov., 1917.

The authors draw attention to the fact that the previous experiments carried out at the Laboratory of Agricultural Chemistry of the University of Wisconsin, Madison, proved that of the four "deficiency diseases" —beri-beri or polyneuritis, scurvy, rickets and pellagra—caused, according to FUNK, by the absence of vitamine, only beri-beri can be called a "deficiency disease," in the sense the term is used by FUNK (*i. e.* caused especially by the deficiency of the water-soluble B), the other three being due to unsatisfactory relationships between the well recognized constituents of the normal diet. To polyneuritis must now be added another "deficiency disease", xerophthalmia, described in Japan by M. MORI (*Jahrbuch fur Kinderheilkunde*, Vol. LIX, p. 175, 1904), in Denmark by G. E. BLOCH (*Ugeskruft for Laeger*, Vol. LXXIX, p. 349, 1917), and in Germany by A. CZERNY and A. KELLER (*Des Kindes*, Leipzig, 1906, Pt. 2, p. 67). This disease appears in children fed on a diet too rich in cereals and too poor in fats, and is manifest by emaciation accompanied by xerosis of the conjunctiva and keratomalacia, often ending in blindness. Experiments at the University of Wisconsin have shown that a diet deficient in the fat-soluble A causes, in animals, emaciation, oedema of the eyes, blindness and death. The animals may be cured, even when dying, by administering fats rich in the fat-soluble A (1), xerophthalmia being attributed to a lack of this factor in the composition of the diet.

The aim of the experiments described in this paper was to ascertain the quantity of each of the two unidentified dietary factors, A and B, necessary to the maintenance and growth of young rats. Wheat germ was chosen as source of the water-soluble B, and butter fat as that of the fat-soluble A. The diet was known to suffice for normal growth and prolonged maintenance of health when an adequate supply of both of the unidentified essentials was furnished. The diet consisted of:—casein 18.0, dextrin 76.3, salt mixture 3.7, agar-agar 2.0 %. It was fed:—(*a*) with an abundance of fat-soluble A (as butter fat); (*b*) with an abundance of water-soluble B (in wheat germ); (*c*) with varying amounts, always below the optimum requirements, of both wheat germ and butter fat as sources of these two factors.

The results of the different experiments gave the following answers to the various questions raised:—

(1) Assuming each of the food products, butter fat and wheat germ, to be of constant quality, what is the lowest intake of each which can supply enough of the A and B respectively just to prevent loss of weight?—The results show that a low plane of intake causes loss of vitality. When the minimum amount necessary to prevent loss of weight is approached, the life of the animal is endangered if the diet is persisted in.

(2) When both essentials A and B are supplied in amounts just above the maintenance requirements will growth be propor-

(1) For a review of the first part of this study see AGRICULTURAL GAZETTE, July, 1918, page 731.

tional to these amounts, or is a certain excess of each over this minimum necessary before growth in the young can take place?—The results show that, within certain limits, growth is proportional to the supply of the factors A and B in the diet, if all other factors are in proper proportion. For this reason the individual behaviour of the organisms to which these factors are administered cannot be eliminated.

(3) Is the requirement of either A or B for maintenance or growth less when one of the two unknowns is present in liberal amounts, than when both are supplied in amounts near the minimum?—The experiments showed definitely that the animal can tolerate small quantities of A and B much better when the rest of the diet is well proportioned than when it is less so.

(4) What is the effect of the health of animals of limiting them to a minimum supply of either the dietary A or B, the remaining one being supplied in abundance, or of limiting the supply of both to nearly the minimum requirement?—The life of the animals is undermined, and endangered if the experimental conditions are such as to render growth impossible. The symptoms preceding the death of rats are similar to the characteristic symptoms of polyneuritis in pigeons.

378—**The Biological Efficiency of Potato Nitrogen.**—ROSE, MARY S., and COOPER, LENNA, F., in *The Journal of Biological Chemistry*, Vol. XXX, No. 2, pp. 201-204. Baltimore, June, 1917.

A woman was submitted for 10 days to a diet of potatoes and clarified butter, which was sufficient for the total calorific energy. In this diet the potatoes supplied 0.1 % of the total nitrogen and nitrogen balance was maintained for 7 days (from the 4th to the 10th day of the experiment). with a total nitrogen intake of 0.096 gm. per kilo. of live weight, equivalent to a net intake of 0.068 gm. per kilo. of live weight. This result agrees with those of other workers, in which nitrogen equilibrium was maintained on potato nitrogen when the amount taken was from 0.04 to 0.08 gm. per kilo., and shows that the potato is a source of nitrogen of high food value, although only 63% of the nitrogen is in the form of protein.

379—**Food Value of Whole Meal and of 85% Flour as Compared with White Flour.**—LAPICQUE, L., and CHAUSSIN, J., in *Comptes rendus des Seances de l'Academie des Sciences*, Vol. CLXVI, No. 7, pp. 300-302. Paris, February 18, 1918.

The authors carried out a series of systematic experiments to determine the value of 80 and 85% flours.

(1)—FOOD VALUE OF WHOLEMEAL.—The experiments showed the food value of wholemeal to be slightly greater than that of its weight of white flour minus the weight of the indigestible residue. Average wheat gives 12% of such residue and its food value is equal to 9 $\frac{90}{100}$ of its weight of white flour. The so-called work lost by the mastication, mixing and intestinal transport of this excess of inert substances causes no deduction in this case as the figures are based on the value for the maintenance of the organism.

(2)—COMPARATIVE VALUE OF WHITE BREAD AND BREAD MADE WITH 85% FLOUR (treated with lime water) (1).—The difference in value between the two breads studied was too slight to be seen. With a mixed diet this difference could not be detected.

If the changes which may arise through the acidity of the bread (2) are eliminated, and the differences caused by the formation of hydrates are avoided or compensated for, 85% bread has practically the same food value as white bread.

380—**Toxic Bread and Flour; Detection and Estimation of Sapotoxins.**—STOECKLIN, L., in *Annales des Falsifications et des Fraudes*, Year X, Nos. 109-110, pp. 561-572, Paris, November-December, 1917. (2 pp. in Institute Bulletin.)

383—**Electric Farming in the United States.**—MOULTON, ROBERT H., in *Hoard's Dairyman*, Vol. LIV, No. 23, pp. 797 and 816, Fort Atkinson, Wis., December 28, 1917.

Experiments on electric farming (2) were made under the direction of Dr. HERBERT G. DORSEY and Mr. F. M. TAIT near Dayton, Ohio (Miami River Valley).

In the preliminary tests small plots were subjected to different kinds of electrification. To prevent the soil of one plot from being better than that of another, top earth was collected, mixed, sifted and then laid to the uniform depth of 7 inches over the whole area. In plot No. 1 was buried a wire screen, a wire network was stretched about 15 inches from the ground, and both connected by several wire antennae. The screen was connected to one terminal of a Tesla coil, and the network to the other. A transformer supplied an alternating current of from 110 to 5,000 volts, charging a condenser of tinfoil and glass plate, which discharged through a primary of the coil. About 130 watts were supplied for an hour each morning and evening.

Plot No. 2 was lit by a 100 watt tungsten lamp with a ruby bulb for 3 hours daily, beginning from sunset. Plot No. 3 was lit in a similar way, but with a mercury vapour lamp. Plot No. 4 was untreated and served as control. In plot No. 5 was buried a wire network connected to the terminal of a 110-volt direct current. The positive terminal was attached to a small sprinkling can with a carbon electrode in its centre. The can was filled, the water electrolysed for several minutes, and the plot sprinkled with the water from the can, the theory being that the current should penetrate the soil in the

(1) See also AGRICULTURAL GAZETTE, July. 1918, page 733.

(2) As regards Electric Farming, see AGRICULTURAL GAZETTE, July 1918, page 734.

water. Plots Nos. 6 and 7 were subdivided into four plots each 2 ft. square, separated by porcelain insulators and arranged with carbon electrodes at each end. Both direct and alternating currents were applied to these electrodes. Radishes and lettuce were sown and, when germination had begun, the different methods of electrification were tested with great care.

The plants in plot No. 1 grew much more rapidly than those of the other plots and weighed more than double those of the control bed. This convinced the experimenters that electrification of the ground by high-frequency currents stimulated plant life to an extent which justified a more complete investigation. Two acres of flat, rich ground were, consequently, selected for further tests.

Fifteen feet above the ground was built a network of sprinkling pipes, which ran east to west for a distance of 200 feet, the pipes being 50 feet apart. In the north-east corner, from north to south, were stretched 7 copper wires, each 200 feet long, at intervals of 15 feet. The wires were placed high enough for the soil to be ploughed with horses. The ends of the wire were attached to insulators on the top of gas pipes set in concrete. A small transformer house was built at the eastern end of the house and machinery capable of supplying 10,000 volts installed. A choke coil and a Tesla coil were used. The whole was so connected that the current from the wire network was sent by the antennae to the network of sprinkling pipes, which were adequately connected with the ground. Towards the end of July the system was ready and the currents tested. At that time a pressure of 50,000 volts was obtained and the frequency of the alternating currents was estimated at 30,000 cycles a second. Birds alighting on the wires were stunned and thrown to the ground, but none were killed. The ground was planted with radishes, lettuce, beet, cabbage, cucumbers, turnips, musk-melons, water-melons, parsnips, beans, peas, maize, and tobacco. All were planted in rows running from east to west, so that one half of each row was electrified and the other half not.

Practically all the plants in the electrified area grew more rapidly than those out of it. In nearly every case the electrified plants ripened a fortnight earlier than the untreated ones. The tobacco plants from the electrified area weighed, on the average, 1,687 gm.; those of the unelectrified area, harvested two weeks later, only weighed 1,632 gm. each. Considering that the tobacco plant grows most rapidly in the two weeks preceding ripening, it was estimated that the actual increase in weight of the plants in the electrified zone was 20% more than that in the unelectrified zone.

Before electricity can be applied practically for stimulating plant growth many problems must be solved which are now being investigated in greenhouses in all parts of the United States. (The author draws attention to the experiments made by English workers who attempted to stimulate animal life by electricity. Two large incubators containing newly hatched chickens were taken, one being subjected to high-frequency currents, the other being used as a control. The chickens in the first incubator grew much more rapidly than the others.)

Mr. W. STAHL, an electrician, used electricity on plants on one of his farms near Chicago. A network of wires, from 10 to 20 feet apart, was placed in the earth at a depth of about 1½ feet; above the ground was another network of wires about 1 foot apart. Twice a day, morning and evening, the electric current was turned on from the main switch-board. The power was supplied by the city electric light plant, and the cost for the period necessary to ripen a crop was $2.50 to $4 per acre. The electric treatment was started just when the plant began to come out of the ground and continued till the crops were about ready to be harvested. The cost of installation is repaid by the increase in crops, and the cost of the current is more than compensated for by the saving in the cost of labour, and the more rapid growth and harvesting of the crop.

In 1917, MR. STAHL gave a demonstration o the electric treatment of plants on a two-acre plot of his farm. He grew beans, tomatoes, beets, melons and other vegetables, which ripened much earlier than those on neighbouring farms, and allowed a second crop to be ripened before winter. The electrified plants are distinguished by their excellent quality.

CROPS AND CULTIVATION

384—**Effect of Meteorological Factors on the Maturation of the Tissues and the Resistance to Cold of the Vine in U. S. A.**—GLADWIN, F. E., *New York Agricultural Experiment Station, Bulletin* No. 433, pp. 107-139. New York, April, 1917. (2 pp. in Institute Bulletin.)

387—**Movement of Soluble Salts Through Soils.**—MCCOOL, M. M. and WHEETING, L. C., in the *Journal of Agricultural Research*, Vol. XI, No. 11, pp. 531-547. Washington, December, 1917.

388—**Total Nitrogen and Carbon in Cultivated Land and Land Abandoned to Grass and Weeds.**—BLAIR, A. W. and MCLEAN, H. G., in *Soil Science*, Vol. IV, No. 4, pp. 283-293, bibliography of 18 publications. Baltimore, October, 1917.

391—**Nitrates and Nitrification in Relation to Cultural Practices and Plant Growth.**—NOYES, H. A., in *Abstracts of Bacteriology*, Vol. 1, No. 1, pp. 38-39. Baltimore-London, February, 1917.

393—**Changes Occurring During the Storage of Manure.**—RUSSELL, E. J. and RICHARDS, E. H. (Rothamsted Experimental

Station), in *The Journal of Agricultural Science*, Vol. VIII, Pt. 4, pp. 494-503. London, December, 1917.

After having discussed the previous work on the subject, the authors describe a series of investigations, carried out in the laboratory and on farms, which aimed at determining the changes produced in the manure heap, independently of the behaviour of the manure in the soil. To this end a study was made of the variations in the content in dry matter and combined nitrogen which occur during the storage of manure under varying conditions.

There is a great loss of free nitrogen, caused by the continual change from aerobic to anaerobic conditions in the heap and vice versa. The authors suggest that this loss is due to the fact that under anaerobic conditions there is a tendency towards the formation of molecular groups; these groups become unstable as soon as aerobic conditions are produced, or the converse occurs. It is known that, in contact with air, certain carbon compounds formed under anaerobic conditions may change into less complex compounds with elimination of the bivalent methyl groups (—CHH_2—). By analogy, therefore, certain complex nitrogen compounds may possibly change into more simple compounds, with liberation of nitrogen. The alternating nitrification and denitrification in the manure heap only represents a special case of this general phenomenon.

For this reason stored manure should be kept under as complete anaerobic conditions as possible, preferably at a temperature of 26°C. (79°F.). Experiments are being made to apply these conditions practically. However this may be, it appears certain that the custom of leaving the manure under the cattle in the stables or under open sheds, until required for use, is the best, wherever possible. No manure heap, however compact and well covered it may be, can fulfill the above conditions; perhaps they might be obtained by keeping the manure in watertight and perfectly closed tanks at the given temperature. It seems improbable that ordinary manure heaps can be further improved.

396—**Experiments on the Bacterisation of Peat for Soil Fertilising Purposes.**—JONES, D. H., in *Abstracts of Bacteriology*, Vol. 1, No. 1, pp. 43-44. Baltimore-London, February, 1917.

Peat bacterisation experiments were carried out with the object of verifying the claims made by Prof. BOTTOMLEY for "humogen" (1). Five 1 bushel lots of peat were taken; to three was added lime in varying quantities and they were then inoculated with rich broth cultures of soil bacteria; the 4th lot was inoculated only with the same culture, and the 5th kept as control. All were incubated at 25° C. (77° F.) for one month, moistened and aerated occasionally. They were then autoclaved for 1 hour, after which rich cultures of *Azotobacter*, *Pseudomonas radicicola* and cellulose fermenting bacteria were added to all except the control, and the lots incubated at 25° C. for two months. Chemical tests and bacterial counts were made from time to time.

The different lots of peat thus obtained were mixed in 0.5, 2 and 10 percentages with a poor soil, the mixture placed in pots and radishes sown. After 1 month the growth and greenness of the foliage was markedly in favour of the 10% bacterised peat. After 3 months the results were, as a rule confirmed, both as regards growth of roots and of leaves, in favour of heavy applications of bacterised peat, up to an increase of more than 100% in plant growth. The following results were obtained:—

(1) See AGRICULTURAL GAZETTE, February, 1918, page 199.

Soil containing	Weight of roots	
	Bacterised peat	Unbacterised peat (control)
	gm.	gm.
0.5 % of peat	39.33	35.5
2 % " "	57.75	41.75
10 % " "	135.25	63.25

The addition of lime had little, if any, effect.

To sum up, the bacterial treatment of peat seems to make the peat useful as a fertilizer, but the large quantities necessary to produce appreciable results excludes its general use as a fertilizer on account of the expense entailed.

405—**The Selection and Hybridisation of Cereals in Alaska, U. S. A.**—GEORGESON, C. C. *Annual Report of the Alaska Agricultural Experiment Stations* 1904-1915. Washington, 1905-1916. (5 pp. in Institute Bulletin).

The introduction of the cultivation of cereals in the districts bordering on the

arctic polar circle is of both practical and scientific importance.

In Alaska there is a great difference between the climate of the coast and that of the interior of the country. Along the Pacific, to the south of the high chains of the Alaska Range and of the St. Elias and Coast Ranges, the summer is cool, but the winter mild, so that at Sitka, for example, the average annual temperature is almost the same as that of Washington, D.C. In this district, the cool summers, abundant rainfall, and frequent clouds, are favourable to the growth of vegetables and grasses but unfavourable to that of ordinary crops, especially cereals, which do not ripen. In the interior, however, along the Yukon valley, between the coast Sierra and the mountain groups of the southern sector (Endicott Range), the climate is decidedly continental, with dry, very cold winters and short summers, but nevertheless capable of causing rapid plant growth owing to the large number of hours of sun daily (18 to 20).

In the article in the Institute Bulletin the work of the Agricultural Stations is described, particularly the experiments with winter wheat, winter rye, spring wheat, rye, oats and barley. We reprint the statement on spring wheat and the conclusion.

On the whole the results obtained with spring wheat are not very satisfactory. As sowing is not possible before May, there remain barely 90 days for ripening before the autumn frosts, so that the indispensable character required is earliness. None of the varieties studied ripen for certain each year, but the best were Chogot and Irkoutsk, the vegetative period of which lasted only 88 days (May 1st to August 27th) in 1914. These two wheats, introduced by the Federal Department of Agriculture, come from the Agricultural Station of Tulun (Government of Irkoutsk, Siberia). The Russian bearded wheat No. 306 is almost as early as these two, and the Russian wheat H. G., of vigorous growth, ripens four days later. Then come Ulka, Velvet Chaff, Ladoga, Red Fife, Romanov, Marquis, Early Java, which usually only ripen once in five years, as was the case in 1912 at Rampart, where the varieties Red Fife, Romanov and Wild Goose gave from 55 to 60 bushels of grain per acre.

All winter and spring cereals may be grown in the valley of the Yukon and its tributaries, where the short, but relatively warm and dry summer, allows them to grow and ripen in the three months' interval between the last destructive spring frost and the first autumn one, *i. e.*, between the end of May and the end of August.

The first place is held by barley, some varieties and hybrids of which seem to unite in good proportions the most essential characters strong straw, high yield, and absence of awns.

407—Oat Selection by Pure Lines at the Agricultural Experimental Station of Highmoor, Maine, U. S. A.—SURFACE, FRANK M. and ZINN, JACOB, *Thirty-second Annual Report of the Maine Agricultural Experiment Station*, pp. 97-148. Orono, Maine, 1917. (2 pp. in Institute Bulletin).

412—Yields of Different Varieties of Maize in Illinois.—BURLISON, W. L. and ALLYN, O. M., in the *University of Illinois Agricultural Experiment Station, Bulletin* No. 191, pp. 409-424. Urbana, Illinois, August 1916.

415—The Composition of the Potato Plant at Various Stages of Development.—RAMSAY, J. T. and ROBERTSON, W. C., in *The Journal of the Department of Agriculture of Victoria*, Vol. XV, Pt. 2, pp. 641-655. Melbourne, November, 1917.

Object of the experiment.—The experiment was carried out to determine:—1) the rate of assimilation of food from the soil; 2) the relative proportion of each of the principal elements contained in the plant at various stages of its growth.

The principal results may be summarised as follows:—

1) The 3 essential plant foods—nitrogen, potash and phosphoric acid— once absorbed by the potato plant are utilised, no migration from the plant to the soil taking place.

2) The critical period of growth is the first 6 to 8 weeks.

3) The greater part of the phosphoric acid enters the plant at the early stage of growth, concentrating in the haulm, and then playing an important part by migrating to the stolons for tuber formation.

4) Potash and nitrogen play a consistently even part throughout the growing period.

5) Practically the whole of the root development takes place during the first 2 months.

6) Haulm development is most active during the first 2 months.

7) The amounts of lime and magnesia assimilated by the potato plant seem to bear a definite relation.

8) The very young potato tuber is richer in phosphoric acid than the semi or mature tuber.

9) Phosphoric acid and nitrogen present in the seed set are largely utilised for sprout formation (25% for the former and 50% for the latter). Potash, apparently, is not utilised directly.

10) The results of the experiments taken collectively show that the plants must be manured during the first month.

11) Potatoes can be grown on poor sandy soil provided that available plant-food in the form of artificial fertilisers and farmyard manure are judiciously applied. In such cases the quantity and quality of the produce may be favourably compared with that from the best potato soils.

12) The value of the dried haulms and roots may be compared to farmyard manure in favour of the dried haulms, 1 ton of which

supplies 3 times as much nitrogen and phosphoric acid, and about 10 times as much potash as 1 ton of farmyard manure.

13) The composition of the potato tuber under experimental conditions may be influenced in so far as the phosphoric acid content is concerned.

14) During the growing period the potato plant utilises phosphoric acid, nitrogen and potash, in the proportion of 1, 4, 6, *i. e.* 1 part of phosphoric acid to 4 parts of nitrogen to 6 parts of potash.

418—**Bokkara or Sweet Clover** (*Melilotus alba*) **in New South Wales.**—BREAKWELL, E., in *The Agricultural Gazette of New South Wales*, Vol. XXVIII, Pt. 10, pp. 731-734. Sydney, October, 1917.

422—**Commercial Onion Growing in Indiana.** SAYRE, C. B. (under the direction of WOODBURY, C. G.), in *Purdue University Agricultural Experiment Station, Circular* No. 57, pp. 27. Lafayette, Ind., September, 1916. (2 pp. in Institute Bulletin).

440—**Fœtal Athyrosis: A Study of the Iodine Requirement of the Pregnant Sow.**—SMITH, ENNIS, G., in *The Journal of Biological Chemistry*, Vol. XXIX, No. 2, pp. 215-225. Baltimore, March, 1917.

441—**The Availability of the Energy of Food for Growth.**—MOULTON, C. R., in *The Journal of Biological Chemistry, Vol.* XXXI, No. 2, pp. 389-394. Baltimore, August, 1917. (2 pp. in Institute Bulletin).

442—**The Feeding of Young Chicks on Grain Mixtures of High and Low Lysine Content.**—BUCKNER, G. D., NOLLAU, E. H. and KASTLE, J. H., in *Kentucky Agricultural Experiment Station, Bulletin* No. 197, pp. 21. (2 pp. in Institute Bulletin).

443—**The Relative Value of Certain Proteins and Protein Concentrates as Supplements to Maize Gluten.**—OSBORNE, T. B. and MENDEL, L. B. with the Cooperation of FERRY, E. L. and WAKEMAN, A. J., in *The Journal of Biological Chemistry*, Vol. XXIX, No. 1, pp. 69-92. Baltimore, February, 1917.

445—**The Influence of the Stage of Gestation on the Composition and Properties of Milk.**—PALMER, L. S. and ECKLES. C. H., in the *Journal of Dairy Science*, Vol. 1, No. 3, pp. 185-198. Baltimore, September, 1917.

The question of the influence which is exerted by gestation on the composition of cows' milk has received practically no attention from an experimental point of view. This paper presents data bearing on this question consisting in complete analyses of the milk and milk fat throughout the entire lactation period of ten cows which became pregnant at various stages of their lactation period, of one cow which was farrow and the complete analyses of the milk for three of the ten cows throughout a subsequent lactation when they were kept farrow.

The conclusion drawn from the data presented in this paper is that gestation does not exert any direct effect upon the composition and properties of cows' milk, but that gestation may affect the composition indirectly by hastening the close of lactation, which is the important factor involved in the changes in the composition of milk as lactation advances. The characteristics of the milk as the end of the lactation approaches are high concentration of protein and fat, and frequently a lower concentration of lactose. The fat of cows' milk is characterized by great depression of the saponification value and Reichert-Meissl number, and great increase in iodine value and melting point.

446—**The Effect of Pepsin Whey on Calves.**—MCINNIS, L. T., in *The Agricultural Gazette of New South Wales*, Vol. XXVIII, Pt. 12, p. 850. Sydney, December 3, 1917.

Since pepsin has been used instead of rennet in the cheese factories of New South Wales, a breeder who had lost calves attributed their death to the use of pepsin whey as a food. For this reason the Department of Agriculture undertook an investigation to see whether there was any ground for this hypothesis. It was found that pepsin whey obtained from various cheese factories is often fed to calves without any ill effects, and is completely satisfactory in all respects, provided it is heated to at least 160°F. before use.

447—**Swine Management in U. S. A.**—ROMMEL, G. M. and ASHBROOK, F. G., in *Farmers' Bulletin* 874, *U. S. Department of Agriculture*, pp. 1-38. Washington, D.C., September, 1917.

450.—**Fresh-Water Mussels; Their Exploitation and Artificial Propagation in the Rivers of the United States.**—RAVERET-WATTEL, R., in the *Bulletin de la Société Nationale d'Acclimatation de France*, Year LXIV, No. 11, pp. 427-438. Paris, November, 1917.

FARM ENGINEERING

451—**The Encouragement of Mechanical Cultivation in France.**—*Feuille d'Informations du Ministère de l'Agriculture*, Year XXII, No. 52, pp. 1-2. Paris, October 16, 1917.

The French Minister of Agriculture has published an order dated October, 8 1917, containing the following provisions:—

Agricultural groupings of at least 7 members, departments, boroughs, may receive State grants for the purchase of

machines for mechanical cultivation, provided that they undertake to use the machines themselves and to prepare for and sow cereals with a minimum per machine of an acreage to be fixed in each case, according to the capacity of the machine and the nature of the soil. When the machines acquired by the above-mentioned groups consist of a set of at least 5 tractors and material for steam or electric ploughing, the subvention (acquisition of material and advances for the cost of cultivation) may amount to 50% of the cost of the machines. In the contrary case, the subvention may not exceed ¼ or ⅓ of the cost of the machines, according to whether the applicant will have recourse or not to an agricultural credit bank. In regions that have suffered through the war, the maxima may be raised respectively to ⅓ or ½ of the price of the machines.

Applications for subventions must be made to the Minister of agriculture through the prefect of the department. They will be accompanied with the opinion of the prefect and the following information obtained or verified by the director of agriculture:—the type and price of machine; the rules relating to the conditions under which the machine is to be used; a provisional estimate for the undertaking; a report on the geological, topographical and agrogeological conditions of the region where the machine is to work; the area to be worked; the engagement provided for; the rules of the syndicate for the agricultural associations, with the number of members and the funds available, the bases of the division of common expenses and charges between them; the extract of the resolution of the general or municipal council for the departments and boroughs; and, finally, proof that the applicants have suffered from the invasion.

455—**The Conversion of Motorcars into Tractors.**—1. The "Shofield" Auxiliary Wagon. *Le Genie Rural*, Year X, No. 78, pp. 8-9, Paris, 1918.—II. The "Tracford" Conversion Unit. *The Implement and Machinery Review*, Vol. XXXXIII, No 513, p. 958. London, January 1, 1918.

I.—The SHOFIELD Co. of Kansas City, U. S. A., have a useful device which enables a motorcar to be used as a tractor with only slight change. The device consists of an auxiliary wagon which is towed on the road by the motor car, while the latter is mounted on the wagon in the field.

When on the wagon, the car is held firmly on two U shaped rails in which the automobile wheels engage. The back wheels of the wagon, serving as driving wheels, have each a rim with internal teeth which engage with a gear whose axle turns on a bearing fixed on the wagon; this axle carries a sprocket wheel. Another sprocket wheel is mounted on the hub of each rear wheel of the car. The two sprockets are connected by a chain. The rear of the car is lifted until the 2 chain drives are sufficiently taut; then the driving wheels of the car turn freely, the movement being transmitted to the rear wheels of the wagon. The front wheels of the wagon can be steered by a wheel placed by that of the car, but which turns vertically. According to the inventor, mounting requires about 10 minutes.

II.—Another conversion unit to enable a FORD car to be used as a tractor, is the "Tracford", sold at $325 by the POWER FARM SUPPLY Co., Priory Lawn Chambers, Ellys Road, Coventry.

The device comprises a pair of large tractor wheels fitted with removable mud strakes, and mounted on a strong axle which is attached to the rear end of the frame of a FORD car. A pair of roller pinions replace the wheels at the end of the FORD axle and the pinions gear with a series of 8 gear sections of 7 teeth each, which are bolted to the inside of the tractor wheels.

The result is a 9 to 1 reduction in the gearing, the road speed being reduced ⅛ while the power delivered at the axle is increased ninefold. A supplementary water tank is mounted over the engine, and a water circulator automatically provides forced circulation through the radiator. The tractor axle forms the draw bar.

The "Tracford" unit weighs less than 800 lb.; its axle is of 1. 15-16 in. solid steel and the wheels have a 10-in. face with angle-iron lugs attached.

457.—**Fire Prevention and Fire Fighting on the Farm, in U. S. A.**—TOLLEY, H. R. and YERKES, A. P., in *United States Department of Agriculture, Farmers Bulletin* No. 904, pp. 16, bibliography of 11 publications. Washington, D.C., January, 1918.

Organised fire prevention is still neglected on farms, as few farmers have considered the means to adopt for preventing and fighting fires. Yet millions of dollars' worth of agricultural wealth is destroyed by fire in the United States each year. At normal prices and w th an average crop, the loss is about equal to the value of the potato crop in that country. This bulletin is intended to interest the farmer in fire prevention on his own premises and to urge him to eliminate all unnecessary fire hazards, while providing all required facilities for fighting fires.

The writers consider the common fire hazards and point out that, as regards the spontaneous combustion of hay sacks, the first cut of alfalfa seems to be the most dangerous in that respect. In addition, precautions should be taken in buildings where incubators, brooders, evaporators, and other equipment requiring the use of fire are housed.

Farmers' Bulletin 842 of the U. S. Department of Agriculture g ves direct ons for installing modern lightning rods. In some instances, farmers' mutual fire insurance

companies make reductions on the premiums charged on rodded buildings.

As regards methods of fire fighting, water is the simplest and cheapest fire extinguisher; pails of water should always be placed in every farm building so as to be instantly available in case of need. Water-supply systems which furnish water under pressure afford excellent facilities if the necessary hose and connection are always ready for use.

Amongst chemical extinguishers carbonic acid is that most generally used. More than 20 firms manufacture soda-acid extinguishers, costing from $7 to $12. They are of simple construction and can throw a stream from 25 to 40 feet for about a minute. These extinguishers can be refilled and used many times.

Another type of chemical extinguisher consists of a metal syringe filled with carbon tetrachloride a liquid that only freezes at —50° F., and which, at about 200° F., turns into a heavy vapour which covers and smothers the fire. It is very useful in extinguishing burning oil, gasolene, or kerosene, on which water or carbonic-acid gas extinguishers have little effect. An extinguisher of this type costs about $8 and liquid for refilling it can be purchased for about $1.50; it is approved by all fire insurance companies.

In Department Bulletin 379 of the U. S. Department of Agriculture an automatic fire extinguisher (1) for use in grain separators is described which can also be used for general fire protection on the farm when the separator is not in use. Besides these types there are also dry-powder extinguishers consisting of metal tubes filled with powder, and hand-grenade extinguishers.

It should not be forgotten that sand is a very good extinguisher of burning oil; in such a fire, water is of no use, unless applied in large quantities. Sawdust mixed with soda at the rate of a bucket of sawdust to 1 or 2 lb. of soda is a good extinguisher of oil fires, especially if the oil is in a deep container.

(1) See AGRICULTURAL GAZETTE, July, 1917, page 628.

RURAL ECONOMICS

460—**Cost of Keeping Farm Horses and Cost of Horse Labour in the United States.**—COOPER, M. R., in *United States Department of Agriculture, Bulletin* No. 560 (Office of Farm Management), pp. 1-24. Washington, D.C., July 9, 1917.

The cost of horse labour has a bearing on the net return of every farm enterprise, but being chiefly made up of items of expense representing materials furnished by the farm and not involving a direct cash outlay is not fully appreciated by farmers who have not made a study of the subject.

This bulletin shows how the annual cost of keeping a farm work horse and the cost per hour worked may be determined, and points out that the cost per hour worked is the true measure of the profitableness of a horse to its owner.

The data presented were obtained from cost-accounting records for 316 horses on 27 farms in three States, namely Illinois, Ohio and New York. The cost records kept on these farms consisted of detailed daily reports of all labour and financial transactions, complete inventories and other necessary information for determining not only the costs and returns of farm work horses, but also the costs of operation and returns from the entire farm business.

A detailed summary of the annual average cost per horse, and the percentage of the total gross cost represented by each item for the horses studied in each State, will be found in Table I.

TABLE I.—*Detailed summary of average annual costs and credits per horse by States (37 farms, 316 horses).*

Item	Illinois (154 horses)		Ohio (72 horses)		New York (90 horses)	
	$	%	$	%	$	%
GROSS COSTS						
Feed and bedding	68 75	65.0	76 86	58.8	91 25	57.1
Labour	13 99	13.2	27 48	21.0	22 09	13.8
Interest	7 90	7.4	8 66	6.6	9 43	5.9
Stabling	4 95	4.7	7 18	5.5	12 98	8.1
Use of equipment	3 82	3.6	5 00	3.8	5 85	3.7
Shoeing	0 86	0.8	2 35	1.8	4 56	2 9
Depreciation	3 46	3.3	—	—	11 56	7.2
Net loss on colts	0 04	—	1 24	1.0	—	—
Miscellaneous	2 12	2.0	1 90	1.5	2 09	1.3
Total	105 89	100.0	130 67	100.0	159 81	100.0
CREDITS						
Manure	5 24	—	8 20	—	13 36	—
Horse appreciation		—	2 10	—	—	—
Colt profit	—	—	—	—	1 43	—
Total	5 24	—	10 30	—	14 79	—
NET COST						
Cost of keeping, less credits	100 65	—	120 37	—	145 02	—

These gross costs and net costs represent the average cost of the work performed by the horse. It will be seen that, with few exceptions, each item of cost was greater in Ohio than in Illinois, and still greater in New York.

This variation in average cost is discussed by the writer analytically for the different items of cost and credit.

Kinds of Feed.—The number of kinds of feed used were 11 in Illinois, 16 in Ohio and 18 in New York. In all cases the principal

feeds used were maize, oats, hay, straw and pasture, representing 97% of the total feed cost in Illinois, 94·5% in Ohio, and 88% in New York.

Corn was the principal grain fed in Illinois, oats in Ohio and New York. The greatest quantity of hay per horse was fed in New York, and the most pasture per horse was used in Illinois (4·93 months, against 2·26 in Ohio and 1·13 in New York).

Cost of Feeds.—In Table II the feeds are divided into three classes, namely, grain, roughage and pasture by States.

TABLE II.—*Average quantity and cost of grain, roughage and pasture per horse by States (27 farms, 316 horses).*

Kind of feed	Illinois (154 horses)		Ohio (72 horses)		New York (90 horses)	
	Average quantity per horse	Average cost per horse	Average quantity per horse	Average cost per horse	Average quantity per horse	Average cost per horse
Grain ..... lb.	4,500	$44 93	3,347	$40 71	2,691	$38 55
Roughage ..... lb.	4,224	16 13	6,600	32 65	9,513	51 20
Pasture ..... days	148	7 69	68	3 50	34	1 50
		$68 75		$76 86		$91 25

These costs are based on the values of feeds at the farm for feed raised, and on actual cash costs for feeds purchased. The price of corn in New York f. i. as compared with Illinois is 42 per cent greater, and of oats 36 per cent greater, while the price of hay is only 9 per cent more in New York than in Illinois.

It is evident that variation in feed prices had a marked influence on the total feed cost per horse in each State.

In Table III are shown the variations in monthly feed costs on three individual farms, one from each of the three States.

TABLE III.—*Variation in feed costs, by months, on three individual farms situated in Illinois, Ohio, and New York respectively*

Month	Illinois	Ohio	New York
	$	$	$
March	8 68	7 75	7 94
April	7 65	7 30	7 68
May	7 34	8 42	10 39
June	6 66	7 30	10 68
July	7 00	7 20	7 93
August	4 70	6 50	7 76
September	4 58	6 66	7 53
October	4 32	6 29	6 23
November	4 67	5 40	6 22
December	4 40	5 70	6 56
January	4 40	5 94	6 56
February	4 23	6 42	5 92
Average	5 72	6 74	7 62

Labour costs.—Labour includes the number of hours of both man and horse labour devoted to feeding and taking care of the horses, cleaning stalls, hauling feed and supplies, and to any other labour performed for the benefit of the horse. The hauling of manure from the barn and barnyards is not charged against the horses, but becomes part of the manure cost charged to the crop on which it is applied. The number of hours, cost per hour, and total cost per horse of man and horse labour devoted to the care of horses is shown in Table IV.

TABLE IV.—*Number of hours, cost per hour, and total cost per horse of man and horse labour devoted to the care of horses by States (27 farms, 316 horses).*

Kind of labour	Illinois (154 horses)			Ohio (72 horses)			New York (90 horses)		
	Hours	Cost per hour	Total cost	Hours	Cost per hour	Total cost	Hours	Cost per hour	Total cost
	—	*Cents*	$	—	*Cents*	$	—	*Cents*	$
Man labour	85.2	14 95	12 74	164.6	16 00	26 34	127.3	16 40	20 88
Horse labour	13.1	9 56	1 25	8.2	13 90	1 14	8.5	14 22	1 21
Total			13 99			27 48			22 09

Interest on value of horses.—The average value of horses studied in this work were as follows: Illinois, $158; Ohio, $173; New York, $189.

Stabling Cost.—This cost, calculated on a 5 per cent interest on the part of buildings used for stabling horses, varied from 4·7 per cent of the total gross cost of keeping in Illinois to 8·1 per cent in New York.

Use of Equipment.—In Illinois this cost calculated on a 5 per cent interest on the average investment in harness and miscellaneous equipment used by horses, was about $4 per head and $1 and $2 higher in Ohio and New York respectively.

Shoeing—On many of the farms this expenditure was of minor importance, since the horses were not shod except when needed for heavy road work or when used on frozen ground. The average cost was therefore only $0.86 in Illinois, $2.35 in Ohio, but $4.56 in New York.

Depreciation and Appreciation.—In determining depreciation and appreciation in value of horses a yearly inventory value was placed on each horse on the farm by careful appraisal and a record was kept of each horse bought and sold. Table V shows the percentage of horses that appreciated in value, the percentage that did not and the factors influencing the aggregate depreciation or appreciation by States.

TABLE V.—*Percentage of 316 horses that appreciated in value, percentage that did not appreciate, and the factors influencing the aggregate depreciation or appreciation, by States (27 farms, 316 horses).*

State and number of houses	Percentage of horses that showed		Number of deaths	Number bought	Number sold	Number of colts bought	Number of colts sold	Number of colts fed
	Appreciation	No appreciation						
Illinois (154 horses)	18.75	81.25	3	21	21	2	—	43
Ohio (72 horses)	21.95	78.05	—	9	17	2	1	7
New York (90 horses)	4.95	94.05	6	6	3	1	2	18
The three States (316 horses)	15.60	84.40	9	36	41	5	3	68

The average net depreciation of the 316 horses was $4.50 per horse. Depreciation varied from $11.60 per horse in New York, to an appreciation of $2.10 per horse in Ohio. (On 378 farms studied in Chester County, Pa., the average depreciation resulting was $7 per head, largely determined by the practice of farmers in disposing of horses while they are still saleable at a satisfactory price. On 14 New York farms in 1912 and 31 in 1913 the average annual depreciation was found to be $14.03. Of the 35 farms studied, 12 showed an appreciation of horses. In Rice County, Minnesota, depreciation varied from $0.98 in 1905 to $15.48 in 1904, averaging for four years $5.56 per head; in Lyon County it averaged $6.94 and in Norman County $5.82 per head.

Profit and loss on colt account.—Of the 43 colts fed on the Illinois farms 19 were born during the years of the survey and showed a loss of 4 cents per head, in Ohio $1.24 per head, while on the New York farms the colts showed an average profit of $1.43 per head. This survey proved that only under favourable conditions is the raising of colts one way of keeping down the cost of horse labour.

Miscellaneous costs.—Including insurance, share of taxes, veterinary services and medicine, etc., varied from $1.90 on the Ohio farms to $2.12 in Illinois.

Manure.—Horses were credited with only the manure recovered from the stables and feed lot, which was valued at $1 per ton before removal. The average manure credit was greatest in the States where the horses were fed the largest quantities of grain and roughage and pastured the least number of days.

Variations in net costs.—Including in one group those years for which the net cost per horse was greater than the average for the State and in another group those years for which the net cost per horse was less than the average for the State, the following differences, shown in Table VI, between the group above the average cost and the group below the average cost were obtained.

TABLE VI.—*Detailed difference in costs and credits between records showing a net cost per horse above the average and below the average (10 farms, 154 horses).*

State	Feed (cost)	Labour (cost)	Depreciation (cost)	Appreciation (credit)	Colt loss (cost)	Colt profit (credit)	All other costs	Manure (credit)
	$	$	$	$	$	$	$	$
Illinois farms	18 05	4 24	1 96	—	3 92	3 38	2 59	0 39
Ohio farms	32 11	7 59	0 07	4 50	2 86	0 34	4 78	2 19
New York farms	9 41	1 68	5 13	—	0 14	3 70	8 90	1 90

Relation of the work performed to the total feed cost.—In order to show the relation if any, existing, between the total work done by a horse and the total cost of feed, which is the greatest item of cost in keeping a farm work horse, the yearly records for each State were divided into two groups with reference to the average total work done per horse. The first group contains the data for those farms on which the horses worked more hours than the average for all records in that State. The second group contains data for those farms on which the hours worked per horse were less than the average for the State group. (See Table VII.)

TABLE VII.—*Relation of work done to the total feed cost by States (27 farms, 316 horses).*

Records with work hours per horse	Illinois (154 horses); average hours worked, 1053)			Ohio (72 horses); average hours worked, 867)			New York (90 horses); average hours worked, 1020)		
	Average hours worked per horse	Average feed cost per horse	Average feed cost per hour	Average hours worked per horse	Average feed cost per horse	Average feed cost per hour	Average hours worked per horse	Average feed cost per horse	Average feed cost per hour
Above the average (1)	1200	$75 20	$0.063	1055	$89 00	$0.084	1172	$97 30	$0.084
Below the average (2)	880	67 30	0.077	723	67 30	0.093	863	85 00	0.098
Difference	320	7 90	0.014	332	21 70	0.009	309	12 30	0.014

(1) Records: Illinois 8, Ohio 7, New York 9. (2) Records: Illinois 9, Ohio 9, New York 9.

This table shows that there is a relation between the work done and the quantity of feed consumed per horse, but the excess in feed cost for the harderworking horses is more than offset by the extra number of hours worked by them, so that the average feed cost per hour of labour in this group was about 1½ cents less on the Illinois and New York farms and about 1 cent less on the Ohio farms.

On an average on the farms studied there was a fairly uniform difference between the average feed cost and the total cost per hour of horse labour, showing that the number of hours worked and the feed cost per horse are the controlling factors in the total cost per hour of horse labour.

Cost of horse labour per hour.—The cost of horse labour depends on the net cost yearly to keep a horse, and the total amount of work done (See Table VIII).

TABLE VIII.—*Cost of horse labour per hour (27 farms, 316 horses).*

State	Average hours worked: Per year	Per week day	Per Sunday	Average net cost per horse	Average cost per hour worked
Illinois (154 horses)	1,053	3 30	0 40	$100 65	$0.0956
Ohio (72 horses)	866	2 70	0 46	120 37	0.1390
New York (90 horses)	1,020	3 24	0 13	145 02	0.1422

Labour performed by months.—In each State very little labour was performed by the horses during January; February, 30 to 40 hours; about 60 hours in March. Thereafter the work increased until, during May, the maximum for any one month was reached (182 hours in Illinois, 168 in New York and 120 in Ohio). From then on to the end of the year there was a fairly uniform decrease in the hours worked per month. In New York and Illinois the increases in October and November (95 and 85 hours respectively) are due to grain threshing and maize harvest. In Illinois the greatest amount of extra horse labour was required during August in Ohio, and in New York in October. This extra horse labour was usually exchange work among neighbours, the major part being used in grain threshing, maize harvest and autumn seeding.

Table IX shows the average number of week days when no horse labour was performed, by months.

TABLE IX.—*Average number of week days when no labour was performed, by months.*

Month	Illinois (10 farms)	Ohio (7 farms)	New York (10 farms)	Month	Illinois (10 farms)	Ohio (7 farms)	New York (10 farms)
January	8.3	9.7	12.4	July	1.2	3.1	1.5
February	5.8	7.0	9.5	August	3.8	2.1	5.3
March	7.0	6.8	12.0	September	3.0	4.0	3.5
April	2.7	4.6	4.6	October	3.5	5.4	4.8
May	5.0	2.2	1.3	November	1.9	3.5	5.8
June	1.1	2.5	1.2	December	5.1	7.6	11.3
				Total	48.4	58.5	73.2

Relation of the total crop acres per farm to crop acres per horse.—This relation is shown in Table X.

TABLE X.—*Relation of total crop acres per farm to crop acres per horse by States (27 farms, 316 horses).*

	Illinois (10 farms; average size 166 acres)		Ohio (7 farms; average size 74 acres)		New York (10 farms; average size 94 acres)	
	Average per farm	Average per horse	Average per farm	Average per horse	Average per farm	Average per horse
	Acres	Acres	Acres	Acres	Acres	Acres
Farms above the average size	230.2	22.2	93.7	17.8	112.74	20
Farms below the average size	111.2	16.8	54.7	14.6	70.07	17
Difference	119.0	5.4	39.0	3.2	42.67	3

From these figures it appears that the large farms permit of a more efficient use of horse labour than do the small farms. On the large farms in Illinois there were 22·2 acres in crops per horse while on the small farms there were but 16·8 acres per horse. Similar results were found on both the Ohio and the New York farms, though in these States the difference between the two groups was not as great as in Illinois.

AGRICULTURAL INDUSTRIES

463—Characteristics and Quality of Montana Grown Wheat.—LEVI, M. THOMAS, in *U. S. Department of Agriculture, Bulletin* No. 522, 34 pp. Washington, D.C., May 18, 1917.

464—The Catalase Activity of American Wheat Flours.—BAILEY, C. H. in *The Journal of Biological Chemistry*, Vol.

XXXII, No. 3, pp. 539-545. Baltimore, December, 1917. (2 pp. in Institute Bulletin).

470—**Detection of Lime Used as a Neutralizer in Dairy Products.**—WICHMANN, H. J., in the *U. S. Department of Agriculture, Bulletin* No. 524, pp. 22. Washington, D. C., May, 1917.—Abstract in the *Annales des Falsifications et des Fraudes*, Year, X No. 109-110, pp. 581-582. Paris, November-December, 1917.

471—**The Determination of Bacteria in Ice Cream.**—AYERS S. HENRY and JOHNSON, W. T., Jr. in *U. S. Department of Agriculture Bulletin* No. 563, pp. 16. Washington, D. C., June 19, 1917.

472—**Chicago Dressed Carcass Contest of Cattle, Sheep and Hogs.**—*The Breeder's Gazette*, Vol. LXXII, No. 24, pp. 1084-1086. Chicago, December 13, 1917. (2 pp. in Institute Bulletin).

AGRICULTURAL STATISTICS

WORLD'S WHEAT PROSPECTS FOR 1918-19.

BY T. K. DOHERTY, LL.B.

In the "Agricultural Gazette" of June last there was published in the Institute Section the world's production of wheat for the years 1916-17, the five years' average 1911-15, and the pre-war five years' average 1909-13. In the same issue also appeared the acreage sown to the various cereals for the grain year 1917-18. The acreage sown for the grain year 1918-19 was given in the August number. Up to the present time considerably less information than usual has been received by the Institute concerning the cereal production for 1918. The only official data available are indicated in the following table by an asterisk; the other data for 1918 are merely estimates. The official figures for the preceding years and period are added to facilitate comparison.

TABLE I.

Countries.	1918.	1917.	Pre-war five years' average 1909–13.
	Bushels.	Bushels.	Bushels.
United States	878,000,000*	650,828,000	686,694,000
Canada	232,000,000*	233,743,000	197,118,000
Mexico	8,000,000	8,480,000	8,480,000
Argentina	170,000,000	218,618,000	147,071,000
Uruguay	8,000,000	12,860,000	6,519,000
Denmark	5,100,000 (*a*)	4,300,000	5,344,000
France	181,000,000 (*a*)	144,151,000	317,639,000
Greece	8,000,000	4,000,000	4,320,000
Switzerland	4,500,000	4,556,000	3,314,000
Italy	158,000,000 (*a*)	140,000,000	183,336,000
Netherlands	4,500,000	4,586,000	4,896,000
Norway	265,000	241,000	306,000
Portugal	7,000,000	7,440,000	7,440,000
Cyprus and Malta	2,400,000	2,400,000	2,400,000
Spain	130,000,000	142,676,000	130,447,000
Sweden	6,900,000(*a*).	6,871,000	7,769,000
Great Britain	90,000,000 (*a*)	59,750,000	59,977,000
Ireland	4,000,000	4,347,000	1,597,000
India	380,202,000*	379,232,000	359,035,000
Japan	30,000,000	32,727,000	24,166,000
Algeria	35,000,000	28,980,000	34,998,000
Egypt	28,000,000	29,835,000	34,814,000
Tunis	9,406,000*	6,963,000	6,230,000
Australia	90,000,000	122,584,000	90,499,000
New Zealand	6,000,000	6,276,000	7,070,000
Chili	12,000,000	12,000,000	12,000,000
Totals	2,488,273,000	2,268,444,000	2,343,479,000

*Official figures.
(*a*) Estimates based on acreage to be harvested, with a 10% increase over last year in yield per acre.
Figures for other countries for 1918 are estimates based on ascertained acreage and on condition reports.

The total production of wheat in 1918 for the countries mentioned in the preceding table at present open to the world's commerce shows an increase of 220 million bushels over 1917 and an increase of 145 million over the average of the five years 1909-13. The increases are pretty generally distributed among the importing and exporting countries, but the United States crop accounts for by far the largest proportion.

The European importing countries, both neutral and allied, which depend largely on the outside world for their supplies, are Denmark, France, Greece, Italy, Holland, Norway, Portugal, Cyprus and Malta, Spain, Sweden, Great Britain and Ireland, Egypt, Tunis, Switzerland, to which may be added Belgium, which still receives supplies through a neutral commission. These countries, exclusive of Belgium, produced 639,071,000 bushels of wheat in 1918 as against 562,116,000 in 1917, an increase of 76,955,000 bushels, but they produced 130,758,000 bushels less than the pre-war average which was 769,829,000 bushels.

On the contrary, the exporting group, consisting of United States, Canada, India, Australia and Argentina, produced in 1918, 1,750,000,000 bushels, as compared with 1,605,000,000 bushels in 1917, an increase of 145,000,000 and, as compared with 1,480,000,000 bushels the pre-war average, an increase of 270,000,000.

It is therefore apparent that the extraordinary demand induced by the war, together with the high prices, have brought about a large increase of production in the exporting countries.

Supply and Demand August 1st, 1918 to August 1st, 1919.

Taking the South Mediterranean group of countries, comprising Cyprus and Malta, Egypt, Tunis, Algeria, and The Cape, Tunis and The Cape will probably be self-sustaining; Malta will remain a small importer and Algeria a small exporter, while Egypt, with a decrease of 7 million bushels below average production will probably need to import for itself and nearby armies more than double that amount. Its pre-war total consumption was 42,620,000 bushels and now the requirements in Mesopotamia and Palestine have to be provided for.

The neutral European group produced in 1918 about the pre-war average of 151 million bushels and would normally require an import of 62 million.

Our chief European allies, France, Great Britain and Italy, normally consumed in the five year pre-war period 361,000,000, 275,000,000 and 236,000,000 bushels respectively. Deducting from these amounts the production of these countries for the present season there would remain import requirements of 180,000,000, 185,000,000 and 78,000,000 bushels respectively. With the present high prices, admixture of other grains, and restrictions, these requirements of normal peace conditions would not obtain for actual current consumption, but they would scarcely be more than sufficient to furnish reserve stocks during the course of the grain year and make provision at its close until the new crops were available. Applying this rule so far as the allied countries are concerned, reducing the normal supply somewhat for the European neutrals and to a greater extent for the importers outside of Europe, the demand situation may be summarized in the following table:—

P. 6. TABLE II.

	Pre-war consumption.	Estimated present needs and carry-over.
	Bushels.	Bushels.
France	361,364,000	180,000,000
Great Britain	275,000,000	185,000,000
Italy	236,000,000	78,000,000
Greece and Salonika armies	.....	15,000,000
Portugal	.....	3,000,000
Belgium	.....	24,000,000
Total allied requirements	.....	485,000,000
Scandinavia and other European neutrals	213,000,000	
normal imports	62,000,000	50,000,000
Outside Europe, normal imports	98,000,000	50,000,000
World's requirements 1918–19	.....	585,000,000

For the past grain year 1917-18 the importing needs were quite as large as for the present year, but the shipments actually made, as secured from official and commercial sources, amounted to only 440 million bushels (wheat and wheat flour) distributed among the exporting countries as follows, with the figures relating to the preceding season for comparative purposes:

TABLE III.

P. 7.

	Exports 1917–18.	Exports 1916–17.
	Bushels.	Bushels.
Canada	169,040,000	174,565,000
United States	135,000,000	200,768,000
India	14,008,000	52,504,000
Australia	38,224,000	70,632,000
Argentina	84,464,000	55,376,000
Total exports	440,736,000	553,845,000

Except for Canada and the United States the shipments for 1917-18 have been disappointing, and it has only been by drastic economy that the supplies actually produced have met the absolute needs. That there were practically no stocks remaining in store on August 1st 1918, in the exporting countries, outside of Australia and Argentina, and especially in the importing countries, appears obvious.

Export Situation 1918-19.

In order to meet the requirements shown in Table II and still retain an adequate carry-over on August 1st, 1919, the following sources of supply may be utilized approximately as indicated in the last column, although it is entirely problematical as to whether the large quantities credited to Argentina, Australia and India can actually be marketed.

TABLE IV.

	Production of 1918.	Home Needs Waste and Carry-over.	Probable Export.
Canada (1)	257,000,000	83,000,000	174,000,000
United States	878,000,000	640,000,000	238,000,000
Argentina: Carry-over—66,000,000	170,000,000	80,000,000	100,000,000
Australia: Stocks, about 200,000,000	90,000,000	50,000,000	80,000,000
India	380,000,000	310,000,000	50,000,000
Total	1,775,000,000	1,163,000,000	642,000,000

(1) The official estimate on August 1st indicated a crop of only 232 million bushels, but the conditions obtaining since and the indications of the crop so far harvested have been so favourable that the figures ascertained for July 1st are here used.

With reference to the above production of Argentina and Australia, it should be observed that these figures relate to the crop to be harvested in December and January next. It is the pre-war average which is here given as an estimate. From the reports to hand on the conditions of seeding in these countries there does not seem to be indicated any more than the promise of an average crop.

Although the carry-over in Argentina and Australia, representing the surpluses of previous crops, is quite large, that fact does not support the probability of any larger shipments than those above indicated. Even to realize these shipments it must be assumed that the shipping facilities will be far ahead of those available for 1917-18. If no further facilities are provided the shipments from these countries instead of being 230 million will be nearer the 136 million bushels exported during the previous season.

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THE PROGRESS OF THE WOOL INDUSTRY

SEVEN years ago, after thoroughly investigating the sheep industry in Canada, the Sheep Commissioners, specially appointed by the Minister of Agriculture, regretfully stated: "From shearing to marketing no country in the world handles its wool in a worse manner than Canada. As far as the wool of mutton breeds and cross breds go, we do not know of any country where it is handled in such an unsatisfactory way and delivered in such bad condition." Having reached this conclusion, the commission intimated that the way was open to find a remedy for the trouble. It was soon after this that the Sheep Division of the Live Stock Branch was organized, and by 1914 the work of applying the remedy had begun. This consisted of the organization of wool growers' associations throughout Canada, the direction of their efforts in producing good wool, and in classifying it. During 1914, the first year of the work, 206,129 lb. were graded for societies organized in Quebec, Ontario, Manitoba, and Alberta. The following year, through 19 organizations distributed over Canada, 420,000 lb. were classified and offered for co-operative sale. The next year 1,712,598 lb. and last year 2,097,909 lb. were thus disposed of.

Early in 1917 the Honourable Martin Burrell, then Dominion Minister of Agriculture, recognizing the importance of centralizing the sale of wool, and the advantages that must accrue from having one centre of operation, sanctioned the rental of suitable premises in Toronto for the storage of the wool of the various associations where clips would be graded by the wool experts of the Live Stock Branch and shipped out when purchased. This led to the further step this year of the organization of the Co-operative Wool Growers' Limited as a central agency for the disposal of wool shipped in and collected from all parts of the Dominion (*vide* Agricultural Gazette for March, page 303).

Whereas, when the warehouse was first established, it was estimated that as much as two million pounds of wool might be received during the year, no less than upwards of two and a half million pounds of wool had been sold up to the end of August this year on account of the associations in th different provinces as follows:—

Provinces.	Pounds.
Maritime	150,000
Quebec	250,000
Ontario	800,000
Manitoba	350,000
Saskatchewan	650,000
Alberta	1,250,000
British Columbia	100,000
Total	2,550,000

After the foregoing amount had been sold a considerable quantity of wool yet remained in storage, but it was anticipated that all would be disposed of at favourable prices before long.

To furnish additional information regarding the development of this important national industry, and the systems that have been adopted of collecting, grading, and disposing of the wool, reports are published from the principal centres and associations touching upon these points, in Part II of this issue of THE AGRICULTURAL GAZETTE. While, perhaps, not as complete as might be desired, the statements given are at least sufficient in extent and explicit in detail to show how generally the movement is approved and acted upon. Not only is this the case, but they indicate in a marked manner the revolution in the industry that has been brought about. No longer can it be said that "no country in the world handles its wool in a more unsatisfactory manner." On the contrary the breeder and farmer has been quick to learn the oft-repeated lesson that to get the best prices the best must be produced. Formerly the wool was sold in bulk for what it would bring. Now, sorted and inspected, grade values become apparent, and sheep raisers are learning more and more to recognize the importance of care in selection, industry in keeping, and the exercise of intelligence in shearing, packing and shipping.

CANADA FOOD BOARD

A REVIEW OF THE WORK OF THE CURRENT YEAR

BY S. H. HOWARD, EDUCATIONAL DIVISION, CANADA FOOD BOARD

THE Canada Food Board has co-operated with the Agricultural Department of the Dominion and with the like department in each of the provinces with the object of stimulating the greatest possible production of foodstuffs, with special emphasis upon wheat and pork. It is recognized that this country is able to produce a greater surplus by many times over than it can possibly save out of normal consumption.

ORGANIZATION

A conference with the provincial and federal Agricultural Departments was held early in the year, and the different plans suggested by each province were discussed. As a result of this meeting special grants were recommended from the Dominion Government to the provinces and an advertising campaign was carried on by the Food Board in the agricultural press, urging the greatest possible acreage for 1918. Hon. C. A. Dunning, as Director of Production for the Canada Food Board, had charge of the Production Campaign and paid personal attention to the West. Mr. J. D. McGregor, Director of Agricultural Labour, with headquarters in Winnipeg, superintended the campaign for securing help for the farms. Dr. J. W. Robertson, representing the federal Minister of Agriculture and the Canada Food Board, co-ordinated the organization for greater production in the five eastern provinces. Dr. Robertson toured these provinces and secured the co-operation of all classes of the community, including the county councils. Arrangements were also made whereby needy farmers could secure supplies of seed.

METHODS OF PROCEDURE

In the West meetings were organized by Hon. C. A. Dunning throughout the Prairie Provinces, and the

food situation as confronting the Allies was placed forcibly before the farming community in practically every district. As a result of the spring campaign, the acreage of grain crops was increased throughout Canada, and, had the weather conditions in the West continued normal throughout the season, a bumper wheat crop would have been harvested. Unfortunately drought and high winds at the critical time did such damage as to reduce the wheat harvest of 1918 to the lowest recorded in many years.

One of the means taken to encourage an increase in the acreage in Canada was a provision of Fordson tractors at cost to the farmers of Canada, through the Departments of Agriculture in each province. These were distributed as follows:—

Prince Edward Island	6
Nova Scotia	14
New Brunswick	4
Quebec	5
Ontario	214
Manitoba	146
Saskatchewan	384
Alberta	333
British Columbia	17
Total	1,123

The performance of these machines, according to every report received by the Food Board, has been entirely satisfactory. By the increased effort of the farmers throughout Canada, supplemented by the combined efforts of all the other agricultural work, the grains and important vegetable crops this year were planted to an estimated area of 33,453,510 acres, as compared with 31,818,722 in 1917.

As further aid to the farmer in the handling of his crops during the summer, about 12,000 school boys were enlisted, organized, and placed on farms by the Canada Food Board, as a result of the "Soldiers of the Soil" movement. These were distributed as follows:—

Prince Edward Island	500
Nova Scotia	1,788
New Brunswick	677
Quebec	670
Ontario	4,621
Manitoba	1,006
Saskatchewan	1,405
Alberta	616
British Columbia	669
Total	11,952

PROVIDING LABOUR

Largely to meet the necessity for providing farm labour the Dominion Government passed the Anti-loafing Law, which had a large measure of the desired effect, particularly in the western provinces. The national registration of man-power undertaken by the Government in June last, by which men who were willing to work on farms, and particularly those who had had previous experience on farms, were asked to signify their willingness to help out in the present emergency, was also of great help to the labour situation, and formed the basis of appeal by the Board for voluntary farm labour. By various means of publicity the Board kept the need for increased production, and of help for the farms, before the people, including the women of the Dominion, who have assisted in such ways as fruit picking, vegetable cultivation, etc. For a series of articles on "The Supplying of Farm Labour" by the provinces, *see* The Agricultural Gazette of September, page 864.)

VACANT LOTS AND WAR GARDENS

Another branch of the Board's efforts to stimulate greater production was comprised in the organization of the War Garden and Vacant Lot Cultivation movement in co-operation with the various municipalities and other local agencies throughout Canada, as a result of which, according to the estimate of the Honorary Chairman of that section, Mr. Frederick Abraham, over double the acreage of 1917 was planted in such garden plots by the people of the cities and towns during the season just ending.

THE SOLDIERS OF THE SOIL MOVEMENT

MR. Taylor Statten, National Director of the Soldiers' of the Soil Movement, inaugurated by, and conducted under, the Canada Food Board, has presented his report on the progress of the organization. The report is dated September 5, and can, therefore, be taken as indicating the achievements practically up to the end of the season. Mr. Statten states that in every province of the Dominion close co-operation was established between the different Departments of Agriculture and the Soldiers of the Soil Committees. Testimony is produced showing that the boys generally rendered most efficient service. It must be understood that the majority of the Soldiers were students in the higher grades of public schools and in high schools and collegiate institutes. One of the features of the campaign for enlistment was uniformity on the part of educationalists to make such concessions as would permit the boys to render the national service called for. The Department of Education in each province decided on the requirements that were necessary, in order that the boys might be permitted to leave school studies earlier, and the regulations were quite uniform. The details of these requirements have previously been published in THE AGRICULTURAL GAZETTE OF CANADA, and, therefore, need not be repeated here. Mr. Statten compliments the Young Men's Christian Association on its ideals for future Canadian manhood, and states that the movement has received every possible form of active consideration from the association. The report proceeds to deal with the work performed and the success achieved in the different provinces.

IN PRINCE EDWARD ISLAND

In Prince Edward Island Mr. J. E. McLarty, Professor of Rural Science in the Prince of Wales College, Charlottetown, accepted the position of Provincial Superintendent. Not only did he create an efficient organization for recruiting and placing throughout the province, but he also appreciated fully the profit this summer's work would be to the boys under adequate supervision. The enlistment campaign was promulgated the second week in April and promoted in the province through the school inspectors. All boys thirteen years and over in good standing were permitted to go out to work before the completion of the term. A total of 720 boys were enlisted as soldiers of the soil. While the boys were being placed on the farms, local supervision committees were organized throughout the province. In accomplishing this work, Mr. McLarty addressed eighteen meetings in six days. About sixty representative farmers, along with business and professional men were formed in fifteen such committees. These committees became responsible for supervising boy labour in every phase of agricultural pursuit. The spirit in which the boys held the movement, Mr. Statten points out, is well illustrated by the action of a group at Charlottetown, who had been in the habit each year of working on the college grounds. When the need for boys was presented in the enrolment campaign, these lads voluntarily gave over their positions to girls who could work on the grounds and themselves went out into the province to do much heavier toil at reduced remuneration. It is estimated that a total of 1,000 boys are entitled to receive the bronze badge of honour given to all who have served on farms during the summer in connection with this movement.

IN NOVA SCOTIA

In his report, Mr. Statten speaks most enthusiastically of the way the "teen-age" boys of Nova Scotia

enlisted and took up the work. He says that when the enlistment campaign was over 2,150 boys had offered their services. The co-operation of the Department of Education, the Department of Agriculture and the Department of Industry and Immigration with the S. O. S. Committee has been most effective. The Department of Education accepted full responsibility for enrolling the boys. Special literature was sent to every teacher. Representatives of the S. O. S., Y. M. C. A. Secretaries, and business and professional men were given free access to the schools, and visited the larger centres. In the others, the school teachers presented the movement to the pupils. The Department of Agriculture carried on a campaign among the farmers, giving attention to the fact that boy labour was available and urging that boys be used to the fullest extent and trained to do the work that was needed. The Department of Industry and Immigration prepared employment forms and obtained information from the farmers regarding accommodations and other necessities. Practically all the boys were placed on the farms by the Soldiers of the Soil Committee. Reduced railway fares were secured for those who were called upon to travel. Three zone supervisors were appointed respectively for the western counties, central counties, and eastern counties. The Department of Agriculture donated $2,000 to further the work of supervision. Thirty-three local committees were formed and there were over one hundred volunteer workers in office.

IN NEW BRUNSWICK

In New Brunswick equal enthusiasm to that displayed in Nova Scotia was manifested. From April 29 to May 4 the propaganda for enlistment was promulgated. The provincial committee had its headquarters in St. John and saw that every city and town had its special group of men to handle the enrolments. As a result, in response to the 500 boys who were asked for, 855 were enrolled. It was not difficult to find men who would visit the boys at their work, advise, and counsel with them in their problems, encourage them in disappointments, and stimulate the irresolute. The province was divided into three zones with a supervisor in charge of each. Mr. A. H. Chipman, of St. John, accepted the position of provincial superintendent. Local committees were generally appointed and arrangements were made for presenting the boys with their badges in a most impressive manner. An outstanding event was a celebration on Dominion Day at Sussex. A procession of Sons of the Soil boys, headed by a military band, together with the war veterans, cadets, and girl-guides, left the high school grounds and paraded to the park, where there was gathered upwards of 2,000 people. The Lieutenant-Governor of the province presented the S. O. S. medals.

IN QUEBEC

In Quebec the movement naturally fell into two divisions, the French-Canadian boys coming under the direction of Mr. A. Desilets, B.S.A., Director of Farm Labour for the province, and the English-speaking boys under Mr. Donald MacLeod, as Provincial Superintendent, associated with Mr. Desilets. The work of the English-speaking boys began early in April, during which month fifty-one schools and academies were covered, and 800 boys enrolled. The report speaks highly of the manner in which the school principals assisted in the work of enrolment. Some difficulty was experienced in placing the boys, but this was finally accomplished and by the end of June, farmers were asking for boys, but could not be supplied. It should be mentioned that some of the lads who volunteered were too young for the work required and the total number placed was some 550 of the number enrolled.

The work of supervision was undertaken, in the Eastern Townships by Mr. Arthur L. Paterson, in the frontier counties by the Rev. J. T. Gordon, Presbyterian Minister from Valleyfield, Que., and in the three eastern counties of Ontario, for which the Quebec organization became responsible, namely, Stormont, Glengarry, and Prescott, Mr. Stanley Walsh took charge. A small army of volunteer workers assisted the supervisors throughout the province. Some twenty local committees were appointed. Under the direction of Mr. Desilets, about 700 French-Canadian boys were enrolled. The work of supervision was undertaken by parish committees which were generally organized. As a total result more than 1,250 boys, French-Canadian and English, have been doing their part this summer as Soldiers of the Soil in the province of Quebec.

IN ONTARIO

The Ontario Organization of Resources Committee through its Labour Committee, of which Dr. W. A. Riddell, Superintendent of the Trades and Labour Branch of the Ontario Government, is Chairman, carried on a campaign of publicity and of visitation of high schools and collegiate institutes with the object of securing the enrolment of boys. Those who did the work of visitation of schools were secured by the National Council of the Young Men's Christian Association and gave their time to the Resources Committee free of cost. The placing of the boys was cared for by the Provincial Government Employment Bureau. There were four zone employment bureaus doing this work, and in addition the Agricultural Representatives of the Department of Agriculture acted as sub-agents of the Trades and Labour Branch of the Government in lecturing the boys on farms. About 5,000 boys were found positions through these agencies. In connection with the recognition of the boys and their friendly visitation, the Boy's Work Division for Ontario and Quebec of the National Council of the Y.M.C.A. provided twelve zone supervisors, who gave their whole time to this work.

IN MANITOBA

In Manitoba, Mr. D. R. Poole, of Winnipeg, Territorial Secretary of the Y.M.C.A., assumed control of the movement as Provincial Superintendent. The Department of Education not alone, changed the requirements regarding the standards sufficiently to allow the boys to give up their studies, but also gave free access to all the schools and requested every teacher, principal, and inspector to assist in recruiting. All boys fourteen and over, who had attended school sufficiently during the year, and particularly those who had any former experience, were permitted to go out in May for seeding, excepting only matriculants, who were required to take their examinations at the usual time. The last week in April saw every hamlet in the province covered with advertising urging enlistment to the Sons of the Soil. Every school teacher received notice of its importance and addresses were delivered to the boys in the different schools. As a result of the enlistment campaign, 1,652 boys were enrolled. The Superintendent of Immigration and Colonization, Mr. Bowman, assumed responsibility on behalf of the provincial Government for the placing of the boys. Two zone supervisors were appointed, namely, Mr. A. E. I. Carruthers for the eastern half of the province, with headquarters at Winnipeg, and Mr. Roy B. Hunter for the western half of the province, with headquarters at Brandon. Details of supervision were undertaken by 110 committees with some 250 volunteer workers, responsible business men and farmers.

IN SASKATCHEWAN.

In Saskatchewan the S.O.S. movement immediately on promulgation received a ready and enthusiastic response. An enlistment campaign was quickly organized and, by the last week in April, the province was thoroughly well covered with posters appealing to boys of the high schools, collegiate institutes, and higher grades of the public schools to enlist, in farm services. As in other parts of the Dominion, the Department of Education and of Agriculture gave their fullest co-operation. The schools of the province were circularized and teachers, principals, and inspectors explained the movement. As elsewhere, all boys fourteen years and over with fair standing, were permitted to leave school without examination and enter the next higher form the coming fall, on the production of a certificate showing three months' service on the farm. The University of Saskatchewan also undertook to recognize matriculants entering on these conditions. A prominent business man, Mr. L. E. McCormick, in Regina accepted the position of Provincial Superintendent. When the campaign for enlistment had been completed he announced that 1,624 boys had been enrolled. Two zone supervisors who travelled through the province were appointed. A committee was organized as far as possible in every municipality, and the zone supervisor got into touch with some 250 responsible men and professional men who generally undertook to act as local directors.

IN ALBERTA

In Alberta Mr. A. L. Marks, a barrister of Edmonton, and leader in the Boy Scout movement, assumed direction of the work as Provincial Superintendent. Mr. W. E. Galloway, Boy Work Secretary of the Y.M.C.A., Calgary, directed the enrolment and acted as placing officer. The province was divided into four zones for recruiting and supervision purposes. Over 100 local committees were formed in various centres of the province for the work of carrying on supervision. The local committees interested about 300 of business and professional men and farmers throughout the province. One part of the plan of supervision was the presentation of the bronze badge, given to the boys for three months' service. These celebrations became a feature of the whole movement. Sports were held and addresses delivered, the whole scheme being carried out with the greatest possible impressment. At the amalgamated stampede for Southern Alberta, held at Lethbridge a programme was put on by the S.O.S. boys. A procession took place of farm teams, stock wagons, grain tanks, and saddle horses liberally decorated with flags and pennants and headed by the Lethbridge brass band. Another rally of importance was held at Tabor on Dominion Day, when Messrs. Taylor Statten, National Superintendent, C. M. Wright, Territorial Superintendent and C. D. McKinnon, Zone Superintendent, took part in the celebration. A total of 1,400 boys enlisted for farm service in Alberta and 1,160 were placed without loss of time.

IN BRITISH COLUMBIA

In British Columbia, 1,734 boys were enrolled as Soldiers of the Soil; 944 boys have been working throughout the expanses of British Columbia, while many of the balance were placed on the rich valleys between mountain ranges. The reports from the zone supervisors indicate that in all parts of the province the boys made good. On Vancouver Island and the smaller islands throughout the Gulf, some 250 soldiers of the soil were put on farms; in the Kootenay-Boundary zone the boys, in cases, had to travel seventy-five or eighty-five miles to their work and about 85 boys were employed; In the Kamloops zone the enlist-

ment of boys' service had been made before the S.O.S. movement was organized and 128 boys were reported as rendering good service; in the Lower Main-Land zone some 800 boys have been at work. Mr. James H. Beatty, Associate Provincial Superintendent, assembled and placed in running order a system regarding information from the boys as to their ability for farm work, and, from the farmers and local committees facts regarding the conditions under which work would be regulated. In the Okanagan Valley 180 boys were employed.

SEED CORN REGULATIONS MODIFIED

THE regulations regarding the movement of seed corn established by Order in council on February 28, 1918 and recorded in The Agricultural Gazette on page 334 of the April number have been modified. The time for the movement of seed corn from the districts and counties named in the Order in council has been extended from July 1, to November 1. By this modification also Seed Merchants within the provinces of Ontario and Quebec are prevented from selling, shipping or delivering the classes of corn named in the regulations until after the 15th of November.

DOCTORS OF AGRICULTURAL SCIENCE

The degree of Doctor of Agricultural Science has been conferred on Mr. J. H. Grisdale, Acting Deputy Minister of Agriculture and Director of Experimental Farms, by Laval University, Quebec. This degree was, on the same occasion, conferred on the Honourable J. A. Caron, Minister of Agriculture for Quebec. Reverend Father Michaud, President of the Agricultural Missionaries of Quebec and Mr. A. T. Charron, Chief Chemist of the Department of Agriculture of the province of Quebec and Director of the Provincial Laboratories.

PART I

Dominion Department of Agriculture

THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF HORTICULTURE

SUMMARY OF WORK NOW BEING CARRIED ON IN PLANT BREEDING

BY A. J. LOGSDAIL, B.S.A., ASSISTANT IN PLANT BREEDING AT THE CENTRAL EXPERIMENTAL FARM

A RAPIDLY increasing interest is being taken in plant and seed improvement and this is not to be wondered at when it is considered that no factor enters so continuously into the question of successful agriculture. from the time of sowing the seed until it is harvested, as that of the inherent ability of the seed itself, or, in other words, well bred seed.

A brief summary is therefore given here of the work now being carried on in plant improvement and breeding in the Horticultural Division of the Central Experimental Farm. The conditions under which this work is being carried on are very limited, considering the intrinsic value of the work, but it is hoped that opportunities for considerable development may be made in the near future.

FRUITS

A considerable amount of cross breeding has been done in the past five or six years with our best varieties of hardy orchard fruits.

In the case of apples the object of the work has been to increase the number of our hardy apples and secure a succession of varieties of first-class quality that will begin to bear at an early age and of sufficient hardiness to make orcharding profitable in our more northerly districts. The orchards now contain a large number of "open fertilized" and "cross-bred" apple seedlings produced by Mr. W. T. Macoun some years ago. Among them have been found quite a number of apples of remarkably good quality, some of which possess a combination of good qualities that will eventually bring them to the fore as first-class commercial varieties.

There are at the Central Experimental Farm some hardy Russian pears, introduced some years ago, that have proved considerably hardier than the varieties of pears grown commercially in our pear growing districts, but in quality of fruit, however, they have proved quite inferior. On this account a number of crosses have been made between our own commercial pears and these Russian varieties and a number of the young trees resulting from this work have been planted out in orchard positions during the past season.

Some very promising gooseberry seedlings have been obtained from crosses made between our native species, Ribes oxyacanthoides and Ribes Cynosbati, and the English gooseberry, Ribes grossularia. We are now multiplying the stock of these superior seedlings and will disseminate it when a sufficient supply has been obtained.

Nothing of particular value has yet been secured in the strawberry breeding, although there are a number of promising seedlings now under trial.

VEGETABLES

The chief work, however, to date has been with the breeding and improvement of early types of vegetables, particularly tomato and sweet corn.

A continuous selection for earliness had been made for a number of years with the variety Earliana and in 1912 these strains were crossed into seed, and from them pure types selected. This work produced an early maturing variety which was named "Alacrity". This variety is now being fairly broadly disseminated throughout parts of Ontario, Quebec and the Prairie Provinces, and it has been very favourably received by a large number of growers, owing to its earliness and quality.

Breeding work with early sweet corn has resulted in the sending out of an early type of sweet corn, known as "Early Malcolm". Since then newer and equally promising types have been secured and it may be claimed for these varieties of sweet corn that they are materially earlier than varieties of sweet corn generally grown some few years ago.

Some interesting and valuable work has been done in the plant improvement of several standard varieties of peas and beans, particularly peas. Having maintained a close system of selection for several years for the heaviest yielding types of several varieties, crosses were made between these types and some very interesting and valuable second generation seedlings were obtained during the past summer. Some individual plants of these crosses have yielded seventy to eighty pods per plant under ordinary field culture. From these seedlings have been chosen types that it is hoped may be developed in the near future into varieties of commercial value.

The work with beans is of a similar nature to that with the peas, but, having been initiated at a later date, this is not as fully developed.

In conclusion it might be well to briefly point out the value of all government work along the line of plant and seed improvement. Owing to economic and labour conditions on this continent, particularly in the east, it is impossible for commercial enterprise to devote as much study and experimentation to this work as has been done in the past by many European firms. It has been proved beyond question, however, that home grown seeds give more satisfactory results than imported stock of equally good quality. Such being the case it is evident that we should be the producers of our own seed and this seed should be of a quality as good as science and money can produce. As it is impossible for private enterprise to undertake the experimental and scientific breeding of stocks the lot necessarily falls to that of government and private endowment, and it is our hope that in the near future we may be able to say that we are producing our own seed stocks of a quality unexcelled in the world and peculiarly adapted to our conditions of soil and climate.

THE DAIRY AND COLD STORAGE BRANCH

THE DAIRY INDUSTRY ACT

REGULATIONS ESTABLISHED BY ORDER-IN-COUNCIL

HIS Excellency the Governor General in Council, on the recommendation of the Minister of Agriculture, and in virtue of "The Dairy Industry Act," has been pleased to order that the Regulations under "The Dairy Industry Act, 1914," established by Order in Council of the 6th day of June, 1914, should be rescinded on and after the 31st day of August, 1918, and that the annexed Regulations be sub-

stituted, therefor, to come into force on the 1st day of September, 1918:

DEFINITIONS

1. In these regulations, unless the context otherwise requires;—

(a) "Act" means "The Dairy Industry Act; 1914."

(b) "Minister" means the Minister of Agriculture;

(c) "brand" means any mark, stencil, stamp, label or writing placed on cheese, or on any package containing cheese, butter or other dairy products, for the purpose of designating a particular grade or classification, the place of manufacture or the country of origin;

(d) "butter" means the food product commonly known as butter, which is manufactured exclusively from milk or cream or both, with or without the addition of colouring matter, common salt, or other harmless preservatives;

(e) "creamery" means a place where the milk or cream of not less than fifty cows is manufactured into butter;

(f) "creamery butter" means butter which is manufactured in a creamery;

(g) "dairy" means a place where the milk or cream of less than fifty cows is manufactured into butter;

(h) "dairy butter" means butter which is manufactured in a dairy;

(i) "dairy product" or "dairy products" means any milk, cream, condensed milk, milk powder, butter or cheese, or any other article manufactured from milk, and all imitations thereof; except however, oleomargarine, butterine or other substitute for butter manufactured wholly or in part from any fat other than that of milk or cream;

(j) "package" means any box, tub, crock, tin, crate, case, paper wrapper or any other receptacle or covering used for the packing of butter or cheese;

(k) "whey butter" means butter which is manufactured from whey;

(l) "skim-milk cheese" means cheese which is made from or by the use of milk commonly known as skim-milk, or milk from which any cream has been removed, or milk to which skim-milk has been added; or cheese containing in the water free substance less than 45 per cent of milk fat.

COMPULSORY BRANDING

2. All brands placed on cheese, or on packages containing cheese or butter, as required by these regulations, shall be legible and indelible and shall consist of letters not less than one-half an inch long and three-eighths of an inch wide, except in the case of parchment paper wrappers for butter the branding of which shall be in letters not less than one-quarter of an inch square.

3. Every manufacturer of whey butter shall cause the package containing such whey butter to be branded with the words "whey butter" at the time of packing.

4. Every person who mixes whey butter with creamery butter or with dairy butter, shall cause the packages containing such mixed butter to be branded at the time of packing with the words "whey butter."

5. Every person who mixes dairy butter with creamery butter shall cause the packages containing such mixed butter to be branded at the time of packing with the words "dairy butter."

6. Every person who manufactures butter from a mixture of ordinary cream as separated from milk, and cream, which has been separated from whey, shall cause the package containing such butter to be branded, at the time of packing, with the words "whey butter."

7. Every person who packs dairy butter in boxes similar to those used for the packing of creamery butter shall cause such packages to be branded, at the time of packing, with the words "dairy butter."

8. No person shall cut or pack dairy butter into blocks, squares or prints and wrap such blocks, squares or prints in parchment paper unless the said parchment paper is printed or branded with the words "dairy butter".

9. Every cheesemaker who manufactures skim-milk cheese shall brand on the side of every cheese, within twenty-four hours after the cheese is removed from the press the words "skim-milk cheese", and also upon the outside of every box or package which contains such cheese, the words "skim-milk cheese" at the time the cheese is boxed or packed, and if such cheese leaves the factory within twenty-four hours after its removal from the press, such branding must be done before the cheese leaves the factory.

10. When butter is packed in tubs or boxes, all brands required by these regulations shall be applied on the side of the package.

PROHIBITED BRANDING.

11. No person shall brand any package containing butter with the words "creamery butter," or with any combination of the word creamery unless such butter is creamery butter within the meaning of the Act and these regulations.

12. No person shall apply any brand of the word "Canadian," "Canadien" or "Canada" as a descriptive term, mark or brand, upon any cheese or upon any box or package which contains cheese or butter, unless such cheese or butter has been produced in Canada.

13. (*a*) No person shall brand any cheese or brand any package containing cheese or butter in any manner that shall give false information as to the country or province of origin, or as to the cheese factory or creamery in which it was manufactured.

(*b*) No person shall brand any package containing butter with any fictitious creamery name or with any word which might be construed as a creamery name, unless such name or word is followed by the word "Brand".

THE SALE OF DAIRY PRODUCTS

14. No person shall knowingly sell, offer' expose or have in his possession for sale:—

(*a*) Any whey butter unless the package containing such whey butter is branded with the words "whey butter";

(*b*) Any butter which consists of a mixture of whey butter and creamery butter or whey butter and dairy butter unless such mixture of butter is branded "whey butter";

(*c*) Any mixture of dairy butter and creamery butter unless such mixture is branded "dairy butter";

(*d*) Any butter manufactured from a mixture of ordinary cream as separated from milk, and cream which has been separated from whey unless such butter is branded with the words "whey butter";

(*e*) Any dairy butter packed in boxes similar to those used for the packing of creamery butter unless such packages are branded "dairy butter";

(*f*) Any dairy butter packed, moulded or cut into blocks, squares or prints and wrapped in parchment paper unless such parchment paper is branded "dairy butter";

(*g*) Any skim-milk cheese unless the words "skim-milk cheese" are branded upon the side of every cheese and also upon the outside of every box or package which contains such cheese; and unless a placard bearing the words "skim-milk cheese" in letters at least three-quarters of an inch square is displayed on the cheese in such a manner as to be clearly visible to purchasers;

(*h*) Any butter branded as creamery butter or any combination of words which includes the word creamery unless such butter is creamery butter according to the definition in the Act, and in these regulations;

(*i*) Any cheese upon which the word "Canadian" "Canadien" or "Canada" is branded, or any cheese or butter contained in any package upon which the word "Canadian", "Canadien" or "Canada" is branded as a descriptive term, unless such cheese or butter has been produced in Canada;

(*j*) Any cheese which is branded or any cheese or butter which is contained in a package which is branded in such a manner as to give false information as to the country or province of origin or as to the cheese factory or creamery in which it was manufactured;

(*k*) Any butter contained in a package which is branded with any fictitious creamery name or with any word which might be construed as a creamery name unless such name or word is followed by the word "brand";

(*l*) Any whey butter, or any butter which consists of a mixture of whey butter and creamery butter or a mixture of whey butter and dairy butter, or any butter manufactured from a mixture of ordinary cream as separated from milk, and cream which has been separated from whey, unless a placard bearing the words "whey butter" in letters at least three-quarters of an inch square is displayed on the butter in such a manner as to be clearly visible to purchasers except in cases where such butter is packed or cut in prints, blocks, squares or pats and wrapped in parchment paper which paper is printed or branded with the words "whey butter";

(*m*) Any dairy butter or any butter which consists of a mixture of dairy butter and creamery butter, packed in boxes similar to those used for the packing of creamery butter, or which has been turned out of such boxes, unless a placard bearing the words "dairy butter" in letters at least three-quarters of an inch square is displayed on the butter in such a manner as to be clearly visible to purchasers.

15. No person, except the final purchaser or consumer, shall remove, obliterate or erase or cause to be removed, obliterated or erased, any brand placed upon any cheese, or upon any package containing cheese or butter as required by these regulations.

16. Any person charged with the enforcement of this Act may, with the consent of the Minister,—

(*a*) Seize and confiscate any apparatus or materials used or intended to be used in the manufacture of any butter, cheese, or other dairy product or imitations thereof in contravention of any of the provisions of this Act or of any regulations made thereunder;

(*b*) Seize and confiscate any apparatus used in the treatment of milk, butter, cheese or other dairy product when such treatment causes the said milk, butter, cheese or other dairy product to contravene any of the provisions of this Act or of any of the regulations made thereunder;

(*c*) Seize and confiscate any illegal dairy product as defined in this Act.

17. When any apparatus or materials or illegal dairy product is seized and confiscated under authority of this Act and of these regulations, such apparatus or materials or illegal dairy product may be

(*a*) Sealed by any person charged with the enforcement of the Act and allowed to remain in the building or premises where found;

(*b*) Sealed by any person charged with the enforcement of the Act and removed to

a public warehouse or some other suitable building.

18. No person except a person charged with the enforcement of the Act shall remove any seal from any apparatus, materials, or illegal dairy product which has been seized, confiscated and sealed under authority of this Act and these regulations.

19. Any apparatus, materials, or illegal products, seized and confiscated under authority of this Act and these regulations may be sold or otherwise disposed of, and any moneys derived therefrom shall be payable to His Majesty.

20. Any person who violates any regulations made under the authority of the Act shall for each offence, on summary conviction, be liable to a fine of not less than ten dollars nor more than thirty dollars together with the costs of prosecution.

21. Any pecuniary penalty imposed under these regulations shall, when recovered, be payable and appropriated in the manner provided by Section 21 of the Act.

22. These regulations shall come into force on the first day of September, 1918, superseding regulations which came into force on the first day of September, 1914.

THE ENTOMOLOGICAL BRANCH

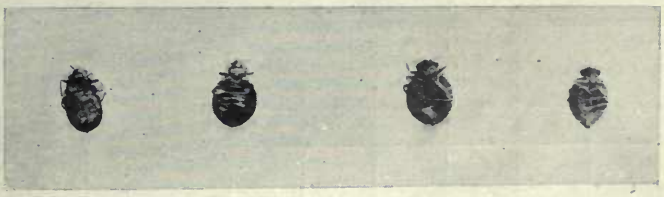
THE VALUE OF HIGH TEMPERATURE FOR CONTROLLING THE COMMON BEDBUG

BY ARTHUR GIBSON, CHIEF ASSISTANT ENTOMOLOGIST

MANY remedies have been used for ridding dwellings of the common bedbug. The adoption of some of these have given partial relief, but not until the value of hydrocyanic acid gas was demonstrated did we succeed in having a remedy really worth while. Fumigation with hydrocyanic acid gas, however, is not altogether satisfactory. The treatment is expensive, decidedly dangerous unless the greatest care is exercised, and moreover, two or more fumigations are frequently necessary owing to the fact that the gas does not destroy the eggs of the bedbug and further even adults may escape the gas as it does not penetrate sufficiently deep into all cracks, etc., where the insects may be hiding.

In superheating, however, we have a remedy which is inexpensive, not necessarily dangerous either to human beings or to dwellings and one which is certainly effective in killing the insect in its various stages.

During the past summer we had an opportunity at Ottawa of superheating a dwelling which was badly infested with bedbugs. The bugs were present in large numbers in cracks in the walls and woodwork in the bedrooms. The premises were vacated and all furniture and other effects removed.



BEDBUGS KILLED BY SUPER HEATING; ABOUT TWICE NATURAL SIZE. (ORIGINAL)

Building. The house is a four-roomed frame cottage, two rooms upstairs and two rooms downstairs. Stairs led up to the back bedroom from the back room below. Near the centre of the ceiling of the front room downstairs there is a hole for a stove pipe. The two back rooms (upstairs and downstairs) are 12 feet by 12 feet while the two front rooms are 10 feet by 14½ feet.

The windows in the dwelling were, of course, all made tight.

Stoves used. The heat was supplied by two stoves of the kind used by plasterers for drying. One stove was placed in the centre of the back room downstairs and the second stove was placed in a similar position in the front room downstairs. As fuel, ordinary stove coal was used in which was mixed a small quantity of chestnut coal.

Temperature. The outside temperature at 4 p.m. on April 26, 1918, the day the experiment was conducted was 60·4 degrees F. In the dwelling the temperature at 12 o'clock noon, was 50 degrees F. in the two rooms upstairs and the same in the front room downstairs. In the back room downstairs the temperature was 55 degrees F. This room had a side window facing the sun. One thermometer was placed in each room, on the wall, about two feet from the floor. The fires in the two stoves were started at 12 o'clock noon. The following table indicates the degrees of temperatures (Fahrenheit) obtained in the different rooms.

SALAMANDER, OR PLASTERERS' STOVE; STOVES SOMEWHAT SMALLER WERE USED IN EXPERIMENT. (ORIGINAL).

Room No.	12 o'c. noon.	p.m. 1	p.m. 2	p.m. 3	p.m. 4.00	p.m. 4.30	p.m. 5.30	p.m. 6.30	p.m. 7.30	p.m. 8.30
1.....	50	75	90	100	120	125	140	145	145	145
2.....	50	70	85	95	115	120	135	140	140	145
3.....	50	95	120	130	165	170	180	175	175	140
4.....	55	95	110	120	140	145	160	155	155	120

1. Front Bedroom. 2. Back Bedroom. 3. Parlour. 4. Kitchen.

At 4.30 p.m. the writer visited the premises and took the temperature records indicated above. At other periods the records were taken by Mr. R. Turner.

From the above table it will be seen that high temperatures in all the rooms were reached by 4 o'clock, higher records obtaining from that time on. At 8.30 p.m. the fires were checked off but not put out, so the temperature in all the rooms continued to be high for at least an hour or so after that time.

Result. At the time of my visit (4.30 p.m.) many bedbugs were lying on the floors of the two upper rooms apparently dead. A number of these were collected and were kept for several weeks. None recovered. Other bedbugs were crawling on the walls of both bedrooms, particularly near the floor. At. 5.30 p.m. a large number of bugs were lying on the

bedroom floors near the wainscotting. Specimens were collected and kept for some time, but all were dead. At 6.30 p.m. a further examination showed absolutely no sign of life.

No bugs were found in the rooms downstairs at any time.

This experiment confirms previous work conducted by the Entomological Branch. In 1914, Mr. W. A. Ross, in charge of the Entomological Field Laboratory at Vineland Station, Ont., superheated an eight-roomed two-story frame house which was badly infested with bedbugs.* In this building the heating system consisted of a hot air furnace in the basement, with shafts leading into all the rooms and a kitchen stove and parlour heater on the first floor. The fires were started at 9.30 a.m. and continued until 7.30 p.m. By 2.30 p.m. a temperature ranging from 115 degrees F. to 138 degrees F. was present in the infested bedrooms upstairs. High temperatures were maintained until after 7.30 p.m. At this latter period the temperatures ranged from 140 degrees F. to 159 degrees F. in the rooms referred to. At 4.30 p.m. it was decided that all the adults and nymphs had been killed but in order to make sure that the eggs also would be destroyed the high temperatures were kept up until 7.30 p.m.

*Can. Ent. xlviii, 74.

THE SEED BRANCH

INJURIOUS WEED SEEDS IN FEEDING STUFFS

BY H. B. SIFTON, M.A., IN CHARGE OF GERMINATION AND MICROSCOPIC ANALYSIS

SOME years prior to the beginning of the war there was a great increase in the demand for both animal and cereal foods, and consequent rises in prices. War conditions have emphasized this to such an extent that the situation has become acute. As a result unprecedented efforts have been made by the milling industry to utilize in the manufacture of feeding stuffs every by-product that has the slightest value as a nutrient.

The weed seeds screened in large quantities from grains which are to be used for milling or for seed contain many varieties which are valuable as feed. In many cases, however, these useful seeds are mixed with others which, if present in quantity, render the feed useless and often harmful owing to their unpalatable or poisonous qualities.

For several years the Seed Laboratory has been receiving from farmers and from other branches of the Department of Agriculture samples of ground feeding stuffs, with requests for botanical analyses. They have usually been accompanied by complaints that stock refused the feed, or that they became ill, in some cases dying as a result of eating it.

Such an analysis of ground feeds involves a combination of two kinds of work. Any whole seeds present and the coarser pieces are identified from their surface characteristics as in regular seed analysis. Finely ground material must be analyzed by means of the microscope, and for this work a knowledge of the morphology and cell structure of the various seeds is necessary.

The drawings in Plate 1 illustrate how it is possible for a microscopist who has learned the characteristics of the different seeds to recognize them from the fine particles in the ground sample. They are copies of sketches from the writer's records of his first investigations in this field, and were not originally meant for publication.

The starches were scraped from the white central portion of the grains and drawn as they appeared spread out in water on a glass slide under the

microscope. The drawings of mustards were sketches from thin sections cut with a sharp razor from the edges of bits of the brown coats of the seeds. The seed coats were melted into a small block of paraffin so they could be held steadily while cutting.

The magnification is about 350 diameters. Some idea of the fineness of structure may be realized by remembering that an average sized grain of wheat at the same magnification would appear about five and one-half feet long.

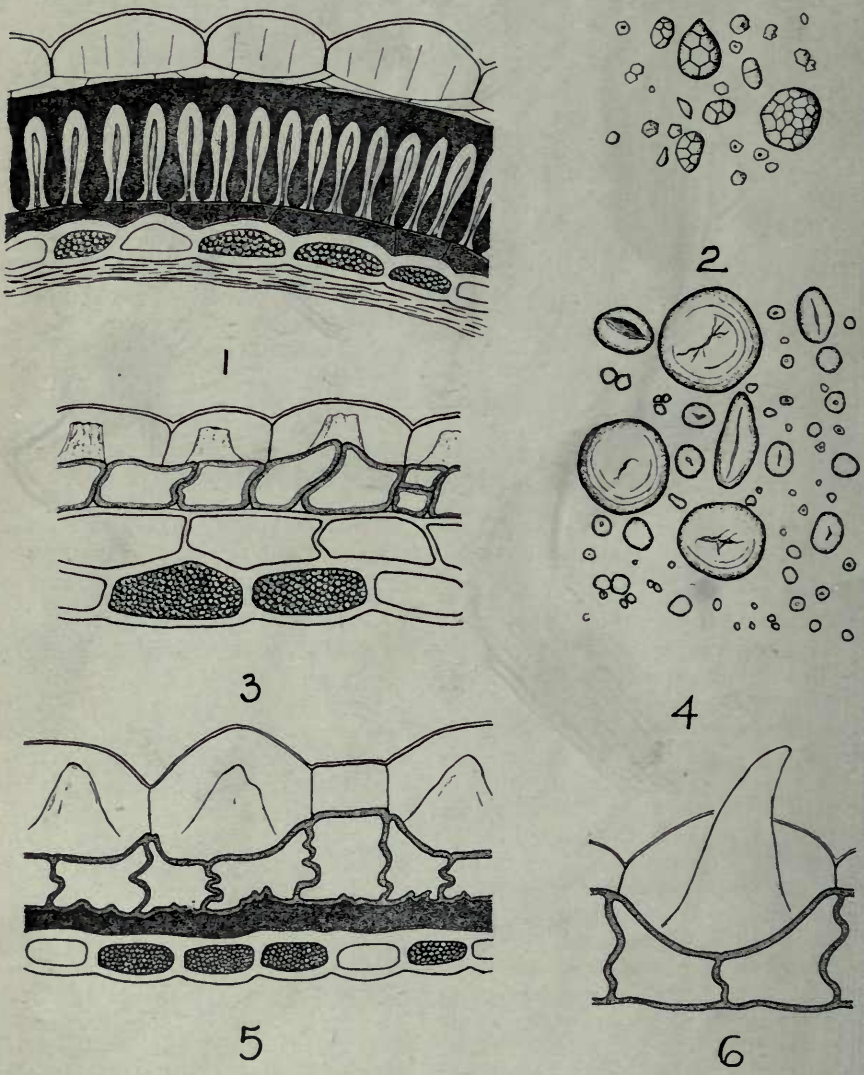


PLATE 1.

Fig. 1—Seed Coat of Wild Mustard (*Brassica arvensis* L) X 350.
" 2—Starch grains of Oat (*Avena sativa*) X 350.
" 3—Seed Coat of Wormseed Mustard (*Erysimum cheiranthoides L.*) X 350.
" 4—Starch grains of Wheat (*Triticum sativum*) X 350.
" 5—Seed coat of Tumbling Mustard (*Sisymbrium altissimum* L.) X 350
" 6—Same as No. 5 but showing mucilage extruded when immersed in water. X 350.

Figures 1, 3, 5 and 6 are sections of different mustards. The brown fragments seen in the ground feed appear so much alike as to be practically indistinguishable, but a glance is sufficient to show the difference when sections of them are magnified as in the drawings.

Figure 1 is a section of the outer coat of Wild Mustard, whose poisonous properties are described later. It is composed of layers of cells, fitted together like stones in a wall. The outer layer (top of figure) is of thin-walled clear cells filled with mucilage in vertical cylinders about a cavity. The thin vertical lines separating the cylinders can be plainly seen. Beneath this is another layer of thin "parenchyma cells," and under that a layer of "palisade cells" with very thick black walls. Beneath these are the pigmented cells, also black or very dark brown, and then come the "endosperm cells" with thick clear walls, filled with small grains of protein.

Figure 3. Wormseed Mustard has the mucilage in a far different shape in the outer layer of cells. The palisade cells appear next to the outer or epidermal layer, but have thin walls of a much lighter colour than those of the wild mustard. Instead of a pigmented layer beneath these there is a layer of large parenchyma cells, with the endosperm cells, next.

Figure 5 shows Tumbling Mustard. In it the mucilage takes still another form, and when immersed in water it swells, bursting the cell wall as shown in fig. 6. The palisade cells are thin-walled as in Wormseed Mustard, but are of a different shape and have a dark pigmented layer between then and the endosperm.

To the naked eye the white starch from the centre of wheat and oats appears very similar, but with the microscope there is no difficulty in distinguishing them. Oat starch (fig 2) consists of small angular grains, which are for the most part aggregated together in balls, while wheat starch (fig. 4) has rounded separate grains, some small and some much larger, even reaching a diameter of about 3/1300 of an inch, with concentric circles and a central "hilum" plainly visible.

These are merely illustrations of a method of identification which can be applied to all the seeds used in feeds. With the addition of microchemistry we have in this method a means of identifying species which cannot be distinguished without its use even when the whole seeds are available.

Owing to the reasons stated at the beginning of this paper a remarkable increase in the number of feeds which include harmful constituents has lately been observable. So great has this been that breeders' associations have been taking the matter up and petitioning for protection. In view of these facts it is advisable that something should be said in the way of a warning against the manufacture and use of mill feeds containing certain of the more injurious species of seeds.

A number of common Canadian weeds have seeds known to be injurious when eaten. It is the intention to describe in this article some of these, along with the evil effects which they produce. As it is impossible within the limits of a brief paper to consider all suspected seeds, only those which are comparatively common and produce evil effects of a very pronounced nature are included.

COMMON SEEDS WHICH ARE HARMFUL

The Mustards

To this family belong a majority of the most widely distributed and detrimental seeds. The plants contain acrid juices which are strong enough in many cases to render them unpalatable and even poisonous. The seeds are richly supplied with oil, and in them the acridity of the plant is generally much intensified. As a result their presence in any quantity renders a feed very unpalatable. Many cases are on record, how-

ever, where animals have eaten them in spite of this unpalatability and have died from the effects.

They vary somewhat in size but are usually about 1/16 inch in diameter. They are almost smooth, exhibiting,

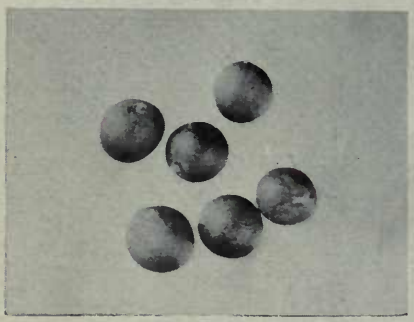


FIG. 7.

FIG. 8.

FIG. 9.

FIG. 10.

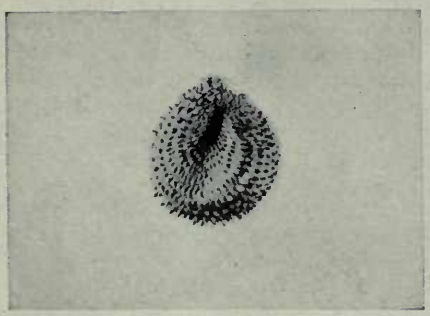


FIG. 11.

FIG. 12.

PLATE 2.

Fig. 7—Wild Mustard (*Brassica arvensis L.*) X 5.
" 8—Wormseed Mustard (*Erysimum cheiranthoides L.*) X 5.
" 9—Stinkweed (*Thlaspi arvense L.*) X 5.
" 10—Tumbling Mustard (*Sisymbrium altissimum L.*) X 5.
" 11—Purple Cockle (*Agrostemma Githago L.*) X 5.
" 12—Cow Cockle (*Saponaria Vaccaria L.*) X 5.

Wild Mustard (*Brassica arvensis L.*). is of general occurrence throughout Canada and has round seeds (Pl. 2, Fig. 7), dark brown or black. however, under a magnifying lens a slightly pebbled appearance.

The seeds are dangerous on account of the small quantities of three differ-

ent poisons which they contain. These are volatile oil of mustard, the alkaloid Sinapin, and the alkaloidal glucoside Sinalbin.

The symptoms produced when they are eaten have been carefully studied. LONG, in his monograph on "Plants Poisonous to Livestock" gives the following results: "Inflammation of the stomach and intestines (with loss of appetite, wind colic, and diarrhoea); inflammation of kidneys (difficult, excessive or bloody urination); and nervous symptoms, with great exhaustion, uncertain gait, paralysis of limbs, and in isolated cases, convulsions."

A case has recently been brought to our notice which corroborates this. A sample of shorts was sent in for analysis, the farmer complaining that, as a result of feeding it, two of his pigs had died. Large quantities of finely ground mustard seeds were found in the sample. A reply to our request for a statement of symptoms ran as follows: "The pigs came up to the trough, and after feeding would fall back in a fit, and kick about two minutes, then jump up and stagger a little. After a few days they would wander around the pen until they died, eating little in the meantime. They showed agony when dying, kicking and frothing at the mouth."

Wormseed Mustard (*Erysimum cheiranthoides L.*) is frequent in waste places and on cultivated land throughout Canada. Though found in grain fields in nearly all sections, it is more plentiful in the east than in the Prairie Provinces.

It has a reddish yellow seed (Pl. 2, Fig. 8) usually about $\frac{1}{24}$ inch long and one-half as wide. The shape is somewhat variable, but the seed is usually pointed at one end and grooves may be seen on the sides, one on each side of the radicle. The surface is dull, with very little mucilage.

The statement is made that the seeds have properties similar to those of Wild Mustard. They contain a pungent oil, and when eaten in quantity produce poisoning, with inflammation of the kidneys and the digestive tract as well as nervous symptoms. (Muller, as quoted by Long.)

The taste of the seeds is exceedingly disagreeable, and our experience is that in the great majority of cases where they are present in any quantity, animals refuse the feed. Under some conditions, however, (for example, in the case of extremely hungry hogs) they will make a meal of it, and with disastrous results.

A sample of shorts was received at the laboratory from a farmer. He and his neighbour had bought some from the same lot and each had given one feed to their pigs. The meal was eaten, and in a few hours all the pigs—eight belonging to one man and ten to the other—were dead. An analysis of the sample showed 1·7% by weight of whole Wormseed Mustard seeds in addition to those which had been ground.

Stinkweed (*Thlaspi arvense L.*) is extremely prevalent in the Prairie Provinces. It has spread until some of it is now found in every province of Canada.

It has a dark brown seed (Pl. 2, Fig. 9) about $\frac{1}{12}$ inch across, a little longer than broad, and somewhat flattened. It is easily identified by the five or six deep, loop-like concentric grooves on the flat surfaces.

PAMMEL states that the plant probably causes counter irritation and is avoided by stock because of its pungent properties. These properties are much emphasized in the seed, the sharply bitter oil making it very unpalatable. Whenever a sample with any considerable amount of this seed has come to the laboratory the complaint has been that the animals refused to eat the feed.

Tumbling Mustard (*Sisymbrium altissimum L.*) is found as a farm weed of importance only in the west. Its seeds are small, $\frac{1}{25}$ inch long. (Pl. 2, Fig. 10) They are either olive brown or greenish yellow, oblong, more or less rectangular, and with a finely roughened skin, through

which the grooves on each side of the radicle are plainly visible.

The properties are similar to those of wild mustard as described above. Pammel states that they may form deep ulcers, difficult to heal.

Among Canadian seeds of the Mustard family which are authoritatively stated to be poisonous must be listed the following:

Black Mustard—*Brassica nigra L.*
Wild Radish—*Raphanus Raphanistrum L.*
Turnip—*Brassica Rapa L.*
False Flax—*Camelinasativa* (L) *Crantz.*

All these seeds are very unpalatable, having the disagreeable, acrid taste characteristic of the Mustard family, and their poisonous effects are similar to those described for other mustards.

OTHER OBJECTIONABLE SEEDS

Purple cockle (*Agrostemma Githago L.*) whose seed is shown in Pl. 2, Fig. 11, has for many years been known to students of poisonous plants, and is found in grain throughout Canada. The seeds only are to be avoided, the rest of the plant having no harmful effects. They are jet black in colour, from $\frac{1}{12}$ to $\frac{1}{8}$ inch in diameter, and somewhat flattened, and are easily recognized by the rows of teeth which curve round from the notch where the seed is attached to the pod.

The physiological effects of their ingestion have been studied by many European investigators, and LONG has summarized their results in his monograph mentioned above.

The amount of poison seems to be variable, depending probably on the season and the soil. The susceptibility of animals varies also, according to these writers, both with the species and the individual. Rodents and sheep are believed not to be harmed by feed containing it, and there is some doubt concerning birds and fowls. Calves, pigs and horses are mentioned as being especially susceptible.

The feeding of even small quantities should be avoided as this produces a chronic form of poisoning called githagism. Symptoms in acute cases caused by eating rather large quantities of the seeds are described as follows: "Intense irritation of the digestive tract, vomiting, headache, nausea, vertigo, diarrhoea, hot skin, sharp pains in the spine, difficult locomotion, and depressed breathing. Coma is sometimes present and may be followed by death. In animals chronic diarrhoea and gradual depression." (LONG, quoting CHESTNUT.)

The chronic form as found in persons and in pigs is described as being characterized by general wasting away, loss of breath, loss of strength, chronic diarrhoea, and nerve troubles, death taking place in marasmus and decline.

POTTS states that abortion is caused in cows and pigs.

Dartel (*Lolium temulentum L.*) is abundant in parts of Manitoba, and is occasionally found in Alberta and Saskatchewan. The seed is the only poisonous part of this plant. Its appearance is not unlike that of a small grain of barley, the hulls very tightly enclosing the kernel. The outer hull is hard and flinty, and the inner one minutely bristly along the edges.

The poison is narcotic, effecting the spinal cord chiefly, and has been known for many centuries, and deaths of horses, sheep and pigs have been recorded. The poison is a narcotic alkaloid called Temulin (or Lolüne.) In many of the seeds is a fungus which forms a layer just inside the seed coat, and the theory has been brought forward that the poison is contained in this fungus. The truth of the statement has not, however, been conclusively proved.

The symptoms caused by the poison have been stated as giddiness, drowsiness, uncertain gait and stupefaction, and in older animals vomiting, convulsions, loss of sensation, and death.

In pigs, foaming, inflammation of stomach and intestines, and congestion of the lungs have been noted.

Ergotized grains, those infested by the fungus *Claviceps*, have effects that are well known. The ergot infects a large number of grasses whose grains are replaced by the "sclerotium" of the fungus. The ergot grains are elongated, more or less angular and striate. The surface is purplish black, and when broken the inside is seen to be white, tinged with pink or purple. The grains correspond in size to those of the grass effected, being, however, somewhat larger and greatly elongated.

Either of two sets of symptoms may result from eating ergot.

(1) Pains in the extremities, followed by dry gangrene.

(2) A nervous disease characterized by convulsions and paralysis.

The drug causes a continued contraction of the involuntary muscles controlling the small blood vessels, producing a much increased blood pressure. The alkaloid Ergotoxine, sometimes called Cornutine, is probably in its physiological effects the most important constituent, though active derivations of amino-acids are also present. It has, among other things, the effect of contracting the uterus, and Ergot is believed to be a cause of abortion in cattle.

PAMMEL states that in animals the disease is usually present in a chronic form, the poison accumulating slowly in small amounts.

Several other plants are listed as having harmful seeds. Among the more common may be mentioned the following:

Cow cockle, (*Saponaria Vaccaria L.* Pl. 2, Fig. 12) said to have effects similar to those of Purple Cockle. owing to the presence of Saponin; Field Bindweed (*Convolvulus arvensis*) and Hedge Bindweed (*Convolvulus Sepium*) held to be a cathartic and purgative causing symptoms similar to those caused by jalap; and Cocklebur (*Xanthium sp*) and Stickseed (*Lappula echinata*) whose hooked spines are said to make them injurious.

The Remedy

As stated near the beginning of this paper, in by far the greater number of cases where harm has been done in Canada, the trouble may be traced to the presence of mustards of various kinds. Other small seeds are responsible for a great deal of the rest of the difficulty.

These may be removed from screenings by the judicious use of a $\frac{1}{14}$ inch perforated zinc screen, as recommended in the bulletin "Grain Screenings" by Dymond of the Seed Branch, Ottawa.

Feeding experiments recorded in the same bulletin by ARCHIBALD and ELFORD of the Experimental Farms Branch, prove that the fine seeds thus removed are useless as feed, even when they do not contain enough of the poison species to kill the animals. No good, therefore, can come from including them, and much harm may result both to the feeder and to the reputation of the feed.

Care should of course be taken to exclude from feed, screenings containing quantities of the larger poisonous seeds such as purple cockle, but in all except a few isolated cases, all chance of harm will be removed by the recommended cleaning.

The small "black seeds" contain a large percentage of oily substances, which should be of value for many purposes. It is suggested that as thousands of tons of these seeds are screened from our grains every year, it would be a practical and desirable plan from every standpoint to encourage, by scholarships or otherwise, scientific research into their composition and properties, with a view to finding uses for those of them which are at present valueless.

THE FRUIT BRANCH

THE FRUIT EXHIBIT AT TORONTO.

ONE of the most attractive exhibits at the Canadian National Exhibition in Toronto this year, and one which perhaps received more favourable comment than any other, was that of the Dominion Fruit Branch.

The exhibit was 50 feet in length by 12 feet in depth, arranged on a terraced floor of artificial green sod. Attractive baskets of apples, pears, plums and peaches were placed on the slopes of the terrace, while the flat parts were filled by about 75 bottles of fruit grown in Canada with a basket of fresh fruit between each two bottles. The fruit in these bottles was not preserved as might be thought from the illustration, but was in its natural condition; in the case of strawberries, peaches, quinces and some other fruits, the fruit was still attached to the limbs.

The background of the exhibit was in gold cloth, and a number of circular cards, surrounded by maple leaves, drew the attention of the public to certain important facts regarding the Canadian fruit industry. Above the exhibit were six transparencies. These photographs on linen cloth showed views of orchards in various parts of Canada, and with electric lights behind them the effect was extremely pleasing.

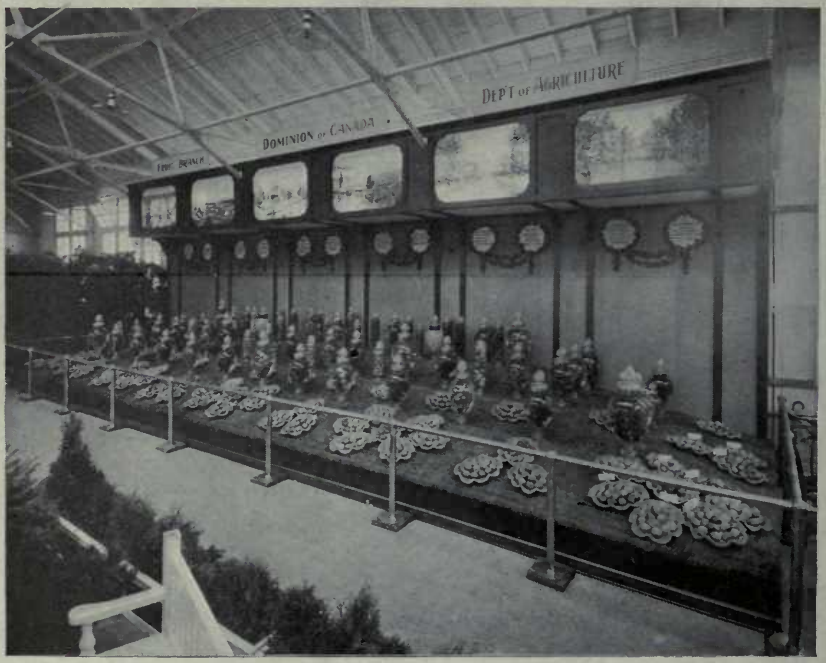


EXHIBIT OF FRUIT BRANCH. CANADIAN NATIONAL EXHIBITION, 1918.

Officers of the Dominion Fruit Branch were in attendance to answer enquiries and to distribute literature. A small booklet, issued by the Branch, and containing 160 apple recipes, were in great demand, and about 25,000 copies were handed out during the two weeks of the exhibition.

At the close of the exhibition in Toronto, the Fruit Branch moved its exhibit to St. Catharines to be shown there at the horticultural show in the Armouries on September 12 and 13.

PART II

Provincial Departments of Agriculture

THE CO-OPERATIVE HANDLING OF WOOL

NOVA SCOTIA

BY H. S. CUNNINGHAM, B.S.A., AGRICULTURAL REPRESENTATIVE, CAPE BRETON

AT the present time there are three Wool Growers' Associations established on Cape Breton Island — one in Inverness County with a grading station at Port Hood, one in Richmond County with a grading station at St. Peter's, and one in Cape Breton County with a grading station at Sydney. The last-mentioned Association was in operation this year for the first time and handled all wool coming from Victoria County.

Early in the season a circular letter was sent out from the offices of the District Representatives, to every farm on the island. This letter dealt with the necessity for, and the advantages of, co-operative marketing of wool. It also gave information as to the care of fleeces at shearing time, importance of the proper tying of fleeces, how to ship, and such other information of interest to the farmer as space would permit. Shortly before the grading stations were ready to receive wool, posters were sent to every post office advertising the dates when wool would be received.

As the majority of the flocks are small, no effort was made to distribute bags. Our shipping tags were late in arriving, but an effort was made to supply a responsible man in each centre with a supply of tags and twine.

WEIGHING, GRADING AND PAYING

When the wool was received at the grading station it was weighed by the Secretary and a copy of the wool receiving "statement" sent to the shipper, accompanied with an advance cheque equal to 40 cents per lb. for the wool received. The wool was then piled in the warehouse until graded. Each man's shipment was graded separately and the weight of each grade entered on his grading sheet. (When the final settlement is made a copy of this grading sheet is sent to the shipper.) The wool was then packed in large sacks, each sack being marked with the lot number, grade, and weight. It was then ready for shipment. To simplify matters, and to avoid confusion, all freights on wool coming to the grading station were paid by the Association.

EXTENT OF THE WORK

The number of pounds of the different grades handled at each of the grading stations was as follows:—

Station.	Fine Med. Comb.	Med. Comb.	Low Med. Comb.	Rejects.	Grays and Black.
Inverness	314	5,880	1,190	13	114
St. Peter's	522	5,243	1,079	32	325
Sydney	149	1,848	568	.....	168
Totals	985	12,971	2,837	45	607

	Locket Pieces.	Tages.	Tub-washed.	Totals.
Inverness	11	25	12	3,475
St. Peter's	9	15	137	7,362
Sydney	39	4	699	7,559
Totals	59	44	848	18,396

The wool was sold through the Canadian Co-operative Wool Growers, Ltd., and it was due to their policy that we were able to pay a portion of the value to the farmers as soon as the wool was received.

On the whole our system was fairly satisfactory, but there is yet room for improvement in the distribution of tags and twine. Lack of local organizations through which we can work is the greatest draw-back here. This will be overcome as the practice of co-operative marketing becomes more universal.

IN GUYSBORO COUNTY

BY A. B. MACDONALD, AGRICULTURAL REPRESENTATIVE

IN order to bring the system of marketing wool co-operatively to the notice of the wool growers in this county, we adopted a plan of advertising, first, by large posters placed on conspicuous buildings throughout the district, and, secondly, by sending circular letters to every sheep raiser. These posters showed the prices received for last year's wool in comparison with local prices. They also explained the chief advantages of marketing co-operatively. The circular letters contained information as to the places and dates for collecting wool for this year's sale. With these letters were sent copies of letters from the most important sheep raisers in the county in which they express satisfaction with the system. There was also enclosed a circular from the Canadian Co-operative Wool Growers, Ltd., which explained the aims of this organization.

SUPPLIES

Owing to the fact that all the sheep raisers in the eastern end of Guysboro county come to Guysboro town for supplies, it was not found necessary to have sacks, twine, and tags sent out from the office. While in town the farmers called at the office and got what material they needed.

THE GRADING

During the grading of the wool two men were kept continually at work sorting out the different lots in order to have them ready for the person who opened the bags for the grader. From the grader the wool was taken to the scales and weighed—record of weights being kept by the secretary. On account of the warehouse being somewhat small it was necessary to keep packing the wool as soon as it was graded, hence two extra men were used for this work. Seven men were thus used in handling the wool while it was being graded.

SALES

The amount of wool sold is as follows:

The Grades.	lb.
Fine Med. Combing	454
Medium Combing	5,473
Low Med. Combing	1,700
Rejects	13
Gray and Black	439
Locks and Pieces	142
Tags	79
Total	8,300

The wool was sold by the Can. Co-operative Wool Growers, Ltd., Toronto.

NEW BRUNSWICK

BY E. M. TAYLOR, SECRETARY MONCTON WOOLGROWERS, ASSOCIATION

THIS spring, 17,969 pounds of wool were handled at the Moncton, N.B., Station of the Canadian Co-operative Wool Growers, Ltd. The grading of wool, and handling it co-operatively, was a new feature in this section, and it was necessary on this account to do considerable propaganda work.

The details of the work were carried out by the Agricultural Representative. In order to get in touch with the wool growers a series of meetings were held during the winter. At these meetings the objects of the Association were explained, and the method of handling the wool, and preparing it for shipment to the grading stations, was discussed. In order to further explain the objects of the Association a personal canvass with the growers was made in many localities, just before shearing time where any considerable quantity of wool was available. At this time the distribution of sacks, twine and tags was effected.

METHOD OF HANDLING

The wool was shipped in largely by freight to the grading station, and there weighed and a statement of the amount made out and sent to the shipper. An advance of forty cents (40c.) per pound was made on the net weight of wool received. Each lot was numbered, and, if a lot contained more than one sack, each sack was numbered. The date on which all wool was to be in and grading begin, was set from this. Farmers who were able to bring their wool in by team availed themselves of this opportunity to see the grading done.

AMOUNT DEALT WITH

After grading, each grade was bagged up and labelled. The amounts of the different grades handled at this station and the selling price were as follows:

THE GRADES

The Grades.	lb.	Price.
Fine Medium Combing	1,213½	.82½
Medium Combing	12,509	.81¾
Low Medium Combing	3,657½	.75½
Medium Clothing	38½	.81¾
Rejection	239½	.42
Black and Gray	202½	.50
Tags	108½	.10

THE RETURNS.

On receipt of the final returns for the wool, settlement was made by cheque to the farmers. The average net return to the farmers has been about seven cents higher than any price offered by local dealers. Many farmers have received eight or nine cents more than they could have realized otherwise. Had it not been for the operation of this organization in this section, it is hard to say what the price paid by local dealers would have been. That it would have been considerably less is certain. We have reports of washed wool having been sold for sixty-five cents per pound.

THE QUALITY

The quality and condition of the wool received was fairly satisfactory. Farmers have shown considerable interest in the grading of their wool, and an improvement in the quality will no doubt be evidenced another year. With the high price received, and the desire of the farmers to produce a higher grade of wool, as expressed by their interest in the grading, the success of this organization another year is assured.

QUEBEC

IN PONTIAC COUNTY

BY C. H. HODGE, B.S.A., SECRETARY PONTIAC WOOLGROWERS' ASSOCIATION

THE first thing to be done in co-operative marketing of any kind, is to get in touch with those who have the articles for sale. In the case of the wool marketing, this was accomplished by means of demonstrations in shearing, rolling and tying of fleeces, etc., a demonstration was held in each locality in the county and all the neighbouring sheep owners were invited by circulars, to attend, lists of the sheep men in each place having been provided beforehand by one of the prominent farmers in the district. Men not attending the demonstrations were called upon personally, and the work explained to them, sacks and twine being left with them at the same time. At the close of each demonstration a director was elected from those present to represent that locality. These directors being later endorsed at a general meeting called for the purpose of organizing the Association.

DISTRIBUTING SACKS AND TWINE

Sacks are distributed in Pontiac County through the different directors, each director sending in to the Secretary, an estimate of the number of sacks required for his district. Twine was distributed this year, through the local stores each man going to his nearest store and purchasing the amount he required, the storekeeper receiving a small commission for handling it. Those being near the secretary secured their twine from him on the same terms. All the wool in the Association is taken in at local points on an advertised day by the Secretary, weighed and tagged by him, the farmer receiving a statement of the number of pounds put in, and the number of fleeces, with an advance of a certain percentage, usually 60% to 70% of the market value of the wool at that date. The wool is then shipped or carted by the Association to the nearest grading point, the freight and cartage being covered by the fees, except in cases of a long cartage, when an extra fee of ¼c. per pound is put on to cover the greater cost of handling. This saves the individual farmer the cost of long hauls, and saves freight charges on small lots. The wool, however, is always insured during transit or if kept over at a local point. Every care is taken in tagging the different lots, a tag bearing the man's name, his address, the number of fleeces, the gross weight, and the number of sacks which he has, is placed inside of each sack, and a similar ticket fastened to the outside.

GRADING THE WOOL

After the wool is assembled at the grading shed, the work of the grading begins. The actual work of grading is done by the grader supplied by the Live Stock Branch The wool, however, must be removed from the sacks and placed on the grading table by men supplied by the Association Each man's lot is graded separately, and the weight and number of fleeces in each grade is entered on a grading sheet, and in a ledger in which the member's name, the total weight of wool, the total number of fleeces, and the amount of his first cheque have been previously entered. Each man is given a reference number at the time his wool is taken in and this number is used on all of his grade sheets, ledger sheets, tags and cheques. The Pontiac Association has always packed the wool into the sacks, as fast as it was graded, this saves extra handling and there is less danger of the grades becoming mixed. The packing table should have spaces enough to permit a sack for each

grade to be hung up at the same time, and, if possible, the name of each grade should be posted above the sack. In hanging up the sacks, we have not been able to find anything any better than the iron hoops, but these may be taken off more easily when the sacks are full, if a bend is placed in the hoop in which to insert the hand when loosening; better still, however, is the use of a truck, to run underneath the bottom of the sack and, raise the weight from the hoop. All sacks are stencilled with the name of the Association, and the grade of the wool before filling and when filled each sack has the number and the gross weight stencilled upon it and is then ready for shipment.

AMOUNT OF WOOL HANDLED THIS YEAR.

The Pontiac Association marketed the following amounts of each grade this year.

The Grades.	Lb.
Fine medium combing	5,017
Medium combing	16,587
Low medium combing	5,614
Fine medium clothing	421
Medium clothing	392
Coarse	13,860
Dead wool	242
Gray	159
Black	156
Rejections	612
Tags	240

METHOD OF SELLING

The Pontiac Wool was all sold through the Canadian Co-operative Association this year, and shipped direct from the grading shed at Shawville to the mills by which it was purchased. The Canadian Co-operative Association secured settlement for the wool and forwarded the amount less their fees for selling, to the Secretary who paid the members of the local Association the balance due them, deducting 1c. per pound to cover the expenses of the local Association.

IN ARGENTEUIL COUNTY

BY J. W. GALL, SEC.-TREAS. ARGENTEUIL WOOLGROWERS' ASSOCIATION

WE call a general meeting in January or February and have some one to give the farmers a talk on co-operative wool marketing and grading; elect directors, farmers, 20 or more from all over the county, who are supposed to spread information regarding the system. Tags and twine are given out for a deposit, which is returned when the wool comes in to be graded. The grading is done in our central exhibition building, each consignor being given a weight slip with the different grades and number of fleeces brought in, etc. The amount handled this year is as follows:—

Medium clothing	183
Low medium combing	3,330
Medium combing	3,508
Coarse combing	3,218
Rejects	385
Black and gray	61
Total	10,709

The selling was done by the Canadian Co-operative Wool Growers, Limited.

IN HUNTINGDON COUNTY

BY R. H. GRAHAM, SECRETARY-TREASURER HUNTINGDON WOOLGROWERS' ASSOCIATION

OUR method of getting in touch with wool growers is that of co-operation. We have an association for the handling of wool and selling of lambs and sheep. Several meetings are held during each year and information given through the local press.

Bags and tags are distributed by the directors of the association at shearing time—each director looking after the wants of members in his own

locality, and a few extra bags and tags being left with the secretary.

RECEIPT AND DELIVERY.

All wool is delivered on certain days, taken in the day before, or during the two days on which the grading is done. No wool is received after the date on which the official does the work. Each man's wool is delivered in a sack, the grader grades and weighs it; each grade is kept by itself and as soon as possible after the grading begins, the packing is started and sacks are stamped, weighed, then stored ready for shipment. Each bag is marked, stating grade and weight of contents.

AMOUNT HANDLED.

The total amount of wool handled this year was 10,664 lb.—graded as follows:—

The Grades.	Lb.	Price.
Medium combing	1,502	.80¾
Medium clothing	439	.73½
Low medium combing	1,586	.76
Coarse	6,043	.71
Rejects (seedy or burry 42. Cotts 40c)	862	.40
Gray and Black	56	.50
Locks and Pieces	83	.40
Tags	93	.10

This year our wool was sold through the Canadian Co-operative Wool Growers, Limited, Toronto.

DISTRICT OF BEDFORD

BY W. R. BEACH, COWANSVILLE, QUE.

THE co-operative selling of wool is yet in its infancy in the District of Bedford, Que., and although it is a new system and the farmers have been very cautious and slow to fall in with the new system it has proved very successful.

That the farmers are benefited is particularly noticeable at the grading stations when the wool is going through. Wool from one particular flock three years ago had to be put among the Rejections on account of the seed and straw it contained, but the wool from the same flock this year graded medium, which meant a difference in price per lb. of about 35c., this being due to a little extra care being taken at feeding time and proper feeding sacks used.

When this new system of co-operative selling of wool was first started, some of the largest and best breeders of sheep were visited and given wool sacks and asked to give it a trial. From this small beginning we have gradually grown to a membership of about 175 and hope to have twice this number before many seasons pass.

The members and all those wishing to sell their wool through the Association are furnished with wool sacks and fleece twine just before shearing time by the directors of the Association in their particular locality. In about a month from the time the sacks are sent out, the dates and places where the wool is to be taken in for shipment to the grading station, are advertised, and a special notice sent each member. When the wool is brought in for shipment, it is weighed and the sacks tagged inside and out, with the farmer's name and address, and the number of lbs. gross. The wool is then shipped to a central grading station to be graded by an expert grader supplied by the Live Stock Branch of the Dominion. At this grading centre, each man's wool is graded separately and each grade weighed and the weights taken by the Association Secretary. The wool is next placed in bins, each grade by itself, and when the total amount of wool sent in by any one association is finished grading, it is re-sacked and the sacks again weighed and marked with the Association's name, the grade of wool the sacks contain, the number of the sack and the lbs. gross.

The number of pounds handled and sold through the Association the past season were 14,702, consisting of the following grades:—

Grades.	lb.
Fine Combing	424
Fine Medium Combing	906
Fine Medium Clothing	417
Medium Combing	5,060
Low Medium Combing	3,144
Coarse Combing	4,184
Rejections	257
Gray and Black	166
Tags	117

The wool was all sold through the Canadian Co-operative Wool Growers Limited.

ONTARIO

BY L. E. O'NEILL, ONTARIO SHEEP BREEDERS' ASSOCIATION

THE official grading and co-operative marketing of wool in the Province of Ontario, which had its commencement in 1917, has developed rapidly. The work is undertaken by the Ontario Sheep Breeders' Association, who, through their secretary, Mr. R. W. Wade, have had the sheep breeders in practically every county canvassed by the Agricultural Representatives with a view to assisting them in getting the maximum of value for their wool crop.

FORMS AND SUPPLIES

As each shipper is expected to file with the secretary an application to have his wool sold by the Ontario Sheep Breeders' Association, blank forms were sent to every person who shipped last year, and, in addition, farmers who wished to sell their wool co-operatively for the first time could obtain an application form from their Agricultural Representative, or directly from the secretary's office. Farmers were supplied with sacks, twine, and tags, either by the Agricultural Representatives, or directly from the Secretary's office, on receipt of the properly filled-in application form.

The sheep raisers in carrying out the requirements ship their wool direct to Mr. Wade at the Winter Fair Buildings, Guelph, where the wool is received, weighed, graded, and distributed into the different grades in readiness for marketing through the Canadian Co-operative Wool Growers Limited.

THE PLAN OF OPERATION

The difficulties encountered in handling the wool last year assisted the Association in working out a system as perfect as seemed possible in handling the product. The wool is delivered by the transportation companies at the wool warehouse, and is accepted only when accompanied by correct freight or express bills, as the case may be. That is to say, the railway companies are made responsible for delivering the wool so marked as to indicate the ownership, charges, and other necessary information up to this point. The wool is then received and a record made in triplicate, giving the following information: name of shipper, address, county, number of sacks, transportation charges, pro. number, gross weight, estimated tare, net weight, cheque number and amount of advanced cheque. The original copy goes to the office, where an acknowledgment of the number of sacks received and the gross weight is made out. With this an advance cheque of approximately 40c. per pound is sent to the consignee. To simplify the work of the office advance cheques are made out for sums of $10 or multiples thereof. The duplicate copy of the form is handed to the grading clerk, and the triplicate to the clerk who weighs the wool after it is graded and distributes it to the different bins according to grade.

WORK OF THE GRADING CLERK

The wool is passed from the receiving clerk to the grading clerk,

who sees that the number of sacks called for on the sack tag is present before opening the sacks for the grader. He also watches for two shipments in the one sack, or any other peculiarities which may occur. The sacks are opened and the wool graded, each fleece being thrown into the basket to which it belongs. The baskets are then transferred to the clerk who weighs the wool after grading and distributes the different grades to their respective bins. By weighing the wool when received and again after grading an absolute check is obtained on every shipment, as the receiving weight, minus the estimated tare, must correspond very closely with the actual net weight after grading. By this system errors of identification, etc., if any, are detected and adjusted at once. The grading is done by an official of the Live Stock Branch of the Dominion Department of Agriculture.

RECORD OF SALE

The wool after being distributed to the respective grade bins is sacked ready for shipping to the purchaser, who purchases either on sample or personal examination. The wool is sold and shipped, f.o.b. Guelph. After the wool is all sold a copy of the grading sheet is made out, containing the following information: (1) Name; (2) Address; (3) Actual gross weight at time of receiving; (4) Net weight; (5) Number of bags received and Date of grading. This sheet shows the selling price of each grade, the number of pounds of each of the grades contained in the consignment, which may include any or all of the following: (1) fine medium combing; (2) medium combing; (3) medium clothing; (4) low medium combing; (5) low combing; (6) coarse; rejects: —(7) burry and seedy; (8) cotts; (9) dead); (10) gray and black; and (11) tags. This sheet also shows the charges deducted, which include the advance membership fee, transportation, selling charges, and advance payment.

Handled in 1917.

Last year the Ontario Sheep Breeders' Association handled the following amounts of these grades:—

The Grades.	Lb.	S. P.
Fine Medium Combing	3,461	.67
Medium Combing	82,241	.66
Medium Clothing	7,184½	.67
Low Medium Combing	64,636	.63⅛
Coarse	93,444	.57
Lustre	4,480	
Rejections	8,835	.50
Gray and Black	1,351	.46
Locks and Pieces	604	.34
Tags	4,886	.26
Total	271,122½ lb.	

Handled in 1918.

This season 1918, the Ontario Sheep Breeders' Association have marketed the following approximate amounts of each grade:—

The Grades.	Lb.	S. P.
Fine Medium Combing	8,200	.76¼
Medium Combing	126,200	.76¼
Medium Clothing	23,100	.73½
Low Medium Combing	226,000	.73¼
Low Combing	169,000	.67
Coarse	104,000	.60¾
Burry and Seedy	12,500	.42
Cotts	25,000	.50
Dead	3,700	.50
Gray and Black	4,000	.41
Tags	17,500	.16½
Washed Wool	7,600	
Coarse washed		.85
Fine washed		.95
Total	726,800 lb.	

In addition to this we handled approximately 2,500 pounds of merino wool which was graded into special grades and sold for from 70c to 76c. per pound.

MANITOBA

BY P. G. COOP, CO-OPERATIVE WOOL AGENT

THERE has been a decided increase in the number of sheep owners who market their wool through the Co-operative Wool Agent, Manitoba Department of Agriculture and Immigration. In 1915 69,000 pounds reached the warehouse; in 1916, 154,000 pounds; 1917, 170,000 pounds; whereas in 1918 a total of 363,000 pounds was received.

Last year 465 sheep owners participated, whereas this year 917 shipments were received. These figures are cited to indicate that co-operative wool marketing is popular in Manitoba.

The grading system has had a marked effect upon the quality of the wool, and graders, as well as grades, uphold the belief that the educational work in this connection is doing an incalculable amount of good and increasing the revenue derived by the sheep owner from the sale of his wool. In former years when wool was sold at a flat rate, the importance of keeping the wool in a clean condition and avoiding the tying with binder twine, as well as mixing the black and tan with the white and tags, locks and pieces, seedy and dead, with higher grade wool, was not appreciated and resulted in a serious loss in revenue to the farmer and a serious wastage of a product so much in demand at the present time.

It cannot be gainsaid that wool sold under the co-operative system has on the average brought a very much higher price than could have been obtained by the farmer selling to the local buyer. This fact is quite evident to the sheep owner, as evidenced by the increased number of patrons this year.

With the exception of two cars, the Manitoba wool was consigned to the United States and has not been sold at the time of writing. Judging, however, from market reports one would conclude that the price realized will be higher than that of last year and, in view of the improvement in quality, the Manitoba wool should bring a much higher average than in any former year.

SASKATCHEWAN

BY W. W. THOMSON, DIRECTOR, CO-OPERATIVE ORGANIZATIONS

THIS is the fifth season that the Saskatchewan Department of Agriculture has acted as a wool marketing agency for the sheepmen of that province. The work was first undertaken in 1914 and the following table shows how it has developed from year to year:

Year.	Number of consignments.	Pounds.	Average price per pound.
1914	179	69,404	17¾ cents
1915	318	150,328	25 cents
1916	487	179,890	32½ cents
1917	623	223,445	65 cents
1918	916	394,068	not sold to date.

As in former years an announcement of the Department's wool marketing plans was made early in March and sheepmen were invited to forward their consignments to the Department's warehouse in Regina, to arrive between June 24th and July 25th. Arrangements were made to supply paper fleece twine and good strong jute sacks at cost to those who wished to obtain such supplies. In June a suitable warehouse was secured and arrangements made to have the wool graded in Regina by expert graders provided by the Sheep and Goat Division of the federal Live-Stock Branch. When the wool was received it was weighed and graded under the supervision of these federal

officers and advance payments at the rate of 45c. per lb. were immediately forwarded to the shippers. When sufficient quantities of any grade had accumulated, the wool was loaded into cars and consigned to the Canadian Co-operative Wool Growers Limited, at Toronto, that firm having arranged to attend to the actual marketing work. A total of 17 carloads, aggregating 394,068 lb. were handled, being an increase of 170,623 lb. or approximately 80 per cent over the quantity handled in 1917.

The following statement shows the quantity of each grade handled. At the time of writing the greater percentage of this wool is as yet unsold:

TOTAL WOOL GRADING STATEMENT

		lb.
Fine Combing	Bright	7
"	Semi-Bright	2,721
Fine Clothing	Bright	113
"	Semi-Bright	13,255
Fine Med. Combing	Bright	2,142
" "	Semi-Bright	43,912
Fine Med. Clothing	Bright	1,861
" "	Semi-Bright	41,325
Medium Combing	Bright	4,652
"	Semi-Bright	123,489
Medium Clothing	Bright	662
"	Semi-Bright	20,493
Low Med. Combing	Bright	1,375
" "	Semi-Bright	63,417½
Low Combing	Bright	184
"	Semi-Bright	27,811
Coarse	Bright	17
"	Semi-Bright	4,298
Rejects	Burry and Seedy	12,944
	Cotts	286
	Dead	1,812½
Gray and Black		2,392
Lock and Pieces		125
Tags		8,149
Washed		134
Tied with Binder Twine		3,380
Pelts		2,593
Mohair		174
Late shipments forwarded to Toronto for grading		10,294
Total		394,068

SOUTHERN SASKATCHEWAN

BY G. S. HERRINGER, SECRETARY, SOUTHERN SASKATCHEWAN WOOL GROWERS' ASSOCIATION

WE have had a Wool Growers' Co-operative Association in this part of the Province the past four years.

We call a meeting of the sheep men at Maple Creek, the most central point in the district, early in April and discuss everything pertaining to the wool and mutton industry, arrange about shearing prices, give in orders for sacks, twine, etc., set dates for the commencement of shearing and the route the shearing gang are to take.

We have a list of the sheep men, and new names are added at every meeting. We notify each individual wool grower by letter, and also insert an announcement in the local paper as to the date and place of meeting.

This year we sent in the individual order to the Canadian Co-operative Wool Growers Limited, for sacks and twine as well as dip and branding fluid, and this was sent direct to the wool grower to his own express office, but another year we will have these supplies come by freight to Maple Creek and distributed from the warehouse here.

GRADING ON THE RANCHES

The grading in this district is largely done on the ranches. The Dominion Government wool graders accompany the shearing gangs. One grader can easily keep up with a gang of 10 or 15 shearers. As the sheep are sheared the fleece is thrown on the grader's table, graded and thrown in whatever grade it happens to be. When there is sufficient of one grade for a sack, it is packed by the two packers, top sewn up, weighed and stencilled by the grader and piled up in the corner off the ground ready for shipment.

The small grower, that is to say, a farmer with from 1 to 200 sheep, brings his wool into the warehouse here, where it is weighed and stored

until one of the graders finishes on the ranches. The wool is then emptied out of the sacks, and the net weight of each grade taken for each individual contributor, and a grading statement made out for him. After all the wool is graded it is resacked according to grade, weighed and stencilled as one lot number ready for shipment. In this way, instead of having twenty small sacks of one grade, we have two or three large ones done up in proper wool sacks. The wool collected at the warehouse is principally domestic. When all the wool in the district is graded, we set dates for loading at the different stations along the line and have cars spotted at these different stations on those dates. We commence at the west end of the district and work east, loading in all eight cars and a part.

THE AMOUNT CONSIGNED

The following is the weight of various grades, both Range and Domestic wools, consigned from here this year:

DOMESTIC

Fine Clothing	112
Fine Combing	856
Fine Med. Combing	3,735
Fine Med. Clothing	45
Range Med. Combing	3,216
Range Med. Clothing	173
Range Low Med. Combing	1,143
Low Combing	111
Rejects—	
Burry and Seedy	371
Coarse	334
Dead	230
Gray and Black	15
Locks and Pieces	76
Tags	45

RANGE

Range Fine Staple	27,962
Range Fine Clothing	4,158
Range Fine Med. Staple	52,019
Range Fine Med. Clothing	4,727
Range Med. Staple	41,597
Range Med. Clothing	2,258
Range Low Med. Staple	9,651
Low Staple	1,104
Murrain	1,892
Rejects—	
Burry and Seedy	362
Dead	2,130
Coarse	119
Gray and Black	598
Locks and Pieces	72
Tags	1,260
Kempy	29

We consign to the Canadian Co-operative Wool Growers Limited, Toronto. We draw on the Company for 50c. a lb. on the amount of wool consigned with bills of lading and grading sheets attached to draft and distribute this amount to the individual growers. When the wool is sold the balance due on the wool is sent forward with a detailed statement showing costs of handling, and the growers are paid the balance due them.

ALBERTA

BY W. J. STARK, SECRETARY-TREASURER, PROVINCIAL SHEEP BREEDERS' ASSOCIATION

THE Edmonton Exhibition Association gives us the use of the stock pavilion for grading wool; this is a big brick building, with cement floor; it is consequently cool to work in, and the wool does not shrink the same as if it were stored and graded in a frame building.

After we have supplied those wishing them with sacks and twine, we arrange with one cartage company to collect all the wool shipped to us, whether by express or freight; a certain amount is, however, brought in by the contributors themselves. On receipt at the stock pavilion the wool is weighed, the weight and number of sacks compared with the shipping invoices, and the contributor is notified by postal card of the receipt of his wool.

RECEIVING AND GRADING

Our superintendent keeps record of this wool in a book arranged alphabet-

ically, so that we can instantly tell whether a man's wool has been received or not—and how much it weighed in. We have another clerk checking the wool as it is graded, and, after grading, the two weights are compared, in order to catch any discrepancies which might arise.

At the grading station, only one man's wool is graded at one time. We have a staff of men employed, some to open the bags and put the wool on the table for the grader, others to weigh the wool as it is graded from this table and sorted into the different grades. Then we have the men who repack the wool and sew up the bags. In this way you will understand our wool is all weighed three times—when it is first received, when it is sorted and graded in individual shipments, and, afterwards, when it is packed into bags and stencilled ready for sale.

We, this year, handled over 100,000 pounds of wool. Speaking roughly, we have more medium combing than any other grade; next comes fine medium combing.

We are this year selling through the Canadian Co-operative Wool Growers Limited, in Toronto.

ALBERTA SHEEP BREEDERS' ASSOCIATION

BY E. L. RICHARDSON, SECRETARY, ALBERTA LIVE STOCK ASSOCIATIONS, CALGARY.

WE get in touch with our members through the mails and through the agricultural press, and ask the members that we sell for one year to give us the names of breeders who might wish to sell their wool through the Association. We also explain the system under which we handle the wool, advise against the use of binder twine in tying the wool and send addressed shipping tags for use in sending the wool to us.

We supply sacks and twine to members of the Association, the actual cost of same being deducted from the proceeds of the sale of wool when it is sold.

THE GRADING

Our wool is graded in the large horse show building, 300′ long by 132′ wide, which permits us to team the wool right into the building and avoids considerable handling. Official graders are supplied by the Live Stock Branch of the Dominion Department of Agriculture. We use two sets of scales and have them Government inspected. Each man's wool is weighed separately before being opened for grading. It is then taken to the grading table, graded; and each grade weighed separately on the other scales in large bins or baskets on truck wheels, which are then wheeled to the bins containing the different grades. The sacks are then weighed separately to ascertain the tare, and before another contributor's lot is opened, the weights before grading and the total of the individual weights after grading are compared to make sure that no mistake has been made. The wool is then packed, labelled officially with the number of the sack, the grade and the weight, ready for loading.

AMOUNT HANDLED THIS YEAR

The amount of wool of the different grades handled by the Alberta Sheep Breeders' Association in 1918, is as follows:—

The Grades.	Lb.
Fine combing	1,864
Fine medium combing	56,926
Medium combing	102,761
Low medium combing	59,409
Low combing	8,726
Fine clothing	20,712
Fine medium clothing	14,188
Medium clothing	3,042
Coarse	3,009
Rejects	3,906
Gray and black	1,952
Tags	4,581
Mohair	2,133
Karakule	987
Total	304,680

The wool handled this year represents the clip of 475 members of the association, as compared with last year's shipment of 155,000 lb. for 228 members. The Association will also have between 12,000 and 20,000 lb. of shipments received after the grading was completed, and which will bring the total shipment up to about 320,000 lb.

The wool has been shipped in fifteen cars to be sold by the Canadian Co-operative Wool Growers Limited, Toronto.

PINCHER CREEK ASSOCIATION

BY J. H. HARWOOD, SEC.-TREAS., PINCHER CREEK WOOL GROWERS' ASSOCIATION

AT the annual meeting of the Pincher Creek Wool Growers Association, all interested in the wool industry are invited to attend. Subjects pertaining to the wool industry are discussed, and at subsequent meetings orders are taken for sacks, twine, dip, etc. When these are received a day is set for delivering and all are notified. Settlement for these supplies is either made at once or is collected when the returns are made for the sale of the wool.

As much as possible the grading is done on the farms. When a day's grading can be gathered at a given point by bringing a few of the neighbours together, the grader attends. Each lot is graded separately, marked, and kept until the day set for loading. The balance, that is the smaller lots, are all gathered at the shipping point.

Four cars were shipped this year by our Association containing the following:—

The Grades.	Lb.
Fine medium combing	11,798
Fine combing	5,510
Medium combing	18,600
Fine medium clothing	6,718
Low medium combing	9,072
Low combing	1,438
Fine clothing	11,108
Low medium clothing	575
Coarse	945
Rejects	1,226
Tags, locks and pieces	850
Blacks	232
Mohair	123

All of the above was forwarded to the Canadian Co-operative Wool Growers Limited, Toronto, Ont., for sale.

It may be said that in an agricultural region the banker is the key man in all material affairs, and that in a large degree it is his to determine whether the commerce and the industry of his community shall be the servant or the master of agriculture, or to put it more agreeably whether agriculture shall wither under exploitation, or whether it shall prosper under serviceable co-operation and accommodation.—United States Assistant Secretary of Agriculture.

THE STOCK-FEEDING POLICY

In the August number of THE AGRICULTURAL GAZETTE was announced the assistance being offered by the federal Department of Agriculture in the movement of live stock from sections of the three Prairie Provinces where feed is scarce northward to where it is more plentiful, and for the carriage of feed in the opposite direction. The provincial Departments of Agriculture also accepted responsibility in connection with this serious state of affairs that has arisen in connection with feed supplies. The following communications indicate the action that each province took in the matter:

MANITOBA

BY J. H. EVANS, DEPUTY MINISTER OF AGRICULTURE

LATE in July it seemed inevitable, owing to the persistent drought, that large numbers of breeding heifers would have to be sacrificed as a result of the shortage of feed. This would be disastrous to the cattle industry, particularly at a time when it is imperative that increased efforts be made to enlarge the output of food stuffs in the western provinces.

In order to cope with the situation, arrangements were made to enable resident farmers to purchase heifers suitable for breeding purposes on the following terms:—10% cash at the time of purchase and the balance payable in three equal, annual payments, the first to become due November 25, 1919. These heifers are selected by the applicants themselves, but require the approval of the Live Stock Commissioner, or his representative, prior to settlement being made.

After the foregoing arrangement had been made there was sufficient rainfall all over the drought stricken areas, and the feed situation improved greatly. Practically all the heifers reaching the stock yards suitable for breeding purposes are being taken back to the farms.

SASKATCHEWAN

BY F. H. AULD, DEPUTY MINISTER OF AGRICULTURE

THE shortage of feed in parts of Saskatchewan is not so serious, nor likely to be productive of so serious consequences, as seemed probable earlier in the season, as July and August rains made conditions much easier. A survey of the province by municipalities was undertaken by the outside staff of the Department of Agriculture early in the summer. Fourteen travelling representatives were constantly engaged in this work, to the exclusion of other duties. At the same time a postal survey of the province was begun by correspondence with rural municipalities. Thus considerable data was obtained regarding districts short of feed and those having a surplus. Individual farmers were advised personally and by correspondence with respect to the steps necessary to enable them to take advantage of the special freight arrangements made by the federal Government with the railways to effect a free movement of cattle and sheep or feed so that breeding stock could be conserved. Publicity was given to the shipping arrangements, and other information essential to stock men desiring feed and farmers desiring a market for their feed. The Department has also addressed a communication to the rural municipalities which during the summer months prevent the running at large of live stock on unoccupied prairie lands, suggesting the advisability of shortening up the period of the herd law as

much as possible, so as to give live stock the earliest possible opportunity of vacating their closely grazed pastures, and enabling them to make the fullest use of the prairie grasses before the advent of winter.

THE PURCHASING SYSTEM

It is expected, however, that the greatest benefit which the Department is able to confer at this time is the purchase of breeding stock available on central markets and the selling of it to farmers who have a surplus of feed. This is a line of work in which the Department has been engaged for five years, but the peculiar conditions which obtain at present is causing a greater demand than had previously been exerienced for this form of assistance. Farmers in Northern Saskatchewan maintain a large number of cattle, but the tendency is to establish even more herds of cattle in the North and Option No. 4, which enables a farmer to buy half a carload, a full carload or two, and neighbours to co-operate in the purchase of a carload of yearlings or two-year-old heifers, is very popular at the present time. The Department gives credit to any individual in this connection up to $500, and requires a cash payment of a third of the value of the animals with the order and no further payment till the fall of 1919, the final payment being due the following year.

There may be a larger liquidation than usual from Saskatchewan owing to some small stock owners not being in a position financially to maintain all of their stock, but there is no occasion for panic and no indication of sacrifice prices.

THE FEED SITUATION

During the month of August sixty certificates had been issued by the Department of Agriculture, entitling their holders to free transportation of stock or haying outfits of feed. These certificates show that approximately 1,250 tons of hay or straw have been moved from north to south, while in the other direction 45 cars of haying outfits, 525 head of cattle and 2,500 head of sheep have been taken north.

ALBERTA

BY JAS. MCCAIG, M.A., EDITOR OF PUBLICATIONS

THE Provincial and Dominion Departments of Agriculture have been in communication with each other with the view to making all surplus feed available to stockmen in the southern part of the province. Dominion land officials and park officials as well as Indian agents have power to grant leases for hay and pasture. A good many sheep have already moved into the reserves, not less than 25,000 to date.

Small cattlemen will suffer on account of small financial resources. The Minister of Agriculture having asked the railway association for reduced rates for the moving of feed and stock has been promised a half rate cut and the Dominion Government will look after the remaining half, so that stock will be moved north and feed will be moved south at no expense to the stockmen. This does not yet apply to the Edmonton and Dunvegan Railway. Haying outfits will be moved at half rates. A line between Lundbreck and Cochrane, running north and south, and another between Lacombe and Kerrobert, running east and west, fixes the line across which free rates apply in the case of stock being shipped to feed on one hand and feed being shipped to stock on the other.

Officials of the Department, Agricultural Representatives, and others, are making an active and thorough cruise of the pasture and hay resources of the province in the west and north, and information is made available

at the Department for stockmen. Officials of the Department on the live stock side are making an investigation of the conditions in the south country, and everything is being done generally to constitute the Department a clearing house for trading in pasture and feeds for the fall and winter. The work is progressing satisfactorily. A large number of stockmen are in the north receiving direction, and a good many have already located hay making and pasture areas. Some will move stock north in large numbers, others will contract for hay, and some will put it up themselves. It is the case that the need of feed will tax all the resources of the Department organization.

THE CONTROL OF RUST

MANITOBA

BY V. W. JACKSON, PROFESSOR OF BOTANY, AGRICULTURAL COLLEGE

FOLLOWING the rust outbreak of 1916, which meant a loss of over one hundred million dollars to the Western Provinces, methods were adopted to remove, as far as possible, known causes of wheat rust. The most easily combatted cause was the barberry bush, and steps were at once taken to find out how many barberry bushes there were in the West, where these were located and their relation to wheat rust. At the first horticultural conference following the outbreak, held at Winnipeg in February, 1917, and at the Canadian Seed Growers' Association meeting, held at the same time, the following resolution was passed:—

Whereas the Province of Manitoba has on several occasions suffered enormous financial losses due to the ravages of the wheat rust; and

Whereas it has been proven that the barberry bush (*Berberis vulgaris*) may and does act as a host plant in the propagation of wheat rust; and

Whereas good results have been found to follow the extermination of the barberry bush in other countries; and

Whereas our neighbours to the south, in the States of North Dakota, South Dakota and Minnesota, have already taken steps in this direction; and

Whereas it has been found that there are at the present time very few bushes of this plant in Manitoba, so that its complete extermination would be a simple and inexpensive matter;

Therefore, be it resolved that we, the members of the..... assembled in convention, humbly petition the Provincial Legislature to enact at as early a date as possible a law prohibiting the sale and planting of the bushes of the species known as *Berberis vulgaris*, and the destruction of those bushes already in existence, with the exception of such bushes as may be considered necessary or advisable to use in strictly experimental or investigational work, and which shall not in any way jeopardize the wheat crop of the Province.

(*Note.*—This resolution was passed in February conferences, and the Manitoba Noxious Weeds Act was amended in March so as to include the barberry among the noxious plants of Manitoba.)

At the rust conference held at the Manitoba Agricultural College, August, 1917, full information as to the number and location of the barberry bushes in the Prairie Provinces was given, and resolutions were passed that Saskatchewan and Alberta should follow the lead taken by Manitoba to remove the barberry, and frame a similar Act to the one already passed in Manitoba. This was done in Saskatchewan this year, and Alberta is taking similar steps.

A SPRING DRIVE

The outbreak of wheat rust on the thousands of barberry bushes in Assiniboine Park, Winnipeg, this spring afforded occasion for a spring drive against the barberry, launched by Professor Buller, who first spotted the outbreak. The Parks Board at once removed all the barberry bushes (some 3,000) in the various city parks. As this was by far the major portion

of the barberries in the province, it was an easy matter to get rid of the rest, which were not over 300 in number. The Patmore Nurseries, Brandon, destroyed the few common barberries they had on hand; the Pine Grove Nurseries, Morden, destroyed the six they had on hand; Mr. Skinner, Dropmore, is destroying all but a few rare varieties he has which do not carry the wheat rust; the Valley River Nurseries have destroyed the few they had on hand, and wherever a barberry bush is reported the party is informed of the danger of keeping this bush, which is a menace to the wheat crop, and, so far, causes as they become known.

At the rust conference held here in August, 1917, the Manitoba Agricultural College was permitted to keep six barberry bushes for experimental purposes. No outbreak occurred on the leaves this spring until they were artificially infected with wild barley stubble. Wheat stubble, carrying the black rust spores, was tied in four shrubs, and wild barley stubble in one shrub. The latter shrub broke out in five days with a heavy infection of æcidia spores, but those with the wheat stubble showed no infection. Experiments seem to indicate that our

BARBERRY BUSH IN MANITOBA, 1916.

MANITOBA, 1918.

there has been no difficulty whatever in having the barberry bushes removed. Every one has complied with the request at once, and, so far as we know, the province of Manitoba is now completely rid of the barberry bush.

INVESTIGATION AND EXPERIMENTS

Mr. W. P. Fraser is doing rust investigation work at Brandon and has given valuable aid in effecting the destruction of the barberry. His work extends into Saskatchewan and Alberta, where he has effected a similar destruction of the barberry, so that it may be said that the prairie provinces are now rid of this one cause of wheat rust, and are prepared to take further steps to remove other wild grasses, such as Wild Barley, Western Rye-Grass and Slender Wheat Grass (*Agropyron caninum*) are the more important carriers of wheat rust, and the worst of these is, undoubtedly wild barley.

Miss Margaret Newton is at present conducting rust investigation, for Mr. Fraser, at the Agricultural College here, and has watched the spread of the spores from the above infected barberry bush and found æcidia spores from it in spore traps on the top of the Biology Building—height 90 feet, distance 100 yards, showing that these spores would carry a great distance, and wild barley, for many yards around, seems far more infected than elsewhere on the farm. Barley and wheat planted near these barberry bushes were very heavily infected.

SASKATCHEWAN

BY F. H. AULD, DEPUTY MINISTER OF AGRICULTURE

WE have done little as a Department with respect to the prevention and control of rust on wheat, except to declare the barberry (*Berberis sp*) a noxious weed, and to endeavour to bring about its eradication. The investigation work being done in the West is being performed by the Dominion Department of Agriculture following a consultation with the provincial universities.

ALBERTA

BY G. H. CUTLER, PROFESSOR OF FIELD HUSBANDRY, UNIVERSITY OF ALBERTA

AT the conference on rust research, held at Winnipeg last year, the committee on Preventive Work and Field Crop Investigations, recommended that investigations for determining the methods of crop and soil management best suited to lessen the damage from rust be instituted as soon as possible at as many places as possible throughout the Middle West. The committee also outlined several lines of investigation to serve as a general working basis for men undertaking the work.

METHODS OF INVESTIGATION

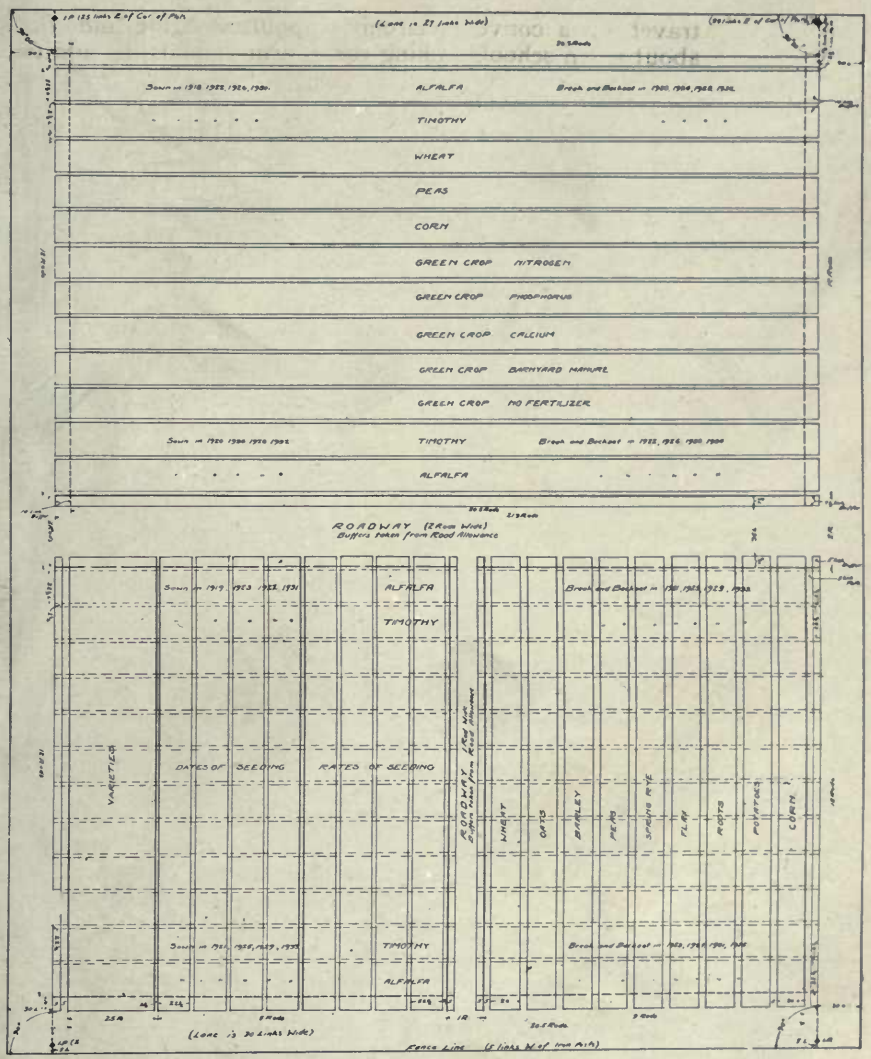
Realizing the seriousness of the damage to crops from this fungus, and the importance of exhaustive and long-continued research, Dr. Tory and Dean Howes gave their permisssion to the Department of Field Husbandry of the University of Alberta to co-operate in this important work. As a consequence some 4 acres of land were set aside expressly for the purpose of making a systematic study, more particularly of preventive measures that might lessen the damage to crops from rust, as was recommended by the aforementioned committee. Plans were at once outlined, and the lines herewith indicated of crop and soil management investigations were begun. The influence upon the growing plant with respect to its susceptability or immunity to rust is being studied under the following conditions:—

1. The date at which a crop is seeded.
2. The rate at which a crop is seeded.
3. The time at which a crop is harvested.
4. The rotation effect of annual crops upon the succeeding crops.
5. The rotation effect of perennial crops upon the succeeding crops.
6. The influence of four fertilizers, including barnyard manure, as compared with no fertilizer, on the growing crop.
7. The relative resistance of different varieties to rust.

These lines of work were all commenced this season. The plan calls for two pieces of land of equal size, one piece to be in the process of preparation, while the other is under experiment, and when once under way should be capable of rendering results each year there is rust.

THE PLAN

The accompanying plan will serve to illustrate the nature and scope of the work undertaken:—



PLAN OF RUST INVESTIGATION EXPERIMENTAL PLOTS, UNIVERSITY OF ALBERTA

SUMMER SCHOOLS FOR TEACHERS

NOVA SCOTIA

BY L. A. DEWOLFE, B.A., DIRECTOR OF RURAL SCIENCE SCHOOLS

THE enrolment at our Truro summer school this year was 131. It was without exception the most industrious class we have yet had. In fact the ambition of the students led them to attempt more than they could well accomplish. It was practically a girls' school. Only two men took the rural science course; two others took the manual training course.

One new feature of the school was the presence of our eight travelling teachers. These teachers will each

travel over a convenient circuit of about a dozen schools, teaching rural science subjects. That relieves the regular teacher from such work—which she ordinarily neglects because it is not on the examination curriculum. These travelling teachers spend their time at canning, milk-testing, poultry-judging, and the study of farm animals, in addition to the regular work in gardening, They are, therefore, well equipped to teach these practical subjects Each teacher will carry with her a milk-testing outfit and will also give canning demonstrations at local exhibitions.

NEW BRUNSWICK

BY R. P. STEEVES, M.A., DIRECTOR OF ELEMENTARY AGRICULTURAL EDUCATION

THE rural science schools for teachers opened at Woodstock and Sussex with an enrolment of twenty and forty-nine respectively. Notwithstanding the fact that the total attendance was smaller this year than usual, at no period since these schools were organized in the province were greater interest and enthusiasm shown. That there was not a larger attendance is easily explainable. Applications were received from nearly one hundred. Many teachers when they returned to their homes after the close of school in June, found home demands upon their time during vacation stronger than they could put aside. In many cases, brothers, and even fathers, had been called to arms, leaving much work to be done.

VALUE OF THE INSTRUCTION

During the session it was noticeable that an increasing number of school trustees came to the schools seeking teachers to fill vacancies. In this respect no better can be done than quote from a letter recently received from a student of the school at Sussex. She writes, "My passing the course successfully has already brought me some good, as the trustees were willing to give me an advance of fifty dollars because I can teach through the garden."

The interest which developed early in the session steadily increased in all departments of the work. At Sussex, after the closing exercises on the evening of August 6th, the entire forenoon of the 7th was one of the busiest, rounding out completely the full four weeks of preparation for service.

Intermingled with the regular duties of the schools, social and literary activities occupied a prominent part and contributed greatly in creating a healthy school spirit.

OF A PRACTICAL NATURE

As in former years, the work of the schools was of the most practical kind. A large part of the time of each instructor was taken in directing experiments, demonstrations, and study of the students. "Learning by doing" was characteristic of the schools. Every teacher took an active part not only in preparing a piece of land, putting in a crop and looking after it, but in cultivating and thinning and trans-planting plants in a garden that had been put in about the first of June for this purpose. The different methods of plant propagation and protection, were dealt with by each student, and plant diseases were observed and studied.

And so the entire range of natural growth from spring until the middle of August, was brought within the personal experience of each. Physical nature and environment, chemistry of the soil, plants and animals and the nature study of animals, as subjects of the course, were treated from the objective angle, in the open air, and in relation to the activities and industries of life.

ONTARIO

BY J. B. DANDENO, PH.D. (HARV.), INSPECTOR OF AGRICULTURAL CLASSES

WHATEVER may be the tendency regarding increase or decrease of attendance in schools and colleges during the war, there is no uncertainty about the progress in the summer courses for teachers given at the Ontario Agricultural College. In 1918, all told, there were in attendance 368 teachers and 79 inspectors. The following schedule shows the attendance since 1911:

Year	Elementary				Intermediate					Inspectors	Total.
	I		II		I		II		III	I and II	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Men	
1911...	8	75	1	16							100
1912...	16	65	2	23							106
1913...	14	64	5	36	23	4					146
1914...	8	55	5	27	13	4	14				126
1915...	15	39	5	18	17	1	9	1			105
1916...	11	99	9	31	15	3	14	1			183
1917...	15	138	7	81	9	1	13	2			266
1918...	6	187	7	119	20	11	9	0	9	79	447

The foregoing table indicates a marked tendency, since 1915, towards an appreciation of the courses provided by the staff of the Ontario Agricultural College under the direction of the Department of Education. The table shows the number in actual attendance at the college, but omits, of course, to give the number who made application for admission. This year more than three hundred applied for admission to Part I of the Elementary course, but the College was able to accommodate only two hundred in this class; consequently, over a hundred candidates in 1918 were disappointed in their endeavour to secure further education along agricultural lines. It is hoped that in 1919 arrangements may be made to accommodate at other centres than Guelph, if necessary, all who wish to take these courses. In some respects the people of Ontario are only commencing to understand the importance of this great movement to increase the efficiency of the Ontario educational system.

THE OBJECT IN VIEW

While the cities and towns are included in the scheme, the chief aim is to introduce a more rational programme into the schools on the side lines and back districts of this province. More than five-sixths of the schools have yet to be reached, but, with the assistance of the inspectors of the different counties, the progress from now on is likely to be quite rapid.

As shown in the table above, 79 inspectors attended the courses in 1918 and took the work provided for the classes which take the courses leading to an intermediate certificate. These men should be equipped, not only to direct the work of the teachers, but also to take an active part in this propaganda of rural improvement. As is the case with the teachers, the inspectors will complete the work leading to an intermediate certificate in 1919.

THE PRIVILEGES

On account of the large number in attendance, dormitory or boarding

accommodation could not be provided for the men; consequently, the courses for all concerned lost much of their charm and efficiency. Going back and forth down town consumed much time and in most cases prevented attendance upon evening meetings.

As was the case last year the swimming tank in the gymnasium provided an opportunity to learn to swim, and also a means of enjoyment to those who had previously learned.

A pageant put on by a number of teachers under the direction of the instructor in games was very much appreciated and enjoyed. A collection on this occasion produced $43.00 which was sent to the Fresh Air Fund of the Toronto *Daily Star*.

Though the work was strenuous and the weather hot, the teachers and inspectors enjoyed the work and no doubt will carry away much of experience that may be useful in their regular spheres of labour.

SPECIAL LECTURES

In addition to the regular class work, six special lectures were given on "Consolidated Schools" by Mr. Lee L. Driver, of Winchester, Indiana. Consolidation of schools in Ontario is now, and is likely to be for some time, a live question in rural communities in Ontario. Information along this line received at first hand from Mr. Driver is highly appreciated.

Opportunity was also provided for the high school teachers in attendance to learn the method of operation and the usefulness in agricultural education of the motion picture machine. It is expected that in the near future the Department of Education will provide a few such machines to be sent from high school to high school where agriculture is being taught, along with sets of films illustrating different topics in agriculture. Having this in view it was deemed wise to give the teachers of agriculture practice in operating motion picture machines.

SOCIAL FEATURES

The social features in 1918 were not so effective as formerly because of the fact that the men roomed down town. However, two enjoyable and profitable excursions,—one to Rockwood, and the other to the convalescent hospital—were carried through successfully. A pageant given by the boys and girls of the neighbourhood also provided consideration amusement. But, perhaps best of all, was a picnic outing on the afternoon of August 1st, to which all those in attendance, inspectors, teachers and rural leaders, were invited.

APPRECIATION OF THE COURSES

These courses are improving year by year and the college staff spares no pains in providing the very best the college can supply. The teachers and inspectors appreciate very highly the splendid efforts put forth by those in charge.

Dr. Cody, the new Minister of Education, spent a day visiting the class-rooms. He expressed his wholehearted sympathy with the work of the staff, and realized that those in attendance upon the classes were gaining much that will increase the efficiency of the rural schools. At the close of the afternoon session he delivered an inspiring address in the gymnasium to the inspectors, teachers and others, making an audience of about six hundred.

MANITOBA

BY G. A. SPROULE, REGISTRAR, AGRICULTURAL COLLEGE

FOR the purpose of stimulating among the teachers of the province a healthy appreciation of the importance of the business of farming and the wide and interesting field of study connected with

scientific agriculture, the Agricultural College puts on two courses every year of one month each. All teachers taking their second-class professional normal training at the time are required to take one of these courses. They are open also to any teacher who wishes to attend. Since these courses are so short it has been found necessary to specialize and three options are offered namely, (1) Household Science; (2) Household Art; (3) Agriculture. All students get School Gardening, Farm Botany, Canning, and Nature Study. Those choosing Course 1 do special work in plain cooking, the school lunch, labour-saving devices for the home, etc. In Course 2 the work is plain sewing and textiles. Course 3 takes up a study of the common grains, grasses, testing milk and making butter, poultry raising and an inspection of the college experimental plots. The majority of these teachers are women. In the May-June class of this year, for example, there were only two men in a class of 170, and, in the July-August class, four men in a class of 72. I believe the students are interested in the work, but the time spent at the college is much too short.

Very few of our graduates are going into teaching, chiefly because there are more attractive openings in the colleges, the extension service, agricultural representative work, and farming.

To prepare principals for the consolidated schools opening throughout the province, the college has made it possible for a teacher holding a first-class certificate to cover the B.S.A. course in three years. Summer courses are offered to assist them to complete the work in the shorter time, the B.S.A. course being a five winters' course. The first year of the three years' course may be taken in three summer courses of six weeks each with assigned reading for the winter months, so that the teacher will not need to be away from his school more than two winters. The first man to register in this course should graduate next spring. Ten in all have entered upon this work, but half of them have dropped out owing to enlistment, or because they feel it their duty to do farm work during the holidays.

I believe if the demand were created for agricultural experts in the schools of the province the men to qualify for the work would be found. That demand as yet has not been felt.

PLANTS POISONOUS TO DOMESTIC ANIMALS

NEW BRUNSWICK

BY WILLIAM M'INTOSH, ENTOMOLOGIST AND BOTANIST

JUST what plants should be included under the above title is debatable. There are a great number of bacteria and diseases-causing plant organisms not listed. Certain species, not poisonous in themselves, if eaten in large quantities clog and inflame the intestines and, by generating gases, distend the stomach and intestinal tract to such an extent that the heart and lungs cease to operate, and death ensues. This is termed bloating. Large quantities of green clover frequently cause bloating, particularly to sheep.

Wild meadow hay frequently contains large quantities of poisonous plants, St. John's Wort, Meadow Parsnip, etc. When this hay is fed to stock they usually reject the dangerous plants.

The farmer thinks his cattle are too fastidious and the fodder is being wasted. Therefore he chops it and mixes it with feed to make it more palatable. Without a doubt, many of the mysterious illnesses of cattle are due to this practice.

Every farmer should know the more common poisonous plants of his locality.

Woolly Mold (Aspergillus glaucus). This common mold develops in oats, corn, and other grains which are harvested too green, or stored in a leaky barn. This dangerous mold is white at first, quickly changing to grey and green. Evidence shows that it causes "staggers" in horses.

Corn Smut (Ustilago maydis).—There is no record of poisoning by this smut in New Brunswick, but in the corn-producing areas of the United States it frequently causes the death of cattle.

Common Ergot (Claviceps purpurea).—This fungus, which infests grasses and causes serious losses of cattle in the prairie regions of the United States, is not very abundant in this province.

Fly Amanita, Fly Toadstool (Amanita muscaria).—This very poisonous toadstool is common and well known. Country people frequently steep it in sweetened water or milk to destroy house flies. There are well authenticated cases of pigs and cattle being poisoned by this plant.

Common bracken fern (Pteris aquilina). In Europe, cattle are frequently poisoned by eating hay containing a quantity of this very common fern.

Common Horsetail (Equisetum arvense).—Experiments show that this plant, if fed to stock in large quantities, is poisonous.

Ground Hemlock, Ground Yew, American Yew (Taxus canadensis).—This plant, abundant throughout the Maritime Provinces, is not often eaten by stock, but is, without doubt, poisonous if eaten in any quantity.

Bearded Darnel, Poison Rye grass (Lolium temulentum).—This plant, introduced from Europe, is poisonous to both man and animals, but fortunately it is not common. Differs from Common Darnel by possessing an awn.

Indian Corn (Zea mays).—Not poisonous, but the death of stock so often caused by it is due to fungus growths thereon. (See Aspergillus.) Feeding too much green corn produces bloating, which sometimes causes death.

False Hellebore, Swamp Hellebore, Indian Poke (Veratrum viride).—Rare in New Brunswick. Fatal to man and horses, but sheep eat it with impunity.

Lily of the Valley (Convallaria majalis). All parts of this beautiful garden flower are poisonous to horses and cattle.

The Slender Nettle (Urtica gracilis). Said to be poisonous to cattle and horses, but there is no well authenticated case of poisoning known in New Brunswick.

Corn Cockle (Agrostema githago).—Animals and fowls are sometimes poisoned by eating the seeds of this purple-flowered weed so often seen growing in grain fields.

The Cursed Crowfoot, or *Swamp Buttercup* (Ranunculus Sceleratus).—This is more poisonous than the Tall Crowfoot, but is not eaten by stock. When dried, the buttercups lose their active poison.

Buttercup, or *Tall Crowfoot* (Ranunculus acris).—Cases of poisoning by buttercups are reported, but cattle usually avoid eating them.

Monkshood, Wolfbane, European Aconite (Aconitum napellus).—A common garden perennial from Europe. Horses and cattle are frequently poisoned by eating it.

Red and White Baneberries (Acteæ rubra and alba).—Both species are poisonous and very common, but animals usually refuse to eat them.

Common Wind Flower or Wood Anemone (Anemone quinquefolia).—This little plant is very common in pasture land, but, owing to its acrid taste, animals seldom attempt to eat it.

Celandine (Chelidonium majus).—This introduced weed is as yet rare. It contains an active narcotic poison, but fortunately the plant is so acrid, cattle rarely eat it.

Poppy (Papaver Sp.).—These plants usually grown in gardens, are frequently eaten by stock, sometimes with fatal results.

Choke Cherry (Prunus virginiana).—Cattle are frequently reported quite seriously poisoned by eating cherry leaves.

Lupines (Lupinus Sp.).—Lupines have escaped from cultivation and become established in a semi-wild state. They are said to be poisonous to stock.

Locust Tree (Robina).—Common as an ornamental tree, poisonous to both man and domestic animals.

Spurge (Euphorbia Sp.).—At least five species of Spurge occur in eastern Canada, all of which contain an acrid, milky, poisonous juice. Cattle usually avoid them.

Boxwood (Buxus sempervirens).—Frequently grown in gardens, poisonous to stock. The poison is volatile and disappears to a great extent when the plant is dried.

Golden Alexanders (Zizia aurea).—The cows reported seriously poisoned by eating this plant which is very common in southern New Brunswick.

Water Parsnip (Sium cicutæfolium).—Commonly believed to be poisonous to stock.

Labrador Tea (Ledum groenlandicum).—Very common and reputed poisonous to stock.

Lambkill, Sheep Laurel (Kalmia angustifolia).—This is a well-known poisonous plant, frequently causing the death of young cattle and sheep.

Andromeda or Bog Rosemary (Andromeda glaucophylla).—This plant contains a dangerous poison, but is seldom eaten by stock.

Mayflower, Trailing Arbutus, (Epigæa repens). This well known plant is reported as being poisonous to stock by the U. S. Bureau of Animal Industry.

Rhodora (Rhododendron canadense). Many farmers say that this plant is poisonous.

Dogbane (Apocynum Sp.).—Three varieties of Dogbane occur in eastern Canada, two of which are very common and known to be poisonous, but they are not usually eaten by cattle.

Milkweed, Silkweed (Asclepias Sp.)—Two milkweeds occur in eastern Canada, both of which are listed as poisonous plants.

Black Henbane (Hyoscyamus niger).—Becoming abundant in some sections. Introduced from Europe and recorded as a poisonous plant there.

Tobacco (Nicotina tabacum).—Cattle eat growing tobacco or drying leaves readily, often with fatal results.

Bittersweet (Solanum dulcamara).—Commonly reputed to be poisonous.

Common Nightshade (Solanum nigrum).—This plant is known to be poisonous, but is seldom eaten by stock when green.

Potato (Solanum tuberosum).—The partly-grown tubers, white sprouts, and potatoes greened by exposure to the sun, are poisonous to some extent. In all these, the harmful principal may be destroyed by boiling.

Foxglove (Digitalis purpurea).—This plant, introduced from Europe, has escaped from cultivation and is becoming common in pasture lands and roadsides and is listed as poisonous to stock.

Lousewort (Pediuclaris Sp.).—Two species are found in this region. One of these, P. Furbishiæ, is believed by New Brunswick farmers to be poisonous to stock.

Lobelia.—Several species are common in wet fields, and all the varieties are said to be poisonous to stock.

Stinking Willie Staggerwort (Senecio Jacobæa).—Locally common and known to be poisonous to stock.

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QUEBEC

BY W. LOCHHEAD, B.A., M.SC., PROFESSOR OF BIOLOGY, MACDONALD COLLEGE

POISONOUS plants undoubtedly exist in the province of Quebec, but little attention has been given to their study because they have apparently been the cause of little loss. It is often difficult for the veterinarian to determine definitely that a farm animal has been poisoned by eating a particular plant. Some ten years ago two fine young Ayrshires of the Macdonald College herd were found dead in the pasture. They had access to a wet piece of ground in which cowbane or water hemlock grew. An autopsy was held by a prominent veterinarian, but he could come to no definite decision as to the cause of death. He was of the opinion, however, that the animals had been poisoned by eating the root of the cowbane. When the pasture was changed no more deaths occurred.

Occasionally reports have come to us of the death of sheep by lamb-kill or laurel (*Kalmia latifolia*).

Wild barley (*Hordeum jubatum*) is common along the lower St. Lawrence, and occasionally causes the loss of an animal. The awns are very long and barbed, and cause mechanical injuries.

The brake or bracken fern (*Pteris aquilina*) is a very common plant in Quebec. Its rootstock is said to be poisonous to horses and cattle, but we have no records of its action.

The common horse-tail (*Equisetum arvense*) is also very abundant in this province. Recent experiments go to show that when horse-tail is cured with hay it is very poisonous to young horses. The results depend upon the amount eaten and the age of the horse. It is very likely that considerable poisoning occurs in Quebec.

Ergot (*Claviceps purpurea*) is a fungus that is sometimes very abundant on wild grasses and on timothy and red top. No doubt poisoning often occurs when cattle have access to pastures, where considerable ergot exists.

Common ragwort or stinking willie (*Senecio jacobaea*) is occasionally found in Quebec. In the Maritime Provinces it causes the Pictou liver disease of cattle. No records of any trouble in this province have been received.

FULL DETAILS REGARDING POISONOUS PLANTS.

Mr. P. I. Bryce, of the Biology Department, has compiled the following data from various sources regarding the poisonous plants, or suspected, that are to be found in Quebec:

Plant. Common Name.	Latin Name.	Reputed Injurious Parts.	Locality where Reported.	Authority Reporting Locality.	Duration.	Kind of Stock Affected.
Purple Cockle	Agrostemma Githago.	Seed	Ste. Anne de Bellevue Beaconsfield St. Tite Grainfields	M.C. Prov.	A	Cattle.
Baneberry—						
Red	Actaea rubra	Berries	Ottawa St. Joachim Ste. Anne de Bellevue	J.M. Prov. M.C.	..... P.	
White	Actaea alba	.....	Beaucour Ste. Anne de Bellevue	Prov. M.C.	P. P.	
Wild Rosemary	Andromeda Polifolia.	Leaves	In Bogs St. Henri de Lauzon St. Hyacinthe	Prov.	P	Sheep.

Plant. Common Name.	Latin Name.	Reputed Injurious Parts.	Locality where Reported.	Authority Reporting Locality.	Duration.	Kind of Stock Affected.
Spreading Dogbane...	Apocynum androsaemi folium.	Stem and Leaves.	Nicolet St. Anne's Hull	Prov..... M.C..... J.M.....	P.....	Stock.
Common Milkweed...	Asclepias syriaca..	Stem and Leaves.	Quebec	(B. & B.)..	P.....	Sheep.
Climbing Bittersweet..	Celastrus scanden	Leaves....	Montreal Mt Ste. Anne's Ottawa	Provan.... M.C..... J.M.....	Per..... Woody.	Horse.
Water Hemlock.....	Cicuta maculata..	Leaves.... Tuberous Roots.	Baie du Febvre Grafton St. Anne's	Prov..... M.C.....	P.....	Cattle.
Poison Hemlock.....	Conuim maculatum.	Seed, Leaves, Stem, Tuberous Root.	Montreal Batiscan Wakefield Quebec	Prov..... J.M. Gray.	Per.....	Cattle.
Thorn-Apple.....	Datura sp.....	Plant.....	Quebec Hull	(B. & B.).. J.M.....	A.....	Cattle.
Horsetail.....	Equisetum arvense.	Stem.....	Canada St. Anne's	Prov..... M.C.	P.....	Horses Sheep.
Sneezeweed.....	Helenium autumnale.	Plant Flower.	Canada Quebec	Prov..... (B. & B.)	P.....	Sheep, Cattle, Horses.
Black Henbane.....	Hyoscyamus niger.	Seed, Leaves.	Baie St. Paul Ottawa St. Anne's	Prov..... M.C.	A..... B.	Chickens, Calves.
St. John's Wort.....	Hypericum..... Sp.	Leaves, Stem.	St. Anne's St. Joachim Pointe Levi.	M.C..... Prov.....	A..... P.	Stock.
Lambkill.....	Kalmia angustifolia.	Leaves....	Ottawa Petit Cap Blandford Quebec	J.M..... Prov..... (B. & B.)	..... P.	Cattle, Sheep, Horses, Goats.
Poisonous Darnel.....	Loliumtemulentuim.	..... Seeds.....	..... Quebec	..... Prov.....	..... A.	
Labrador Tea.....	Ledum sp.....	Leaves....	Montmorency Blandford Madington St. Henri	J.M..... Prov.....	P.....	Sheep,
Indian Tobacco.....	Lobelia inflata....	Plant.....	Quebec St. Joachim St. Anne's Wakefield	B. & B.... Prov. M.C. J.M.	A.	
Wild Mandrake or May Apple.	Podophyllum peltatum.	Leaves, Root.	Mount Royal	Prov.....	P.	
Wild Black Cherry....	Prunus serotina...	Wilted leaves.	Eastern Tsps Tring Arthabaska Ottawa	Chaudiere Prov..... J.M.	R P..... Tree	Cattle.
Wild Radish.....	Raphanus raphanistrum.	Plant.....	Quebec Montmorency Falls	Gray..... J.M.	A.	
Tall or Green Headed Coneflower.	Rudbeckia laciniata.	Plant.....	Chateau Richer Quebec Ste. Anne de Beaupre	Prov..... (B. & B.) J.M.	P.....	Sheep.
Buttercups..... 1. Tall..... 2. Bulbous..... 3. Cursed Crowfoot. 4. Creeping Crowfoot.	Ranunculus..... " acris. " bulbosus. " sceleratus. " repens.	Stem Leaves.	Quebec Ottawa Quebec Montmorency Quebec Saguenay St. Joachim	Prov..... (B. & B.).. Prov.	....	Cattle. Sheep.
Common Ragwort....	Senecio Jacobea..	Stem, Leaves, Flowers.	Cap de Bonne Esperance Quebec	Prov..... Gray.	P.....	Cattle.

Plant. Common Name.	Latin Name.	Reputed Injurious Parts.	Locality where Reported.	Authority Reporting Locality.	Duration.	Kind of Stock Affected.
Black Night Shade....	Solanum nigrum..	Fruit, Leaves, etc.	Quebec..... Eastern.....	Prov..... (B. B.)	B.....	Calves, Sheep, Goats, Swine.
Nightshade or Bitter-sweet.	Solanum Dulcamara.	Leaves, Fruit.	Quebec.....	(B. & B.)..	P.....	Cattle, Sheep, Goats, Swine.
False Hellebore.....	Veratrum viride..	Whole plant.	Ste. Luce..... Chateauguay..... East Tsps..... Wet Grounds.....	Prov..... Spotton.	P.....	Horses, Cattle.
Cockle Bur.....	Xanthium canadense.	Burs.....	Quebec..... St. Anne's..... Ottawa.....	Prov..... M.C..... J.M.	A.....	Young Horses.
Bracken.....	Pteris aquilina...	Leaves....	Quebec..... Ste. Anne's.....	Prov..... M.C.	P.....	Horses Cattle.
Field Horsetail.....	Equisetum arvense. Smut Fungi.	Stem.....	Quebec..... St. Anne's.....	Prov..... M.C.	P.....	Horses.
Oat Smut.....	Ustilago Avenae..	Smutted oat forage.	Quebec.....	M.C.....	.....	Cattle.
Corn Smut.....	Ustilago Zeae.....	Smutted ears of corn.	Quebec.....	M.C.....	.....	Cattle.
Stinking Smut or Bunt	Tilletia foetens....	Smutted grains of wheat.	.....	.....	.....	Cattle.
Wind Flower.....	Anemone quefolia. Sac Fungi.	.....	Quebec.....	B. & B.... Gray.		
Ergot of Rye, Wheat Oats, and of these Grasses, and Couch, etc..... Wild Rye..... Prairie June ..... Reed Canary..... Meadow	Claviceps purpurea. Agrophyson sp... Elymus sp..... Koeleria sp..... Phalaris sp..... Poa sp.....	Ergots in Seed.	Quebec.....	M.C.....	.....	Cattle, Horses.

ABBREVIATIONS.

B. & B.....Britton & Brown, Ill. Flora of Northern United States and Canada 1st Ed., 1898.
J. M.....Collection of plants at Macdonald College determined by John Macoun.
M.C.....Plant collected by Biology Department Macdonald College.
Prov.....Abbe Provancher's Flore Canadienne, 1862.
Spotton.....Dr. H. B. Spotton's Wild Plants of Canada, Part II, 1897.
Gray.....Gray's "Manual of Botany": 7th ed., Robinson & Fernald.
Sp.....Species.
A.B.P.....Annual, biennial, perennial.
Quebec refers to the Province.

ONTARIO

BY J. E. HOWITT, PROFESSOR OF BOTANY, ONTARIO AGRICULTURAL COLLEGE

EXAMINATION of the correspondence received by the Department of Botany of the Ontario Agricultural College, indicates that there are only two poisonous weeds in the Province which cause the farmers any serious trouble. They are Spotted Cowbane or Water Hemlock (*Cicuta maculata*, L.) and Field Horsetail (*Equisetum arvense*, L.). Judging by the letters received the former is the more frequent cause of stock poisoning in Ontario.

Spotted Cowbane or Water Hemlock is a weed of marshy places. Cattle are frequently poisoned by eating the roots of this plant, especially early in the spring when the pasture is scarce. It is a smooth perennial, from two to five feet high.

The leaves are compound, of two or three divisions, the stalks with expanding bases which clasp the stem. The leaflets are lance-shaped and sharp toothed. The flowers are small, white, and in flat topped clusters (umbels). The root consists of numerous spindle shaped " tubers."

Farmers should watch low places for this weed and hand pull any plants that are found. This is easily done if the roots are first loosened with a spud or other implement. Be sure to destroy the plants after pulling them.

Field Horsetail is found in damp grass lands, in low places in cultivated fields and on apparently dry, sandy land which has a poorly drained subsoil. If fed in quantity in hay it is poisonous to horses.

Horsetail appears in early spring as small, pale stalks, with yellowish or brownish heads. Later in the season feathery, tail-like, leafy green shoots appear. These are frequently described by correspondents as being like little pine trees. It is in this form that the plant is usually noticed in cultivated fields and in hay.

The appearance of this weed in any quantity always indicates lack of underdrainage. This lack supplied, this weed soon disappears from well cultivated fields.

Other stock poisoning plants which are found in the province are:—Sneeze Weed (*Helenium autumnale*), introduced from the West and found on roadsides and in meadows; Poison Hemlock (*Conium maculatum*, L.), found in the southern and south-western portions of the province; Sheep Laurel or Lamb Kill (*Kalmia angustifolia* L.); Stinking Willie (*Senecio jacobaea*, L.), reported once from Wellington County, and Purple or Corn Cockle (*Agrostemma githago*, L.), very common in fall wheat, the seeds of which are found in screenings and are recorded as being poisonous to young chickens.

QUEBEC

FARMERS ASSISTED IN SECURING TRACTORS AND PLOUGHS

IN order to assist farmers in the province to increase the production of field crops, the Department of Agriculture has made arrangements with a large tractor manufacturing firm in the United States and with a plough company in Canada, whereby the farmers are enabled to purchase tractors of different capacities and ploughs of various sizes at prices much below the regular prices charged. Farmers who desire to take advantage of the arrangement are required to send the amount of the purchase price of the machines that they select to the Department of Agriculture, who will be responsible for placing the orders. In a circular letter sent to members of the clergy and to secretaries of farmers' clubs and agricultural societies and legislative councillors, in which the arrangement is explained and the prices of the machines given, farmers, who desire to witness these tractors in operation, are invited to write to the Oka Agricultural Institute, La Trappe, the Agricultural Representatives in Rimouski, Plessisville, Louiseville, Lennoxville and Roberval, or the Department of Agriculture at Quebec.

ONTARIO

THE KEMPTVILLE SCHOOL OF AGRICULTURE

BY W. J. BELL, B.S.A., PRINCIPAL

THE Eastern Ontario Agricultural School farm at Kemptville, in Grenville County, has harvested an excellent crop of hay and grain, and will have a good yield of roots and corn. The construction of buildings is well under way, and will, by the beginning of

the new year, be ready to receive students at the new judging pavilion. The farm of two hundred acres is representative of the soil over a large part of Eastern Ontario. That is to say, it is chiefly lightish in character and has rough patches, with shale rock plentiful. It is made up of two farms situated on either side of what will be the new Ottawa-Prescott highway. Each farm occupies a comparatively narrow strip on either side of the road, affording the best possible opportunity to be observed from the highway.

A DEMONSTRATION FARM

It is not proposed to make this an experimental farm in the sense that small plots will be used. The farm will be operated rather as a demonstration plant, where methods and varieties that have been proved good by test at Guelph and Ottawa will be grown side by side in sufficiently large areas to demonstrate the advantages of improved systems and kinds of crop.

There is much to be done in draining, grading, and fencing. Complete drainage surveys have been made, and plans prepared, and a drainage machine will be put into operation this year. The fences are practically all being renewed.

When the farm was secured some of the arable fields had been in grass for a dozen years or more. The farm will have an excellent opportunity of demonstrating to the farmers in the vicinity the folly of this too common method in the eastern part of the province. A four-year and a three-year crop rotation is being followed. By this system it is hoped that an abundance of noxious weeds, such as twitch grass and bind weed, will be completely destroyed. Twelve acres of orchard have been planted to the following varieties of apples: MacIntosh, Wealthy, Snow, Duchess, and Yellow Transparent, the three first-named varieties predominating.

THE LIVE STOCK

Already an excellent live stock foundation has been secured, some first-class animals having been purchased that will serve as excellent material for class-room work, will demonstrate the advantage of superior live stock in the neighbourhood, and, in addition, assist materially in making the farm profitable to operate. The surrounding country being devoted largely to dairying, no beef breeds of cattle will be kept. Holstein blood predominates in the herd, but the nucleus of an Ayrshire herd has been secured. We have been fortunate in securing descendants of such Holstein individuals as Johanna Rue 4th's Lad; King of the Pontiacs; Sir Lyons Syis; Boutsje Q Pietertje De Kol, whose record at 5 years was 20,668 lb. milk and 960 lb. butter, and Desta, ex-Canadian Champion, with a record of 27,128 lb. milk and

THE PIGGERY

1,048.75 lb. butter. A young herd sire has recently been purchased from the Ontario Agricultural College, whose dam, Molly Rue Rattler, holds the four-year-old Canadian championship. This young bull's four nearest dams have an average record of over 24,000 lb. milk.

The horse stock is of good draught type and of Clydesdale breeding. The two mares, Susie of Riches and Rosemary's Last, each three years old, are of an specially fine type. These will be used for breeding as well as demonstration purposes. The hog stock consists of Yorkshires of the approved type. It is proposed to establish a modern poultry plant and to stock it with bred-to-lay Plymouth Rocks and Leghorns.

Commercially the farm will be operated as a live stock, seed, dairy, poultry and truck farm. A motor truck will be used for marketing vegetables, fruit, eggs, etc., in Ottawa, thirty miles distant over the new highway.

THE BUILDINGS

Building construction is in progress. The completed buildings consist of a horse barn and a hog pen. An implement shed is being built and the live stock judging pavilion is well under way. The horse barn is 68 by 34 feet, with capacity for seven single stalls and two box stalls, with feed room, harness room, carriage room, and storage capacity for hay and grain. The hog pen is 66 by 20 feet with pens, yards and with elevated sleeping pens. One of the farms when taken over had a fairly good cattle barn. This is being remodelled, enlarged, and a silo erected. The farm house on this farm will answer as a home for the farm help. The other farm, on which the school buildings are being placed, possesses a very old, but substantially built, stone house. This is being remodelled. The judging pavilion, with dimensions of 85 by 51 feet, is a two-story structure of solid brick

THE HORSE BARN

construction. The lower floor will have, in addition to the judging pavilion with large ring and raised seats on either side, the office of the principal. The upper floor will be used for class room and lecture hall purposes. Eventually other school buildings will be erected on the high ground adjoining the judging pavilion; the lecture hall in the pavilion will then be used as a gymnasium.

PROGRESSIVE IMPROVEMENT.

The original barns on this farm were of small capacity and unsuitable for the purposes of the school. These have all been sold. A landscape plan is being prepared, which, when planted, will present an attractive appearance from the highway. The work of improvement and construction is not being hurried. Several years will be occupied in improving the farm and its equipment. Nothing elaborate is being done. In fact, it is the policy of the Department to demonstrate approved methods of farming in the best possible way rather than to build up a model without regard to cost of maintenance and operation.

During the coming winter months six weeks of short courses will be held on general agriculture, farm mechanics and domestic science.

This school is being established and will be carried on as a portion of the work of the Ontario Department of Agriculture under the provisions of the federal AGRICULTURAL INSTRUCTION ACT.

CO-OPERATIVE EXPERIMENTS WITH WINTER WHEAT

BY DR. C. A. ZAVITZ, B.S.A., SECRETARY, EXPERIMENTAL UNION

THE acreage of winter wheat harvested in Ontario in the present year was only about one-third of the average annual acreage for the past thirty-six years. The decrease was largely due to the light acreage sown last autumn and to the unusually large amount of winter killing.

From answers to inquiries sent to the farmers in the different counties of Ontario, eighty-one per cent. report that the Dawson's Golden Chaff is still the most extensively grown variety.

With the object of originating better varieties than those already in cultivation, crosses have been made at the Ontario Agricultural College between the Dawson's Golden Chaff and some of the varieties of particularly high quality for bread production. A cross made between the Dawson's Golden Chaff and the Bulgarian has furnished a new wheat which in six years has surpassed both its parents in average yield per acre and is almost equal to the Bulgarian in bread production. This variety has been given the name "O.A.C. No. 104," and has been distributed throughout Ontario in connection with the co-operative experiments in each of the past three years. It has made the highest record in each of these years. It proved to be one of the hardiest varieties in the test of the past year. This new wheat should be available in fairly large quantities by another season. It is being distributed in small lots for co-operative experiments this autumn to those who wish to test varieties of winter wheat. This new variety will be included in experiment No. 1 as given below.

Six tests are provided in connection with fall sown crops as follows:

1. Three Varieties of Winter Wheat;
2. One Variety of Winter Rye and one of Winter Wheat;
3. Spring Applications of five Fertilizers with Winter Wheat;
4. Autumn and Spring Applications of Nitrate of Soda and Common Salt with Winter Wheat;
5. Winter Emmer and Winter Barley;
6. Hairy Vetches and Winter Rye as Fodder Crops.

The size of each plot is to be one rod wide by two rods long. Suffi-

cient seed and fertilizer to carry on these tests are provided free by the college. Fertilizers for Number 4 are supplied this autumn and for Number 3 will be supplied next spring.

THE KHAKI UNIVERSITY

DR. G. C. Creelman, Commissioner of Agriculture for Ontario and president of the Ontario Agricultural College, is at present overseas in the interest of agricultural instruction in the Khaki University. This university is a peripatetic institution for the instruction of the men at the front who had commenced their studies in Canada, somewhat on the plan outlined by Dr. H. M. Tory, president of the University of Alberta, at the annual meeting of the Commission of Conservation, and published in the February number of THE AGRICULTURAL GAZETTE.

There are already 20 lecturing centres in England and France which have commenced the first year course in agriculture. Additional classes will be arranged as the opportunity and advisability arise. The suggestion is that the Ontario Agricultural College shall accord a man, who takes a year's instruction overseas, credit for the first year work of the College upon his return to Canada. This means that a returned soldier going in for the thorough course in agriculture will start at Guelph with second year work, if he has completed the first year in the Khaki University.

There are upwards of 575 graduates of the Ontario Agricultural College now overseas from whom lecturers can be chosen. To select men for this work is one of the reasons for Dr. G. C. Creelman's crossing the Atlantic. Dr. Creelman, who anticipates that his absence will cover at least two months, will also make a study of agricultural conditions in England and France, paying special attention to farms being worked by soldiers who have returned to private life.

JUDGING COMPETITIONS

JUDGING competitions for young men were held at the Canadian National Exhibition, Toronto, and at the Central Canada Exhibition, Ottawa. The competitions were conducted by the Agricultural Representatives Division and included, at Toronto, heavy horses, beef cattle, dairy cattle, sheep, swine, poultry, grain and roots, fruit and vegetables; while at Ottawa it was confined to the various classes of live stock. Considering the conditions due to the war, the classes were well filled, almost entirely by young men trained as junior farmers by the Agricultural Representatives. At Toronto there were from fifteen to thirty competitors in each of the different classes. At Toronto, the contestants had the privilege of entering one class of live stock including poultry and either grain and roots or fruit and vegetables. At Ottawa, each contestant had the privilege of entering two classes of live stock. At both Exhibitions each contestant in the live stock classes was given 20 minutes to judge the class, place the animals and write reasons. The papers were then collected and in each contest the contestant had to appear before a judge to give his reasons orally. The written reasons were only read in case of a tie.

High scoring was obtained in nearly every section. In the live stock and poultry classes 200 points were possible. In several instances

190 points were scored, and in the case of beef cattle, 196. In grain and roots, out of a possible 300 points, 264 was made. In fruit and vegetables, 300 points was the maximum, while the highest competitor's score was 265. The entries at the Ottawa exhibition were larger in the dairy cattle section, there being twenty-eight men competing, in beef cattle ten, in horses twenty, sheep fifteen, and swine twenty-one.

The judges who took charge of the classes were recognized authorities in the respective classes. At Toronto they consisted of officials of the provincial Department of Agriculture and prominent breeders of pure-bred flocks and herds. At Ottawa the judges were chiefly representatives of the federal Department of Agriculture and Macdonald College.

IDENTICAL VARIETIES OF POTATOES

BY JUSTUS MILLER, B.S.A. ASSISTANT COMMISSIONER OF AGRICULTURE

AT a conference of the Potato Council of Ontario held in Toronto on September 6th, the following varieties of potatoes were decided to be identical and are classed as Green Mountain.

Carman No. 1	Clyde.
Gold Coin (Vermont)	Delaware.
Dreer Standard (not Dreer Early Standard)	Green Mountain.
Green Mountain Jr.	Norcross.
Snow	State of Maine.
Uncle Sam	Wee MacGregor.

The experts present agreed that no one can distinguish between them as to plant, blossom, or tuber.

AGRICULTURAL REPRESENTATIVE ACTIVITIES

GREY COUNTY.

MR. H. C. Duff, Agricultural Representative, reports that a farmer in his vicinity who entered heartily into the Greater Hog Production movement has largely solved his labour difficulties by adopting self feeders in all his pens containing hogs weighing one hundred pounds or more. The results have been thoroughly satisfactory.

HURON COUNTY.

Mr. S. P. Strothers, Agricultural Representative, reports that a farmer in his district engaged farmerettes to hoe his sixty-eight acres of corn land, the labour of which, at fifteen cents per hour, cost $101.00. The work was satisfactorily done.

WELLINGTON COUNTY.

Mr. R. H. Clements, Agricultural Representative, carried out a Junior Farmers Improvement Automobile excursion to the Ontario Agricultural College, Guelph early in September. The soldiers' training farm was also visited. About forty cars were required to handle the excursion.

LENNOX AND ADDINGTON COUNTIES.

According to the report of Mr G. B. Curran, Agricultural Representative, most of the townships in his district are giving grants to school fairs amounting to about two dollars per school. This, added to the county grant of three dollars per school, helps materially in financing the prize lists of the school fair.

PROVINCIAL APIARIST

MR. B. N. Gates, M.A., Ph.D., late of the State College of Agriculture, Amherst, Massachusetts, has been appointed to succeed Mr. Morley Pettit as Provincial Apiarist for the province of Ontario. Dr. Gates was Assistant Apiculturist in the Bureau of Entomology in the United States Department of Agriculture at Washington from 1907 to 1910 when he became Assistant and Associate Professor of Beekeeping, Apiarist of the Experimental Station, and Inspector of Apiaries for the State of Massachusetts. He is a past President of the National Beekeepers' Association. Dr. Gates assisted his predecessor from time to time in carrying on short courses in the province of Ontario. Dr. Gates will hold the dual positions of Professor of Apia culture at the Ontario Agriculture College and Provincial Apiarist.

SASKATCHEWAN

LIVE STOCK DISTRIBUTION

THE Live Stock Branch has been successful in selling a large number of cattle to the farmers under The Live Stock Purchase and Sale Act. Animals were sent to a number of exhibitions and fairs throughout the province, and afterwards sold. The exhibits consisted of grade heifers, pure bred bulls, and cows with calves. This policy has done much to acquaint the people with the opportunities offered for commencing or augmenting their herds.

The summer fairs were utilized for selling cattle to farmers. At Regina, Saskatoon, Yorkton, North Battleford and Prince Albert exhibitions both males and females of various ages and breeds were disposed of and made up some eight carloads. Heifers brought from $65 to $75 each, cows about $110 and bulls from $250 up to $550. Sales were also made at a number of smaller fairs.

The Department announced that in order to give farmers who have sufficient feed on hand an opportunity to establish themselves in the cattle industry, arrangements have been made to sell to such farmers up to $2,000 worth of heifers on a half cash basis.

Some two thousand head of sheep have now been secured, which are procurable by farmers under the terms of the act. Most of these sheep have been bought in this province, but some have come from Alberta. While farmers can still get the common range ewes through the Branch as formerly, this year an endeavour is being made to furnish ewes graded up by the use of pure-bred rams several generations removed from the range type. These ewes, and pure-bred rams, will be supplied on the usual terms, and one individual can purchase sheep up to a value of $400 on a quarter cash basis, or $1,000 worth on a half cash basis. The ewes can be supplied, as the purchaser may require, either not bred or bred to a pure-bred ram, the latter being sold for November delivery.

EDUCATIONAL EXHIBITS

BY F. H. AULD, DEPUTY MINISTER OF AGRICULTURE

ON account of the scarcity of space at the Regina Exhibition the Department did not make its usual grain exhibit, but both the Department and the University had live stock exhibits and material.

The College of Agriculture had

on display exhibits of cattle, sheep, and swine, showing representatives of Shorthorn, Aberdeen Angus, and Ayrshire cattle, with their progeny, range ewes with their progeny when mated with Shropshire, Southdown, and Oxford rams, also Yorkshire and Tamworth sows with litters.

The Department had on exhibit a carload of two-year-old heifers and a number of pure-bred bulls to illustrate the class of stock that may be purchased from the Government by farmers on credit terms at cost.

BRITISH COLUMBIA

DAMAGE TO FRUIT TREES

BY E. W. WHITE, ASSISTANT PROVINCIAL HORTICULTURIST

THE fruit orchards, more especially in the Fraser Valley in common with many other parts of Canada, suffered serious damage from the severe weather conditions that prevailed last winter. An ice storm that occurred in December caused injury in splitting and breaking down many young trees.

The Horticultural Branch of the Department of Agriculture made plans to give all the assistance possible to growers in the sections which suffered damage. Subsequently, during the first week of March, a staff of practical and expert horticulturists was assembled and set to work under the supervision of the Assistant Horticulturist for the District.

It was the aim of the Department to have the Horticulturists visit every orchardist whose trees were damaged, and to give practical advice in regard to the best methods to be adopted in pruning, tree surgery, selection, cutting and storage of scions, grafting, top-working, spraying, and general orchard practices.

Agricultural Representatives and District Fruit Inspectors co-operated with the officials sent out by the Department, not only to give advice and demonstrations, but to help growers who were short of labour to repair damaged conditions.

ADVISORY BOARD OF WOMEN'S INSTITUTES

IN the organization of Women's Institutes in this province there is an Advisory Board of four women representing the four districts in which the province is divided. Heretofore, these have been appointed by the Department of Agriculture. It has been decided that in future the members of this Board shall be elected by delegates from the Institutes at the autumn conference to be held in October. Each district conference will elect a member of the Advisory Board to represent that district. In a circular letter sent to the secretaries of Women's Institutes in the province instructions are given as to the method of election. Each Institute is asked to submit the name of some member of the institute in the district. These names are to be sent to Mrs. MacLachlan, Secretary of the Advisory Board of Women's Institutes of the Department of Agriculture. A list of the names thus received will then be sent to each Institute. The Institute then instructs the delegates how to vote.

RETIREMENT OF THE DEPUTY MINISTER

MR. W. E Scott, Deputy Minister of Agriculture and Superintendent of Institutes in the province of British Columbia for the past ten years, has retired from public service. This has been necessary as a result of a severe illness which has left Mr. Scott incapacitated for office duties.

PART III

Junior Agriculture

DEMONSTRATIONS, COMPETITIONS, AND CLASS-ROOM STUDIES IN RURAL LIFE FOR BOYS AND GIRLS

DISTRIBUTION OF EGGS TO SCHOOL CHILDREN

PRINCE EDWARD ISLAND

IN Prince Edward Island boys' and girls' poultry clubs are organized only at school fair centres under the direction and guidance of Mr. McLarty, Director of Elementary Agricultural Education. The clubs must decide upon some one breed of poultry to be raised.

This year there were about 15 clubs organized with a total membership of about 175. Each member received a setting of 15 eggs, the price charged for a setting being $1.00. Payment for the eggs is made when the cockerels are sold this fall. An exhibit from the chickens raised must be made at the club school fair.

Each member is required to prepare an essay of not more than 250 words, setting forth the method of incubating and rearing the chickens.

NOVA SCOTIA

BY J. P. LANDRY, MANAGER AND LECTURER, POULTRY DEPARTMENT, AGRICULTURAL COLLEGE

WE distributed this year 610 settings of eggs to the pupils of the schools selected by the different inspectors throughout the province. Our plan has been to ask each inspector to select 15 schools in his district to receive each 4 settings of eggs to be distributed by the teachers to the pupils. Each pupil is required to pay 40c. per setting for the eggs. During 1915 we supplied the eggs free to the pupils, and the results were not as satisfactory as they have been since making the small charge for the eggs. This Department pays expressage on the eggs to the teachers. We have made no effort to organize a boys' and girls' poultry club in the schools owing to the fact that it would entail a great amount of work carrying on the organization. We, therefore, asked the teacher to give a report on the results obtained in hatching these eggs. Our own poultry plant supplied a great number of these eggs. A number of flocks of fowls are selected and the eggs obtained from these flocks in the neighbourhood. Several well-known breeders in the province supplied us with lots of 100 or 200 eggs for this distribution. The improvement of the flocks kept by the pupils has been progressing very favourably, as shown by the quality of the exhibits at the fairs and school exhibitions. The distribution of eggs has been underway in this Department since 1915. During that year we supplied 680 settings. During 1916 we supplied 480 settings and in 1917, 715 settings. We have also supplied in the neighbourhood of 300 settings to school pupils who made application,

independent of the distribution to the schools *via* the school teachers. Owing to the extent of the province, and the limited time for conducting this work, we found it would not be practicable to organize school clubs, and decided to follow this system in distributing the eggs.

NEW BRUNSWICK

BY A. C. M'CULLOCH, POULTRY SUPERINTENDENT.

APPROXIMATELY twenty-five thousand eggs have been distributed to members of boys' and girls' poultry clubs in New Brunswick this year. Our supply was obtained from Maine, Prince Edward Island, and Ontario. The eggs obtained from Maine and from Ontario came from flocks which have been bred especially for high production. Some of them have been bred for high production as long as fifteen years. Practically all of this stock I inspected personally before purchase was made. A great deal of it has in its make-up bred-to-lay blood from the University of Maine. The eggs, about 2,000 in number, obtained from Ontario, were of the O.A.C. bred-to-lay strain pure. That speaks for itself. The eggs imported from Prince Edward Island were from some of the best producing farmers' flocks on the Island. Practically all of the eggs imported were Barred Plymouth Rocks.

We have not as yet established any breeding centres in this province for our supply of eggs. Something along this line, however, will no doubt be undertaken very soon.

This is the first year that eggs have been distriubted to clubs not in connection with the schools. Poultry clubs in connection with the schools or school children have been under way for three years. In the distribution of eggs to boys and girls poultry clubs not connected with the schools, we have sent the eggs by express to the particular point where the club is in operation and a representative of the Poultry Division received them, distributed them to the boys and girls, and, where possible, set them, or at least gave instructions on how to do the same. Before being sent to the clubs however, these eggs were all unpacked and repacked at this office.. At this time undesirable eggs are eliminated. In the case of distribution to schools the eggs are sent to the teacher by express, and each member is given his or her allowance. I am inclined to think the former method is more satisfactory, in that we have at least an opportunity of giving the members first-hand instructions in the setting of their hens, etc. Reports from the boys' and girls' poultry clubs, not in connection with the schools, show a hatch of about 50 per cent. Figures are not available for the proportion hatched of those sent to schools.

The effect of our distribution of eggs is hardly apparent as yet, as this work has not been conducted on an extensive scale until this year. It will, however, no doubt result in a material increase in the laying ability of the general stock of the country, an increase in the number of birds kept, and to a certain extent in the standarization of our stock. The latter is due to the fact that practically all the eggs distributed are of one variety, Barred Plymouth Rock.

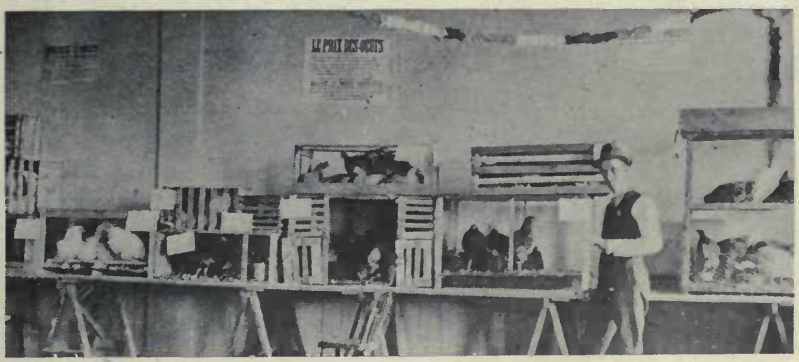
QUEBEC

BY A. G. TAYLOR, B.S.A., POULTRY DEPARTMENT, MACDONALD COLLEGE

REALIZING the need of improved conditions and better-bred poultry on the farms in the province of Quebec, the Poultry Department of Macdonald College distribute each year to the school children in the province a large number of settings of eggs. These

eggs are all from selected flocks of hens and all of the Barred Plymouth Rock breed.

Breeding flocks have been established in several counties, some districts having a number of these flocks. Each flock is inspected twice or three times each year and only the best and most desirable birds are used as breeders. Only birds showing good vitality and robust constitution are used in the laying pens. Male birds from selected strains are supplied each year from the college poultry department to head these breeding flocks. In this way the Poultry Department hopes to standardize the poultry industry throughout the province. The Barred Plymouth Rock was chosen because of its desirable qualities as an egg and meat producer.



CHICKENS PRODUCED FROM EGGS DISTRIBUTED TO SCHOOL CHILDREN

RULES AND REGULATIONS

The rules and regulations governing the work of these breeding flocks are very simple indeed. Females must be of desirable breeding, preferably of Macdonald College strain. Show qualities are not desired, but the birds must be of good utility type and of good laying strain. The male birds heading these pens must be purchased from the college each year. Only good vigorous well-matured birds of heavy laying strains are sent out to head these pens. Cockerels usually give higher fertility than older male birds, and by changing the male birds annually there is little danger of inbreeding. The entire output of eggs during the hatching season, less those used by the owner of the flock for his own private hatching work, is supplied to the college and the price per dozen varies with the season. This year 75 cents per dozen was the price paid. Only good hatching eggs are accepted, —eggs of uniform size, sound in shell, clean, and free from unevenness in shell formation. Eggs are shipped to the college once each week. In a number of districts the eggs are shipped to the county Agricultural Representative and distributed by him to the school children. By this method the eggs reach the hands of the children much fresher and with little shaking due to rough handling. Each child receives one dozen eggs as a setting, and two to four settings are allowed to each school, depending on the number of children in attendance.

PROGRESS OF THE WORK

This distribution of hatching eggs to school children has been carried on since 1914 and has increased each year. One of the principal reasons for the increase in the number of settings given out is the better understanding between the college and the

farmer. The farmer and his children are now very much in sympathy with the movement and do all in their power to assist those in charge of the work. We look forward with assurance that the work will continue to increase as the years go on because of the interest shown and the increasing demand for poultry instruction.

The distribution of eggs to the school children is carried out through the Rural School Department of Macdonald College, and also through the Agricultural Representative in the various counties. Both these methods have proven very satisfactory. There is a very little close relationship between these two departments, each assisting the other whenever possible. The school fairs are also conducted in the same way. The college supplies most of the judges, makes up and prints the prize lists, and assists in the organization of the school fairs. The County Demonstrators are responsible to the Quebec Department of Agriculture. The eggs are also paid for by the Department.

THE DISTRIBUTION

Eggs were distributed this year as follows:—

By Rural School Department—

County.	Settings.
Argenteuil	59
Compton	105
Missisquoi	57
Brome	48
Wright	31
Total	300

By Representatives—

County.	Settings.
Huntingdon	67
Chateauguay	63
Beauharnois	18
Megantic	48
Sherbrooke	133
Stanstead	62
Richmond	99
Pontiac	168
Total	658
Grand total	958

Hatches have been about normal, but no definite information is at hand to tell the exact per cent hatch. Last season the hatch was about 75 per cent, with about 60 per cent of the chickens maturing.

INSTRUCTION AND RESULTS

Information is supplied to the children when the eggs are given them in the spring, telling them how to set the hen, care for the chicks, etc. Instruction on how to care for the chicks during the summer, how to show them at the school fair, and how to care for them during the fall and winter months is also supplied during the summer and fall months. The quality of the poultry throughout the province has been improved to a very marked degree by the distribution of eggs to the school children, and the instructions sent out serve to cultivate in the minds of the older people a desire for improved methods of feeding, housing, etc. With improved blood entering the flocks of the county each year and better methods of feeding and housing the school fair system of assisting the farming community to better poultry conditions on the farm can have but one effect—advancement.

BY BROTHER M. LIGUORI, POULTRY DIVISION, QUEBEC

THIS year as usual a distribution of eggs for hatching was made by the Poultry Division of the Province of Quebec to the pupils of the rural schools, who hatch these eggs under the direction of special instructors.

A number of our instructors having reported for military service this year, only 27,000 eggs, or 2,300

settings, were distributed. Most of these eggs were from the so called utility or American breeds chiefly the Rhode Island Red, with a certain proportion of Plymouth Rocks and a small quantity of Wyandottes. The Rhode Island Red appears actually to be the favorite breed in the province.

The bulk of the eggs are supplied by the twenty poultry stations of the Provincial Department of Agriculture, the members of the Quebec Farmers' Experimental Union and the Macdonald College.

SUPERVISION

A close watch is kept during the winter and the spring over the flocks supplying these eggs by the instructors of the Poultry Division, who also supervise as much as possible the production and transportation.

The average number of chicks raised from these eggs was 49% of the total number of eggs set for incubation. This is the actual number of chicks raised: the proportion of hatching was a little larger, about 55%. The number of chicks raised is satisfactory but the hatching is not quite so good.

CAUSE OF FAILURES

Most of the failures in hatching are due to the condition in which the roads were at the time of shipping (March and April). There would be less risk, if the distribution could be done in May, but it is necessary, that these eggs should hatch in April or at the beginning of May, so that the chickens may be shown at the fall school fairs and so that the pullets may start to lay in the fall.

THE DISTRIBUTION

The distribution of the eggs to the schools is done by Government poultry instructors and Agricultural Representatives, who give all needed information for a successful hatch to the children and teachers and who visit, whenever possible, the home of the pupils during the hatching and during the first period of raising.

In the fall, the public are invited to show their chickens at the agricultural school fairs and prizes are granted to the best. Other systems of supervision have been tried, but it is considered that the above is the best under all circumstances. Some supervision was also exercised by school inspectors, but most of those inspectors have their time pretty well taken by their regular duties during the incubation season, and can only give us moral help.

We consider that this distribution of eggs for hatching serves two good purposes: introducing and distributing good breeds of fowls throughout the country and encouraging the child to think out his breeding operations and study the laws of breeding.

ONTARIO

THERE are in operation in almost every county from three to five poultry breeding centres. These centres constitute flocks of bred-to-lay Barred Plymouth Rocks produced from eggs supplied primarily from the Ontario Agricultural College in connection with the school fair work conducted by Agricultural Representatives. Centres are operated by successful poultry raisers selected by the Agricultural Representatives. In most cases no other flock is kept, although in cases where others are kept, the centre flocks have to be kept separately, especially during the breeding season. These flocks vary in number from twenty-five to as high as one hundred and twenty-five. Cockerels are supplied to these centres direct from the college flock and are from selected bred-to-lay strains only. The cockerels are purchased from the county

grant and are placed at the breeding stations until the breeding season is over when they are disposed of and the proceeds placed to the credit of the county grant.

These poultry centres constitute the source of supply of eggs for the pupils to raise chickens for the school fairs. About 130,000 eggs were thus distributed this year. Each centre is bound to supply first the eggs needed for the schools in the district in which they are situated. After these are supplied they are allowed to sell to others.

Settings are distributed to the schools by different methods. In most cases they are delivered to the schools by the Agricultural Representatives, but this year the parcel post system was tried in a number of counties. This latter method was found quite successful when the eggs were not required to pass through more than one or two offices. When several changes in the routes were necessary the hatching results were unsatisfactory.

At the recent conference of agricultural representatives Professor Graham brought up the question of having these centres officially inspected. The Representatives regarded this favourably, considering that it would be of great advantage in raising the standard of the flocks in the country and ultimately of the poultry breeding industry in the province. The object of the inspection, which would be carried out in July, August and September, is merely to select the heavy layers from the others in the flock. The system of inspection would be that adopted by the International Poultry Association, published in the September number of THE AGRICULTURAL GAZETTE.

MANITOBA

BY S. T. NEWTON, DIRECTOR, AGRICULTURAL EXTENSION SERVICE

WHEN boys' and girls' clubs were first organized in Manitoba six years ago, chicken raising, corn growing, and potato growing were the three contests included under boys' and girls' club work, and a dozen eggs, 10 pounds of potatoes, and 3 one-quarter pound packages of corn were supplied to each member who enrolled.

The number of contests have been gradually increased until now there are twelve, but each member is urged to not take part in more than three or four contests. The larger number of contests permits the club members to have a considerable latitude as to their choice of contests, and insures each one undertaking the line of work which appeals most to him, and, as a result, a remarkably large number of the members carry their work to a successful conclusion at the school fair, in September and October.

Throughout the whole six years chicken raising has been one of the favoriute contests, and one club member in every three can always be counted on for chicken raising.

For the first three years, eggs were supplied free to all members who enrolled in the chicken raising contest. For the next two years, eggs were supplied free only to new clubs or branch clubs. This year eggs were supplied only to new members, who each paid 40 cents a dozen to held defray the expense of providing cartons, paying express, etc. The only breeding centre yet established in the province is at the Agricultural College, but the demand for eggs and baby chicks by adult poultry raisers has been so great that very few eggs have been obtained from that source.

For Manitoba we have settled on the general policy of recommending the Barred Rock as being the most suitable for Manitoba conditions. But owing to the fact that it is necessary for us to obtain nearly all the eggs needed for boys' and girls' club work from poultry raisers in the

province, and to the fact that there was not a sufficient number of pure bred flocks to meet the demand, it has not been deemed advisable to limit the eggs supplied to boys' and girls' clubs to Barred Rocks. An effort has been made, however, to only supply one breed in the same neighbourhood. Last year 25,320 eggs were supplied to clubs, and this year 35,004.

Possibly no phase of boys' and girls' club work has been less encouraging than that of providing eggs for club members, for although the judges at the school fairs claim that there is a marked improvement in the quality and number of chickens shown at the fairs, and the freely expressed opinion of parents and teachers that it is a splendid idea, we receive more complaints in this division than any other, mainly for the following reasons:—

1. Many people suppose all of the eggs come from the Agricultural College, and being college bred they must be vastly superior to ordinary eggs, and should hatch better. Less than 5 per cent come from the college.

2. It has proved somewhat difficult to have shipments made direct from the producer to the club, consequently eggs have had to be shipped twice, and quite often while in transit one way or the other extremely cold weather has been encountered, with the result that a number are chilled.

3. Frequently the poultry raisers have a limited number of pure-bred hens. These are closed off from the rest of the flock, and not having free range, less fertile eggs are produced.

4. Owing to express handlers having less experience than formerly, a larger number of eggs were broken in transit than in former years.

It is only natural for us to hear the unfavourable side, as where a dozen settings turn out well, we hear nothing of them, whereas if the hatch is small or the eggs broken in transit, we hear of it in quick order. It will not be possible for us to get a definite report on the percentage of chickens hatched until the fairs are held, and the record books examined. From enquiries made, and other reports received, it would seem that about five chickens hatched out of every dozen eggs supplied. On each box of eggs sent out a notice was printed that if there were less than 5 chickens from the setting to write to the Extension Service, and while 2,917 settings were supplied only 20 reported having less than 5 chickens.

As boys' and girls' clubs have now been organized in every part of the province, and through them good foundation stock has been established it is not the intention of the Extension Service to supply eggs next year

At a number of places this year, pure-bred male birds were loaned to club members who had good flocks, and the intention is to extend this plan next year, in an effort to further improve the many good flocks now found in every part of the province.

Boys' and girls' clubs having now been in operation for six years; the champion chicken raisers of the early days now take delight in exhibiting a fine pair of pigs or a pure-bred calf, while the younger members of the family find their greatest interest in chickens.

BRITISH COLUMBIA

BY J. R. TERRY, CHIEF POULTRY INSTRUCTOR

THERE are twenty-three poultry clubs in the province this year with a total membership of 176. The largest club has 51 members and the smallest, 8.

The clubs are managed by the children themselves, after once being organized by an adult. If eggs are unobtainable locally, the Department secures suitable eggs and sells the same to the children at 50 cents per setting of 13 eggs. This year fourteen of the clubs secured eggs from the Department, the favourite breed

being the White Wyandotte, followed closely by the Barred Rock.

Eggs are purchased from commercial poultry farms, preference being shown to those farms which have made good records in our provincial egg-laying contest.

This is the third year that clubs have secured eggs from the Department, although there have been clubs in connection with our local poultry associations for the last five years. These were not under our jurisdiction.

We get very satisfactory results from the present method in vogue here. We purchase the eggs at rates per hundred and pay express to the clubs as well.

A total of 1,133 eggs were sent out, the remainder of the clubs purchasing their eggs from local sources. Hatches average 68 p.c. A very marked improvement has been noticed in the quality of the general farm flocks, even during the first year. This province doubtless has more pure-bred poultry in proportion to the stock kept than any of the others. During the past two years, numbers of farmers availed themselves of the opportunity of purchasing eggs and cockerels from the contestants of the clubs. In one instance, a girl competitor sold three utility White Wyandotte cockerels in a mining section of the province for $5 each, and also sold settings at $2.50 per 15. The ranchers are getting dissatisfied with their scrub after seeing the stock raised by their own children.

Should a club decide to keep the same breed the next year and desire eggs from the Department, eggs from a different breeder are sent.

SASKATCHEWAN

HOUSEHOLD SCIENCE PROGRESS

BY J. T. M. ANDERSON, M.A., LL.B., INSPECTOR OF SCHOOLS, YORKTON

NO province in Canada has made such rapid strides in several matters educational as has Saskatchewan during the past few years Of course much yet remains to be done but that it will be done, and well done, no one need doubt Dr. Foght's report is before the public and its contents are being read and digested in every corner of the province. It will take time to carry into practical operation many of the excellent schemes he outlines, but the most vital reforms advocated will receive careful consideration during the coming months.

This year the Department of Education has sent out two Assistant Directors of Household Science, one, Miss Neelands, being stationed at Swift Current, and the other, Miss Hiltz, at Yorkton. These capable young ladies accompany the Inspectors of Schools on visits to the rural and village schools and discuss various phases of their work with the teachers, trustees, and parents.

A report has been received from Miss Hiltz, of Yorkton, which shows the welcome reception given by teachers and ratepayers to this important branch of child development. She has visited many schools and has directed her efforts, so far, largely to having the warm noon lunch idea carried out. Since coming to the Yorkton inspectorate in June, Miss Hiltz has succeeded in having a dozen schools provided with excellent equipment for serving warm dishes to the pupils who remain at school during the noon hour. Two schools have added "dining rooms" to their school buildings and others contemplate providing these in the near future.

Much of Miss Hiltz' work lies in the non-English districts. One example will suffice to show the response she met with in the Ruthenian settle-

ments: Mostetz school had been asked to purchase a noon lunch outfit suitable for catering to the needs of the fifty children enrolled. Word was sent that Miss Hiltz would be at the school on a certain Monday to remain two days. The parents were asked to provide a supply of milk, eggs, etc. When she reached the school she found a full supply of cups, saucers, cooking utensils, spoons, etc. Almost everything necessary had been purchased except an oil stove and that had been ordered. As for milk, eggs, etc., there was enough of these to start a modern cafe. The first day hot cocoa was made by certain pupils and served to the fifty scholars at noon. All were intensely interested. One boy who helped "keep house" at home remarked that he would add this dish to their daily menu. The next day another dish was served. The pupils in the senior classes wrote out the recipe and were advised to provide similar dishes at their homes

Many other Ruthenian schools are engaging in this work and others will follow as soon as Miss Hiltz has visited them Wonderful possibilities lie before those engaged in this work. These children must be taught how to sew and cook as well as how to read and cipher. They must be taught concerning our home life—our modes of housekeeping. Politeness, table etiquette, cleanliness, hygiene, etc., must be inculcated in these schools. The work being done by Miss Hiltz will assist materially in accomplishing this desired end.

The agreement of the British Government to buy the output of Australian wool for two years constitutes the greatest wool transaction in history. It is estimated that the amount involved exceeds five hundred million dollars. The Acting Prime Minister of the Commonwealth in announcing the purchase said: "The flat rate is 1s. 3½d. per pound of greasy wool, plus charges to cover expenses from the wool warehouse to f. o. b. steamer. The Australian wool growers will participate to the extent of 50 per cent in any profit accruing from the sale of wool for other than British Government purposes. The conditions as to appraisement payment are as per current contract. The control will remain in the hands of the Central Wool Committee which has successfully conducted the wool scheme since its initiation, and which has the confidence of the wool growers. Before negotiations were opened it was necessary for the Central Wool Committee to arrange for the storage in Australia of large quantities of wool at three or four principal ports, in order to take advantage of every available ton of shipping. To Commonwealth wool growers and sheep breeders this Imperial Government wool purchase gives a security previously unknown in the pastoral history of Australia, and the circulation of the proceeds practically means stability to financial and commercial institutions throughout the Commonwealth for the period covered by the agreement."

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications and Notes.

THE QUESTION OF A NATIONAL FLOWER

The question of settling upon the selection of a flower as a national emblem for Canada has received much attention since the movement was set on foot and discussed in THE AGRICULTURAL GAZETTE commencing in January number this year. In various quarters claims for consideration on behalf of several native species have been made from time to time. Champions of the pansy, the red tiger lily and the perennial aster have something to say for their respective selections. A correspondent from St. John, N. B., writing to Mr. F. E. Buck, assistant in ornamental gardening at the Experimental Farm, Ottawa, and Chairman of the local committee in charge of the question of a national flower makes the following claims for the pansy:

THE PANSY

1. The Pansy will grow "over there" where great beds are seen.
2. It will grow anywhere in Canada.
3. It will grow indoors or outdoors.
4. It is a suitable flower for the purpose Overseas—the adornment of the graves of fallen Canadians.
5. The varied colours make the Pansy a desirable flower. If desired, the various colours could be used for the different branches of the Service, say, white pansies for graves of the Flying Corps, dark blue for the Navy, and the mixed colours for all other arms of the land forces.
6. The Pansy blooms from early spring to late Autumn.
7. It is well known, admired and loved by everybody.
8. It is a companionable flower in that it is not poisonous—its pollen is no menace.
9. It is a favourite flower for home decoration and also for personal adornment.
10. It is a flower of desirable character and beauty for a National flower.
11. The Pansy is adaptable for use in drawing, painting, literature and song.
12. It suggests beautiful faces—reminding us of the reports of the Canadians, that the faces of their fallen comrades looked more beautiful than ever before.
13. The Pansy stands for "Thoughts".
14. It ranks in character with the chosen floral emblems of other countries.

Why not "adopt" it and raise it to National honour and distinction?

The Canadian boys in the New Brunswick Depot Battalion grew pansies in boxes in the windows of their buildings. That gave me the suggestion. Am I not right in the choice?

THE RED TIGER LILY.

The Tiger Lily of Canada (*Lilium Philadelphicum*) may be seen from the train as it rushes across the Dominion from the Pacific to the Atlantic, on the sides of the mountains, along the prairies, and in the shadow of the forests, during the months of July and August. It is one of the most general and beautiful of Canadian wild flowers. There is a suggestion that it may be adopted as the national flower. (See page 519, THE AGRICULTURAL GAZETTE of Canada for May, 1918.)

The red, red Tiger Lily flaunts itself along the line
Its petals stand up bravely in the shadow, rain or shine,
'Tis spotted like its namesake, or a dainty speckled trout,
Where a tiny lip of honey from its heart is peeping out.
As the troop trains speeding eastward bore our boys away to fight,
The red, red Tiger Lily from the windows met their sight;
And one hero wrote his mother, from the trenches mud and gloom,
Do not worry dear, I'm coming back, when Tiger lilies bloom.
On a stricken field in Flanders—the land where poppies blow,
I saw a hillside, a deeper crimson glow;
'Twas the red, red Tiger Lily, planted by a comrade's hand,
Where a gallant boy from Canada had made his final stand.
His life is in the petals of that Tiger Lily red,

Its cup is full of brown stains from the blood he bravely shed:
Where they stopped the raging flood of Huns which swept across the Rhine,
Like the lads from its dear homeland, it is holding down the line.
You may tell of English roses, or the lilies fair of France,
Of Scotland's hardy thistle, or the shamrock's green perchance,
Maybe the violet's sweeter, or the primrose is more gay,
But the red, red Tiger Lily stands for Canada to-day.

R. McD.

THE ASTER.

"O dainty little lady with your starry purple eyes,
The autumn day is calling me with rustlings and with sighs;
In your royal gold and purple you are wonderfully fair,
Among the swaying golden rod with sunlight in your hair."

Eloise Street.

If a flower has accompanied you across a continent of nearly three thousand miles, smiling at you in friendly greeting and nodding many good-byes in parting, and if it should be so sweet and intelligent and wholesome as the purple aster, there would seem to be something to be said for it as a national flower, should there be a contemporary demand for such an emblem.—The Globe, Toronto.

ASSOCIATIONS AND SOCIETIES

EVENTS OF THE COMING MONTHS.

October 1 to 5.—Soil Products Exhibition, Victoria, B.C., George I. Warren, Secretary Manager.
October 23 to 24.—Manitoba Sheep and Swine Breeders' Sale, Brandon, W. I. Smale, Secretary.
" " Soil Products Exhibition, Edmonton, Alta., W. J. Stark, Secretary Manager.
" " Alberta Sheep and Swine Breeders' Sale, Edmonton W. J. Stark, Secretary Manager.
October 30 to 31.—Alberta Breeders' Annual Auction Sale of Sheep, Swine and Dairy Cattle, Calgary, E. L. Richardson, Secretary Manager.

WOMEN'S INSTITUTE MEETINGS

Women's Institute conventions will be held in British Columbia as follows:—
October 8–10.—At Kelowna, for Okanagan and North Thompson Districts.
October 14–15.—At Kaslo, for Kootenay and Boundary Districts.
October 21–23.—New Westminster, for Lower Main Land District.
October 29–31.—At Victoria, for Vancouver Island.

Mr. Wm. Bonavia, Department of Agriculture, Victoria, is the secretary.

October 17–18.—Eastern Convention of Ontario Women's Institutes, Ottawa, G. A. Putnam, Toronto, Secretary.
October 30–31.—Western Convention of Ontario Women's Institutes will be held at London.

The Central Institute Convention will be held at Toronto during the second or third week of November.

The fifty-fifth annual meeting of the Entomological Society of Ontario will be held at the Ontario Agricultural College, Guelph on November 6th and 7th, 1918. Mr. A. W. Baker, Ontario Agricultural College, is secretary.

The Alberta Provincial Poultry Show will be held at Calgary, November 26th to 29th.

The Alberta Winter Fair at Calgary will be held December 10th to 13th.

The Alberta Auction Sale of cattle, females of beef breeds, will be held at Calgary, December 10th to 13th.

NEW BRUNSWICK UNITED FARMERS.

At a meeting of the United Farmers of New Brunswick, held at Woodstock, N. B., on August 22nd, the statement was made that the membership had reached a total of 1,000 and that stock had been sold to the amount of $6,000 for the co-operative branch of the association. Resolutions were passed expressing satisfaction at the progress of the war in France; pledging the United Farmers of the province to exercise every effort in the way of greater production; expressing gratification at the leave granted to soldiers in training to take part in harvest work; expressing appreciation of the fact that the Government decided there should be no harvest excursion this year from the Maritime Provinces to Western Canada; expressing the opinion that in agricultural legislation affecting the province, the United Farmers as an organization should be consulted, requesting the Government to buy hay direct from the farmers of the United Farmers Co-operative Company of New Brunswick, instead of through the produce dealers, and deciding to memorialize the Government not to set the price of hay or any other farm product below the cost of production, or what the regular market would offer.

NEW PUBLICATIONS

DOMINION DEPARTMENT OF AGRICULTURE

Report of the Minister of Agriculture for the year ending March 31st, 1918. This report contains, in addition to the Migratory Birds Convention Act, a synopsis of the operations of the various branches of the Department, with two appendices, the first reviewing the work of the Public Health Branch, and the second that of Exhibitions. The report constitutes a volume of ninety-six pages.

THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF HORTICULTURE

Peach Canker—by W. A. McCubbin, M.A. Assistant in Charge of Fruit Diseases, Dominion Plant Pathological Laboratory, St. Catharines, Ont. This is bulletin No. 37, second series, and consists of 40 pages, including 6 full page plates with explanatory notes. The nature of the disease from its first appearance, with full description of methods of control and cure, is set forth. The bulletin is the result of six years' investigation by Mr. McCubbin.

Circular No. 15, prepared by Mr. W. T. Macoun, Dominion Horticulturist, deals with the selection and wintering of biennial vegetables for seed. Briefly and plainly, information is given of the most successful methods of wintering cabbage, celery, beets, carrots, parsnips, salsify and turnips, resulting from experiments at the Central Experimental Farms.

THE ANIMAL HUSBANDRY DIVISION.

The Self-Feeder for Hogs, designated "Special Circular No. 15," a four-page leaflet by G. B. Rothwell, First Assistant Animal Husbandman, explains the use and the advantages of the self-feeder and the method of its construction.

THE DIVISION OF BOTANY.

Diseases of Tomatoes.—Mr. W. A. McCubbin, M.A., in charge of the Field Laboratory of Plant Pathology at St. Catharines, Ontario, is the author of this publication, designated "Bulletin No. 35." This treatise is based on information derived from the Division of Horticulture and Botany of the Experimental Farms and of the Entomological Branch of the Department of Agriculture.

THE FRUIT BRANCH.

The One Hundred and Sixty Apple Recipes is the title of a pamphlet prepared to awaken in the minds of the consumer of Canada the great necessity of not only conserving food for the Allies, but also to emphasize the great value of the apple as an article of food. Besides the recipes, lists are given of varieties of apples to be used in each of the several seasons when apples are available in fresh form.

THE HEALTH OF ANIMALS BRANCH.

Meat inspection Circular No. 23, gives recent modifications that have occurred in the staff at the various establishments under inspection. Instructions are given to meat inspectors and operators of packing houses called for in the Meat Inspection Act and regulations thereunder.

THE ENTOMOLOGICAL BRANCH

Canadian Bark-Beetles, Bulletin No. 14, (Technical Bulletin).—Mr. J. M. Swaine, Assistant Entomologist in charge of Forest Insect Investigations, has written and prepared a comprehensive study of the Canadian bark-beetle. The bulletin is divided into two parts. The first part devoted to descriptions of new species, comprises 32 pages. The second part, consisting of 143 pages is devoted to a preliminary classification with an account of the habits and means of control. The latter is very elaborately illustrated with full page plates accompanied by explicit explanatory matter. In this letter of introduction, Dr. C. Gordon Hewitt, Dominion Entomologist and Consulting Zoologist, points out that the bark-beetle constitutes the chief insect enemy of our coniferous forests. He adds that competent authorities are of the opinion that the annual loss caused by the destruction of these and other forest insects which are widely distributed throughout the country, is greater in the aggregate than the loss due to forest fires, which, it is needless to say, is very serious. The bulletin has been written with the object of assisting students and practical foresters in determining the bark-beetles of Canadian forests.

ONTARIO

The Report of the Minister of Agriculture for the year ending October 31, 1917, recently published, is preceded by a frontispiece showing the motor bus for the use of returned soldiers, presented to the Military Hospitals Commission, and purchased with money derived from the sale of patriotic buttons by children at rural school fairs. The report contains a full summary with illustrations and statistics of the operations and activities of the various branches of the Provincial Department of Agriculture for the twelve months referred to. Reports are included of both the Ontario Agricultural College and the Ontario Veterinary College, also of the Bureau of Industry.

Drying of Fruits and Vegetables. Circular No. 12 of the Women's Institute, consisting of 24 pages, gives instructions for the drying of fruits and vegetables and the preservation of vegetables by fermentation and salting. The circular is handsomely illustrated and very complete in its contents.

Manual of Elementary Agriculture and Horticulture, by J. B. Dandeno, Ph.D., Harvard, Inspector of Agricultural Classes for Ontario. This manual has been published in the hopes that it will be of assistance to the teachers. It might also serve to bring more fully to the minds of the instructors of the summer courses in agriculture, the body of material to be made use of, and the character of the instruction likely to be most serviceable in forms III and IV (grades five to eight) of our public and separate schools. The manual is from the publishing house of Wm. Briggs, Toronto.

Report of Beekeepers' Association for 1917, This volume of 65 pages gives the officers of the association for 1918, the treasurer's report for the year ending October 31st, 1917, and the addresses delivered and business transacted at the annual meeting held in December, 1917.

Common Diseases of the Digestive Organs of Horses and Cattle.—Dr. J. Hugo Reed, Professor of Veterinary Science at the Ontario Agricultural College, is the author of this, publication, designated "Bulletin 264." It is a popularly written hand-book, suitable for farmers.

SASKATCHEWAN.

The fourth annual report of the Co-operative Organizations Branch deals with agricultural co-operative association, summary of business transacted and reports of enterprises conducted by the Branch, including wool marketing, poultry marketing, feed distribution, and other services. The report covers the year ending April 30th, 1918.

BRITISH COLUMBIA."

Bulletin No. 80, "Management of Market Rabbits and Directory of Breeders," has been issued by the Live Stock Branch. It is prepared by Mr. J. R. Terry, Chief Poultry Instructor. It deals with suitable selection of stock, with housing, feeding, breeding, killing, dressing, marketing, and treatment for sickness and disease. The Directory gives the addresses of breeders of Belgium Hares, Flemish Giants, Polish, New Zealand Red, Siberian Hares, American chequers, and common rabbits.

The First Annual Report of the Land Settlement Board of the province of British Columbia, for the year ending December 31st, 1917, recently made public, gives full details of the work of the Board from the date of its being brought into operation namely, on the 16th day of July, 1917. A summary of the Report, with an account of the policy and constitution of the Board, was given in THE AGRICULTURAL GAZETTE of Canada for September.

MISCELLANEOUS

The Director of Public Information has issued a pamphlet summarizing particulars of the national effort made by Canada since the commencement of the war. The record is intended to mark the beginning of the fifth year of the war. It is a pamphlet of 32 pages, concluding with a chart showing the organization of the Canadian Government and its development during the war.

The Dominion Grain Research Laboratory of the Department of Trade and Commerce has published a "Report of the Trial shipment of Bulk Wheat from Vancouver *via* the Panama Canal to the United Kingdom." The report is styled "Bulletin No. 1" and has been prepared by Frederick James Birchard, Chemist in charge, and Alfred Woodley Alcock, Assistant Chemist. The bulletin is illustrated with numerous diagrams and constitutes a publication of 20 pages.

The Department of the Interior has published a supplement to "Maps Available for Distribution from the Natural Resources Intelligence Branch." The publication contains a synopsis of regulations governing the granting of Homesteads, purchased homesteads, pre-emptions, mineral rights, grazing leases, timber berths and irrigation schemes, with statistical information relating to Western Canada.

NOTES

Mr. James C. Miller, B.Sc., Ph.D., for several years Provincial Director of Technical Education in Alberta, has left the Department of Education to take up work with the United States Government.

The Government of Quebec grants to students taking the regular course in the School of Household Science at Macdonald College, belonging to the farming community of the province, in the junior and senior years, a bursary ranging from $20 and not exceeding $50 each.

The Department of Agriculture of Quebec grants to each student belonging to the province, attending the School of Agriculture at Macdonald College, and employed in study according to the time tables, $7.00 per month of attendance.

The annual International Soil Products Exhibition and Dry Farming Congress will be held in Kansas City, Missouri, from October 16th to 26th. As usual, a number of exhibits from the western provinces will be in evidence. The Government of Saskatchewan will pay the freight charges of all individual exhibits from that province.

The United States Railroad Administration has established a department known as the Agricultural Section, whose particular duty will be to give attention to the transportation needs of agricultural districts and to stimulate agriculture by this means, mainly in the South and West. A man with long experience in development work has been appointed manager of the section.

The Women's Gardening Association of London, Ontario, has within its organization, fourteen community gardens. With fifty private gardens, in addition, there are about 250 women and girls organized for production. The annual membership fee is 50 cents, for soldiers' wives the fee is 25 cents, and for girls under fifteen years, 15 cents. District convenors inspect the gardens once a month. Prizes are given and the girls' gardens are judged separately from the women's. A cart-load of produce is sold on the local market twice a week, the proceeds being used for patriotic purposes.

The Manufacturers' Co-operative Agricultural Association of Windsor, Ontario, is believed to be the largest town-community farming enterprise at present being carried on in the province. Seventeen manufacturing firms organized in the spring to cultivate 500 acres adjoining the city. Shares in the association were allotted at $30, payable at call. A tractor, and other equipment, is owned by the association, but men and horses are hired as required. About 250 acres of land have been put in crop this year to potatoes, corn, beans, and flax. Land has also been prepared for fall wheat.

Cottage cheese is an excellent substitute for meats, since it contains a high protein and energy value; and it is cheap in comparison with other foods. The United States Department of Agriculture says that for supplying protein, a pound of cottage cheese is more valuable than a pound and a quarter of meat, and as a source of energy it is about half as valuable. Cottage cheese would be a more popular dish if it were served in a greater variety of ways. It can be used in making the dining table look more attractive, and at the same time it is a delicious salad accompaniment when used as plain cottage cheese balls nestled in lettuce or water cress, or when partially covered with strawberry or raspberry jam or preserved quinces. Cottage cheese can be flavoured with caraway seeds, chopped stuffed olives, or chopped pimento and used for sandwiches.

One of the great munition works in the Midlands of England has achieved remarkable success in the cultivation of the waste land surrounding the factory buildings and sheds. This land, which previous to the war would have beeen neglected as waste and unsightly with refuse heaps, by means of an intensive system of cultivation is producing great quantities of potatoes and all kinds of vegetables, which fully supply the requirements of thousands of work people. This season pig and poultry rearing and breeding have widened the scope of the scheme, and immensely added to its food-producing value. One hundred acres are under cultivation, and it is expected that the factory will be entirely self-supporting as regards vegetables. As the employees number about 12,000 people a great saving of food stuffs is secured.

The Report of the Elementary School Gardens of the Education Committee of Oxfordshire, England, for 1917, shows that six acres in sixty places produced about three thousand dollars' worth of vegetables.

The Canadian Countryman, Toronto, Ont., Aug. 24, 1918.
Preparing Beef Cattle for the Show-ring. Wade Toole, Professor of Animal Husbandry, Ontario Agricultural College, page 1043.
How to prepare Poultry for Exhibition, Geo. Robertson, Assistant Poultry Husbandman, Central Experimental Farm, Ottawa, page 1046.
Aug. 31—The Only Reliable Test for Dairy Cows, H. H. Dean, Professor of Dairy Husbandry, Ontario Agricultural College, page 1079.
Sept. 7—Alfalfa and Red Clover for Hay and Seed, C. R. Klinck, B.S.A., Specialist in Plant Breeding, Ontario Agricultural College, Guelph, page 1104.
Winning with Fruit and Vegetables, F. E. Buck, Assistant in Ornamental Gardening, Central Experimental Farm, Ottawa, page 1104.

The Canadian Farm, Toronto, Ont., Sept. 4, 1918.
Marketing Potatoes, F. W. Brodrick, Professor of Horticulture, Manitoba Agricultural College, Winnipeg, page 5.

The Canadian Poultry Review, Toronto, Ont., Sept., 1918.
Efficient Poultry Production in War Time, M. A. Jull, Manager, Poultry Department, Macdonald College, Quebec, page 350.
The Distribution of Egg Production, M. A. Jull, page 356.

The Canadian Thresherman and Farmer, Winnipeg, Man., August 1918.
The Draft of Ploughs at the Brandon Tractor Ploughing Demonstration, J. J. Smith, Professor Agricultural Engineering, Manitoba Agricultural College, Winnipeg, page 10.

Farmer's Advocate and Home Magazine, London, Ont., Aug. 22, 1918.
The Veterinary Profession, A. B. Wickware, Secretary-Treasurer of the Central Canada Veterinary Association, Ottawa, page 1360.
Aug. 29—A National Live Stock Policy, H. S. Arkell, Live Stock Commissioner, Dominion Department of Agriculture, Ottawa, page 1392.
Coming Up with Sheep, Professor Wade Toole, page 1393.
The Outlook for Canadian Dairying, J. A. Ruddick, Dairy Commissioner, Department of Agriculture, Ottawa, page 1398.

Farmer's Advocate and Home Journal, Winnipeg, Man., Aug. 21, 1918.
Lots of Rust, But too Late, V. W. Jackson, Professor of Botany, Manitoba Agricultural College, Winnipeg, Man., page 1363.
Aug. 28—Record of Performance Test for Pure-Bred Dairy Cattle, C. S. Wood, Chief Inspector, Record of Performance, Department of Agriculture, Ottawa, page 1383.

Farmer's Magazine, Toronto, Ont., Aug. 15, 1918.
Shorthorns, Angus and Herefords, Professor Wade Toole, page 3.
Sept. 14—Pure-breds or Grades on the Dairy Farm, Professor H. H. Dean, page 1139.
Sept. 15—Good Fortune on the Farm, Professor H. H. Dean, page 18.

The Farm and Ranch Review and The Country Home, Calgary, Alta., Sept. 5, 1918.
The Recent Frost in Central and Northern Alberta, G. H. Cutler, Professor of Field Husbandry, University of Alberta, Edmonton, page 964.

The Grain Growers' Guide, Winnipeg, Man., Aug. 28, 1918.
Glimpses of Shorthorn History, Hon. Duncan Marshall, Minister of Agriculture for Alberta, Edmonton, page 8.
Sept. 4—Glimpses of Shorthorn History, Hon. Duncan Marshall, page 9.
Sept. 18—Why the Holstein-Friesian? W. A. Clemons, Secretary, The Holstein-Friesian Association of Canada, St. George, Ont., page 8.
Field Tests at Indian Head, page 9.

The Journal of Agriculture and Horticulture, Quebec, September 1, 1918.
The Farm and Farm Crops, L. C. Raymond, Assistant in Cereal Husbandry, Macdonald College, page 36.
Fall Work with Sheep, W. C. McKillican, Superintendent, Experimental Farm, Brandon, Man., page 43.

The Nor'-West Farmer, Winnipeg, Man., August 20, 1918.
Dry Farming Practices and How to Remove Them, Address by Hon. W. R. Motherwell, Minister of Agriculture for Saskatchewan, at the Western Canada Irrigation Congress, Nelson, B.C., July 24th, 1918, page 1119.
Sept. 5—Founding a Profitable Farm Sheep Flock, James McCaig, Editor of Publications, Alberta, Department of Agriculture, Edmonton, page 1165.
Sept. 20—The Challenge of the Country Boy, John G. Rayner, Director, Boys' and Girls' Clubs, University of Saskatchewan, Saskatoon, page 1221.

PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty, International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

497—**Agricultural Development of British Guiana.**—SPENCE, R. O. H., in *United Empire, The Royal Colonial Institute Journal*, Vol. IX, No. 2, pp. 61-65. London, February, 1918.

498—**The Organisation of the Rural Hygiene Service in Spain.**—*Boletin de Agricultura técnica economica*, Year IX, No. 103, pp. 612-619. Madrid, July, 1917. (2 pp. in Institute Bulletin).

499 — **Public Health Studies Concerning Cheese.**—SCHROEDER, E. C. and BRETT, G. W., in the *Journal of the American Veterinary Medical Association*, Vol. LII, No. 6, pp. 674-685. Ithaca, N. Y., February, 1918.

The primary and special purposes of these studies on cheese were to determine the frequency with which it is contaminated with virulent tubercle bacilli at the time it reaches the consumer.

The number of samples of cheese in these investigations on which the tests are now complete is 256, and among these 19, or 7.42%, were found to be infected with virulent tubercle bacilli. The bacilli in all cases were of the bovine type.

Leaving the samples of cheese of the varieties that require some time to ripen before they are marketed out of consideration, none of which were found to be contaminated with tubercle bacilli, the 194 samples of fresh cheese may be divided as follows:—

131 samples of cream, 18, or 13¾%, infected with tubercle bacilli

31 samples of cottage, 1, or 3¼ % infected with tubercle bacilli

32 samples of Neufchatel, all free from infection.

These studies seem to warrant the following conclusions:—

(1) that cheese of the kind which requires some time to ripen rarely if ever contains true, living, pathogenic bacteria when it is marketed and it does not seem likely that such cheese is apt to contain dangerous products of bacterial origin;

(2) that cream cheese is often heavily contaminated with tubercle bacilli of the bovine type and should therefore be made either from pasteurized milk and cream or from milk and cream obtained from cows which have been proved free from tuberculosis. This pasteurization of milk would also destroy dangerous germs of the colon and septicemia groups;

(3) that cottage and skim milk Neufchatel cheeses are much less frequently infected with the tubercle bacilli than cream cheese; but this should not be used as a reason for making them from raw milk.

500—**The Digestibility and Utilization of Egg Proteins.**—BATEMAN, W. G., in *The Journal of Biological Chemistry*, Vol. XXVI, No. 1, pp. 263-391, Bibliography of 74 publications. Baltimore, Md., August, 1916.

By means of experiments carried out on dogs, rats, rabbits and man, the author arrived at the following conclusions:—

Raw egg-white is found to be a decidedly indigestible substance. It causes diarrhoea in dogs, rats, rabbits, and man when ingested in any large quantity. Its utilisation by the body is poor since it is used only to the extent of 50 to 70 per cent. Subjects can acquire a certain tolerance for the native protein after ingesting it for several days so that it no longer causes diarrhoea and is somewhat better utilized.

Raw egg-white can be made digestible through coagulation by heat; by precipitation with alcohol, chloroform, or ether; by incubation with dilute acids or alkalies; by partial digestion by pepsin; by conversion into alkali-metaprotein.

The indigestibility of native egg-white probably lies either in its anti-tryptic content or in its chemical constitution. Its physical texture appears to play a minor part in its behaviour. Of the individual proteins con-

stituting egg-white, the albumin fraction appears to be the indigestible component.

The whites of the hen's egg and duck's egg act alike in causing diarrhoea and in being poorly utilized.

Egg-yolk either raw or cooked is excellently utilized. It sometimes causes digestive disturbances in dogs, apparently because of its high fat content.

A review of the literature shows that dietitians have relied, in general, upon the early observations of BEAUMONT as support for the use of raw eggs. These observations were in the main exact; but, so far as the digestibility of raw egg-white is concerned, were misinterpreted. In current dietotherapy raw whole eggs, raw egg-white, and albumin-water are extensively prescribed. There appears to be little in their conduct as foodstuffs, however, to warrant such faith in their nutritive value or ease of assimilation.

501—**The Vitamine Content of Brewers' Yeast.**—SEIDELL, ATHERTON, in *The Journal of Biological Chemistry*, Vol. XXIX, No. 2, pp. 145-154. Baltimore, 1917.

CROPS AND CULTIVATION.

502—**The Effects of Meteorological Factors on the Growth and Yield of Rice in the Vercelli District, Piedmont, Italy.**—MARCARELLI, B., in *Giornale di risicoltura*, Year VIII, No. 1, pp. 7-16. Vercelli, 1918. (2 pp. in Institute Bulletin).

At the "R. Stazione sperimentale di risicoltura" of Vercelli, Prof. MARCARELLI has, for some years, carried out a series of agricultural meteorological studies by the modern scientific method of parallel observations. His object was the determination of the critical periods of rice in relation to the various meteorological phenomena and factor of the district.

The experiments are described and the results given in the article in the Institute Bulletin.

504—**New Experiments in Dry Farming in Italy.**—DE ANGELIS D'OSSAT, G., in *Le Stazioni sperimentali, agrarie italiane* Vol. LI, Pt. 1-2, pp. 41-45. Modena, 1918. (*Author's abstract, in Italian*).

505—**A Correlation Between Bacterial Activity and Lime Requirement of Soils.**—BEAR, F. E., In *Soil Science*, Vol. IV, No. 6, pp. 433-462, Bibliography of 14 publications. Baltimore, December, 1917.

506—**Drainage Ditching of Irrigated Lands in Colorado, U. S. A.**—*Engineering News Record*, Vol. CXXX, No. 6, p. 263, New York, February 7, 1918.

The San Luis valley, Colorado, is level and without rivers or ravines to afford natural drainage for the water coming from higher levels. Beneath the gravelly subsoil there is water under pressure, and nearly every ranch has a flowing well, many of which run continuously, causing an additional amount of surface water. Under these conditions the land in the valley has become waterlogged and therefore requires drainage.

The drainage work is being done by the CHARLES & GIBSON CO. of Alamosa, Colorado, which owns large tracts of the land and develops them for settlement.

The drainage ditches, of which over 100 miles have already been excavated, are made by 3 AUSTIN excavators. The ditches are 8 ft. wide on the bottom, with slopes of 1 and 1½. They are mainly 6 to 8 ft. deep; but the machines can cut to a depth of 11 ft.

The excavated material is deposited on both sides of the cut, leaving 8-ft. banks, so that in the future a machine can be run over the ditch for the purpose of cleaning and reshaping it. The machine works night and day (except Sundays), being equipped with an electric plant for lighting, The day shift consists of 5 and the night shift of 4 men. The machine can excavate 800 to 1000 cu. yd. per 10-hour shift.

507—**Irrigation of Alfalfa in the United States.**—I. BECKETT, S. H. and ROBERTSON, R. D., in the *College of Agriculture, Agricultural Experiment Station, Bulletin* No. 280, pp. 273-294. Berkeley, California, May, 1917.—II. FORTIER, SAMUEL, in the *U.S. Department of Agriculture, Farmers' Bulletin* No. 865, pp. 40. Washington, December, 1917.

508—**The Progress of the Nitrogen Industry.** BERTRAND, A., in *Anexo al Boletin de Mayo de la Asociacion Salitrera de Propaganda*, pp. XXXVIII+363. Valparaiso, 1917.

Review of publications relating to the nitrogen industries in the chief producing countries, especially during the war. There are 5 parts, dealing with Germany, Chile, United States, France, Great Britain. In II appendices are given:—a paper by the Badische Anilin- und Sodafabrik on the monopoly of nitrogen in Germany; a study by P. EHRENBERG, professor of Agricultural Chemistry at the University of Göttingen, on the organization of this monopoly; the nitrogen question at the United States Congress; a list of publications on the net cost of nitrate of soda; a list of the members of the Nitrate of Soda Council since its foundation; a list of information regarding propaganda for nitrate of soda in various countries; a list of articles published in Chilian periodicals from 1907-1914 on the efficaciousness of the propaganda for nitrate of soda; a list of articles published in the above-mentioned periodicals on synthetic nitrogen products; a bibliography of the Chilian press relating to the organization of the nitrate industry; a list of studies, projects and inventions relating to that industry; a general bibliography of the names of authors arranged in alphabetical order.

It constitutes a very full compilation of information relating to the production of nitrogenous fertilizers and their application.

The author shows that in Chili there is a lack of a publication giving nitrate of soda statistics in full and giving information as regards the production, consumption, price, etc., of other nitrogenous products. He finds that that want has been provided for:—

(1) by the monograph on the "Production and Consumption of Chemical Manures in the World," published by the International Institute of Agriculture in 1914, followed by a second edition in the same year;

(2) by the half-yearly publications on the "International Trade in Fertilizers and Chemical Products useful in Agriculture," commenced in September 1914, and based on the above monograph, by the Bureau of Agricultural Intelligence of the above-mentioned Institute;

(3) by Part IX of the Yearbook of Agricultural Statistics, also published by the International Institute of Agriculture, which gives data regarding the production, trade and prices of chemical fertilizers for the preceding 10 years.

The author hopes that these publications will be distributed as widely as possible in Chili, and that they will lead to treating nitrate of soda statistics in the same way as others, especially if the review of "International Trade in Chemical Fertilizers" is published quarterly and then, as soon as possible, monthly.

The author considers that the war has shown that combined nitrogen is the elementary chemical basis of explosives as well as feeding and textile stuffs, so that the importance of a country can very well be measured, whether in peace or in war, by considering its capacity for producing combined nitrogen.

510—**Fertilizers in Australia.**—in *Commonwealth of Australia, Advisory Council of Science and Industry, Report of Executive Committee for the Year* 1916-17, pp. 32-34. Melbourne, 1917 (2 pp. in Institute Bulletin).

512—**Cyanogenesis in Plants, Studies on Tridens flavus (Tall Red Top).**—VIEHOEVER, A., JOHNS, CARL O. and ALSBERG, CARL L. in *The Journal of Biological Chemistry*, Vol. XXV, No. 1, pp. 141-149. Bibliography of 7 publications. Baltimore, Md., May, 1916.

515—**The Effect of One Growing Plant on Another.**—RUSSEL, E. J., in *the Gardeners' Chronicle*, Vol. LXIII, No. 1621, pp. 23-24. London, Jan. 19, 1918.

From time immemorial gardeners have been convinced that certain plants injure others, and, in many cases, it is firmly believed that the harmful effect remains in the soil for months, if not for years. This has led to the opinion that certain plants excrete something from their roots which is poisonous to other plants of the same kind, though not necessarily so to those of a different kind. For a long time the plant was considered as completely analogous to the animal, and, thus, the scientist agreed with the practical man in admitting the existence of a poisonous excretion in plants. Of recent years, however, much doubt has been thrown on the idea of a poisonous excretion, and serious obstacles have been shown to hinder its acceptance. In a good grass field, for example, the plants are as crowded as they can be, yet they show no signs of "sickness" or poisoning. If the soil be poor the plants may go hungry, but this may be remedied by applying suitable fertilizers; there is nothing in the appearance of the plants to suggest that any other factor is concerned.

On the other hand, some years ago Dr. WHITNEY, chief of the Bureau of Soils of the U.S. Department of Agriculture, expressed the opinion that plants do excrete a toxic substance which may, however, be precipitated or rendered inactive by fertilizers. Therefore the improvement of plants by fertilizers is due, not only to the food they supply, but also to the above-mentioned action, and perhaps to others as well. WHITNEY'S hypothesis gave rise to much discussion, which lead to a great deal of progress being made on the subject.

British investigators have usually taken the view that there is no evidence of a persistent toxic excretion. The experiments at Rothamsted seem to bear this out. At the present time the famous Broadbalk field is carrying its 75th successive crop of wheat, and the plants look as well as any on the farm, and better than a good deal of the wheat in the district. The last crop of mangolds was the 42nd; it was well above the average and has rarely been exceeded during the whole period. Similarly, barley has been grown for 57 years in succession without showing any signs of suffering. Leguminous crops, however, cannot be grown in this way, and after a short period fail; they are the only crops which experimental evidence has shown cannot be grown year after year on the same land. Observations show, nevertheless, that other plants also fail in the same way; thus foxglove grows splendidly in the soil of a freshly cleared wood (provided the soil is suitable, *e.g.*, the clay patches on the Downs) but for one year only, not longer. It is also said that flax and onions may fail if grown too often in the same soil. These, however, are all simply observations which, even if exact, may have some other explanation.

The idea that plants excrete poisonous substances has been investigated by Mr. Spencer Pickering. The growth of plants was found to be considerably decreased if they received water which had washed part of the roots of another growing plant. This effect seems to be general; the washings from the roots of mustard check the growth of mustard; those from grass check the growth of fruit trees, and so on. It was

possible to establish the important point that these washings lose their poisonous quality very rapidly, so that they do not necessarily affect the soil after plant growth has ceased. These experiments are, therefore, perfectly consistent with those of Rothamsted described, above.

Another set of Rothamsted experiments is, however, more difficult to reconcile with Mr Pickering's results. Dr. Winifred Brenchley grew wheat alone, weeds alone, and wheat mixed with weeds. She observed that when poppy (*Papaver Rhoeas*), black bent (*Alopecurus agrestis*) and spurry (*Spergula arvensis*) were grown with wheat they made less growth than when grown alone; on the other hand, wheat made more growth per individual plant(1). This, of course, does not mean that wheat should always be grown with weeds; the plants would have done better had no weeds been present, but they suffered less from the presence of the weeds than they would have done from an equal number of wheat plants. In these experiments spurry proved more harmful than the other weeds because, by its straggling habit it badly checked the young wheat, which never recovered properly. Charlock and wheat settle down to some sort of equilibrium as neither masters the other.

So far as could be seen, the effect was solely one of competition for food, and it made no difference to the individual wheat whether it competed with another wheat plant or a plant of a completely different order. The whole phenomenon could be explained by the supposition that the number of plants the soil can carry depends on the amount of plant food present in the soil and the amount of space available for growth; if the food and space are to be divided, each individual will get a smaller share and will, consequently, make less growth than if there were fewer plants present. At first sight these results seem difficult to reconcile with those of Pickering's experiments, which seem to prove that a large number of plants suffer not only from starvation, but also from mutual poisoning, so that growth would be less both individually and collectively than when a smaller number is grown. The apparent disagreement may, however, be explained. In another of Mr Pickering's experiments plants grown in plots divided into compartments so that each individual root was kept separate from its neighbour made no better growth than did plants in undivided pots where the roots of the different plants mixed freely. Thus, the toxin produced by one individual plant does it as much harm as that produced by its neighbour. Further Mr. Pickering found, in open soil that the total growth was the same whatever the number of plants (within certain limits of distance apart) or, in other words, that the weights of the plants were inversely proportioned to the bulk of soil available. This is in full agreement with Dr. Brenchley's results and may be explained perfectly well, without assuming the existence of a toxin, simply by the fact that the full crop-bearing capacity of the soil has been reached. If, with Mr Pickering, a toxin is assumed to be present, it must be supposed to be at least as harmful to the plant itself as to any other. This assumption involves possibilities which new experiments should investigate.

(1) See AGRICULTURAL GAZETTE, January 1918, No. 625.

516—Action of Magnesium Salts on Wheat.—VOELCKER, J. A., in *The Journal of the Royal Agricultural Society of England*, Vol. LXXVII, pp. 260-262. London, 1916.

517—Action of Sodium Compounds on Wheat.—VOELCKER, J. A. in *The Journal of the Royal Agricultural Society of England*, Vol. LXXVII, pp. 262-264. London, 1916.

519—The Selection of Plants Resistant to Diseases, Animal Pests and Adverse Meteorological Conditions.—MOLZ, E., in the *Zeitschrift fur Pflanzenzuchtung*, Vol. V, Pt. 2, pp. 121-241. Berlin, 1917. (5 pp. in Institute Bulletin).

522—The Production of Forage Plant Seeds in Denmark.—*Statistiske Enterretninger*,, Year, X, No. 1, pp. 5-6. Copenhagen, January 23, 1918.

The extraordinary rise in the price of forage plant seeds has caused in Denmark a considerable increase in the area cultivated for the production of such seed; this is shown by the following figures:—

Area cultivated for the production of forage plant seeds in Denmark.

Seed.	July, 1917.		December 5, 1917	
	acres.		acres.	
Roots:—				
Swede	2,528.6		7,125.0	
Turnip	1,875.5		12,490.1	
Carrot	1,487.1		5,042.2	
Forage Leguminosae:—				
Clover, alfalfa, etc	2,210.8		1,513.0	
Forage grasses:—				
Cocksfoot	18,265.6		22,502.3½	
Meadow fescue	2,993.5		3,585.0	
English ray-grass	5,751.0	32,221.4	2,866.5	41,681.2
Italian ray-grass			4,222.9	
Field brome-grass	3,199.3		7,028.0	
Other forage grasses	2,012.0		1,476.5	
Total	40,323.4		67,851.5	

It is seen that the increase in seed production for root crops is considerable, whereas that for grasses only forms about 30% of the total.

525—Medicago falcata, a Yellow-Flowered Alfalfa.—OAKLEY R. A. and GARVER, SAMUEL, in *United States Department of Agriculture, Bulletin* No. 428, pp. 70, Biliography of 67 publications. Washington, 1917.

The first recorded importation of *Medicago falcata* in the United States was made in 1897. The first systematic introduction for the purpose of utilizing the species as a cultivated forage crop was made in 1906 by Prof. N. E. HANSEN under the auspices of the U. S. Department of Agriculture. Since that date many lots of seed representing various forms of the species have been introduced by Prof. HANSEN, Mr. F. N. MEYER and various others. Approximately fifty lots have been introduced, mostly from Russia and Siberia.

At the present time *Medicago falcata* is found growing without cultivation in most parts of Europe and the western two-thirds of Asia. Over a large portion of this area it is probably indigenous. It is found throughout a wide range of soil and climatic conditions and at depressions and elevations ranging from below sea level to 13,000 feet above. It is much wider in its adaptations than *Medicago sativa*.

The species was recognized by botanists early in the history of modern botany, if not long before. Recent botanists differ somewhat with regard to its taxonomic relationship to *Medicago sativa*. Some give it the rank of a true species, while others regard it as a variety or subspecies of the latter. The natural relationship of the two, however, is quite clearly shown by the readiness with which they hybridize and the fertility of their hybrids.

It is an extremely variable species, many forms of which are difficult to classify satisfactorily on account of their varying combinations of characters and the difficulty of determining whether they are of pure or hybrid origin. A classification or grouping has been attempted in this paper largely upon the basis of habit of growth. Four groups have been established, ranging in habit from prostrate to almost erect. The first two are referred to as pasture groups, as they are not sufficiently erect to be harvested satisfactorily for hay by machinery. The last two are sufficiently erect to be harvested for hay and are referred to as hay groups.

Botanists have named and described several of the species, many of which have proved to be hybrids of *Medicago falcata* and *Medicago sativa*.

Medicago falcata has never been extensively cultivated in Europe or Asia, although it has been utilized as a wild forage plant since a very early date. Many attempts have been made to cultivate it in Europe, but so far as can be found it is now being cultivated only in India and, possibly, to a very limited extent in south-eastern Russia and Chinese Turkestan.

The erect forms of *Medicago falcata* closely resemble those of *Medicago sativa* in their mass effect, but on an average they produce a heavier yield in comparison with their bulk, partly because of the more numerous stems and partly because of the texture of their herbage. Under similar conditions of soil and stand of plants the best strains of *Medicago falcata* frequently outyield the best varieties of *Medicago sativa* for the first cutting of the season.

A very serious drawback to the general utilization of *Medicago falcata* as a cultivated forage crop is its inability to recover quickly after cutting. Under conditions such as exist in the West and Northwest, where it appears to offer its greatest possibilities, it can be depended upon to make only one crop in a season. It produces seed sparingly and does not hold it as retentively as does *Medicago sativa*. This is also a serious handicap to its use as a cultivated crop.

The natural range of distribution of the species, its adaptations, and its behaviour under field conditions in the United States warrant the conclusion that it is relatively hardy and drought resistant.

Chemical analyses and general feeding tests indicate that it is approximately as valuable from a feeding standpoint as common alfalfa.

The cultural requirements of *Medicago falcata* appear to be much the same as those of *Medicago sativa*. On account of the hard seed which the former produces and the slow growth of the young plants it is difficult to secure a satisfactory stand from seeding, either broadcast or in rows. When grown in broadcast stands the procumbent forms are inclined to be more nearly erect than when grown in rows or hills. The plants of this species bear transplanting better than do those of *Medicago sativa*.

Data from broadcast plants of *Medicago falcata* and *Medicago sativa* indicate that in seasons when only one cutting of the latter can be procured the former produces the heavier yield, but in favourable seasons, when two or more cuttings can be procured, the latter excels appreciably in yield.

Sowings of *Medicago falcata* have been made on unbroken native sod land and a fair stand of plants secured. The plants appear to lack sufficient aggressiveness to make them really valuable under such conditions.

The greatest possibilities offered by the species appear to be in the field of selection and hybridization. In a few cases it is probable that the development of promising pure strains by selection will prove to be advantageous. As the result of hybridizing with *Medicago sativa* and subsequent selection it is believed that superior varieties of alfalfa can be developed and that the greatest value of the species is for this purpose.

Much time and effort will be required before *Medicago falcata* will be ready for general cultivation.

526—**Cultivation of the Castor-Oil Plant in North Africa.**—COUSTON, F., in *Journal d'Agriculture pratique*, New Series, Vol. XXXI, No. 3, pp. 45-47, February 7, 1918; No. 4, pp. 71-73, February 20, 1918; No. 5, pp. 94-95, March 7, 1918. Paris.

The castor-oil plant grows abundantly in many ravines on the North African coast. The severe winters prevent its growing in the Upper Table Lands and in the Atlas Mountains, but it re-appears in the Sahara zone and is found in many oases where it was originally imported as an ornamental shrub. The author has observed it from the Biskra district (foot of the Atlas) to Ain-Salah and Aoulef, more than 600 miles further south, in the midst of the Sahara.

The castor-oil plant is perennial. It is injured by hard frosts and prolonged cold, and requires much water in summer, when its growth is most active. It would do well all along the coast, and in the south in the Sahara district, wherever it is assured of sufficient moisture during the summer growing period. In its climatic and cultural requirements it resembles cotton; *in North Africa the castor-oil plants thrives wherever the cotton-plant does well.* It seems to withstand slightly more cold than cotton.

534—**The Mango in Porto Rico.**—KINMAN, C. F., in *Porto Rico Agricultural Experiment Station, Bulletin No. 24, pp. 30.* Washington, 1918.

These observations are drawn from the work of several years during which trees of many varieties have been imported, propagated and in some cases brought into satisfactory production.

536—**The Red Spruce: Its Growth and Management in the United States.**—MURPHY, L. S., in the *U. S. Department of Agriculture, Bulletin No.* 544, p. 100. Washington October 31, 1917.

Red spruce (*Picea rubens* Sarg.) is one of the most important woods of the north-east of the United States, where it is found in pure or nearly pure stands. It is used more than any other wood in the manufacture of paper and supplies a large amount of lumber and other material. Of the 116 500 million feet board measure of standing square timber in the United States (4% of the total timber), 48.3% is composed of red spruce, 30.3% of the Rocky Mountain or Engelmann spruce, and 21.4% of the Sitka spruce. These figures concern the districts where this timber is of commercial importance; white spruce, black spruce, Colorado blue spruce and *P. Breweriana* Watts occur also.

The most important by-products of red spruce are the resin, used as chewing gum, and the extract from the tender tips of the branches which forms the basis of spruce beer, a non-alcoholic beverage, formerly very popular, especially amongst sailors, who considered it to be a preventative against scurvy. On account of its lightness, strength, reliability and freedom from hidden defects, spruce wood has recently come into general use in the manufacture of aeroplanes.

Many methods of management have been adopted by the large timber and paper manufacturing companies, who use spruce wood more largely than any other wood. The bulletin under review attempts to determine the methods most suited to various conditions. It is estimated that, under average natural and uniform conditions, 50 to 60 years are necessary for the maximum production of wood used for paper pulp; if judicious thinning is carried out this period may be shortened by 5 to 10 years. For timber production 100 to 120 years either in virgin or selection forests are required.

The bulletin ends with an appendix containing many volume and measurement tables.

LIVE STOCK AND BREEDING

541—**The Chemical Composition of Lime-Sulphur Animal Dips.**—CHAPIN, ROBERT M., in *U. S. Department of Agriculture, Bulletin* No. 451, 16 pp.; Bibliography of 10 Publications. Washington, D. C., December 14, 1916. (4 pp. in Institute Bulletin).

542—**The Toxicity of Carotin.** — WELLS, GIDEON H. and HEDENBURG, O. F., in *The Journal of Biological Chemistry*, Vol. XXVII, No. 1, pp. 213-216. Baltimore, Md., 1916.

543 — **Studies in Blackleg (Symptomatic Anthrax) Immunization with Special Reference to Blackleg Filtrate.**—EICHHORN, A., in *Journal of the American Veterinary Medical Association*, Vol. LII, No. 6, pp. 651-669. Ithaca, N. Y., February, 1918.

Up to the present the most common method of vaccination for immunization against blackleg (symptomatic anthrax) consisted in the injection of attenuated virus prepared in either pellet or powder form.

With this method direct losses from vaccination are known to occur from time to time and insufficient protection following vaccination is also of too common occurrence.

The first investigation on attempts to utilise filtrates of bacterial growths of blackleg cultures for immunization purposes are recorded by FOTH. Japanese investigators have continued the work along the lines developed by FOTH and, according to Prof. NITTA of the Tokio University, the filtrates obtained appear to afford uniform protection, entirely avoiding losses from vaccination.

The experimental work reported in this paper dealing with the preparation, standardization and immunizing properties of blackleg

filtrate, fully substantiated these claims, with the following results:—

(1)Blackleg ffltrate is an effective immunizing agent against blackleg.

(2) Blackleg filtrate confers an active immunity which protects cattle against the disease for as long a period of time as the germ-free extracts (agressins) prepared from the juice of the tissues from affected cattle.

(3) Since it does not contain the blackleg germ in any form it cannot produce the disease, therefore losses incidental to vaccination with the powder or pellet form are entirely avoided.

(4) Blackleg filtrate may be prepared in a concentrated form and, when suitably preserved, will retain its potency for an almost indefinite period of time.

(5) It is essential to subject the blackleg filtrate to the various tests for sterility, both during the filtration and filling processes in order to guard against any possible contamination.

551—**Breeding Hens for Egg Production.**—MURPHY, L., in the *Journal of the Department of Agriculture and Technical Instruction for Ireland*, Vol. XVIII, No. 1, pp. 33-48. Dublin, 1918. (2 pp. in Institute Bulletin).

552—**The Behaviour of Chickens Fed Rations Restricted to: —(I) Cereal Grains; (II) Wheat or Maize Kernel.**—I. HART, E. B. HALPIN, J. G. and MCCOLLUM, V., in *The Journal of Biological Chemistry*, Vol. XXIX, No. 1, pp. 57-67. Baltimore, February, 1917.—II. HART, E. B., HALPIN, J, G., and STEENBOCK, H., *ibid.*, Vol. XXXI. No. 2, pp. 415-420, August, 1917. (2 pp. in Institute Bulletin).

553—**Studies on the Physiology of Reproduction in the Domestic Fowl.**—PEARL, RAYMOND, in *The Journal of Biological Chemistry*, Vol. XXIV, No. 2, pp. 123-135. Baltimore, Md., 1916.

FARM ENGINEERING

554—**State Motorculture in England and Scotland.**—I. *Mark Lane Express Agricultural Journal*, Vol. CXIX, No. 4505, p. 88. London, January 28, 1918.—II. *The Scottish Journal of Agriculture*, Vol. I, No. I, pp. 61-62. Edinburgh, January, 1918.

I. The President of the Board of Agriculture has stated that the area ploughed by Government tractors from the middle of August to January 12, 1918, was 231,000 acres. On the latter date there were 1813 tractors working.

II. The Food Production Department of the Board of Agriculture and Fisheries acquired a large number of tractors, one-seventh of which were allotted to the Scottish Board. This quantity, however, was not required, and only 115 new tractors were added to the previous year's total. These were of the following types:—Titan, Overtime, British Universal, Moline, Wallis, Cub Junior, and Burford-Cleveland.

Considerable difficulty was experienced in providing ploughs for these tractors to suit Scottish conditions. The ploughs brought by the Scottish Board were mostly made by Messrs. Sellar & Son (Scotland) and Oliver (United States). One Sanderson & Mill plough and one Case plough were bought.

Grubbers, cultivators and harrows will also be provided for use with the tractors.

556 — **Energy Required in Cultivation.** — RINGLEMANN, MAX, in the *Journal* d'*Agriculture pratique*, Year LXXXII, Vol. XXXI No. 4, pp. 66-69. Paris, February 21, 1918. (2 pp. in Institute Bulletin).

557—**The Agricultural Tractor: Some Factors Governing the Design of a Small Tractor.** —CHORLTON, A. E. I., in *Engineering*, Vol. CV, No. 2714, pp. 7-10, Fig. 12, Tables 2. London, January 4, 1918.

The problem of providing mechanical power in the most suitable and efficient form for the purposes of agriculture, is one of no inconsiderable difficulty, the guiding factors being such variables as the size of the farm, the class of land, the nature of crop, road transportation and the financial ones of first cost, annual charges, etc. Owing to lack of precise information the author has had to provide much of the essential data by actual experiments, the results of which are of great value for all those interested in the agricultural tractor.

After having discussed and compared the advantages and disadvantages of a special power implement for each purpose with those of a multi-purpose machine, the author concludes that the financial consideration of the problem brings out the advantages of a multi-purpose machine, but without necessarily excluding special machines. There will always be farms so large or special conditions of such a nature as to allow of the purchase of special machines. The 3 chief uses which, by their requirements, govern the design of the tractor are:—(*a*) Road work, which governs the minimum axle loading; (*b*) Land work, which governs the maximum axle loading; (*c*) Farmstead, which governs the minimum power required.

ROAD WORK.—The basic factors are adhesion and resistance. The adhesion of the driving wheels on the road must be sufficient to utilize the power developed by the engine in overcoming the tractive resistance of the load and the tractor combined. There exists a considerable amount of data relating to tractive resistance, but for tractive adhesion on common roads, little can be found. For traction on rails recognized constants have been developed from abundant data. The

standard figure of adhesion is 0.25, *i.e.*, one-quarter of the load on the driving axles can be used in drawbar pull. After a detailed consideration of adhesion and resistance the author gives the results of his test in 2 diagrams, which will be of great use for tractor construction.

WORK ON THE LAND.—The pressure which worked land will bear without injurious effect on the crops, varies according to the nature of the soil. From the mechanical point of view the limit of pressure is set by the necessity to prevent sinking into the ground, an occurrence which is seldom due to excessive weight. What usually happens is that owing to inadequate gripping power the driving wheels rotate and act as milling cutters, scraping out the soil from underneath. The relative values of weight and spud area are very difficult to allocate so as to be able to make comparisons. For instance, a machine with a 30-cwt. axle loading and short spuds pulls partly by adhesion and partly by grip, the latter being rendered more effective by the weight of the wheel holding the ground down during this action. A lighter tractor with a 15-cwt. axle loading must pull very largely by grip alone and the effectiveness of the grip is modified and reduced by the lighter weight behind it, and the greater rolling resistance per ton set up by the spuds. The factors to be determined are, therefore, the proper relation of pressure on the land, the pressure against it, and the action of the rim projection, strake, spud or grouser. In most cases 3 conditions must be met:—(*a*) driving axle loading; (*b*) pressure against grips or spuds; (*c*) effect of rolling resistance. On examining these conditions the author finds that, for light lands, the spud must be increased 4 times, as compared with heavier land. Many useful experiments could be carried out to determine the most efficient form of grip for varying conditions of soil and weight of tractor. On very soft land the wheeled tractor, either by reason of weight or spud pressure, is not suitable, and one of the caterpillar type becomes essential.

WORK ON THE FARMSTEAD.—The highest power required is for threshing, which according to the author's diagram, does not exceed 20 h.p., though it is usual to allow 25 h.p. for large machines.

The appended table summarises the results of the author's experiments and shows the basic requirements for a multi-purpose tractor.

——	Power required.	Driving axle loading.
	H.P.	Lb.
Road work	18–20	4,400
Land work	23–25	4,400
Farmstead	20–25	Stationary

In considering the engine, the conditions should be taken into account under which it has to run on a farm, the inexpert attention likely to be given to it being an important factor. Generally, while this requires robust construction, it also calls for a low power rating or a considerable reserve of power, and probably the factors of low speed, large cylinder capacity for power required, strength and simplicity of parts are the main ones. The engine *must* operate on paraffin, and it should be able to develop its power without water injection. Such an engine running on paraffin would give an economy of 30 per cent. It should, however, be quite possible to secure better economics with the ordinary engine than are at present customary. It may be taken that the consumption per acre in practice is about 3 gallons. A 20-h.p. tractor has probably about 12½ brake-h.p. Taking 2 hours per acre, this gives 12 pints per hour, or 0·96 pint per brake horse-power. This result is not at all a bad one, and is probably much better than when the tractor is run by an ordinary farm hand in daily work. The consumption might well be reduced to 0·85 pint per brake horse-power, or with a high-compression engine to 0·6 pint or even less.

The author suggests that the horizontal type of engine is to be preferred. The high speed engine reduces the weight of the tractor, but in view of the necessity of giving a reasonably long life under conditions of farm usage, it is debatable if this is a wise policy. The system of cooling chosen—radiator or tank system—depends mostly on local conditions.

The writer deals with the following points: Frame; Gearing; Steering (there is a general tendency to adopt the double-pivot system for tractor work); Wheels (which tend to be reduced in diameter, probably with a view to reduce weight); Land Grips. The caterpillar arrangement, whilst entirely suitable for special conditions on the land, cannot be considered as advisable for road work.

560—**The "Acremeter".**—*The Implement and Machinery Review*, Vol. XLIII, No. 515, pp. 1187-1188, Figs. 2. London, March 1, 1918.

An instrument invented and placed on the market by Mr. W. G. GEORGE, Tunnel Hill, Worcester, England, to measure the acreage covered by tractor ploughs. The "Acremeter" measures from one 9-in. furrow up to 6 furrows either 9 in. or 10 in. wide, and can be fitted to any plough in 10 minutes; whilst it will also register the work of other implements, such as mowers, binders, etc., up to 6 ft. wide or over.

The instrument will be very useful for measuring areas in tractor-ploughing tests. It costs $25.

561—**Double Disc-Harrows for Mechanical Cultivation.**—MANRIN, G., in the *Journal d'Agriculture pratique*, Year LXXXII, Vol. XXXI, No. 3, pp. 50-51, Paris, February 7, 1918.

562—**Harrows with Rotary Spades.**—MANRIN, G., in the *Journal d'Agriculture pratique*, Year LXXXII, Vol. XXXI, No. 5, pp. 92-93. Paris, March 7, 1918.

563—**The "Bucheronne", a Machine for Felling and Sawing Coppice-Wood.**—MATHIS DE GRANDSEILLE, in the supplement to the *Bulletin de la Société des Agriculteurs de France* (Comptes Rendus de l'Assemblee Generale de 1917, 48th Meeting), pp. 51-52. Paris, January, 1918.

M. MATHIS DE GRANDSEILLE, President of the 4th Section (Forestry) of the "Société des Agriculteurs de France," reports the results obtained by M. PIOCHE'S machine—the "Bucheronne"—for felling and sawing timber.

The machine was tested in Crains forest, Yonne, France, in the presence of several officers of the Forest Inspection Department, the Central War Material Department of Angouleme, the Air Ministry, Woods and Forests, and Patents Office (Engineering section). According to their report, the soil should first be cleared of all shoots of less than 2½ in. in diameter. In woods over 30 years old, this is usually unnecessary; for good and continuous working there is needed: 1 driver for the machine, 1 sawyer for the knife-blade, 1 workman to guide the felled tree the right way, and 2 assistants to trim the felled trees and place them in heaps ready for sawing; total—5 men. For sawing, the same number of men is needed at the machine. The yield is very satisfactory, especially when compared with that of previous experiments. With the "Bucheronne" 5 men felled 120 trees of 2·7 in. diameter in 1 hour, and the crew of 5 men felled and sawed in 1 day, 741·63 cu. ft. of wood, while the same crew, working with axes, only felled and trimmed 1,059·5 cu. ft. in 4 days. With the machine each workman will produce 141·26 cu. ft. per day, while without it he will only produce 35·31 cu. ft. If the coppice is older, the yield will be better. The machine, which is strongly built did very well throughout the trial. The inventor should improve the machine by furnishing greater grip on the soil and by providing a hood so that the knife blade can be inspected during working.

564—**The Application of Electricity to Agriculture in France.**—DABAT in *Comptes Rendus des Séances de l'Académie d'Agriculture de France*, Vol. III, No. 41, pp. 1138-1155. Paris, December 26, 1918.

The author considers the present importance of the various uses to which electricity may be put in agriculture and suggests ways of developing the extended use of electricity on farms.

Manual labour, now of increasing scarcity, should be partly replaced by machinery. Great progress has been made by using internal combustion, gas and steam engines. Electricity, though already used in agriculture is not employed as much as it ought. Electric motors have many advantages over internal combustion engines, which are much more generally used in agriculture and they are cheaper. However, for mechanical ploughing the electric motor is superior to the steam engine. But in spite of its qualities, the electric motor may be less economical. If certain uses of energy could support the present sale prices, for many others (motorculture, threshing cereals) the price of 15 to 20 centimes the kw-hour should not be passed. For irrigation and drainage works, the tariff would have to be lower, according to the lift required. To lower the sale price, the height of which results from the small and discontinuous demand for farm use, farmers should unite in groups comprising enough members to represent current and number of working hours of importance. On the other hand, the State should intervene and use all possible means to obtain low tariffs for farmers. The energy being supplied at rates suiting the farmers, they should remove the obstacles formed by certain methods of farming so as to derive the greatest benefit from the use of electricity.

The foundation of hydroelectric works constitutes one of the most important factors in lowering the cost of electric energy. France has, in its watercourses, an enormous quantity of latent energy, estimated statistically at from 4 to 5 million HP. at low-water and 9 to 10 million at an average level; while the total nominal HP. of steam engines in France amounts to 15 million HP. It follows that the coal beds decrease every year while the water-power remains unchanged.

The adaption of watercourses for the production of electricity only dates back some twenty years. Before the war the total water power in use amounted to 620,000 HP., of which 380,000 HP. were distributed, the rest being utilised on the spot. Since 1914, the total water power, employed or about to be employed, has increased by 400,000 HP.

The author quotes various technical administrative or legislative measures taken by the Minister of Agriculture to develop the utilisation of "white coal".

From the technical point of view, the work of the "Services des Grandes Forces hydrauliques", often praised by both French and foreign scientists and engineers, will eliminate the necessity for private individuals of long and costly study regarding the exploitation of watercourses.

Regarding administration and legislation, the Minister of Agriculture has drawn up rules for Communes when about to transfer their water rights and he has put forward several bills attempting to remove the hindrance caused by the present legislation to the industrial use of watercourses. To obtain

reduced tariffs for agricultural work, he has obtained that the principle of reduced tariffs in favour of syndicates should be inserted in the contracts. The obligation of furnishing current at low prices is also provided for in various concessions for works on rivers of the public land conceded by the Minister of Public Works. The text of a recent bill regarding *all the categories of watercourses* not only gives concessions to syndicates, but also to *agricultural groupings of any kind.* The bill contains clauses requiring industrial concession-holders to provide reserves of water and current for agriculture and accords reduced tariffs to all agricultural groupings of general interest.

The Minister of Agriculture also helps to organize co-operative societies for the generation and distribution of energy. The State, in this case has helped financially as well as providing for the collaboration of the technical experts of the Service for agricultural improvements. The Minister has also profited from the establishment of works founded since the war to intensify the production of chemical fertilisers. To this end, some contracts require that, for a certain period of years after peace has been declared, considerable amounts of energy shall be provided for the manufacture of calcium carbide and cyanamide.

For some years, the electrical distribution societies have completely neglected to obtain the custom of farmers. But they have finally realised that if, when commencing work, they were justified in seeking more paying customers (lighting, transport, industry), it would have been better management to seek other outlets, such as agriculture, which, by means of lowered tariffs, would consume that surplus energy which is often so difficult to utilise. Accordingly the distributors have decided to do propaganda work to interest farmers in the uses of electricity in agriculture. The electrical exhibition at Marseilles (1908), the international electrocultural congress at Rheims (1912), the general agricultural competition of 1913, have greatly contributed to a more widely diffused knowledge of the application of electricity to agriculture. Some distributing societies addressed the farmers directly. For example, the Motive Power Society of Refrain, at Montbeliard, should be mentioned, as it has installed electricity in several agricultural villages, under the stipulation that if the consumers were not satisfied, the current would be withdrawn and no charges made. In every case the installation has been retained.

The author thinks that the State should encourage these societies to continue in this way, by helping to form agricultural associations for using energy in common. In this way, not only would the total energy required by the farmers increase, but the hours of current consumption would be greater owing to circulation established between the associations. Whilst distributing energy among the consumers so as to reduce variations of load while increasing its duration, thus playing a similar part to the syndical associations for the distribution of irrigation water, the association would reduce the concession-holders' expenses and assist development. If new lines have to be installed to supply the agricultural consumers, the association will help to equalise the charge on the capital invested by dividing it among a large number of consumers. The association has also the advantage of buying the more expensive apparatus to be used in turn by the members.

The author shows that the State rather than distribution societies should found these associations. The distributors might hesitate on account of the time and capital required and become discouraged by the setbacks always produced by attempts to unite agriculturists. The State has more powerful means of action and it should intervene all the more, seeing that these collective organs would not only be useful for furnishing energy, but would enable all sorts of agricultural improvements to be carried out: threshing in common, co-operative dairies, distilleries, etc.

The author also points out the value of State help in showing the most economic and suitable method of utilising energy, so that all possible facilities may be obtained from the distributors and full profit from the advantages given them by law. In the case where the supplying of farms would require the extension of a distribution network, and the cost would fall on the consumers, the project might be formulated by the technical experts of the Service for agricultural improvements, who would supervise the work, while the cost would be lightened by subventions and loans from State funds. This technical and financial aid would always be given to farmers whenever the utility of forming a special service for production and distribution is recognised.

It is to be hoped that the co-operative movement, first intended for the common working of farm products, with oil works, cooperative wine-cellars, and continued by the common purchase and use of threshing machines, will extend to the generation and distribution of electric energy. Thanks to the various measures now under discussion, which will be supplemented by active propaganda, the agricultural use of electricity will be rapidly developed, to the great profit of French agriculture.

565—**The Use of Hydrogen for Driving Engines: Tests in Holland.**—Extract from the *Bulletin des Usines de Guerre*, in *Le Genie Civil*, Vol. LXXII, No. 13, p. 224. Paris, March 30, 1918.

Experiments carried out at the Hague with a motor car driven by hydrogen have shown that:—

(1) A car engine will work quite regularly and perfectly on a mixture of pure hydrogen and air.

(2) The engine does not require adaption.

(3) The engine can work smoothly even with a very primitive type of carburettor.

(4) The experiments that preceded the practical tests did not require a great outlay; a few tubes of hydrogen and the necessary mounting was all that was required.

These tests were carried out as a result of the shortage of petrol for public automobiles in Holland. A 1906 type "Spyker" 10-15 h.p. motor-taxi was used, which still ran well on petrol and which could still do over 30 miles an hour.

Below the body was placed a tube of hydrogen, 59 in. long and provided with a manometer and a pressure reducing valve. The hydrogen passed under 1 atmosphere pressure in a metallic tube leading to the carburettor. A tap, placed on the gas tube and connected to a pedal, controlled the supply of hydrogen. The air supply was not very well regulated, being done by hand, before starting.

After regulating the entry valves, in spite of the primitive form of the carburettor, the engine worked quite smoothly and evenly without missing. The number of revolutions was found to be less with hydrogen than with petrol. By igniting at 8 mm. distance from the dead-centre, the maximum number of revolutions was obtained. No traces of napthalene were found in the exhaust gas, which was found to be pure steam. The engine therefore worked perfectly on hydrogen and air, and that in spite of the casual methods used for adapting the carburettor.

The car started off on the first speed, changing to the second, and after running 15 minutes on the road, returned normally, the engine working perfectly all the time.

The tests and the trial run, which took 30 minutes in all, had required 1½ cu. metres of gas, while the pressure had fallen from 160 to 100 atmospheres.

AGRICULTURAL INDUSTRIES

571—**Microscopical Studies on Tomato Products.**—HOWARD BURTON, J. in collaboration with STEPHENSON, CHARLES H., in *United States Department of Agriculture Bulletin*, No. 581, pp. 24. Washington, October 6, 1917. (2 pp. in Institute Bulletin.)

574—**Dairy Inspection in the United States.**—BAILEY, W. H., in the *Journal of the American Veterinary Medical Association*, Vol. LII, No. 6, pp. 686-692. Ithaca, N.Y., February, 1918.

In this address delivered at the 54th Annual Meeting of the American Veterinary Medical Association, the following points were discussed: (1) Healthy Cattle; (2) The Importance of Clean Milking Methods, Cooling, Transportation and Distribution Methods; (3) Pasteurization.

The following points were emphasized concerning the value of close correlation of dairy and milk inspection:—

(*a*) Milk produced under filthy conditions may possess a low bacterial count if it is instantly and constantly cooled to 50° F. or below.

(*b*) Milk produced under sanitary conditions may possess a high bacterial count at the time of distribution, if it has not been cooled and maintained at proper temperature.

(*c*) A high scoring dairy may, at times, produce a badly contaminated milk, while a dairy scoring very low may produce clean milk.

(*d*) Thus careful inspection of gross conditions and the rating of their value in terms of per cent on the government score card, together with milk inspection, particularly bacterial analysis, will enable any health department to judge its milk supply correctly.

576—**Chemical Changes in the Souring of Milk.**—VAN SLYKE LUCIUS, L., and BOSWORTH, ALFRED W., in *The Journal of Biological Chemistry*, Vol. XXIV, No. 3, pp. 191-202. Baltimore, Md., 1916.

577—**Studies on Goat's Milk.—I. The Casein of Goat's Milk: II. The Soluble and Insoluble Compounds of Goat's Milk.**—BOSWORTH, ALFRED W. and VAN SLYKE, LUCIUS L., in *The Journal of Biological Chemistry*, Vol. XX, No. 3, pp. 173-175; 177-185. Baltimore, Md., 1916.

578—**A Comparison of the Composition of Cow's Milk, Goat's Milk, and Human Milk.**—BOSWORTH, ALFRED W. and VAN SLYKE, LUCIUS L., in *The Journal of Biological Chemistry*, Vol. XXIV, No. 3, pp. 187-189. Baltimore, Md., 1916.

579—**Pasteurization of Cream.**—LARSEN, C., FULLER, J. M., JONES, V. R., GREGORY, H. and TOLSTRUP, M., in *Agricultural Experimental Station, South Dakota State College of Agriculture and Mechanic Arts, Dairy Husbandry Department, Bulletin* No. 171, pp. 529-548, 9 Tables. Huron, S. D., November, 1916. (2 pp. in Institute Bulletin).

580—**Concerning Rancidity of Butter.**—GUTHRIE, E. S., in *Journal of Dairy Science*, Vol. I, No. 3, pp. 218-233. Baltimore, September, 1917.

The plan of research of the investigations, concerning rancidity of butter, reported in this paper, was outlined as follows:—Is rancidity due to chemical, enzymic, or biological changes? On account of lack of time to study all the factors, the first two changes were the only ones investigated.

So long as most of the previous investigators thought that oxidation was the main consideration in the development of rancidity, the chemical changes were studied with special reference to the iodine number.

The chemical changes in butter were found to be very slight when biological agencies were held in check. These changes did not cause rancidity. The enzymic development caused very little variation in the iodine number, and it produced no rancidity.

The exposure of butter and butter fat to high temperatures, light and air, did not cause a marked change in the iodine number, and this exposure did not cause rancidity. Rancidity of butter as defined by butter dealers and expert butter judges is rarely found. The average person thinks of the strong flavour of butter as rancid.

A bibliography on the subject is appended.

582—**Cheese Mites.**—EALES NELLIE, B., in *The Journal of the Board of Agriculture*, Vol. XXIV, No. 10, pp. 1087-1096. London, January, 1918.

PLANT DISEASES

584—**Observations on the Damage Done to Trees by Tarring the Streets of Milan, Italy.**—BRIZI, U., in *Reale Istituto Lombardo di Scienze e Lettere, Rendiconti*, Series 2, Vol. L, Part 12-13, pp. 568-591. Milan, 1917. (2 pp. in Institute Bulletin.)

590—**Comparison of the Effects of Copper Mixtures and Acid Mixtures on Mildew of the Vine.**—CAPUS, J., in *Comptes rendus des séances de l'Académie d'Agriculture de France*, Vol. IV, No. 2, pp. 86-90. Paris, 1918.

In 1917 the author undertook experiments in the experiment field of Cadillac (Gironde) and the laboratory of the Plant Pathology Station of the Department of Gironde, on the comparative effects of the following mixtures:—

(*a*) basic Bordeaux mixture, according to the formula MILLARDET and GAYON, with 2% copper sulphate;

(*b*) acid Bordeaux mixture prepared by the PICKERING and SICARD method, with the same quantity of copper sulphate;

(*c*) basic Bordeau mixture, prepared by PICKERING's method, *i. e.*, with lime water and 2% copper sulphate;

(*d*) acid Burgundy mixture, prepared by FONZES-DIACON's method;

(*e*) 2% neutral Burgundy mixture.

The results obtained showed the acid and basic mixtures to be equally efficacious against mildew of the vine, but that for a period exceeding 20 days and during heavy rains, basic mixtures retain their efficacy better than acid ones.

593—**Bacterial Blight of Barley.**—JONES, L. R., JOHNSON, A. G. and REDDY, C. S., in the *Journal of Agricultural Research*, Vol. XI, No. 12; pp. 625-643. Washington, D. C., December 17, 1917.

This paper describes a bacterial disease of barley (*Hordeum* spp.) which was first observed in 1912 doing considerable damage to two-row Montana barley (*H. distichon*), and later on common six-row varieties (*H. vulgare*), at Madison, Wis. Since then it has appeared each year in the same district and has also been reported from other parts of the United States.

The disease principally attacks the leaves, where it forms small water-soaked areas, which enlarge later into translucent yellowish or brownish blotches or stripes. Similar lesions may also appear on the glumes.

The disease is very widespread, from the Mississippi Valley to the Pacific coast. It attacks the two row (*H. distichon*), common six-row (*H. vulgare*), and erect six-row (*H. hexastichon*) barleys.

Although the bacterium may hibernate in infected leaves there is no doubt that diseased grain is the principal factor in spreading the parasite and the seat of spring infection. The most efficacious means of control known at present consist in avoiding infected seed and in doubtful cases, disinfecting it.

594—**Diseases of Cabbage in the United States.**—HARTER, L. L. and JONES, L. R., in the *United States Department of Agriculture, Farmers' Bulletin* 925, pp. 30. Washington, D. C., January, 1918.

595—**Pseudomonas seminum n. sp., a Bacterium Injurious to Peas, in England.**—CAYLEY, DOROTHY M., in *The Journal of Agricultural Science*, Vol. VIII, Pt. 4, pp. 461-479. Cambridge, 1917.

596—**Verticillium albo-atrum a Hyphomycete Causing "Vissnes Juka" (Wilt) of Cucumber in Sweden.**—LINDFORS THORE, in *Kungl. Landtbruks Akademiens Handlingar och Tidskrift*, Year LVII, Nos. 7-8, pp. 627-636. Stockholm, 1917.

In 1916, in a field of cucumbers at Bellersta, Sodermanland, plants which were sound and strong till the end of July, were attacked by wilt, of which the majority died. A microscopical examination of the infested material showed the existence within the stem tissues of masses of mycelium which more or less completely closed up the vessels, thus preventing the passage of the water from the roots. While the host lives the parasitic mycelium is restricted to the vascular bundles, and only invades the surrounding tissues after the death of the plant.

The author suggests, in the first place, the uprooting and destruction of diseased plants, care being taken to remove all the soil with which such plants may have been in contact. Dead plants left in the field rapidly become seats of infection. In infected districts neither cucumbers nor potatoes should be grown for several years. The soil should be disinfected. The author believes that for this purpose good results could be obtained with formalin; tests with 2% potassium permanganate solutions had no effect.

AGRICULTURAL ECONOMICS

A STATISTICAL ENQUIRY INTO CO-OPERATIVE ORGANIZATIONS IN THE UNITED STATES

In the first part of this article, which was published in the August number of the Agricultural Gazette at page 840, a general account was given of the results of the inquiry into co-operative selling in the United States made by the Office of Markets and Rural Organization. In this part of the article the statistics concerning various kinds of co-operative organizations are given in more detail.

GRAIN ELEVATORS AND WAREHOUSES.

The 1,637 grain elevators and warehouses which reported are distributed among twenty-three States, as shown in Table I. Two hundred and sixty-four are in North Dakota, 241 in Minnesota, 228 in Iowa, 192 in Illinois, 183 in Nebraska, 153 in Kansas and 135 in South Dakota. In other words, more than 85 per cent of the elevators reporting are in these seven states of the grain belt. In Oregon, Washington, Idaho, Utah and Colorado practically all the grain has until recently been handled in sacks, and the farmers have consequently organized warehouses instead of elevators. Premises on which the grain can be handled in bulk at the termini are now being completed in the grain centres of the Pacific coast, and many of the warehouse companies are preparing to build elevators. When the practice of handling the grain in bulk at the terminal markets becomes general, the warehouses will gradually be replaced by elevators. A chief reason for this change has been the high cost of sacks for grain, their price having increased rapidly in the last two years.

It is estimated that there a few hundred farmers' grain marketing organizations from which no reports have been received, but they are believed to be the smaller organizations, for the largest and most successful businesses seem to have replied most promptly to the request for information.

One hundred and seventy-four elevators and warehouses report that they are organized as capital stock companies, 496 that they are organized as co-operative companies. The latter however also, for the most part, have capital stock. The former are the companies which manage their business and distribute their profits according to the method commonly followed by stock companies. Companies which had only a few members or most of whose stock appeared to be owned by one or a few individuals were excluded from the inquiry. Of 1,074 elevators which do not distribute their profits on a co-operative plan many have certain co-operative characteristics. All of them distribute their stock among a number of farmers; some limit the number of shares which one person may own; many have regulations as to the transfer of stock; and many adhere to the "one man one vote" principle. The stock is in many cases distributed among farmers, few of them holding more than one share. These organizations chiefly fail to follow co-operative principles in their distribution of profits, for they do not distribute a dividend to those supplying their grain. The fact should however be borne in mind that many States have enacted co-operative laws only recently, and there has therefore been no provision for paying dividends to suppliers. The elevators grouped in the co-operative class limit the dividends they pay on stock and distribute any further profits they may have as dividends to suppliers, sometimes to all suppliers, sometimes only to those of them who are members. Often the non-members are paid at a rate half that at

which members are paid, and some associations provide that dividends paid to non-members be applied towards the purchase of a share of stock. The shares of these companies range from $10 to $100, the par value being in most cases from $10 to $25. The annual volume of business handled by the 1,637 elevators reporting. is found to be $234,529,716.

Many elevators carry on side lines of business as well as handle grain. Of the 1,637 elevators 630, or 38 per cent, handle fuel, so that it is evident that farmers' elevators have found this practice to be desirable. In most cases the farmers themselves shovel the coal from the bins, thus reducing the costs of handling to a minimum. Most of the coal is hauled by the farmers on their return trip from delivering grain at the elevator.

Lumber was handled by 80 elevators, including 33 in Iowa, 13 in Nebraska and 10 in Illinois. The fact that the elevators handling lumber are so much fewer than those handling fuel is due to the greater outlay of capital and the larger share of a manager's time which the transport of lumber requires. One elevator reports that it handled $75,000 worth of lumber in a year, and lumber is thus in some cases an important element of an elevator's business.

Twelve of the 28 elevators which reported that they handled fruit and vegetable produce are in Kansas. Of the 16 handling merchandise six are in Kansas and three in Montana. Miscellaneous products and supplies, which heading includes binding twine, fence wire and posts, cement, oil and miscellaneous goods, are reported as being handled by 640 elevators.

It is estimated that 1,637 companies which this report covers represents about 166,974 grain farmers. A great many farmers derive benefits from a farmer's company to which they do not belong by consigning their grain through it. Among such benefits are the dividends sometimes paid to non-members, and the better prices sometimes secured by the organization of a company. It is estimated that at least 125,000 farmers who are not members of the companies market their grain through the 1,637 elevators which this survey covers. Added to the members they bring the total number of those who do business with these elevators up to about 289,000.

CREAMERIES AND CHEESE FACTORIES.

Of the 1,708 creameries and cheese factories reporting, 521 are classified as working on a capital stock basis, and 1,124 are co-operative.

Only 58 of the creameries and cheese factories report that they handled anything except milk and cream; namely five of them fruit and vegetable produce, four fuel, three live stock, two grain, and 44 miscellaneous products. There is therefore a contrast between the creamery and cheese factory associations and the elevator companies in this respect. The work of the former is less seasonal than is that of the elevator companies, and a buttermaker or cheesemaker finds it difficult to attend to outside duties. The elevators are all situated on the railroad, conveniently for the unloading of supplies, and usually have ample warehouse and storage accommodation. The creameries, on the other hand, often have no such accommodation and are at a distance from a railroad.

The average membership reported was 83, giving a total of 141,786 members for the 1,708 associations. As in the case of the elevators, many suppliers are not members. Suppliers of a large number of the creameries and cheese factories share however in the benefits of the organization on the same basis as members, for the farmer who delivers the total product of his cows to a company is considered to be a member of it. There are cases in which the ownership of stock forms the basis of membership and others in which a small membership fee is exacted.

ASSOCIATIONS FOR MARKETING FRUIT AND VEGETABLE PRODUCE.

Of the fruit and vegetable produce assotions reporting, 307 are organized as capital stock companies and 504 co-operatively. The proportion following co-operative methods is therefore considerably larger than in the case of the elevators and slightly smaller than in that of the creameries and cheese factories.

There is a tendency among the co-operative associations towards centralized selling and unity of action in matters of mutual interest other than selling. It is realized by the federation of small local associations into district organizations which, in their turn, organize a central selling agency. In some cases district or local associations federate in order to collect information as to crops and markets and accomplish other work impracticable for them individually, but retain their individual machinery for making sales and their policy as to sales. The policy of conducting sales centrally has been adopted by the citrus growers of Florida and California and the walnut and almond growers of California, and has gained favour from time to time among associations in the Pacific North-West. The plan of federating in order to gather information and improve distribution has been adopted by many co-operative and independent companies in the vegetable-growing districts when unusually heavy crops have had to be handled.

A history of the co-operative movement in the districts growing fruit and vegetable produce would show many experiments and a support of the organization which varied from one year to another. The most successful co-operation among fruit and vegetable

marketers is usually found in districts where associations of that sort are, comparatively speaking, not of recent origin. There are a few exceptions: for example, several district organizations in the Pacific North-West have made rapid progress in the short period for which they have existed.

Co-operation in the marketing of fruit and vegetable produce is strongest in districts remote from the consuming centres. Thus necessity does and will cause the co-operative organization which overcomes such difficulties as the distance from markets, the perishable nature of merchandise which renders skill in marketing and distributing it necessary, and the lack of sufficient buyers in the field to cause entire crops to be bought regularly for cash.

Box shooks, paper, nails, spraying materials, and growers' general supplies are handled by practically all these organizations. Forty-five of the companies which are classed as fruit and vegetable associations conduct canneries.

Other organizations discussed in the article in the Institute Bulletin are co-operative stores, cotton organizations, tobacco associations and live stock associations.

REPRESENTATIVE TYPES OF CO-OPERATIVE ORGANIZATIONS.

The article in the Institute Bulletin contains detailed information concerning some of the larger associations. The accounts of two of the associations are given here.

The Farmers' Union of Maine was organized in 1912 as the result of a movement started by the Bureau of Markets and Supplies of the State Agricultural Department. A number of local associations were formed, and they in turn formed the central organization which is this Farmers' Union. The local associations now number over 70 and one or more of them represent every county in the State. A local association is affiliated to the central organization by buying one or more $10 shares.

In 1912 the local unions began to consign potatoes and in that season consigned about 250 carloads of them.

There was a demand among the farmers for such supplies as grain, flour and fodder, and the manager of the union was able to organize, in order to meet it, the Farmers' Union Grain and Supply Company. This company had a turnover of $250,000 last year. In the autumn of 1915 the local unions voted in favour of buying the private wholesale house, each of them giving its note for $500. It is estimated that the saving effected will pay the interest and allow the notes to be withdrawn in about five years.

The Farmers' Union has effected a saving to farmers in the matter of contracting for fertilizers. The local unions have erected 23 warehouses, 25 grain stores, 3 grocery stores and a gristmill. The erection of a flourmill and a wholesale grocery house is contemplated. The gross turnover was $324,000 in 1912-1913 and $800,000 in 1914-1915.

The Eastern Shore of Virginia Produce Association was organized in 1900 in order to market the produce of the farmers in the two counties which form the Virginian part of the peninsula between Chesapeake Bay and the Atlantic Ocean. This is a truck-farming district: the chief crops are Irish and sweet potatoes, strawberries, cabbages and onions. The exchange markets the produce of about 3,000 farmers, that is about two-thirds of the total output of the district in which it is active. Its annual business includes the sale of from 8,000 to 10,000 carloads of Irish potatoes, from 2,500 to 3,000 carloads of sweet potatoes, and from 100 to 300 carloads each of strawberries, onions and cabbages. The total annual volume of business is between five and six million dollars. The exchange deals with more than 1,300 wholesale buyers, distributed among some 50 towns in about 40 States and provinces.

The right to sell produce through the exchange can be procured by becoming a stockholder, or a tenant of a stockholder, or by buying a "shipping privilege" which costs $1. The exchange has a central office, and there are from one to four loading stations in each of the 35 local divisions into which its territory is divided. Each local division elects a stockholder as director of the general board of directors. The board of directors has supervision over the exchange, but the work of management is mainly left to the general manager and the secretary-treasurer. Each division elects a local agent to look after its work. There are also inspectors for each loading point who, in order to ensure efficient and uniform inspection, are chosen by the board of directors instead of the local growers. The central office keeps in touch with the local agent and thus ascertains the probable amounts which will be loaded at each point daily, and eventually the amounts actually loaded. Thus the central office can see that the proper cars are provided and find markets for the produce loaded. The local inspectors examine the produce as it is loaded, allow it to carry the exchange trade-mark if it is up to standard, and see that if otherwise it is loaded on a car of unmarked produce. The central office conducts sales and forwards their proceeds to the local agents, who make out checks for the growers. Payment is made within twenty-four hours of the delivery of the goods. The association can do business on this basis because a large surplus and good credit enable it to pay growers for all produce delivered but not sold. Its present surplus is about $150,000, and this, together with its paid-up capital of $42,000 gives it an ample working capital. Hereafter part of the net

profits will be returned to the growers in proportion to the amount of business they have transacted with the association. Extensive use is made of the telegraph in effecting sales. Sales are generally made f.o.b. loading point, so that the buyer assumes the risk of delay and normal deterioration during transit. Other losses are borne by the association.

The expenses of the business are met by charging a 5 per cent commission on the produce sold by the exchange and a 3 per cent commission on a smaller quantity of produce, never more than a tenth of the whole, mainly not standardized and intended for neighbouring markets, which is handed over to selling agents.

This organization has brought about an intelligent distribution of its members' produce and has much enlarged the territory in which the produce of the district is marketed. The service of inspection has led to standardization.

URGENT NEED OF FERTILIZERS IN ITALY

Signor Galliani, Provincial Agricultural Commissioner, gives the alarm in the "Messaggero" as to the most disastrous prospects for the future cereal crops of Italy under existing conditions. Next year, if the season is a normal one, the crops will be 25 per cent under the average, in 1920 they will fall to about 60 per cent (?) of the average. This will mean an enormous increase of imports.

For this year the cause of the estimated decline is already at work. For the first time Italian agriculturists will be compelled to sow and cultivate the soil with scarcely any fertilizers, and they will have to work with the knowledge that their crops must be reduced considerably. Italy used to consume about 1¼ million tons of phosphates for manure; this year only one-quarter million tons will be available. Without fertilizers an intensive cultivation is impossible and production will be reduced enormously. Other chemical manures are needed for rice, potatoes, oats, etc.

Phosphates abound in Tunis and Algiers, from whence they cannot be exported for lack of tonnage. But later on tonnage will have to be found to bring into Italy the cereals which she will need in ever larger quantities if her crops are not allowed to fail altogether. It is easier to supply tonnage for the comparatively small quantity of fertilizers than to transport 10 to 12 million quarters of wheat.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the March number of the International Review of Agricultural Economics. Persons interested in any of the articles in this list may obtain the original bulletin on application to the Institute Branch, so long as the supply for distribution is not exhausted.

AGRICULTURAL STATISTICS

AREAS OF CROPS IN THE NORTHERN HEMISPHERE (a)

Countries.	1918.	1917.	Five years' average, 1912–16.	1918 compared with: 1917.	1918 compared with: Five years average.
	Acres.	Acres.	Acres.	%	%
CORN—					
France	841,000	867,000	1,037,000	96·9	81·1
Italy	3,460,000	3,572,000	3,616,000	96·9	95,7
Switzerland	7,000	5,000	3,000	140·0	233·3
United States	113,835,000	119,755,000	105,698,000	95·1	107·7
Canada	213,000	234,000	252,000	91·0	84·6
Japan	144,000	142,000	145,000	101·2	99·5
Totals	118,500,000	124,575,000	110,751,000	95·1	107·0
FLAXSEED—					
France	21,000	20,000	37,000	106·8	57·9
Italy	42,000	44,000	44,000	94·7	94·7
Canada	927,000	920,000	1,225,000	100·8	75·7
United States	1,967,000	1,809,000	1,978,000	108·7	99·5
India	3,737,000	3,559,000	3,757,000	105·0	99·5
Totals	6,694,000	6,352,000	7,041,000	105·4	95·1
POTATOES—					
Denmark	143,000	143,000	155,000	100·0	92·3
France	3,418,000	3,482,000	3,507,000	98·2	97·5
England and Wales	645,000	508,000	451,000	127·0	142·8
Scotland	171,000	148,000	145,000	115·8	117·8
Italy	741,000	717,000	707,000	103·4	104·8
Norway	146,000	145,000	105,000	100·4	138·5
Switzerland	170,000	140,000	120,000	121·6	142·0
Canada	686,000	657,000	477,000	104·4	143·8
United States	4,113,000	4,390,000	3,678,000	93·7	111·8
Japan	273,000	246,000	200,000	111·1	136·2
Totals	10,506,000	10,576,000	9,545,000	99·3	110·1

(*a*) For areas of wheat, rye, barley, and oats, see Agricultural Gazette, August, 1918, p. 843.

UNITED STATES SEPTEMBER CROP REPORT

The estimated yields of the principal crops on Sept. 1st, as reported by the U.S. Department of Agriculture, compared with one year ago, were as follows:

	1918.	1917.
	Bush.	Bush.
Winter wheat	556,000,000	418,000,000
Spring wheat	343,000,000	233,000,000
All wheat	899,000,000	651,000,000
Corn	2,674,000,000	3,159,000,000
Oats	1,477,000,000	1,587,000,000
Barley	236,000,000	209,000,000
Rye	76,500,000	60,100,000
All hay, tons	86,300,000	94,900,000
Flax	15,900,000	8,500,000

CROP AREAS IN ENGLAND AND WALES

The preliminary statement of crop areas in England and Wales confirms former statements with regard to the increase of acreage under cereal crops. The wheat acreage is 638,000 larger than in 1917, barley 42,000, and oats 520,000 acres greater. In addition to these increases there is a total of 141,000 acres under mixed grain, which crop in previous years was apportioned amongst wheat, barley and oats. Rye has been seeded on an area 45,000 acres greater than in 1917, whilst beans show an increase of 40,000 acres, and peas of 19,000 acres. The increase of 125,000 acres for potatoes agrees with previous official statements. The total area under grain and pulse (wheat, barley, oats, rye, beans, peas and mixed grain) this year thus amounts to 7,481,000 acres, as compared with 6,035,000 acres in 1917; an increase of 1,446,000 acres or 24 per cent, and the largest area under grain since 1879. Against the increases mentioned there is some decrease for field roots and forage crops, and the land under permanent grass is smaller by 1,240,000 acres, and that under clover and rotation grasses smaller by 400,000 acres. Only a part of the grassland is reserved for hay, but nevertheless the decrease given for this (hay) crop is over 700,000 acres, therefore we must naturally expect that considerably less hay has been harvested this year. The numbers of cattle, sheep and pigs have all decreased, compared with 1917, but it may be noted that this decrease has been accompanied by an increase for cows and heifers and breeding sows.

BROOMHALL'S FOREIGN CROP SUMMARY, SEPTEMBER 24th.

Italy.—Harvest returns are regarded as satisfactory, but, despite the good returns, a substantial quantity of wheat will have to be imported because of the added requirements of the army. Corn prospects are described as promising, but this crop in its entirety has been requisitioned by the Government. Gathering of corn has progressed rapidly in the south.

Japan.—Reports are to the effect that the combined total of this year's wheat, barley and rye crops is 11,000,000 bushels less than last year.

Portugal.—Drouth and heat greatly reduced the out-turn of the crops. It is expected that supplies of wheat, corn and other cereals will be short during the current season.

Denmark.—Official reports confirm average crops of wheat and rye, but barley and oats, it is claimed, are below the average.

France.—Threshing operations have been progressing rapidly and the results are quite satisfactory, especially for wheat and rye. Prospects for corn have improved, but the out-turn nevertheless is expected to show a somewhat smaller yield. Potatoes will probably be a short crop. The oats crop is about maximum.

North Africa.—All reports confirm a satisfactory harvest and threshing has made favourable progress. Yields in some parts are slightly disappointing.

LIVE STOCK STATISTICS

DENMARK.

Classification.	5th Feb., 1918.	12th July, 1917.	20th Feb., 1917.
	Number.	Number.	Number.
Horses	510,615	572,412	538,395
Cattle	2,141,684	2,458,158	2,452,853
Sheep	247,213	480,007	267,979
Pigs	513,012	788,814	1,650,623

NEW ZEALAND.

	January, 1917.	January, 1916.
Horses	373,600	371,331
Asses and mules	320	246
Cattle	2,575,230	2,417,491
Sheep	(a) 25,270,386	(b) 24,788,150
Goats	18,235	17,601
Pigs	283,770	297,501

(a) 30th April, 1917. (b) 30th April, 1916.

SWEDEN.

	June 1st, 1917.	June 1st, 1916.
Horses	715,101	701,099
Cattle	3,020,381	2,913,159
Sheep	1,344,202	1,198,469
Goats	135,690	131,788
Pigs	1,029,967	1,065,396
Poultry	6,034,716	.....
Beehives	140,878	.....

INDIA.

	1916–17.	1915–16.
Bulls and oxen	49,416,000	49,085,000
Cows	37,617,000	37,772,000
Buffalo bulls	5,581,000	5,564,000
Buffalo cows	13,699,000	13,642,000
Young stock (calves of all sorts)	43,112,000	42,886,000

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CO-OPERATION IN THE EGG INDUSTRY

CO-OPERATION has made immense strides in agricultural Canada during the last three or four years, and probably in no other line has it more thoroughly done so than in the handling and marketing of eggs. Both the federal and provincial Governments have bent their energies to the work and have accomplished much.

In the article entitled "The Poultry Situation in Canada," published in the September number of THE AGRICULTURAL GAZETTE, a comprehensive outline was given of the situation in Canada so far as the egg industry was concerned. In this article it is proposed to show the great progress that has been made by co-operation, and to trace to some extent the history of the movement that is going forward. In that article also was shown how Canada from being an importer of eggs has become an exporter. This article will show how one great activity has helped to bring this about.

Co-operation is in no sense a new idea; but it is only in comparatively recent years that co-operation has to a national extent been commercialized. In agriculture Denmark has largely led the way in this respect. Between 1865 and 1870 an export trade to England sprung up. This continued for a time, and then it was found that farmers kept back eggs in order to receive the higher prices that prevailed as the season grew older. This led to an inferiority in the quality of the eggs, and the trade slackened. In this emergency some serious-minded individuals formed societies for collecting and selling eggs stamped and numbered so as to show from whom they came. This was the beginning of the co-operative movement in eggs, which led, not alone to the restoration of Denmark's trade with Great Britain, but to its growth from ninety-five tons in 1895 to a yearly average between 1911 and 1915 of four thousand six hundred and sixty-one tons, and an increase in price from $1.58 per great hundred eggs to $2.18. It is worthy of mention that, as Harald Faber points out in his standard work on "Co-operation in Danish Agriculture," "Eggs were the only agricultural export from Denmark which during these years did not fall in price." Previous to the formation of the Danish societies France did the bulk of the trade in eggs with Great Britain, but France failed to expouse co-operation in the same thorough way that Denmark did, and the trade departed. The story of Denmark is very much the story of Canada as far as eggs are concerned.

THE ORGANIZATION OF CIRCLES

The co-operative egg circle is an association organized among farmers for the purpose of marketing eggs frequently and regularly through a common medium. The object is to maintain the quality of eggs as they leave the farm and to place them in the hands of the consumer with the least possible delay and in good condition. It has been estimated that Canadian farmers, previous to the adoption of co-operation, annually lost between five and six million dollars as a result of carelessness in the handling and marketing of eggs.

Co-operation in the marketing of eggs and poultry has lifted the poultry husbandry to a higher plane, both in the consideration of the farmer and in that of the consumer. It has led, not only to a more stable market, but also to better methods of housing, more generous and systematic feeding, and to an improved order of things all round.

Relative to the formation of the egg circle, the usual methods of procedure are adopted as in other organizations with, of course, rules and regulations such as the particular conditions of the egg industry demand.

CO-OPERATIVE DEVELOPMENT IN PRINCE EDWARD ISLAND

In Prince Edward Island the system has, perhaps, reached a greater completeness than in any other section of Canada. In the constitution of The Egg and P ultry Selling Association adopted in pursuance of the provisions of an Act passed by the Legislature of Prince Edward Island in 1917, the objects are set forth as the encouragement of the production and marketing of eggs and poultry and of matters connected therewith; the supervision of and encouragement in such commercial enterprises as may be deemed advisable in order to facilitate the more profitable production and sale of the produce of the members; the encouraging of the purchasing for breeding and distribution of improved strains of high producing poultry. A Board of seven directors is elected, and the officers of each circle are required to put up a collateral demand note in favour of the association for an amount not exceeding twenty-five dollars. The Board is authorized to employ an egg collector. Each circle is required to turn over a small percentage to the association to meet unavoidable expenses. Each circle also reports annually to the association and keeps the association posted. An Arbitration Board is appointed of three members chosen by the Board of Directors of the association. Arrangements are made for the assistance of the circles in case of the association sustaining financial loss. Members of an egg circle are required to deliver all their eggs not to be used for their own housekeeping or breeding purposes, or which they wish to sell for breeding purposes, at a time and place determined by the Board of Directors of the egg circle. All eggs are required to be unbroken, clean, and not more than one week old, weather and roads permitting. No member is allowed to dispose of eggs through an egg circle from hens other than his own. Such are the main features of a typical egg circle.

HISTORY REPEATS ITSELF

The experience of Prince Edward Island prior to the organization and adoption of a permanent system of co-operation was very much the same as that of Denmark. Years ago a trade of some dimensions existed between the Island Province and Quebec, but difficulties of transportation and lack of systematic method in production, keeping, and collecting led to a falling off in this trade until finally the Poultry Division of the Federal Live Stock Branch came to the rescue and sent experts to Prince Edward Island, who succeeded in inaugurating the industry on the basis that now exists.

It was anticipated that what has been accomplished in the Island might also be accomplished in Nova Scotia and New Brunswick. The series in another part of this month's AGRICULTURAL GAZETTE explains the situation in Nova Scotia. Much has been done and more will doubtless be accomplished in the near future. Efforts are also being made in New Brunswick to develop the industry, but systematic organization in that province is in its infancy.

DEVELOPMENT IN QUEBEC

In Quebec the necessity of better regulating egg production and methods of marketing was recognized at a meeting held at Macdonald College in 1916. Methods were then adopted for carrying out projects which have since been continued with much profit to the poultry trade of the province. The Provincial Department of Agriculture has also taken a wide and active interest in work in this direction. It can be stated that while the value of eggs shipped from the different circles in the province of Quebec in 1916 amounted to $17,803.67, a lesser quantity in 1917 reached the value of $20,639.33. It is hardly necessary to point out that this increase of revenue is to a considerable extent due to the systematization and standardization of marketing, which, in its turn, is to be attributed to co-operation.

PROGRESS IN ONTARIO

In Ontario the progress that has been made in the march of co-operation as regards the marketing of eggs has been most pronounced. In 1916, 36 circles reported 1,416 shipments of 382,808 dozens, representing in gross value to the circles $104,227.36. In 1917, 40 circles reported 1,605 shipments of 542,853 dozens, representing in gross value to the circles $209,837.31. These returns, it must be understood, are for eggs only. The upward tendency is plainly continuing, as is shown by the returns for the earlier quarters of the present year. In the first quarter the returns compared with the same period in the three previous years were:

Year	No. of members	Quantity shipped dozens.	Gross value to circles
1915.....	400	25,036	$ 6,853.58
1916.....	735	53,338	15,997.49
1917.....	855	58,088	24,481.78
1918.....	1,140	56,121	29,299.49

In the second quarter similar results to the foregoing are shown as follows:

Year	No. of Members	Quantity shipped dozens.	Gross value to circles
1915.....	810	135,740	$ 28,026.28
1916.....	1,022	198,311	47,353.72
1917.....	1,685	291,003	106,576.15
1918.....	2,441	377,881	151,892.98

GOVERNMENT INSPECTION IN THE WEST

In the West the egg-marketing legislation administered by the Federal Live Stock Branch, especially as regards inspection, has resulted in a great improvement of methods. Here again we find that history repeats itself. In the first flow of eggs from that section of the country there were marked discrepancies in quality. This led to such disparagement of western eggs that there was a tendency among eastern dealers to venture no more with them. Under the system that has been initiated by the Federal Live Stock Branch, the percentage of low grade eggs is exceedingly small, due to the fact that merchants are now compelled to candle and grade eggs properly before shipment, as all are Government inspected, and each case bears the Government stamp.

It has been found that, owing probably to the more or less newness of settlement and the distances that have to be covered, the system of co-operative egg circles as followed in the Eastern provinces is not altogether applicable to the Western provinces. As a consequence other methods have been taken that are materially developing the egg industry in that section of Canada. These methods in Manitoba and in Alberta are described in some measure in the articles that form part of the series previously referred to as appearing in Part II of this number of THE AGRICULTURAL GAZETTE.

As showing the store set upon Canadian eggs in Great Britain, the following extract from a report made to the Department of Trade and Commerce by Trade Commissioner J. Forsyth Smith is worth quotation:

The egg importers of Liverpool and Glasgow have been much interested in the recently passed regulations of the Canadian Government in regard to the grading and inspection of eggs for export. It is generally felt that these regulations will have a beneficial effect upon the future prospects of Canadian eggs on the British market, as it is considered very important, if present business is to be maintained after the war, that a high standard of quality, grade, and pack should be set up and adhered to.

THE FUTURE OF CANADA'S EXPORT TRADE IN MEATS

"PRODUCTION is exceedingly important," said the Hon. T. A. Crerar, Dominion Minister of Agriculture in a recent interview with members of the Canadian press, "but quality, condition and finish, are even more essential, if we are to ensure our products reaching the markets of Great Britain and our Allies, as is evidenced by the statement of the British Ministry of Food. There is, however, another reason, and to our farmers and, in fact, to all Canadians, an almost equally important reason why we should do our utmost to put only meats of the best quality and finish on the export market at the present time, and in the immediate future; practically all our bacon surplus and a very large portion of our surplus of beef must find its outlet in Great Britain. If, therefore, we would retain our place on the British market, both now and in the future, it is apparent that we must retain the good reputation we already have for a superior article of bacon and improve our present status as a beef-producing country, and, since the very existence of our bacon industry and, in no small measure the continued prosperity of our beef producing interests, depend upon our standing in the British markets, I make this appeal, feeling convinced that the standard set this year may easily determine our reputation and largely establish our commercial position in these lines, for not only the immediate, but also for the more distant, future.

"It seems to me, therefore, that I am not exaggerating when I say that, upon our handling of this situation at the present time depends in no small degree, the life of our bacon and beef trade, and I feel that I am not asking too much when I urge upon every individual farmer and feeder the importance of each one doing his utmost to ensure only finished animals going to the block."

THE DISTRIBUTION OF SEED TO SETTLERS IN THE WESTERN PROVINCES

FOLLOWING is a certified copy of a report of the Committee of the Privy Council, approved by His Excellency the Governor General on the 7th October, 1918:

The Committee of the Privy Council have had before them a report, dated October 3rd., 1918, from the Minister of the Interior, stating that he is informed that many entrants for Dominion Lands in the provinces of Manitoba, Alberta, Saskatchewan, and British Columbia are unable without financial assistance to purchase seed for the coming spring, and that unless such entrants can be enabled to purchase the necessary seed, a large area of Dominion Lands in the above provinces will be unproductive, and that not only great hardship to many entrants but a serious impediment to war activities may thus be entailed.

The Minister is further informed that sufficient seed is in most cases obtainable locally, or through the Department of Agriculture may be made obtainable locally, if the purchase money therefor can be provided.

The Minister calls attention to the fact that in previous years, seed for this purpose has been provided by the Department of the Interior, and that in the year 1915 a large, quantity of seed was further supplied for the purpose of seeding patented lands;

It is the opinion of the Minister that the circumstances of the present year call only for provision on the part of the Dominion of Canada of seed for necessitous cases for unpatented Dominion Lands, and it is desirable that if possible a more economical method of providing such seed and the obligations should be put into effect.

With these objects in view, the Deputy Minister of the Interior had a conference with representatives of the Provincial Governments of Saskatchewan and Alberta at Regina on the 10th. inst., and, upon the conclusion of such conference, the Minister conferred with the chartered banks of Canada with a view to effecting with them, on behalf of entrants for unpatented lands aforesaid, an arrangement whereby such settlers will be assisted to finance themselves in the said banks for the purpose of obtaining the required seed.

The Minister recommends that such assistance shall take the form of loans to entrants of unpatented lands by the chartered banks, which loans shall be made at the rate of seven per cent per annum, the Minister of the Interior, on behalf of the Dominion of Canada, guaranteeing the principal and guaranteeing interest thereon to the extent of five per cent per annum.

An entrant desiring seed is to make application to the Secretary-Treasurer of the Municipality in which he resides, or, if the district be unorganised, to the Provincial Officer of the Department of Municipal Affairs, such applications to be on the forms provided by the Minister of the Interior. The Municipal officer or Provincial Government representative, as the case may be, shall verify the application and transmit it to the Agent of Dominion Lands for the district in which the land is situated, the said Agent of Dominion Lands shall also verify the application as far as possible, and if it appears that the advance may not be warranted, he shall send an Inspector to make an investigation. After the said Agent has made such investigation as may be necessary, he shall send the application with such recommendation as appears to him to be advisable to the Chief Inspector of Dominion Lands Agencies at Winnipeg, where it shall be again verified. The Chief Inspector shall then send liens in duplicate for the land in question, together with memoranda of his approval of the proposed loan to such bank as has been indicated in the application.

Upon receipt of these liens, the bank shall notify the applicant who shall sign the note form, with lien attached, authorized by section 88 of The Bank Act. This note shall be in favour of the bank. The applicant shall also sign a lien in duplicate, in form prescribed, in favor of the Minister of the Interior on behalf of the Dominion of Canada. The bank shall then transmit the lien to the Department of the Interior, and shall give to the applicant an order on a prescribed form. The said order shall be so designed that it can be used only for the purchase of seed grain, but shall be negotiable in the hands of the person selling or delivering the seed grain to the applicant.

Upon the written request to the Minister of the Interior by the bank, which request must be made before the first day of March, 1920, unless further time be granted by the Minister of the Interior, the principal sum, or any part thereof, advanced upon any note as aforesaid, which shall remain unpaid, shall be paid to the bank by the Minister of the Interior, together with interest thereon at the rate of five per centum per annum so far as interest is unpaid by the applicant. All notes so paid by the Minister of the Interior on behalf of the Dominion of Canada by the bank which has received such payment. A bank may be allowed a

commission of one per cent of the total amount of loans collected by such bank from the aforesaid applicants who have been granted loans under the provisions of this Order-in-Council. The Minister further recommends that as there is need for prompt action, he be authorised under the provisions of the War Measures Act, 1914, to put into effect the plan above described and to make arrangements with the chartered banks accordingly, including the giving of a guarantee as above set out.

CANADA FOOD BOARD

DEMONSTRATIONS IN FOOD CONSERVATION.

BY S. ROY, CHIEF OF THE EDUCATIONAL DIVISION

THE Canada Food Board conducted demonstrations of war-time cooking at the Exhibitions in Sherbrooke, Que., Quebec, Toronto, London, and Ottawa. In each case the actual demonstration work was in charge of members of the staffs of the principal Domestic Science institutions in Eastern Canada. These were assisted by graduates and other Domestic Science teachers. The supervisors and demonstrators all gave their services without salary, their expenses only being paid. In fact all the exhibits were arranged on a purely patriotic and voluntary basis.

Equipment, utensils, etc., and a large part of the supplies were loaned, or donated, by manufacturing concerns or wholesale dealers. Consequently the cost to the Food Board was exceptionally small, while a large number of people have been reached.

The exhibition association in each case provided the space without charge and constructed the demonstration circle or circles. The Food Board provided the demonstrators; arranged for equipment and supplies, and arranged exhibits of posters, ration cards, etc.

At the Canadian National Exhibition in Toronto an entire building was given over to a patriotic food show under the auspices of the Canada Food Board. Macdonald College, Que., had charge of a circle devoted to the conservation of fats and sugars, and an exhibit of the rations of the Allies, in contrast with the *per capita* estimated adult consumption in Canada. The Department of Household Science of the University of Toronto demonstrated the uses of fruit and vegetables, including the latest approved methods of canning, drying and preserving with a minimum of sugar. Members of the staff of the Central Technical School, Toronto, and some of the Toronto Domestic Science teachers assisted in the work. The co-operation of the Organization of Resources Committee of Ontario and the Boy Scouts organization provided boys to sell the Canada Food Board's recipe books. Manufacturers and dealers were exceptionally generous in providing the considerable amount of equipment needed in Toronto.

The Canada Food Board also co-operated with the Ontario Government Fisheries and the Canadian Fisheries Association in an exhibit in the Government Building. This work involved no expense whatever to the Food Board.

At Sherbrooke, P.Q., the demonstration work was in the hands of the Department of Household Science of Macdonald College, assisted by the local Housewives' League. At Quebec the Housewives' League also assisted members of the teaching staff of Macdonald College.

At London, the work was in charge of the Department of Household Science of the University of Toronto and Macdonald Institute, Guelph, assisted by local Domestic Science teachers.

At the Central Canada Exhibition at Ottawa, the demonstrators were provided by the Women's Institutes

of Ontario and Macdonald College.

As a result of these exhibits and demonstrations the Canada Food Board had a large number of applications for demonstrations at other exhibitions throughout Canada.

In some cases the Women's Institutes of Ontario have been able to provide demonstrators. In all cases the Food Board has sent literature for distribution; also posters.

In the Maritime Provinces the exhibition work has been in charge of the provincial secretaries of the Canada Food Board working in cooperation with the Ottawa office.

In Western Canada the Winnipeg office of the Canada Food Board was in charge of all exhibition work.

In the case of the Ontario fall fairs, which are very numerous, posters and literature have been sent to each.

Among the most interesting exhibits arranged by the Canada Food Board was a display of thrift posters designed by school children of Paris. Victor Boret, the French Minister of Revictualling had these designs printed in poster form and distributed all over France, where they proved exceptionally effective in promoting the interests of conservation.

The Food Board's exhibition work this year has been successful to a far greater extent than was anticipated. Very great interest was shown in all the exhibits and much credit is due to the demonstrators for their enthusiastic and untiring service. A better understanding and closer relationship have been established between the Domestic Science Institutes and the Canada Food Board, which cannot fail to have far reaching benefits.

Boys are maturing early in these days and assuming greater responsibilities, for they have to step into the shoes of the older brothers who have gone on still more important business. Especially is this true in the country.

It will be a national calamity if the added responsibility laid upon the growing boy should rob him of his education—an education that will fit him to meet the problems of reconstruction that will come after the war. This must not be, and the College authorities feel that in opening a new course this winter for the younger boys they are moving in accordance with he spirit of the times. We must keep our schools and colleges full. Great Britain, in spite of the overwhelming immensity of her war problem, is putting forth special effort and spending millions of dollars to put her schools and colleges in full motion again.—*From Announcement of New Course for Boys at the Manitoba Agricultural College.*

PART I

Dominion Department of Agriculture

THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF CHEMISTRY

*THE UTILIZATION OF NITRE CAKE IN THE MANUFACTURE OF SUPERPHOSPHATE

BY FRANK T. SHUTT, D. SC., AND O. E. WRIGHT, B. SC.

NOTWITHSTANDING the advances that have been made of late years in the utilization of chemical by-products nitre cake—essentially sodium bisulphate the residue from the manufacture of nitric acid from Chili saltpetre must be regarded as a waste product and practically valueless. Many uses have been proposed for it, but only a few of these have proved profitable or of any commercial importance. The literature on the subject is voluminous, and we find on record the results of a very large amount of investigatory work of the highest order, but apparently the problem still awaits a successful issue. Even in peace times this by-product has accumulated and proved an expensive nuisance; in these days when it is being produced in millions of tons its disposal has become a very serious matter. Where location permits it to be discharged into tidal waters it is most cheaply, and, possibly, least objectionably got rid of, but inland its disposal means, generally, the pollution of streams and lakes and the destruction of fish or the ruination of land. It is evident that a fortune awaits the one who can find a profitable use for it in large quantities.

USES OF NITRE CAKE

Of the almost innumerable processes that have been brought out or suggested it is quite impossible here to give any account, but a few of the uses that nitre cake has been put to may be enumerated, for the purpose of showing the wide range of investigational activity in this matter; the production of hydrochloric acid and salt cake by furnacing with salt; the pickling of metals; the extraction of grease from wool; the bleaching of lace, etc., mineral water manufacture; the manufacture of crude ferric sulphate for sewage precipitation; the preparation of sodium sulphide; the separation into Glauber's salt and free acid, and, lastly, though by no means is the list exhausted, as a diluent for sulphuric acid in the manufacture of superphosphate. It is in connection with this last use, though not employing sulphuric acid,

*Contribution from the laboratories of the Division of Chemistry, Experimental Farms, Ottawa, and read in abstract before Section III, Royal Society of Canada, May, 1918.

that the work here recorded was undertaken.

This preliminary investigation was taken in hand at the instance of the Metallurgical Division, Explosives Department, Imperial Munition Board, which was anxious to find some useful purpose for the large amount (about 150 tons daily) of nitre cake produced at the munitions plant at Trenton, Ont. This nitre cake is stated "to contain 30 per cent free sulphuric acid, nitric acid not over 2 per cent, and small amounts of iron. Otherwise it is practically free from impurities". The supplies of nitre cake (Trenton), Florida, Pebble Rock, and Canadian apatite used in this experimental work were furnished by the Director of Explosives.

THE PROCESSES

In the preparation of the materials the nitre cake was reduced in an iron mortar until sufficiently fine to pass through a 60-mesh sieve. No particular difficulty was experienced in this operation. Reduction of the cake in a pebble or ball mill was tried, but this was found to be unsatisfactory, owing to the material adhering to the pebbles. Both the Florida Pebble phosphate and the Canadian apatite readily reduced in the pebble mill, screen tests showing that for the former 98 per cent passed the 80 mesh and 78 per cent a 100 mesh sieve, and for the latter the ground product 100 per cent passed the 100 mesh sieve.

After certain preliminary experiments it was decided to ascertain the action of the nitre cake on the phosphates when (1) the materials were mixed "dry", and (2) on the materials when made into a paste with the addition of a little water.

In the "dry mix", the powdered substances were weighed out in the several proportions stated in the tables of analysis, thoroughly mixed, and placed in glass-stoppered bottles. The product or "mix", after being allowed to remain at room temperatures, was analysed at the end of one week. The product was a fine flour-like material, with no evidence of caking.

In the "wet mix", to the materials mixed in the proportions noted, a small but known weight of water was added and the whole stirred to a damp mass. This was placed in stoppered bottles and allowed to stand 48 hours. The mass was then emptied out and allowed to air-dry. Although a slight caking or hardening took place, it was very readily broken down to a fine powder. The setting or hardening was more pronounced with the Canadian apatite than with the Florida phosphate, but in both cases a first class product as regards its mechanical condition was obtained.

THE ANALYTICAL PROCEDURE

An outline of the analytical procedure may be given as follows: 2 grams of the mix were weighed into a beaker and 200 cc of water added. After occasional stirring for 2 hours the whole was filtered and the filtrate made up to 500 cc and an aliquot taken for the determination of water soluble phosphoric acid. The filter with its residue was then placed in the bottle with 500 cc of a 1 per cent solution of citric acid and shaken for 5 hours in a mechanical shaker and filtered. The phosphoric acid as determined in the filtrate is denoted in the tables of analyses as "1 per cent citric soluble". Determinations of the water soluble and ammonium citrate soluble phosphoric acid were also made according to the official methods of the Association of Official Agricultural Chemists, generally adopted on the American continent in the official analysis of fertilizers.

*Analyses of "dry" mixes that had been allowed to stand two weeks gave results practically identical with those of one week's standing.

THE UTILIZATION OF NITRE CAKE IN THE MANUFACTURE OF SUPERPHOSPHATE.

TABLE I

Using Florida Pebble Phosphate

	Available Phosphoric Acid						Total P_2O_5 in Mix	Percentage of total P_2O_5 rendered available	
	Water Soluble	1% Citric Soluble	Total H_2O and 1% Citric	Water Soluble A.O.A.C. method	Citrate Soluble A.O.A.C. method	Total A.O.A.C. method		H_2O 1% Citric	A.O.A.C.
(a) DRY MIX									
Proportions									
2½ N.C.; 1 F. P.P...	7·15	2·17	9·32	5·30	0·76	6·06	9·32	100·00	65·0
2 N.C.; 1 F. P.P...	7·28	3·70	10·89	5·04	0·94	5·98	10·80	100·00	55·4
1 N.C.; 1 F. P.P...	6·83	8·94	15·77	6·00	0·81	6·81	16·15	97·6	42·2
0·5 N.C.; 1 F. P.P...	5·04	10·34	15·38	5·30	1·92	7·22	21·54	71·4	33·5
(b) WET MIX									
Proportions									
6 N.C.; 3 F.P.P.; 1 H_2O.	7·57	2·94	10·51	6·83	0·64	7·47	10·47	100·00	71·3
3 N.C.; 3 F.P.P.; 1 H_2O.	7·31	5·04	12·35	7·79	1·08	8·87	15·61	79·1	56 8
6 N.C.; 6 F.P.P.; 1 H_2O.	7·66	8·43	16·09	7·85	1·41	9·26	16·00	100·00	57·9

THE UTILIZATION OF NITRE CAKE IN THE MANUFACTURE OF SUPERPHOSPHATE.

TABLE II

Using Canadian Apatite

	Available Phosphoric Acid						Total P_2O_5 in Mix	Percentage of total P_2O_5 rendered available	
	Water Soluble	1% Citric Soluble	Total H_2O and 1% Citric	Water Soluble A.O.A.C. method	Citrate Soluble A.O.A.C. method	Total A.O.A.C. method		H_2O and 1% Citric	A.O.A.C.
(a) DRY MIX									
Proportions									
3 N.C.; 1 C.A.....	3·64	3·00	6·64	3·00	0·00	3·00	9·85	67·42	30·5
2 N.C.; 1 C.A.....	4·34	3·83	8·17	3·64	0·00	3·64	13·13	62·22	27·7
1 N.C.; 1 C.A.....	3·96	4·47	8·43	4·21	0·16	4·37	19·70	42·79	22·18
0·5 N.C.; 1 C.A.....	2·94	5·24	8·18	3·32	0·45	3·77	26·27	31·15	14·4
(b) WET MIX									
Proportions									
6 N.C.; 3 C.A.; 1 H_2O.	6·14	2·23	8·87	7·85	0·58	8·43	12·31	72·06	68·5
6 N.C.; 6 C.A.; 1 H_2O.	6·26	3·64	9·90	6·45	0·57	7·02	18·88	52·43	37·17

The composition of the Florida pebble phosphate and the Canadian apatite used in the experiments, is as follows;

ANALYSIS OF FLORIDA PEBBLE PHOSPHATE AND CANADIAN APATITE

	Florida Pebble Phosphate	Canadian Apatite
Total phosphoric acid	32·30	39·40
equivt. to tricalcic phosphate	72·54	86·05
One per cent citric soluble phosphate acid	11·50	6·06
equivt. to tricalcic phosphate	25·10	13·24
Citrate soluble phosphate acid A.O.A.C.	1·91	nil
equivt. to tricalcic phosphate	4·17	"
Water-soluble phosphoric acid	nil	"

DISCUSSION OF RESULTS

Tables I and II set forth clearly the results obtained in this investigation, and will need but little explanatory text. The percentages of phosphoric acid as rendered available in the several mixes, as determined by treatment with water and 1 per cent citric acid solution, and by the A.O.A.C. methods, are stated and the percentages of the total phosphoric in the mixes so converted are also given. Certain of the more important results may be briefly emphasized as follows:

TABLE I. FLORIDA PEBBLE PHOSPHATE

Dry Mix.—The highest percentage of available phosphoric acid, as obtained by using water and 1 per cent citric acid solution as solvent, resulted from the 1 to 1 mixture. This product contained 15·77 per cent, of which 6·83 per cent was soluble in water. This indicates that of the total phosphoric acid in the mix, 97·6 per cent had been converted into more or less available form. This is closely followed by the mix, 0·5 nitre cake to 1 F.P. phosphate, which by the same analytical method is seen to contain 15·38 per cent of available phosphoric acid. Since the percentage of total phosphoric acid in this latter mix is greater than in the 1 to 1 mix, the percentage rendered available is less, viz. 71·4 per cent.

Considering the results obtained by the A.O.A.C. methods, it will be observed that while the percentages of water soluble phosphoric acid do not differ greatly from the water soluble data just discussed, the percentages of "citrate soluble" are very much less than when 1 per cent citric acid solution is used. This markedly reduces the total percentages of available phosphoric acid, as compared with the results when employing the citric acid solution. In the mix 1 to 1, the total available phosphoric acid is 6·81 per cent, of which 6·0 per cent is soluble in water.

Wet Mix.—Three series were experimented with, the proportions being:

(a) 6 N.C.; 3 F.P.P.; 1 H_2O
(b) 3 N.C.; 3 F.P.P.; 1 H_2O
(c) 6 N.C.; 6 F.P.P.; 1 H_2O

The percentage of water soluble phosphoric acid in all three series was practically the same by both methods, but as in the case of the dry mix the citric soluble percentages are much higher than those obtained by the A.O.A.C. citrate soluble method.

The best results were obtained with proportions of series (c), 6 N.C.; 6 F.P.P.; 1 H_2O; which gave a pro-

duct containing 16·09 per cent available phosphoric acid (of which 7·66 per cent was water soluble), as determined by 1 per cent citric acid solvent. Since the total phosphoric acid in the mix is 16·0 per cent, it is evident that the conversion is very satisfactory. Similarly in series (a) 100 per cent conversion was brought about, but the product contains a lower percentage of available phosphoric acid (10·51), corresponding to the lower percentage of total phosphoric acid in the original mix.

By the A.O.A.C. methods, series (c) similarly possessed the highest percentage of available phosphoric acid, viz. 9·26, which stated otherwise means that practically 60 per cent of the total phosphoric acid in the mix had been rendered available.

TABLE II, CANADIAN APATITE

Dry Mix.—It will be at first evident that the degree of conversion is decidedly lower than in the similar series using Florida Pebble phosphate, indicating the harder and more resistent nature of the Canadian apatite.

The series in which the proportions were 1 N.C.to 1 C.A. proved, as in the case of the Florida Pebble phosphate, the most successful. Its product contained 8·43 per cent available phosphoric acid (of which 3·96 per cent was water soluble), as determined by 1 per cent citric acid method. This is equivalent, practically, to a 43 per cent conversion. By the A.O.A.C. methods the available phosphoric acid was 4·37 per cent (practically entirely water soluble), or, expressed otherwise, a 23 per cent conversion.

Wet Mix.—The results generally as regards the total available phosphoric acid in the several mixes, and hence in the degree of conversion, are considerably higher than in the corresponding dry mixes. In the series 6 N.C.; 6 C.A.; 1 H^2O the total available phosphoric acid is 9·90 per cent by the 1 per cent citric acid method and 7·02 per cent by the A.O.A.C. methods. This, respectively, is equivalent to 52 per cent and 37 per cent conversion of the total phosphoric acid in the mix.

Unfortunately more pressing work necessitated at this stage, the postponement of further prosecution of this investigation. As opportunity permits the work will be proceeded with, laboratory experiments being supplemented by trials on a larger scale, to simulate more closely the results that would be obtained in the factory. Though of a preliminary and incomplete nature, the results here presented appear to justify the conclusion that the waste product nitre cake could be used advantageously in the manufacture of a superphosphate containing 7 per cent to 9 per cent available phosphoric acid (A.O.A.C.), employing either Florida Pebble phosphate or Canadian apatite, the only apparatus required being the grinding machinery for reducing the materials.

SUMMARY

1. Employing finely ground Florida Pebble phosphate (total P^2O^5, 32·3%) a dry mix of 1 N.C. to 1 F.P.P. yielded a superphosphate 15·77 per cent available phosphoric acid as determined by 1 per cent citric acid method or 6·81 per cent by the A.O.A.C. methods. The wet mix, 6 N.C.; 6 F.P.P.; 1 H^2O gave 16·09 per cent and 9·26 per cent, available phosphoric acid, respectively, by the two methods of analysis.

2. Canadian apatite (total P^2O^5, 39·40%) is less readily acted upon by the nitre cake than Florida Pebble phosphate, the products of the several mixes showing lower percentages of available phosphoric acid than the corresponding mixes with the later phosphate.

The dry mix 1 N.C. to 1 C.A. gave a product containing 8·43 per cent and 4·37 per cent, available phosphoric acid, respectively, by the 1 per cent citric acid method and the A.O.A.C. methods. The wet mix

product from 6 N.C.; 6 C.A.; 1 H^2O, contained 9·90 per cent and 7·02 per cent available phosphoric acid respectively by the two methods of analysis employed. While in the case of the Florida Pebble phosphate no very marked increase in the percentage of available phosphoric acid resulted from mixing the materials wet and allowing them to stand, the wet mixes using Canadian apatite were decidedly richer than the corresponding dry mixes in this constituent.

THE POULTRY DIVISION

LIGHT IN THE POULTRY HOUSE

BY F. C. ELFORD, DOMINION POULTRY HUSBANDMAN

FOR some time it has been a question whether artificial light in the poultry house was a benefit or not, and to help solve the problem the Poultry Division of the Experimental Farm, made a test during the winter of 1916–17 with two pens of Barred Rock pullets. Another test was made during last winter with two pens of Rock pullets and two pens of Leghorn pullets.

1916–1917.

During the six winter months of 1916–17 forty Rocks were divided into two pens, twenty of which were given light in the afternoon and evenings during the short days. Two tungsten 40 watt lamps were turned on before dusk in the afternoon and turned off at 9 o'clock at night. In neither case was the yield heavy, but the light pens gave considerably the better results.

The summary of the two pens for the winter of 1916–17 is as follows:

	No. of eggs	Total value	Cost feed	Cost light	Cost feed and light	Balance	Cost per dozen
Light	1,106	54·93	22·33	2·40	24·73	30·20	26·8
Dark	636	29·46	21·09	....	21·09	8·37	39·8

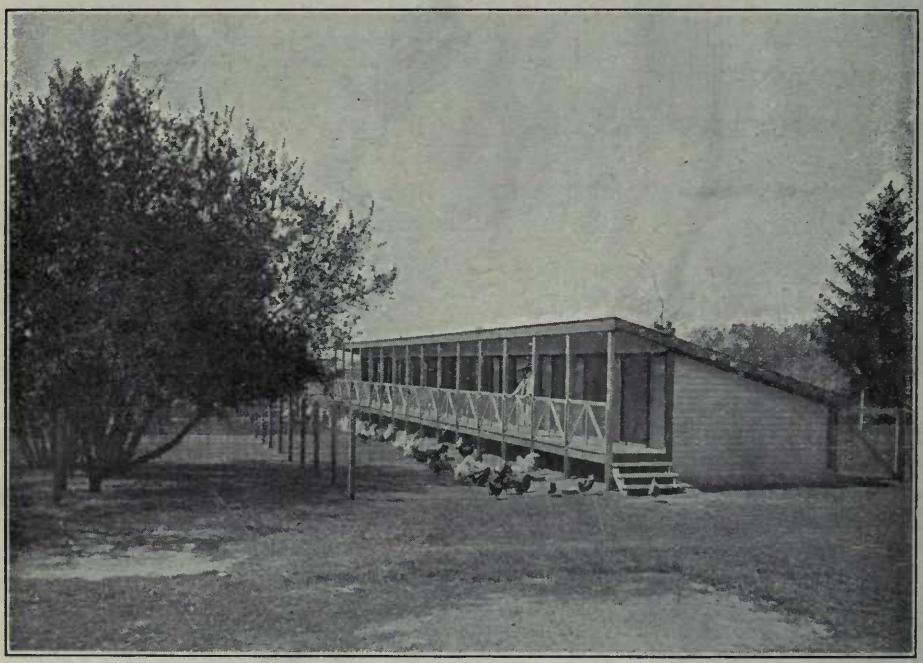
1917–1918.

During the winter of 1917–18 forty pullets, each of Barred Rocks and White Leghorns, were selected and divided into pens of twenty. One pen each of Rocks and Leghorns were given light and the same number kept as checks. The light was turned on the middle of November when the days grew short, a week or two after the pullets were put into their laying quarters. The light was continued until the middle of March, when the longer days made the light unnecessary. The light consisted of two 40 watt. lamps for each pen of 20 birds. It was turned on at 6 a.m. and left till daylight, turned on again in the afternoon before dusk and left till 9 p.m. They were just ordinary tungsten burners and were turned on and off by hand. At first they were turned on and off several times at night to induce the pullets to go on to the roosts, but before long the birds seemed to know when they were expected to go to bed, and went without any trouble.

The yields were not high in either case, and the total difference in egg yield in the six months of the 1917–18 test was not large, but the forty birds with light gave a balance over cost of feed and light of $77.64, while the forty without light gave a balance of only $58.95 over cost of feed. This difference was made up in the time that the eggs were received. Those with the light gave their heaviest yields in December and January, while by far the heaviest months for the Leghorns without light were March and April and the Rocks January and February.

For early winter eggs during the short days, the light does increase the egg yield, but later in the season the yield is not as heavy as with birds that have not had the light. The advisability of using light, therefore, will depend upon what is wanted. If early winter and high priced eating eggs are the object, the lights are an advantage; if eggs during the hatching season, the lights are a disadvantage.

The question of degree of fertility also comes in, and though there was practically no difference in this respect in these pens, during the hatching season, we are not satisfied that the light has no injurious effect and will give it further trial.



RANGE OF INDIVIDUAL PENS IN WHICH ELECTRIC LIGHTING EXPERIMENT WAS CONDUCTED

The summary of the egg yields, the value and the cost for the various months during the experiment are given in the following tables. The last part of March and the month of April are also included in the tables for the purpose of comparison:

20 White Leghorns with light.

Month	No. of eggs	Total value	Cost of feed	Cost of light	Cost of feed and light	Balance	Cost of one dozen
November	71	3·55	4·76	0·20	4·96	—1·41	83·8
December	311	18·14	4·76	0·40	5·16	12·89	19·9
January	276	17·25	5·57	0·40	5·97	11·28	25·9
February	154	9·62	3·72	0·40	4·12	5·50	32·1
March	222	11·10	5·30	0·20	5·50	5·60	29·7
April	215	8·06	3·80	....	3·80	4·26	21·2
Totals	1,249	67·72	27·91	1·60	29·51	38·21	28·3

20 Barred Rocks with light.

Month	No. of eggs	Total value	Cost of feed	Cost of light	Cost of feed and light	Balance	Cost of 1 dozen
November	78	3·90	4·93	0·20	5·13	—1·23	79·0
December	349	20·36	4·93	0·40	5·33	15·03	18·3
January	317	19·81	4·86	0·40	5·26	14·55	19·9
February	193	12·06	5·26	0·40	5·66	6·40	36·2
March	146	7·30	3·15	0·20	3·35	3·95	27·7
April	138	5·17	4·44	....	4·44	0·73	38·6
Totals	1,221	68·60	27·57	1·60	29·17	39·43	28·6

20 Leghorns without light.

Month	No. of eggs	Total value	Cost of feed	Balance	Cost of 1 dozen
November	15	0·80	4·65	—3·85	3·9
December	123	7·17	4·65	2·52	45·3
January	157	9·81	4·21	5·60	32·2
February	165	10·31	5·07	5·24	36·8
March	312	15·60	5·56	10·04	21·4
April	322	12·07	4·37	7·70	15·3
Totals	1,095	55·76	28·.1	27·25	31·2

20 Rocks without light.

Month	No. of eggs	Total value	Cost of feed	Balance	Cost of 1 dozen
November	66	3·30	5·59	—2·29	10·1
December	184	10·73	5·59	5·14	36·4
January	281	17·56	4·58	12·98	19·5
February	257	16·06	6·32	9·74	29·5
March	166	8·30	5·46	2·84	39·4
April	193	7·24	3·96	3·28	24·6
Totals	1,147	63·19	31·50	31·69	32·9

SUMMARY OF TOTALS

With Light.

	No. of eggs	Value	Cost of feed	Cost of light	Total cost of feed and light	Balance	Cost of 1 dozen
Leghorns	1,249	67·72	27·91	1·60	29·51	38·21	28·3
Rocks	1,221	68·60	27·57	1·60	29·17	39·43	28·6
Without Light.							
Leghorns	1,095	55·76	28·51	....	28·51	27·25	31·2
Rocks	1,147	63·19	31·50	....	31·50	31·69	32·9
Totals.							
With light	2,470	136·32	55·48	3·20	58·68	77·64	28·5
Without light	2,242	118·95	60·01	....	60·01	58·94	32·1

AN EGG-LAYING CONTEST

AN Egg-Laying contest was commenced at the Experimental Station, Charlottetown, on November first this year to be continued until the end of September 1919. This competition is being instituted in Prince Edward Island on account of the important position occupied by the poultry and egg industry of that province from which eggs constitute one of the main agricultural exports. Following were the rules and regulations governing the contest:

RULES AND REGULATIONS.

This competition will be known as "The First Prince Edward Island Annual Egg Laying Contest". It will be conducted on the Experimental Farm at Charlottetown, and under the direction of the Poultry Division of the Experimental Farm.

Board of Management.—The board of management will be, The Dominion Poultry Husbandman; R. D. L. Bligh, B.S.A., Experimental Farm; J. G. Morgan, Superintendent of Contest, and W. Kerr of the Poultry Division, Live Stock Branch.

Scope and Number of Entries—The contest will be open to all. It will consist of 20 pens of 8 females—hens or pullets. The first twenty *bona fide* applications received will be the twenty accepted. Contestants will be privileged to maintain throughout the year a full complement of eight birds. No males will be included.

Fees.—The entry fee for each pen will be One Dollar ($1) which must accompany the application.

Prizes.—Suitable prizes will be awarded the winning pens.

Classes.—There will be two classes, Class 1 consisting of the Light Breeds and Class 2 consisting of the Heavy Breeds.

Delivering the Birds.—The birds must be delivered at Charlottetown, express prepaid, between the fifteenth and twentieth of October, nineteen eighteen. The shipment should be addressed "Laying Contest, Experimental Farm, Charlottetown" and must also have the name and address of the shipper plainly marked on the shipping crate.

Rejection of Birds.—Any birds arriving in a sick condition may at the discretion of the Contest Superintendent be rejected and either destroyed or shipped back to the owner. None but pure-bred birds will be accepted and only those breeds that lay a marketable sized egg. The Superintendent also will have the right to clip the wings of any birds that may prove troublesome.

The Standard for Judging.—The rating of the birds or pens will be determined by the number, together with the size, the uniformity and marketing value of the eggs. The Canadian standards for eggs will be adhered to.

Feed and Care.—The birds while in the contest will receive the best of feed and care, but this will be subject to the judgment of the Board of Control. The eggs from all will be the property of the Government and will go towards the cost of feed, but each contest-

ant will be entitled to the record of each bird he has in the contest and to a statement showing the receipts and expenditure of his pen for the eleven months.

Housing.—The contest will be housed in double colony houses 10 x 12 feet divided into two pens having glass and cotton fronts. The houses will be placed on the Poultry Plant of the Experimental Farm facing the railway as it runs through the farm.

Reports.—A summary of the standing of each pen in the contest will be compiled at the close of each month, a copy of which will be supplied the owner of each pen. The summary will also be provided the press of Canada.

Return of the Birds.—If no notification as to the disposal of the birds has been received by September 1, 1919, the birds on the completion of the contest, will be sent by express collect, to owner's address from which the shipment was made.

THE CEREAL DIVISION

DISTRIBUTION OF SEED GRAIN

BY instructions of the Honourable the Minister of Agriculture, a free distribution of superior sorts of grain will be made during the coming winter and spring to Canadian farmers.

The samples for distribution will consist of spring wheat (about 5 lb.), white oats (about 4 lb.), barley (about 5 lb.), and field peas (about 5 lb.) These will be sent out, free, by mail, from the Central Experimental farm, Ottawa, by the Dominion Cerealist, who will furnish the necessary application forms.

Only one sample can be sent to each applicant. As the supply of seed is limited, farmers are advised to apply very early.

THE ENTOMOLOGICAL BRANCH

THE LARGE ASPEN TORTRIX, CACŒCIA CONFLICTANA, WALK

BY NORMAN CRIDDLE, ENTOMOLOGICAL LABORATORY, TREESBANK, MAN

THE number of insect pests with which the entomologists has to deal is practically endless. It is not as if these were all well established as such or their habits known. True there are many which on account of their persistent depredations have become what might be termed pests of established reputation, but there are many more which only turn up in injurious numbers after long periods of inactivity, while others again have never to our knowledge been of economic importance. Unfortunately, there are no means whereby we can distinguish the bad from the harmless because an insect may remain in obscurity for ages and then, owing to favourable conditions, or the temporary absence of its natural enemies, increase at an enormous rate and become a pest of first importance. The Pale Western Cutworm, *Porosagrostis orthogonia* is an excellent example of this. Others have recently occurred in Manitoba of which that described below is typical.

It was during the year of 1916 that aspen poplars over a wide area were found to be infested by a small lepidopterous caterpillar which had become so numerous in a short time, as to seriously threaten large numbers of trees. This capetpillar commenced to devour the leaves as soon as they burst from their buds, at first eating holes in them, but soon afterwards curling them by means of silken webs so that the leaves formed a funnel or trumpet-shaped enclosure. It was within these that each individual larva lived, ate and grew, until such time as its food supply became short, when it migrated to another leaf to repeat the performance. As there were millions upon millions of these larvæ the result may be well imagined. Trees soon showed a ragged appearance and as the time of the insect's pupation drew near large areas of trees presented a bareness not unlike that of winter. A second

season's attack even worse than the first was responsible for much killing, of which the accompanying illustration is an example.

Two species were in reality involved in this attack, both remarkably alike in habits, namely *Cacœcia* (*Tortrix*) *conflictana* Walk. and *Argyroploce duplex* Wlsh. The former species alone is dealt with here.

THE WORK OF THE LARGE ASPEN TORTRIX (ORIGINAL)

The eggs of the large Aspen Tortrix, *Cacœcia conflictana*, are scale-like in appearance and are attached to the upper surface of the leaves in flat masses, the eggs in each mass varying from 160 to 600 in number. These round masses are arranged very much in the form of fish scales, the individual egg being flat, rather pyriform and green in colour. The eggs are thus difficult to distinguish even from a short distance. They are deposited during the first half of June. From these emerge, about July 10, small flat, dull greenish-yellow larvæ with heads considerably in excess of the width of their bellies. They are active little creatures and immediately crawl to the under surface of the leaves where they remain and eat small holes in the tissues. They molt after a few days and in the operation lose all the original flatness becoming henceforth, of the usual cylindrical shape with heads slightly narrower than the body. The former is still black and the latter greenish with dark tubercles and white hairs. The caterpillars at this time are extremely active. They spin much silk, move restlessly about and may be seen in large numbers hanging from the leaves and twigs or wandering aimlessly about, a considerable distance away from the trees upon which they have been feeding. About July 24 nearly all have vanished into hibernation where they remain until the warmth of returning spring warns them that their food supply is again in readiness and so they once more make their way up the trees. Full grown larvæ instead of curling a single leaf usually gather two or three leaves together. At this time they measure approximately 26 mm. in length. The head is irregularly shiny, black and brown, thoracic shield black, with the exception of the front margin and a narrow dorsal line of dull white; body dull olive-green becoming almost black in some specimens; tubercles, legs and anal shield black, the former shiny;

hairs pale. A variety has the head entirely black and the body sooty-green.

Pupation takes place almost exactly a year from the time of birth, namely July 10; the usual habit being to utilize the curled leaves for that purpose. From this chamber the pupa works its way partly out as the moth emerges and the thousands of brown objects protruding from their miniature tents is a familiar sight at this time.

ADULT OF LARGE ASPEN TORTRIX ENLARGED ONE THIRD

The moth measures approximately an inch across the wings and in colour is dull gray indistinctively barred and marked with darker shades on the primaries. Soon after emerging the moths might be seen in countless numbers flying about the woods and trees upon which the caterpillars had previously lived. This flight commenced about sunset, and at this time the sides of buildings close to bushes were literally covered with the moths. The moths also found a special attraction in clothing so that any persons standing near them soon had a large number resting on their clothes.

During the second year of this abundance these insects were attacked by several hymenopterous parasites which diminished them considerably and these undoubtedly at last, would have quite reduced them to their former insignificance. Predacious animals also took their toll and several birds found them a palatable and easily-obtained food. Among the birds observed to persistently feed upon these caterpillars were Cedarbirds, Rose-breasted Grossbeaks and House Sparrows. Warbling and Red-eyed Vireos, Downy Woodpecker, Yellow-bellied Sapsucker, Black-billed Cuckoo, Baltimore Oriole and American Robin were also noted feeding upon them at times but less frequently.

It was evident that another season would have seen this pest doomed in any case, but another agent forestalled the living ones. This was the very erratic spring of 1918. Hot summer-like weather in April induced an unusually early leafing of the trees, it also caused an earlier awakening than usual of the hibernating caterpillars. Later there was a change to the other extreme with a return to almost winter. This killed a large percentage of the newly-formed leaves and so caused a dearth in the food supply. Whether it was in reality lack of food or merely vicissitudes of weather that overcame the vitality of the young larvæ is unknown, but the fact remains that very few survived and the trees were once more able to produce their leafly verdure unmolested.

It may be fifty years before another outbreak of this insect occurs but there is left behind another example of how a comparatively rare species may become very destructive.

With an insect having such a wide range over woodlands, remedial measures are not practicable at present. For those trees utilized as shelter belts or for ornamental purposes two methods may be employed for their protection. These consist of first spraying with an arsenical mixture when the young caterpillars hatch towards the middle of July, and secondly of banding the trees with some sticky material before they commence to leaf out in spring time. The first operation will destroy the larvæ before they go into hibernation, the second will prevent them climbing the trees for food as they emerge in spring from their winter quarters on the ground.

THE SEED BRANCH

SEED LABORATORY OPENED IN WINNIPEG

A BRANCH seed laboratory and seed control station has recently been opened in Winnipeg, Manitoba, by the Seed Branch of the Federal Department of Agriculture. The primary work of the laboratory and office will be to administer the Seed Control Act within the inspection district comprising Saskatchewan, Manitoba, and that part of Ontario west of, and including, Port Arthur. Seedsmen, grain dealers, and farmers who have seed for sale within this inspection district should send samples to the Winnipeg laboratory for germination and purity tests. Twenty-five tests will be made free for any one firm or individual each year. For tests in excess of this number there will be a charge of twenty-five cents each. Samples should be addressed—Dominion Seed Laboratory, 173 Portage Avenue, Winnipeg, Man., and postage prepaid.

SEED TESTING AT THE CALGARY LABORATORY.

BY JAS. R. FRYER, M.A., SEED ANALYST IN CHARGE

THE object of this article is to describe the methods of testing seeds employed in the Canadian Government Seed Laboratories at Calgary, Alta.

Each sample of seed on arrival is given a test number which, with the name and address of the sender, the date received, and the tests required, is entered in a large file. The sample is then placed in a manilla paper envelope marked with the test number and the tests required, and taken to the purity laboratory, the germination laboratory, or the cleaning room, according to the test to be given.

EXAMINATION OF SEED FOR IMPURITIES

In the purity laboratory the sample is first mixed thoroughly by means of a mechanical mixer (Figure 1) for the purpose of distributing the impurities contained evenly throughout the sample. A certain portion of the mixed seed is accurately weighed out on the balance shown in the right of Figure 1. For timothy and seeds of similar size the quantity is one-quarter ounce: for seeds the size of flax, one ounce, and for cereals, one pound.

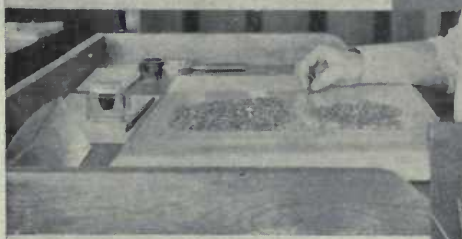
This weighed portion is placed on a sheet of plate glass with which each purity table is provided. The analyst now goes over it carefully with a paper knife, as shown in Figure 2, picking out the impurities. The portion is gone over in this way until the analyst is absolutely certain that every impurity has been removed.

The impurities are then separated, identified, and counted, after which a report is made out giving the test number, kind of seed analysed, kinds and numbers of weed seeds found, and the grade with those kinds of seed for which grade standards are defined. Purity tests of small seeds particularly are frequently conducted in duplicate to check the uniformity of the sample.

GERMINATION TESTING

A sample which requires germination test only is taken directly to the germination laboratory, after being numbered and entered in the general file. The germination laboratory is equipped with a number of standard germinators (Figure 3), light germinators, and various other pieces of equipment, chiefly counting and working tables.

In commencing a germination test,



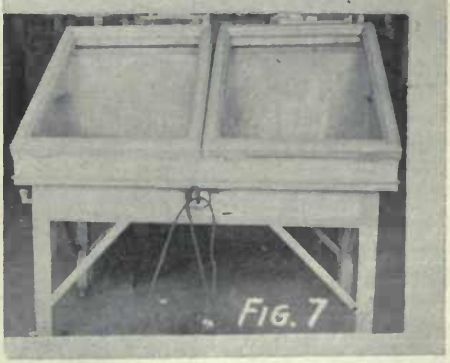


Fig. 1. On the left is shown a seed mixer; on the right a torsion balance used for weighing out accurately small quantities of seed for purity analysis.

Fig. 2. Method of separating weed seeds from a sample of wheat in making a purity analysis.

Fig. 3. A corner of the germination laboratory showing a few standard germinators.

Fig. 4. Counting out from a sample of oats two lots of one hundred each for germination test.

Fig. 5. Samples of barley that have been under germination test in soil for six days. The sprouted seeds are removed and counted on the sixth day, the remainder of the seeds being left in soil for a few days longer in order to be certain that every vital seed has been given an opportunity to germinate. Seed that will produce a high percentage of sprouts during the first few days of the test may be expected to give a better stand than seeds that are slower to germinate.

Fig. 6. Separating out and counting sprouted seeds in six day count on oats.

Fig. 7. Light germinator.

the sample is poured out on a piece of plate glass on one of the counting tables and two lots of one hundred seeds each are counted indiscriminately to get an average sample of the whole lot and put into small glass vials (Figure 4).

The next step is called "putting in". The counted lots of seed are placed in the proper germination medium, soil, sand, or blotters, as the kind of seed may require. Oats, barley, corn, peas, beans, and timothy are tested in soil; wheat, turnip, onion, and cucumber, between blotters; beet and mangel on sand; brome grass, western rye grass, and parsnip are placed on top of blotters. For all tests of oats and barley, a definite proportion of water and air-dried soil is used. The dry soil, water, and one hundred seeds, are placed in a stiff paper box labelled with the test number of the sample from which the seeds were counted and placed in a room kept at a temperature of about 72 degrees F., by means of a special electric heating apparatus. To secure correct results, it is necessary to regulate the atmospheric moisture in this room-germinator. The test is allowed to run in the room-germinator for six days undisturbed, when it is taken out (Figure 5) and transferred to the counting tables. The contents of the paper box are turned out and the sprouted seeds picked out and counted (Figure 6). The unsprouted seeds and soil with a little more water are replaced in the paper box and returned to the room-germinator for six days more. When this time has elapsed the twelve-day count is made similarly to the six-day count.

With wheat or other seeds which are tested between blotters, the one hundred seeds are put between wet blotters to which has been attached the test number label. The blotters are laid on a galvanized iron or copper tray, placed in the standard germinator, kept moist by sprinkling occasionally, and maintained at a suitable temperature. After six days the final count is made and the unsprouted seeds placed in the blotters and returned to the germinator. In six days more (the twelfth) the final count is made, and any seeds that have not then germinated are considered non-vital. For turnips, beans, corn, onions, and cucumbers the counts are made on the fourth and tenth days instead of on the sixth and twelfth, as for wheat.

Timothy is tested in soil in the standard germinator, the preliminary count being made on the sixth day and the final on the twelfth day. Such seeds as beet, mangel, parsnip, brome and western rye grass are tested on sand or on blotters in the light germinator (Figure 7), as it has been found that these seeds require to be exposed to the light for their proper germination.

All germination tests are conducted in duplicate in different germinators. If at the end of the test there is any considerable variation between the results of the duplicate tests, a retest is made, also in duplicate. The average results of all the tests made is taken as the germination of the sample, unless there is reason to believe that some of the results are incorrect. In cases where great accuracy is required, tests are often conducted in quadruplicate.

CLEANING SEED

The seed laboratories are equipped with a small cleaning machine which is used very extensively in connection with samples of grain, particularly those from farmers. The mill is supplied with about sixty sieves, all of different mesh. In reporting a cleaning test it is the practice to indicate the percentage that should be removed from the sample to bring it up to good seed standard, if this is economically possible by cleaning, and to recommend sieves most suitable for such cleaning. Very frequently, samples of timothy, alfalfa, western rye grass, brome, and other kinds of seeds difficult to

clean, are received with requests for information as to the most economical methods of cleaning.

REPORTS

In reporting tests on farmers' samples an effort is being made to describe each sample from the standpoint of its seed value. Information is given on the following: the weed seeds, other grains, and other foreign materials in the sample; the general quality of the grain itself, i.e., whether frosted, green, shrunken, etc.; the percentage of germinable seeds, together with suggestions for improving the seed by cleaning.

LIMITED NUMBER OF TESTS FREE

amples to the number of twenty-five in any one season are tested free of charge for any farmer or seedsman Tests on samples in excess of this number must be paid for at the rate of 25 cts. The only outlay, therefore, which a western farmer must make in order to ascertain the seeding value of the grain he purposes using for the production of a crop is the postage required to carry a sample to his nearest seed laboratory.

THE FRUIT BRANCH

THE NEW FRUIT COMMISSIONER

MR. C. W. Baxter, Chief Fruit Inspector under Section IX of the Inspection and Sale Act (Fruit Marks Act)for Ontario east of Toronto and the province of Quebec, has been promoted to the position of Fruit Commissioner, succeeding Mr. Donald Johnson, whose death occurred in August. Before entering the Government service in July, 1912, Mr. Baxter had spent his life in the fruit trade. When first appointed in the service he was made chief fruit inspector for the Prairie Provinces, with headquarters at Winnipeg, which position he held until, 1914, when he was transferred to Ottawa and given the eastern supervision. During these years he was closely associated with Mr. Johnson in handling the major problems relative to the distribution of fruit and vegetables. On the reorganization of the Food Administration, when the Canada Food Board succeeded the Food Controller, Mr. Baxter, while still an officer of the Fruit Branch, was placed in charge of the fruit and vegetable section of the Board. On the completion of the licensing system an enforcement section was created and Mr. Baxter was given its charge. Mr. Baxter has entered upon his new duties as Fruit Commissioner.

MR. C. W. BAXTER, DOMINION FRUIT COMMISSIONER

THE DAIRY AND COLD STORAGE BRANCH

GRIMSBY PRE-COOLING AND EXPERIMENTAL FRUIT STORAGE WAREHOUSE

BY C. M. BONHAM, SUPERINTENDENT

THE tender fruit season is now nearly over, but we still have (October 10th) a considerable stock of peaches, pears and Reine Claude plums in storage. They are moving out now and will soon be practically all gone.

About 90% of our carload shipments of tender fruits this year have gone to points west of Port Arthur. We have shipped one or more carloads each to Edmonton, Regina, Prince Albert, and Moose Jaw. These western shipments show a large increase over last season, when a considerable proportion of the pre-cooled cars were sent to Ontario markets. The cars all turned out satisfactorily with the exception of a few Lombard plums in one of the Moose Jaw cars, and a few which were slightly overripe in a Regina car, but in neither case was there any serious shrinkage, or loss, as it was only on a small percentage of the car.

We have generally advised against the shipment of Lombards to those distant markets, as it is seldom that they will stand up under a journey of eight to twelve days, although in one case a shipment of Lombards to Prince Albert, Sask., arrived in good condition. We have received a satisfactory report on a mixed car of plums, pears, tomatoes, etc., shipped by one of the growers to Edmonton. The Dominion Fruit Inspector reports that the car arrived in perfect condition and that the consignees were well pleased. They wired the shipper to this effect and were anxious to have further pre-cooled shipments made this season, but unfortunately the season was then too far advanced.

As usual Manitoba has received the greater part of our shipments, and, as far as our information goes, all cars sent to that province have given satisfaction.

We have handled a large quantity of fruit this year for short time storage, while growers were accumulating a carload or waiting for better market conditions.

After the tender fruits are all cleared out we expect to fill the warehouse with apples for winter storage.

THE HEALTH OF ANIMALS BRANCH

FOOT AND MOUTH DISEASE IN ENGLAND

A CABLE dispatch having been received from the Canadian High Commissioner's office in London, England, stating that there is an outbreak of foot and mouth disease in the county of Sussex, England, the Canadian Department of Agriculture promulgated the following order for the cancellation of permits already issued for the importation of live stock into Canada from Great Britain, with the exception of those covering animals already *en route:*

OTTAWA, September 28th, 1918.

Under and by virtue of the authority conferred upon me by the provisions of Section 9 of the Animal Contagious Diseases Act, R.S.C., 1906, I do hereby order that, owing to the existence of Foot and Mouth Disease in England, all permits for the importation to Canada from the United Kingdom of cattle, sheep, and other ruminants, and swine, with the exception of such animals as are actually at this date embarked on vessels *en route* for Canada, shall be and are hereby cancelled.

Acting Deputy Minister of Agriculture

PART II

Provincial Departments of Agriculture

THE CO-OPERATIVE MARKETING OF EGGS

NOVA SCOTIA

BY J. P. LANDRY, MANAGER AND LECTURER, AGRICULTURAL COLLEGE

DURING the past five years the co-operative handling of eggs has received considerable attention in this province. We established, under the direction of Mr. Benson several co-operative egg circles in different parts of the province. Our conditions were not similar to Prince Edward Island conditions, and on that account the collection of the eggs on any particular route was more expensive than in the Island. On this account, and owing to the local peddlers collecting a large portion in each district we decided to discontinue the egg circle as carried on there.

THE PLAN ADOPTED

Recognizing the fact that a large production of eggs was placed on the market during April, May, and June, and also that a great number of these eggs were lost, we decided to adopt the plan of conserving the eggs by building cement tanks in different sections of the province as an experiment, and collecting the eggs in the low price season and storing them in tanks with a preservative (*sodium silicate*), and during the winter season placing them on the market to help relieve the scarcity which exists during that period of the year. This was an advantage to the consumer and incidentally resulted in an average increase of prices for eggs produced in the spring to farmers. The system worked satisfactorily, and gave good results. During last year at three different points in this province we handled 16,000 dozens of eggs in this way. The circle selected their own collector and manager, and charged 4c. per dozen for handling and marketing the eggs so collected by the manager off the proceeds of the sale of the eggs. The balance was paid to the farmers after the eggs were sold. This method increased the spring prices to from 5 to 11c. per dozen. The eggs were candled into the tank, and also candled out of the tank into the cases for shipment, which enabled the circle to guarantee the quality of the eggs. We found some little difficulty in inducing the storekeepers to handle preserved eggs, but, after the customer had a shipment of these eggs, we were unable to supply all they required.

ATTITUDE OF THE DEPARTMENT

Our Department assumes no financial responsibility in this matter. We agree to furnish the market and to assist in organizing the circle; all other work devolves upon the respective managers of the different egg circles. During this past season the prices during April, May, and June were considerably higher than in other years, and on that account the circle managers decided of their own initiative that it would be advisable to preserve the bulk of the crop of the past spring. We will not,

however, have at these circles as large a number to dispose of this fall. At two of the circles we have about 5,000 dozen in the tanks.

The higher price of feed, and the difficulty of obtaining suitable foods for poultry, has caused a great many breeders and persons in town lots having small flocks to dispose of their flocks, and the production of eggs and poultry, as well as I can learn from reliable sources, will not be as large as last year by about 25%.

NEW BRUNSWICK

BY W. R. REEK, SECRETARY FOR AGRICULTURE

THE co-operative handling of eggs, has not yet been taken up in this province. We are busy endeavouring to lay a foundation, in order that there will be sufficient eggs to market in that way in the near future.

QUEBEC

BY BROTHER M. LIGUORI, POULTRY DIVISION

REMARKABLE progress has been made in the co-operative sale of eggs during the last few years. A great impetus was given to the movement by the Quebec Farmers' Experimental Union and the Quebec Cheesemakers' Agricultural Co-operative Association, with the help of the provincial Poultry Division. Eggs are gathered by the local agricultural co-operative associations, which number over two hundred in the province, and sent to the Central Co-operative (the Cheesemakers' Co-operative Association) by which they are handled.

STAMPING ADOPTED

All eggs are stamped, as soon as gathered, with a stamp furnished to the members for the purpose. They are then shipped to Montreal, to the central association. As each egg bears a number, it is easy to identify the producer, who is paid according to the quality of the product.

In addition to these local associations, some egg circles have been organized during the last few years in the Eastern Townships and in the district of Shawville (Pontiac). Some of these circles also sell their eggs through the central association. However, the members of these circles are not under the obligation to stamp their eggs, and it is almost impossible in this case to identify the producer. Therefore, the club receives as a rule only an average price for each shipment, instead of being paid according to the quality of each dozen of eggs. It is more difficult under such conditions to secure an improvement of the products.

METHOD OF OPERATION

This co-operative system for the sale of eggs is quite simple:

1. The eggs which, as mentioned above, have been stamped by the producer, are delivered on a certain day of each week to the local secretary, or to a person who has been designated by the local association. Each of these eggs bears the number of the producer. If the producer lives at some distance from the local shipping office, he may ship his eggs directly to the headquarters of the central association, but his eggs are numbered in any case.

2. All boxes of eggs received are shipped to the city by the local secretary, who receives a small remuneration for his work.

3. The eggs are graded on arrival, and the proceeds, less shipment

charges and a sum of 2%, are returned at once to the local secretary, and by him distributed among the producers, according to the quantity of eggs supplied by each.

Speaking on the subject of this co-operative sale of eggs, Mr. Auguste Trudel, manager of the Quebec Cheesemakers' Co-operative Association, stated lately.

Great progress has been made in the co-operative sale of eggs and this progress will become still more marked when the trade can be diverted from the channel which it has constantly followed up to the last few years.

The greatest obstacle to the establishment of a good system, profitable to both consumer and producer, is the country storekeeper. The storekeeper is not in a position to exercise any control over the quality of the eggs, as he is sometimes more or less compelled to purchase these eggs, such as they are, from his customers; this is why he generally pays an average price, and this has the baneful effect of discouraging the producer from any attempt at improving the quality.

As regards particularly our Cheesemakers' Co-operative Association, I note every year a large increase in the quantity of eggs received, and a considerable improvement in the quality of the eggs supplied by our regular patrons. This, I believe, is a good evidence of the fact that the co-operative sale is the most efficient means of increasing the production as well as improving the quality. Such system offers great advantages, specially for the producers who live far from great markets, as the latter, through the local associations to which they belong, may ship strictly fresh eggs to the large centres and secure the highest prices obtainable.

It should be also stated, I think, that the chief usefulness of local associations lies in the numerous advantages which they offer for the handling of eggs and poultry, and I believe that no efforts of the federal and provincial Departments of Agriculture could be more fruitful than those training for an object the development of these associations, which, if they receive the support they deserve, will doubtless succeed, by freeing the egg trade from the routine system it has too long followed in the past, to greatly increase the production and improve the quality of eggs.

MANITOBA

BY J. E. BERGEY, POULTRY SPECIALIST, AGRICULTURAL COLLEGE

CO-OPERATIVE handling of eggs in Manitoba has hardly had a fair trial. The first effort to establish egg circles was in 1914, when Professor Herner organized one at Ninette. This was organized along the same lines as those in the eastern provinces, with the exception that each member delivered his eggs to the manager instead of having a collector collect the eggs. This circle is still in operation.

In the spring of 1915 an effort was made by the Poultry Division of the federal Live Stock Branch, co-operating with the provincial Department, to organize a number of marketing associations throughout the province. Ten or twelve were organized, but with one or two exceptions they disbanded before they had been in operation six months. The difficulty seems to be that there were not enough eggs to make shipments often enough to guarantee eggs of first class quality. None of these is now operating.

This Department at present concerns itself principally with encouraging farmers to take better care of their eggs, and the country grocer to buy on a quality basis. In this last we have not been successful, as practically all grocers pay in trade, and are, therefore, paying for eggs, case count. The quality of eggs marketed in 1917 in Winnipeg was, however, much superior to that of those marketed the previous year, which would indicate that the educational work has had some effect on the producers.

BRITISH COLUMBIA

BY J. R. TERRY, CHIEF POULTRY INSTRUCTOR

Owing partly I believe, to the fact that this is a big province with a small population, there has not been any formation of egg circles here as yet. Most of our farmers' co-operative concerns are for the purpose of purchasing feed, and in some cases household supplies. Several of the creameries handle eggs for their patrons, and some of the farmers' exchanges also handle eggs during the months of high production in the spring.

In the case of the creameries the eggs are bought on the same day as the cream and are in some cases crated before shipment. I do not know of any co-operative concerns that candle eggs regularly.

ALBERTA

BY J. H. HARE, B.S.A., POULTRY MARKETING COMMISSIONER

NUMEROUS attempts have been made in Alberta to organize poultry and egg-marketing associations as they have them in Ontario and the East; to begin in the authorized co-operative way with the unit in the country and lead up to the formation of a larger organization through the federation of these units. Unfortunately these attempts have failed. There is a lack of sufficient interest on the part of farmers, due principally to absorbing interest in wheat, and the larger lines of live stock, and to a non-appreciation of the possibilities of poultry. In view of this difficulty it became necessary to attack the problem from a different angle. In doing this, advantage was taken of the numerous farmers' organizations that now exist. These include principally U.F.A's, U.F.-W.A's, Agricultural Societies, and Women's Institutes.

THE PLANS PROPOSED

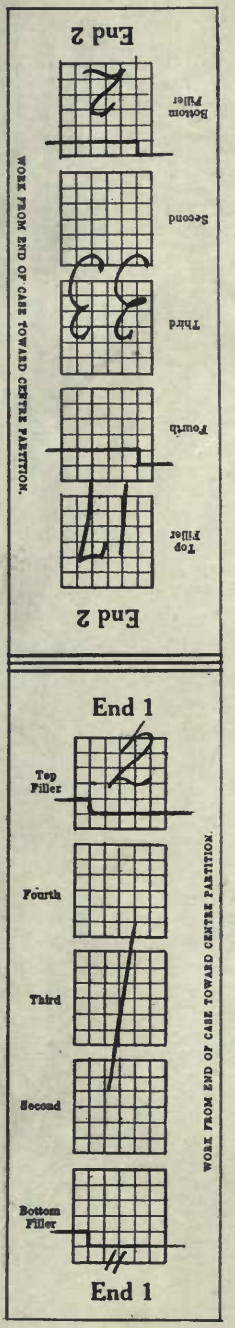
Meetings were held under the auspices of these organizations at which the proposed plans were outlined, the salient features of these plans being as follows:

1st. The establishment, by the two Departments of Agriculture, dominion and provincial, acting jointly, of a marketing service, situated in the two logical marketing centres of the province, Calgary and Edmonton. The station in Calgary was established in the month of June, 1917. It is proposed to open the Edmonton station early in the season of 1919.

2nd. The marketing service to receive, candle and grade shipments of eggs from farmers and farmers' organizations, and to render a report as to the grading of individual producers' lots of eggs, indicating bad eggs, if any, and the quantity of each of two general grades, drawing the line between Extras and Number Ones of the official Canadian standards. This plan has been carried out, and has been made possible by the use of the egg-case plan, a simple device, which is here illustrated, and which shippers find no difficulty in using.

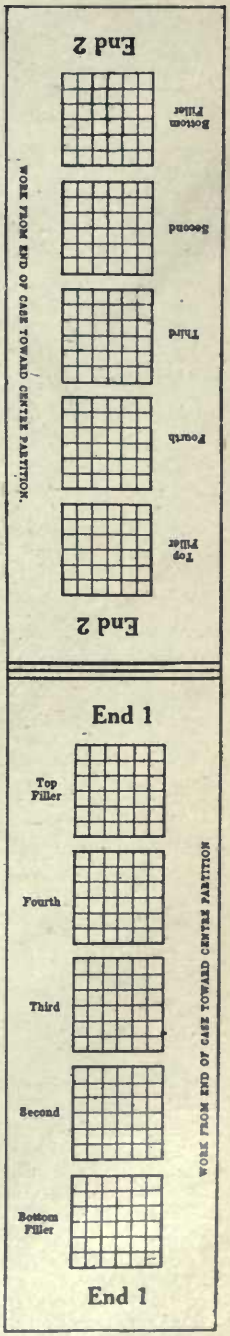
3rd. Any farmers' organization to have the privilege of sending shipments of eggs to the marketing service. It is suggested to any interested organizations that an egg marketing committee be formed, and that all matters pertaining to the business of assembling the eggs and making shipments be assigned to this committee.

The selection of a shipper, the settlement of his commission, and general oversight over the work at the local point, constitute the principal duties of the marketing committee. It is often thought preferable by the local organization, to instruct its regular executive to undertake the



In the standard egg case there are ten fillers, five in each end, each filler being made to contain thirty-six, or three dozen eggs. On the card illustrated on the right, which is called a "Case Plan," there are ten large squares. Each of these squares represents a filler. Each of the ten large squares is again divided into thirty-six, or three dozen small squares, this number corresponding exactly with the number of eggs which each filler will contain.

The form on the left is marked to indicate the location in the case of five small lots. The numbers 11, 1. 2, 33, and 17 are the numbers given to the five producers from whom the eggs contained in the case were collected. From the marking on the form it will be seen that producer number 11 supplied seven eggs, number 1 twelve dozen, number 2 five dozen, number 33 eight dozen and six, and number 17 three dozen and eleven. By this system the candler can locate each farmer's lot in the egg case, candle it separately and report upon it as to the number of eggs falling into each grade.



necessary local arrangements and become responsible for the supervision of the work at the local point.

METHOD OF OPERATING

In this connection Schedule A, herewith given, is filled in and signed and forwarded to the management of the egg marketing service:

This is to certify that the Egg Marketing Committee of the.....

.....
(*Organization*)

has appointed.....

.....

as local shipper to receive eggs from egg-producers in the vicinity of..... for shipment to the Egg Marketing Service at Calgary, and that the said local shipper is authorized to receive from said Egg Marketing Service the net proceeds realized from the sale of the eggs received, for distribution according to the plan set out in the Egg Marketing Service Memorandum, dated Jan. 1st, 1918.

Dated the.....day of.....191..

(Sgd) .....
Chairman, Egg Marketing Committee.

A SAMPLE STATEMENT

The following is a sample of the statements that are made out:

Voucher No. 56

EGG-MARKETING SERVICE

(*Under Direction of Dominion and Provincial Departments of Agriculture*)

CANDLER'S REPORT

Shipper, A. A. Hodgson & Co..... Lot No. 1748.....

Station, Cayley.....P.O..... Date Received, August 1st 1918.
.....

Quantity, 3.....Cases. Candled by A. S.....

Capacity, 90-0.....Dozen. Certified Correct

Shortage.....Dozen. EGG MARKETING SERVICE

Actual Contents, 90-0..... Per.....

Producers No.	Total Quantity Shipped	GRADING			Amount due Producers at 37 and 33
		Extras	No. Ones	Bad	
4	–7	–5	–2	..	0·20
1	12–0	6–6	5–4	–2	4·16
2	5–0	–3	4–3	–6	1·49
33	8–6	3–6	4–11	–1	2·91
17	3–11	1–0	2–11	..	1·33
17	23–1	2–8	20–5	..	7·73
6	6–11	1–6	5–5	..	2·34
6	5–1	1–4	3–8	–1	1·70
3	3–0	–11	2–1	..	1·03
39	17–0	–10	16–2	..	5·64
29	4–11	..	4–5	–6	1·46
Totals	90–0	18–11	69–9	1–4	29·99

Shipper's Commission, ·90.....

Paid August, 1918 30·89.....

The report of the central office of the marketing service indicates that for the season, 1917, the service was taken advantage of by farmers and farmers' organizations at 23 points throughout the country; 182 shipments of eggs were received and marketed, making a total of 450 cases, or 13,326 dozens.

The reports to September for the current season, 1918, indicate that regular shipments have been received from 65 points, and that 1,739 shipments have been received and marketed, making a total of 4,286 cases, or 128,580 dozen.

PRIZE WINNING CREAMERY BUTTER

At the Canadian National Exhibition in Toronto, Nova Scotia, Quebec, Manitoba, and Alberta carried off the principal prizes in the creamery butter awards. The articles that follow describe the methods that were followed in the development of the butter industry in some of the winning provinces:

NOVA SCOTIA

BY W. A. MACKAY, DAIRY SUPERINTENDENT

THE Nova Scotia creamery butter that was exhibited at the recent Canadian National Exhibition, and which was successful in winning some prizes, was made in four of the best creameries in the province. These are all cream-gathered creameries taking in cream, at that time, three times per week. Cream as sweet and of as good flavour as possible was selected, pasteurized to 165 to 170, held 10 minutes, cooled to churning temperature and churned in 3 to 4 hours with acid from .2 to .3 on different lots. Butter was churned in the usual way, sprayed once and washed once, worked twice until the desired grain was secured, packed as neatly as possible and kept in cold storage for two or three days.

Where our makers appeared to fall down most was in flavour. Nothing objectionable was on the butter, but rather a lacking in flavour. This might develop after the butter was kept for some time longer. The pasteurization, no doubt, helped, but it seems to be the general opinion that if a good clean culture were available and then churned in three or four hours after cooling, that, not only would the flavour be improved at time of scoring, but the keeping quality of the butter would be improved. The important point would be that the culture was right.

QUEBEC

BY J. D. LECLAIR, GENERAL INSPECTOR OF CREAMERIES

THE progress of the Quebec butter industry and the present high quality of its products are mainly due to three factors: the teachings of the Dairy School, the supervision of the manner in which these principles and methods taught at the school are put into practice at the factories, and the enforcement of laws, of a very mild nature it is true, to prevent the obstinate maker from feeling secure in his carelessness.

Instruction at the factory was given at the very beginning of the factory system of butter-making in Quebec. A few prominent factories were selected for the purpose, and the makers at these factories were taught and directed by experts. Before long, however, it was noticed that this system was quite inadequate,

that it was unable to keep up with the rapid expansion of the industry, and that vicious methods would inevitably be introduced and spread from factory to factory.

A technical school for butter and cheese makers was, therefore, established at St. Hyacinthe in 1893; the admission was free to all makers. The principles of manufacturing were taught and their application demonstrated, so as to enable the students to appreciate the practical value of the same. Very few makers have neglected to take advantage of this opportunity of perfecting their methods.

A system of supervision was organized to correct any mistakes that might be made at the factory in the application of the methods taught, to encourage makers to give up routine, to instruct the farmers of their duties and of the part they were called upon to play, in co-operation with the makers, for the improvement of the industry. These supervisors or inspectors pointed out the defects in the equipment of factories and the improvements necessary. All these inspectors are experts who have passed a special examination in classwork and practical work, and are thoroughly competent in pasteurization as well as milk and cream testing.

Pasteurization of the cream, followed by the use of a culture, is the most efficient means of giving butter the flavour which is looked for by the consumer, and the uniformity which is desired by the trade.

This pasteurization was introduced in the province by what I shall call a " new kind of sanction."

A special sale of this butter under the label " pasteurized " was held at its bi-weekly public auction by the Quebec Cheesemakers' Co-operative Association; such butter sold at a premium (this premium is $\frac{3}{8}$ of a cent); this surplus and the bonus granted by the priovncial department to every factory adopting this system was the final step which removed all hesitation. This is what I call " sanction."

MANITOBA

BY L. A. GIBSON, DAIRY COMMISSIONER

DURING the last few years the creamery business in Manitoba has gone ahead by leaps and bounds, not only from the standpoint of production but quality as well. To show the development which has taken place, it is only necessary to mention that in the year 1912 Manitoba imported 55 carloads of creamery butter and exported none, while up to the present time this year we have exported over 100 carloads, besides taking care of our market requirements. The increased consumption of butter in the Western provinces during the last few years has been quite marked, partly on account of the increased population but more because of the production of a class of butter more acceptable to the consumer.

CAUSES OF IMPROVEMENT

The improvement in the quality of Manitoba creamery butter can be largely attributed to:

1. The grading of cream by the creamery operator, and payment therefor on a quality basis.

2. More up-to-date methods in the manufacturing process including pasteurization.

3. Grading of butter by the Dairy Branch.

GRADING OF CREAM

Intelligent cream grading necessitates the establishing of definite cream grades, and the adoption of the following as a basis for so doing has been recommended by the Dairy Branch:—

1. *Specials:* Cream that is both sweet and clean in flavour, and the consistency of which is smooth and even.

2. *First Grade:* Cream that is clean and fresh in flavour, and the consistency of which is smooth and even.

3. *Second Grade:* Cream that is very sour, slightly stale or old, or otherwise defective in flavour.

Cream below second grade to be classed as "Off Grade", and either rejected or paid for according to its value.

The prices paid for Specials and No. 1 cream should be sufficient to encourage the production of that class of cream. A spread of at least 5 cents per pound butterfat should be made in the price between Specials and Second Grade cream.

The dairyman who produces a sweet, clean-flavoured cream that will make a first-class, clean-flavoured butter, should undoubtedly be paid for the superiority of his article.

PASTEURIZATION

One of the outstanding features of our creamery operations deserving of more than passing notice, has been the adoption of effective pasteurization of cream for butter-making by practically all our creameries. After considering all literature available, the experience of the Dairy Commissioner for Alberta, and the results obtained by our own Branch from practical experience gained during 1916 and 1917, we realized the necessity for the proper pasteurization of cream for butter-making, thus making it a safer article of food, and preventing the development of a fishy flavour when placed in storage.

Although the installation of equipment necessary to pasteurize cream entails a considerable expenditure, our creamery operators have been prepared in practically every instance to meet this cost, and they are fully alive to the importance of maintaining and improving the high standard which Manitoba butter has now reached. The co-operation of Manitoba creamerymen in this respect has been, and will continue to be, invaluable in developing and improving the dairy industry of Manitoba. This fact is still more significant when we realize that a large percentage of the increased prices received by creamerymen, as a result of improved methods of handling the cream, finds its way into the pockets of the patrons of the creameries.

The temperatures generally advocated for pasteurizing cream for butter-making previous to 1916 were 140 to 145F., held for from 20 to 30 minutes. These temperatures effectively disposed of micro-organisms, and to a lesser degree eliminated the free, fatty acids from the butter fat, but at least some of the unorganized ferments or enzymes survived to carry out their function of deteriorating the resulting butter. We found that in order to secure the results we really wanted it was necessary to use a somewhat higher temperature than the above, and a temperature of 170F. held for 10 minutes, was recommended, as this temperature is sufficient to destroy both bacteria and enzymes, which are undoubtedly responsible to a very large extent for the deterioration of butter in storage.

We found that butter made from cream with low acidity (0·2%) and treated as above, will "hold up" in storage for a period of twelve to eighteen months, where butter made from raw or improperly pasteurized cream will show a decided deterioration in a few months, and in some cases only a few weeks. The general adoption of pasteurization, with a low acidity cream, places our dairy industry practically upon a new basis, more particularly in relation to the export trade. We endeavour to make a butter which is mild, sweet, and clean in flavour, with the texture firm and fine, using from 2 to 2½% salt.

To show the keeping qualities of our product, I might mention that the Manitoba butter which won the silver cup for highest scoring butter, at the Canadian National Exhibition, Toronto, with a score of 98·16, was over a month old when judged.

GRADING OF BUTTER

Our system of grading the butter enables us not only to keep in touch with the buyers who are in direct touch with the trade, but we in turn interpret their ideas and express them to the creamerymen who are in direct touch with the producer; therefore, a complete chain is formed in our grading system between the consumer at one end of the line and the producer at the other. We try never to lose sight of the fact that the consumer is the ultimate party who must be satisfied.

In our butter-grading system we do not issue a Government Grade Certificate, unless the butter has been made from properly pasteurized cream, showing a negative reaction to the Storch Test.

THE STORCH TEST

A great many investigations have been carried out with a view to discovering a method of detecting whether milk or cream had been heated. In 1898, when the campaign against tuberculosis in cattle was commenced in Denmark, regulations were issued for compulsory pasteurization, in order to limit the spread of tubercular disease by means of milk. It was necessary to provide a test which would insure the fulfilment of the prescribed pasteurization, and such a test was based upon the presence in milk of a ferment which gave a specific colour reaction. This ferment was known as peroxidase, and gives a peculiar blue colour when treated with paraphenylene-diamine and hydrogen peroxide. If the cream has been heated to 176 F. without holding, this reaction is destroyed. Storch, who first worked out this reaction, believed that it was reliable for differentiating between milk which had been heated to 176 F. or above, and milk which had not been heated to so high a temperature.

To carry out the test about 5 cc's of cream and 5 cc's of distilled water are put into a test tube, and two drops of a 2 per cent solution of hydrogen peroxide added from a dropping bottle, also three drops of a 2% solution of paraphenylene-diamine. The test tube is then well shaken, and if the cream has not been heated sufficiently high, or if not heated at all, then an intense blue colouration is produced. If at once or after half a minute the cream becomes bluish-grey, it indicates that it has been heated to a temperature of 158 or over. When the colour of the milk is unchanged after addition of the reagents it may be concluded that the heating has exceeded 176 F.

Storch's test has shown itself to be the most reliable of all methods proposed for distinguishing properly pasteurized cream. All the so-called improvements which have been advocated by other chemists have proved to be of no benefit, often indeed the opposite.

If during the pasteurization of the cream the temperature falls below 176 for a time, then the whole of the cream after being mixed reacts to the Storch Test. The sensibility of the test is so great that the admixture of 10% of cream which has only been heated to about 158 F. suffices to make the whole volume of cream react to the test.

In applying this test to butter—take two or three ounces of butter in a test bottle, and place in water at a temperature of 130-140 until casein and water have settled to the bottom of the bottle, then take 5 cc's from the bottom of the bottle, being careful not to get any fat, as this interferes with the reaction, and proceed with the test as for milk or cream.

THE HIGHWAYS OF THE PROVINCES

NOVA SCOTIA

BY W. G. YORSTON, CHIEF ENGINEER, PROVINCIAL HIGHWAYS BOARD

ROAD MILEAGE 18,000.

UNTIL the year 1918, the rural part of the province had county organizations, 18 in all. In 1880 the municipalities had full control of the roads and bridges, but neglected them, and the Provincial Government enacted various laws; first taking over the construction of larger bridges; then the maintenance of larger bridges; then the construction and repair of smaller bridges; and, finally, the maintenance of highways, to a great extent.

EXPENDITURE AND REVENUE

In 1908 a Provincial Commissioner of Highways was appointed, an office under the Commissioner of Public Works. Expenditure under the Provincial Highways Commissioner in 1917 was approximately as follows:

For highway structures of permanent material, out of capital (not included with larger bridges) $52,311; for construction and maintenance of highways including smaller bridges out of capital, $10,445; for construction of larger bridges out of capital, $58,645; total, out of capital, $121,401. For construction and maintenance of highways, including smaller structures and repairs to larger bridges, out of revenue, $238, 053. Total expenditure, $359,454.

The total amount of revenue for the fiscal year 1917, from automobile licenses was $33,175, and was set apart specifically for road purposes. An amount of about $250,000 was assessed annually by the municipalities under the Statute Labour Law, and the expenditure was under the control of the county authorities.

METHOD OF CONTROL.

In carrying on the work of the Provincial Department, counties were separated into districts for provincial highways expenditure, and over each district was placed a provincial inspector, there being 39 inspectors in all. It was the duty of each inspector to send to the Provincial Highways Commissioner, yearly, a report of road improvements required, with an estimate of the cost. When such report and estimate were approved by the provincial department, it was the duty of the inspector to organize and carry on the work, and to return pay-rolls to the Department.

The province up to the present, has very little but earth roads.

THE LEGISLATION

During the 1917 session of the local legislature, road legislation was passed known as the Public Highways Act, being Chapter 3 of the Acts of 1917. Under this Act the administration of the public highways of the province was placed under a Provincial Highways Board, and the Act went into force Jan. 1, 1918.

Under the provisions of the Public Highways Act, statute labour throughout the province is abolished, and a direct property tax and poll tax substituted therefor. The control of the highways is centralized and the municipalities are relieved altogether of any responsibility, the entire administration of the roads being placed under the Provincial Highways Board.

HOW THE FUNDS ARE DERIVED

The Provincial Highways Funds provided for in this Act consist of the following:—

1. Such sums as may be voted annually by the legislature, from revenue, for road purposes.

2. All fees paid to the Provincial Treasurer for motor vehicle licenses.

3. All sums contributed by the federal Government.

4. Highway tax from cities and incorporated towns, being one-tenth of one per cent of all city and town property and income.

5. Municipal tax of not less than 40 cents on every $100 assessed on real and personal property, and income within the municipality.

6. Poll tax of $3 when not assessed, and $1 when assessed on real and personal property.

7. All sums appropriated by the Governor in Council, being net revenue from Crown lands in the counties of Cape Breton, Inverness, Victoria, Richmond, and Guysborough.

8. Any sum which may be contributed by any municipality, city, or town, and other corporation, or by any association for road improvement or repair.

It is estimated that the gross amount of Provincial Highways funds for 1918 will amount to $610,000.

QUEBEC

BY B. MICHAUD, DEPUTY-MINISTER OF GOOD ROADS

As late as the year 1907, people merely talked about good roads, to clear their conscience as it were, and not to appear to ignore the existence of bad roads. From 1907 to 1911, an active interest was taken in the matter by the Quebec Government. Such interest was manifested by laws that might be called preliminary, and that were rather praiseworthy attempts than direct steps towards decided improvement. The chief object of this preliminary legislation was to abolish the statute labour and the share system, to encourage municipal corporations to take charge of their own roads, rather than to leave the same in the care of individuals. It was a great step forward, much greater than is generally thought, as, although it did not produce the results that were expected, it taught us that everything was lacking—mentality, education, and organization.

THE PERIOD OF MOVEMENT

In 1911 began the period of great movements. Mr. Caron, the Minister of Agriculture, realized that the matter of road improvement is part of the public works and cannot be abandoned to the activity, or rather inactivity, of the municipalities. The main causes of this inactivity were indifference, lack of information, and specially lack of funds. Subventions had been quite inadequate, and the good they had done was only in proportion of the amount expended, which was very small. It could hardly be expected that great arteries of communication would result from an expenditure of $200,000 or $300,000 on 30 to 40,000 miles of roads. Realizing this, the Government had "the Good Roads Act" passed in 1912, by which it was empowered to place at the disposal of the municipalities all the money that was necessary to macadamize or gravel their roads. The Government was also empowered to build provincial highways to connect important centres. Work was started at once. "The Good Roads Act" of 1912, and its amendments, authorized a total borrowing of $20,000,000. On the loans granted to the municipalities out of this $20,000,000, the latter agreed to pay an interest of 2% for 41 years; this interest was later increased to 3% (the sinking fund is entirely paid by the Government).

THE POLICY IN HISTORY

To sum up, the chief events in the launching of this movement are the following:—

In 1912, organization of Good Roads Department, the first chief of which was Hon. J. E. Caron, who was also Minister of Agriculture;

In 1914, separation of the Departments of Good Roads and Agriculture and appointment of Hon. J. A.

Tessier to the Good Roads Department;

Construction of five provincial roads as follows: road, Edward VII, 38 miles; road, Montreal-Quebec, 159 miles; road, Sherbrooke-Derby Line, 30 miles; road, Chambly, 15 miles, and, road, Levis-Jackman, 95 miles. Another provincial road is under construction which will be finished next year. It will connect Three Rivers, Shawenegan and Grand-Mère, about 25 miles.

Construction by the municipalities themselves, under the immediate control of the Minister of Good Roads of nearly 2,000 miles of macadamized or gravelled roads.

Purchase by the Good Roads Department of machinery costing over half a million dollars; creation of a store from which may be shipped in any part of the province, at 24 hours' notice, the exchange parts necessary to repair the machines used; creation of a well equipped laboratory for testing materials, such as stones, pebbles, cement, sand, etc.

THE LAWS.

The Good Roads Laws of the province of Quebec are very complete. They enable the Government to build direct highways of great communication, and to act upon the municipalities to compel them to complete incomplete links within their territory. The Government is also empowered to compel the municipalities to maintain the roads that have been macadamized or gravelled, and, if necessary, to macadamize them itself, in case of neglect on the part of the municipalities. The whole thing is organized so as to leave the municipalities as much freedom as possible.

From July 1, 1911, to December 31, 1917, the sum of $18,827,830.25 was spent on the improvement of roads by the Government of Quebec. All business in connection with this matter must be treated with the Department of Good Roads, the headquarters of which are at the seat of the Government in Quebec.

ONTARIO

BY W. A. MCLEAN, M. CAN. SOC. C.E., DEPUTY MINISTER OF PUBLIC HIGHWAYS

ROAD improvement has been materially affected by war conditions during the past few years, more especially by the scarcity of labour, high wages, and lack of railway service for the transportation of materials. Financial conditions have not been wholly unfavourable, particularly on the part of the rural municipalities; but road work has been largely restricted to that which could be carried on with expenditure available from current revenue, as bond flotations for this purpose have been very limited in number and amounts. Labour has not, in some localities, been obtainable for the proper maintenance of roads already constructed.

GOOD AND BAD ROADS.

Unnecessary labour of all kinds, and unnecessary expenditure should undoubtedly be avoided in time of war not merely on the part of national and municipal governments, but also by the individual citizen. Acting on this general principle, the Department of Public Highways has not encouraged road construction or expenditure except where dictated by needs of efficiency and economy. It is recognized, however, that the waste of time in transporting goods, or in driving, over bad roads is very great; that much inefficiency is created by bad roads; and that because of bad roads farm produce is frequently lost, or much depreciated by inability to place it on the market. Road construction, rightly applied, is a useful war measure. Reasons of efficiency in transportation render it expedient that certain roads should be improved even in war-time; but more important, that others already in good repair should be properly maintained.

THE ECONOMIC ASPECT

Road maintenance means very largely that a limited amount of time and effort are expended on the repair and improvement of roads in order that a comparatively great amount of time and energy may be saved in travelling and transportation over them; in order that still other traffic which would have to take less economical routes will follow the improved road; and in order that still other traffic which would not exist, may be created and developed. Good roads, desirable as a matter of efficiency in time of peace, are much more necessary in time of war, when economy of men, money and labour is urgent. While the extensive construction of new roads may not be a saving in man-power within the period of the war, the better maintenance of existing roads is undoubtedly a profitable war measure.

LOOKING TO THE FUTURE

The efforts of the Department of Public Highways have been energetically devoted to organization for road development after the war, in order that this important public work may be utilized as far as possible in the adjustment of after-the-war problems. To this end surveys are being made for provincial work, municipal organization has been encouraged, and it is anticipated that rapid progress will be made at the close of the war in meeting the needs and opportunities of better roads.

THE MARCH OF EVENTS

Matters of recent importance in relation to roads in Ontario, and deserving of special record include,—

1. The enactment of the Provincial Highways Act.
2. Provision for the designation of Provincial County Roads.
3. The adoption of County Roads systems by all but one county in the province.
4. The completion of an excellent concrete highway between Toronto and Hamilton, a distance of 35.8 miles, under the management of a special commission appointed for that purpose in 1914.

PROVINCIAL HIGHWAY GRAVEL ROAD WELL DITCHED AND GRADED.

PROVINCIAL HIGHWAYS

The most important change in the organization for the construction of rural highways in Ontario was effect-

ed by the passing of "The Provincial Highways Act" in 1917.

This "Act gives the Provincial Highways Department, with the approval of the Lieutenant Governor in Council, power to take over on behalf of the Crown, any public highway, by filing a route plan of the road in the local registry office, and giving notice in *The Ontario Gazette*.

The Department, through its officers, is thereafter responsible for the proper construction and maintenance of the highway so assumed.

BRIDGE ON A LANARK COUNTY ROAD SUBSIDIZED BY THE PROVINCE.

For this purpose the Department has the usual powers of municipal corporations to widen or deviate the road allowance, procure material for construction, purchase machinery, and in general to control the use of the highway under the usual responsibilities placed upon municipalities.

Adjacent to cities the cost is borne in the proportion of 40% by the province, 30% by the city, and 30% by the municipality through which the road passes. Outside of the suburban section, the province assumes the proportion levied on the city, thereby paying 70% and the local municipality 30%. In the case of bridges, the local municipality is placed on the same basis as in the case of a county road; viz,—the local municipality pays 60% of the cost of a bridge suitable for county purposes, and the province pays the balance.

In cases where a special type of pavement is desired by a locality, provision is made for levying any excess part of the cost on a frontage basis. Various contingencies are provided for, with, in general, a right of appeal to the Ontario Railway and Municipal Board. All cost of surveys, the purchase of machinery, plant and equipment, land for widening or deviating, general overhead and staff expenses are to be borne entirely by the orovince. Thus the local municipalities will be in effect required to pay less than 30% of the total cost.

A fundamental basis upon which the cost is thus distributed is that each local community should be required to pay for a road suited to local requirements. It is unfair to the rest of the province to levy less than that amount. It is unfair to the local municipality to require it to pay the entire cost of a road carrying an excessive amount of through traffic. The difference between the cost of a road suited to local requirements, and one of a character suited to the traffic of a main road, is, therefore, to be levied upon cities immediately served, or is to be met by the province

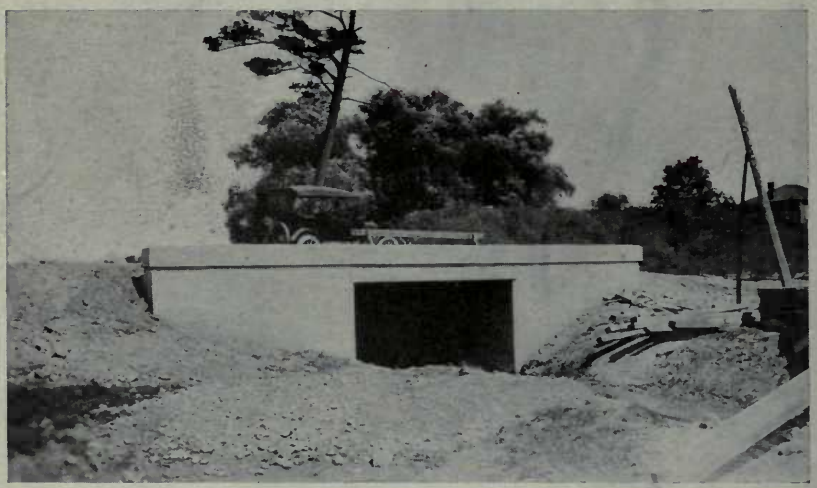
from the revenue from motor vehicles. A main road from the County of Essex to the Quebec boundary with branches to St. Catharines and Ottawa, passes through urban and rural municipalities having half the population of the province, and over 60 per cent of the assessment.

METHOD OF PROGRESS

The building of the Provincial Highway system will not be undertaken as a huge work of continuous construction, but will be a matter of gradual development and extension. Wherever conditions are favourable, systematic maintenance will be applied so as to make the most of any reasonably good sections as they now exist. Construction will be taken up in sections where traffic is especially heavy and where the road has heretofore been neglected. One type of pavement throughout is not contemplated. An effort will be made to construct according to traffic, making the best possible use of local materials.

The immediate need is for a reasonably good trunk road system, joining up cities and local road systems, and making it possible for each local community to be a unit in such a trunk system without carrying an excessive or burdensome share of the cost.

The first section of the Provincial Highway (41 miles in length and extending from the easterly boundary of York County to the western limits of the town of Port Hope) was taken over by the Department on August 21st, 1917. A plan of efficient maintenance and gradual development has been applied, and the road is now in fair condition for travel. When traffic become so great at any point that maintenance of the existing type of road is no longer economical, a more permanent surface will be laid. In the meantime, however, the foundation work of widening, grading, drainage, construction of culverts and bridges, etc., is steadily being completed. On August 15th, 1918, three additional sections were assumed, which will be given the same class of treatment.



CONCRETE CULVERT ON PROVINCIAL HIGHWAY.

These new additions are the Ottawa-Prescott Highway, about 57 miles in length; the Hamilton and Queenston Road, 36 miles in length, and a short section from Napanee to Kingston, 23 miles in length. A further section from Grafton to the city of Belleville, 32 miles, will be taken over at an early date.

PROVINCIAL COUNTY ROADS

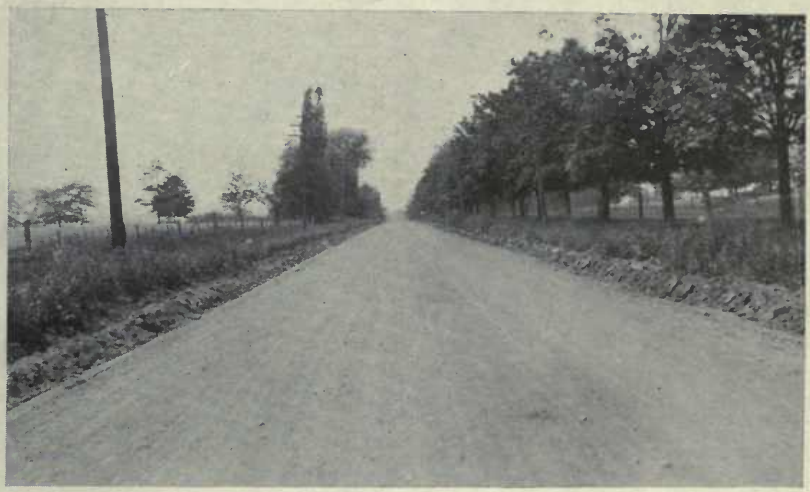
Provision for the designation by the Department of Public Highways of a class of roads to be known as "Provincial County Roads" was authorized by an amendment in 1917 to the Highways Improvement Act. This class of roads is co-operative with Provincial Highways, but under county control.

To such roads the province will contribute 60 per cent of the cost of construction and maintenance. These roads are intended to enable the more equitable maintenance of certain county roads, carrying a considerable proportion of through traffic, but which the county may efficiently maintain, and which are not of sufficient importance to be classed as "Provincial;" or which it is not desirable, or expedient, for the province to assume as Provincial Highways. They continue to be county roads, but because of heavy through traffic, will receive an increased subsidy. In general, they will form branches of the provincial highway system, joining up cities and other important terminal points of traffic. They constitute an intermediate link between the provincial and county road system, and are subject to special regulation.

A total of approximately 726 miles of these provincial county roads has now been designated.

COUNTY ROADS

The most systematic construction of roads in the province has for some years been carried out by county councils, this work being subsidized by the province. Between 250 and 300 miles of stone and gravel road are constructed annually under this organization.



AN INVITING STRETCH OF GRAVEL ROAD ON PROVINCIAL HIGHWAY IN PICKERING TOWNSHIP.

These roads are essentially the market roads: the farmers' roads. They radiate from market towns and shipping points, and meet the needs of accumulated farm traffic The aiding of these market roads by the province is an effective means of assisting townships in their road improvement, in that township councils are thereby relieved from the burden of their most expensive roads, and can devote their energies to the improvement of less travelled roads, comparatively inexpensive to maintain. Expenditure on roads is necessarily proportionate to the travel over them, and the roads radiating from

market towns and shipping points carry the accumulated farm traffic of the district which they serve. It is estimated by the Department that 20 per cent of the township roads, those usually included in a county system, carry 80 per cent of the total farm traffic. The mileage of roads in a county system is usually from 12 to 18 per cent of the total road mileage of the county, and is, therefore, somewhat in proportion to the number of townships and area of the county. The average county in Ontario has about 200 miles of county road.

County roads are aided to the extent of 40 per cent for construction and (under the legislation of 1915-16) 20 per cent for maintenance. All county councils are authorized under the Highways Improvement Act to assume and control a system of leading roads, within the county. Out of thirty-seven counties in the province, thirty-six have adopted such systems under which 9,200 miles of road have been assumed for construction and maintenance, and of which since the passing of the Act 2,350 miles have been substantially improved to the end of the year 1917, with a total expenditure of $9,089,768.34, including $1,507,424.50 for bridges.

SUBURBAN ROAD SYSTEMS

The increased carrying capacity and utility of main roads due to the use of motor vehicles for passenger and freight have greatly increased the direct value to cities of main country roads. The advantages of good roads in relation to national and community development have been generally accepted in the past, but not to the extent which now marks the situation.

The urgency with which cities have desired the improvement of the main roads of the province has also suggested, in a marked degree, the benefit which such main roads are to urban centres. Recent highway laws of the province recognize this important principle, and provide organization whereby cities may contribute directly to the construction and maintenance of main roads adjacent to and radiating from them.

The tendency of municipal organization in the past has been to encourage each local municipality in the belief that it should be responsible solely for the roads within its boundaries, as a city, town, village, or township; and has failed to recognize sufficiently the community of interest, obligation, and opportunity for betterment involved in county organization. So far has this spirit existed in Ontario that cities of the province upon incorporation have been automatically separated from county organization, thereby becoming relieved from their obligations with respect to the development of the larger community in which they are located. County organization is a means of uniting the common interests of a series of local municipalities under one body, the county council. Under these circumstances a readjustment has become necessary, for which purpose "Suburban Road systems" were authorized under the Ontario Highways Act; thereby seeking to expand the usefulness of the Ontario municipal system by linking up cities with county organization in a slight degree.

Suburban road commissions have been organized with respect to the cities of Toronto, Kingston, Guelph, Galt, Kitchener, Hamilton, Brantford, St. Catharines, London, Windsor, and the town of Smith's Falls, while the matter is in process of negotiation with respect to others. A board of commissioners is composed of three members in the case of a city of less than 50,000 population and five members when the city has a population of more than 50,000. The county and city are equally represented on the board, which designates the roads to be improved, determines the expenditure to be made each year, and has oversight of the work.

The demand upon the city cannot exceed one-half mill annually for construction, but it is generally understood that the expenditure under these commissions will as a rule be limited during the war to maintenance and development work of more urgent character.

The provincial subsidy to the work of suburban commissions is the same as for county roads; viz,—40 per cent for construction and 20 per cent for maintenance. But the joint contributions of city and county are expected to be double that of the county alone, so that the provincial subsidy is proportionately greater, and a more substantial type of improvement becomes possible by such united effort. In this way provision will be made for the heavier traffic adjacent to cities, demanding the more expensive types of construction, and more constant maintenance.

EXPENDITURE

The estimate of expenditure on county roads this year exceeds $2,000,000; on the provincial highways $100,000; and by townships $1,500,000, in addition to over 1,000,000 days of statute labor. This does not include expenditure within the urban municipalities; that is, towns, villages, and cities; nor the expenditure on colonization roads in Northern Ontario.

MANITOBA

BY ARCHIBALD MCGILLIVRAY, HIGHWAYS COMMISSIONER

DURING the past two years no statutory changes have been made in "The Good Roads Act" of this Province, although on account of the world-wide abnormal conditions resulting from the War, capital expenditures on road improvements have been confined to such works as were considered essential to the proper carrying on of the country's business. Municipal councils in general are not inclined to undertake large and expensive schemes of improvement until such time as the war is over and labour and financial conditions more settled. Preparations, however, are being made by the engineers of this Department for large and comprehensive schemes of road improvement work contemplated by many of the municipalities when the war is over, the idea at present being to have surveys, plans, and estimates made and by-laws passed, so that the work may be in readiness to start as soon as conditions warrant.

The replacement of old bridges and improvement of important highways has been gone on with, and every considerable work which was indispensable has been done in this connection.

During the two years 1916-7, $846,653 was expended in the construction of highways and bridges by the municipalities of the province in co-operation with the Government under "The Good Roads Act". In those two years 448 miles of roads were improved, of which 163 miles were gravelled. Of the 166 bridges built in these years, 94 were reinforced concrete; 22 steel on concrete foundations; 2 timber on masonry foundations and 48 timber structures throughout.

It is estimated that $500,000 will be expended during the present year on this class of work.

ALBERTA

BY L. C. CHARLESWORTH, DEPUTY MINISTER PUBLIC WORKS

THE policy of the province of Alberta with regard to roads has been pretty definitely laid down by "The Public Highways Act" passed at the last session of the Legislature. This Act, which is administered by the Department of Public Works, was summarized in a paper by myself, read before the meeting of the Engineering Institute of Canada, held at Saskatoon in August, and the following is quoted therefrom:

This Act provides for the division of all Highways in the Province into three classes: Main Highways, District Highways, Local Highways, and the responsibility for the construction and maintenance of a highway of any class is specifically set out in the Act, as is also the proportion of the cost to be borne by the province and by the local authority of the municipality within which the highway lies.

Main highways are defined as "Such highways as the Minister of Public Works deems to be of a prime importance, either by reason of being trunk channels of communication between the more important cities and towns of the province, or with the main travelled roads situate outside and adjoining the province, or for any other reasons." The location of these main highways is established only after consultation with the municipal authorities in the municipal districts within which they lie, and the route is then laid down exactly upon a map. This map forms the basis of an Order-in-Council establishing the road as a "Main Highway" under the Act.

The cost of construction of these main highways is to be borne jointly by the Department of Public Works and the local authorities in the proportion of 75 per cent and 25 per cent respectively, and the cost of maintenance is to be borne entirely by the Department.

"District Highways" are those which the Minister considers to be of less importance generally than main highways, but still of considerable local importance. Their location is to be established by Order-in-Council in the same manner as main highways, but only after agreement with the municipal authorities of the districts through which they are intended to run. The cost of construction is to be borne by the Department and the local authorities jointly in the proportion of 25 per cent and 75 per cent respectively, and the cost of maintenance is to be borne entirely by the local authorities. In the case of district highways the Minister may direct that districts through which the highway does not in fact pass shall contribute towards both the original cost of construction and the cost of maintenance. This provision is made because the case may frequently occur where the people most in need of a particular road to a market town reside in another municipal district.

"Local Highways" are all such highways in the province as are not classified as main or district highways, and they are to be constructed and maintained entirely at the expense of the local authorities within whose district they are situated.

The control of construction shall, in the case of main highways, be under the Department of Public Works, and in the case of district highways, either under the Department or the local authorities as agreed upon and, in default of agreement, under the Department, and in case of local highways, under the local authorities.

Provision is made in the Act for recovery by the Department from the local authorities of their proper proportion of the cost of the highways constructed.

Provision is also made, that where the local authorities fail to properly maintain a district highway after sufficient notice, the Department may step in and properly repair or maintain the same, and recover the cost of so doing from the local authorities.

A highway under the Act by definition includes any bridges thereon, but a special clause in the Act provides that the Department may repair any bridge on any highway in case of flood or accident, and where the Legislature votes the money for the purpose may build or rebuild any bridge. This provision was made doubtless because it was felt that in many cases bridges of the larger sizes were often beyond the financial ability of the local authorities, and that they had not sufficient experience or equipment to deal with such matters as efficiently as the Department.

The Minister is given power to make rules for the control of all traffic and vehicles on any highway. These rules will probably include some regulations as to the permissible load upon tires of different widths.

The Act does not come into force in its totality until the first day of January, 1919, and in the meantime preparation is being made for the classification of the highways of the province.

As we have not yet operated under the Act, we are not in a position to give any idea as to where its weaknesses lie. Doubtless it has faults, which can only be made apparent by its application, but we believe it to be a step in advance towards a system of roads in the province.

In regard to mileage of permanent roads constructed or overhauled, we

have nothing but earth roads in the province, so that the term "permanent" in its generally accepted meaning, can hardly apply. We are endeavouring, however, to establish a system of maintenance which will render our earth roads as nearly permanent as possible.

Until classification is made under the provisions of the Act, it is hardly possible to give mileages of main or district highways.

There was voted by the Legislature for various highway purposes this season a total of $925,000.00.

BRITISH COLUMBIA

THE care of the roads in this province come within the jurisdiction of the Public Works Department. Up to the end of 1917, the mileage of roads, trails and bridges constructed was as follows:—roads, 16,000 miles; trails, 14,000 miles; bridges, 52 miles. In repairs and construction during the last fiscal year an expenditure was incurred of approximately $1,400,000. Considerable reorganization in this matter has taken place during the last year or two. In lieu of the Road Superintendents, formerly in office, eight District Engineers have been appointed, who are directly responsible to the Public Works Engineer for the work in their respective districts. With their assistant engineers or general foreman, it has been possible for these District Engineers to supervise all maintenance and construction work, and at the same time to keep the Department advised as to local conditions. To offset the high cost of team labour, tractors have recently been purchased to facilitate the delivery of road-building material. During last year the Department endeavoured, in district municipalities, to spend money only on recognized trunk roads, conditional on adequate assistance being obtained from the municipalities affected. In consequence of increased activity in mining, the Department supervised or carried out the construction of mining roads and trails at an approximate cost of $100,000.

There has been expended the following sums during the past year:

	Maintenance. (including Reconstruction).	Construction.
Roads and Trails	$889,650	$143,150
Bridges	430,500	58,000
Wharves, etc	75,890	7,500
River Banks Protection	31,000	
Total	$1,427,040	$208,650

THE CARE OF BEES

NEW BRUNSWICK

BY W. R. REEK, SECRETARY FOR AGRICULTURE

LAST January L. T. Floyd was appointed Provincial Apiarist. Previously it had been generally conceded that beekeeping in New Brunswick was a minor sideline to agriculture and was scarcely worthy of much attention. A Beekeepers' Association had been organized but was allowed to drift until it became useless.

Last spring Mr. Floyd set out to visit every beekeeper that time would permit, for instruction purposes and to incidentally build up the association. No record of the number of beekeepers was available, consequently they had to be discovered. Up to the end of September over four hundred men had been visited and, in many cases, much assistance and instruction were given in the simpler work of caring for bees.

The Beekeepers' Association now stands with a membership of over one hundred. A short course for beekeepers will be arranged during the winter.

BRITISH COLUMBIA

WITH a view to controlling foul brood in apiaries two orders-in-council have recently been passed by the Government of British Columbia. The first provides for the issuing of certificates of inspection to apiaries and requires bee-keepers, or other persons who sell, barter, or give away colonies of bees, or of any comb, honey, or appliances in connection with the same, to produce a certificate of inspection as to freedom from disease. The second order prohibits the movement of bees within the province unless such bees, and the premises where they are kept, have been examined by an inspector under the provisions of the Foul Brood Bees Act within a period not exceeding thirty days before such movement.

NOVA SCOTIA

ENCOURAGEMENT OF THE SHEEP INDUSTRY

THE Nova Scotia Department of Agriculture in co-operation with the Live Stock Branch of the Dominion Department announce the following policies connection with encouragement the sheep industry of the province:—

1. Several hundred selected grade ewe lambs have been purchased and will be sold at cost to *bona fide* sheep breeders wishing to secure them.

2. The Departments will pay transportation on these ewe lambs from place of purchase to destination.

3. If parties wishing to secure ewe lambs for breeding purposes will write the Nova Scotia Department of Agriculture, Truro, they will get advice relative to price and other particulars. If all lambs already secured are disposed of, an effort will be made to purchase more. Get orders in early, as later prices may be higher.

4. The Live Stock Division of the Federal Department of Agriculture will assist, as heretofore, in the distribution of pure-bred rams.

5. To supplement the distribution of pure-bred rams, the Provincial Department of Agriculture will secure and ship at cost, high class unregistered ram lambs at slightly higher than butcher prices.

6. Mr. S. A. Logan, in charge of Sheep Extension Work of the Nova Scotia Department of Agriculture, will, as far as possible, call on parties wishing help with their sheep flocks or requiring further information in regard to the increasing of their flocks.

PROTECTION OF SHEEP

Nova Scotia now has up-to-date legislation for the protection of sheep against dogs. An amendment passed last session makes it compulsory for every municipality to collect a tax on dogs, thus creating a fund for the repayment of sheep owners who have had lambs or sheep destroyed by dogs of which the owners are either not known or not able to pay.

Several hundred ewes for breeding purposes have been purchased by the Department. Assistance in the transportation of these to any railway point in Nova Scotia will be furnished by the Department.

NEW BRUNSWICK

BREEDERS OF LIVE STOCK CONSIGNMENT SALE

A COMMITTEE selected to represent the various live stock interests met at Fredericton, recently, at the call of the Department of Agriculture, to complete arrangements for the holding of a consignment sale of pure-bred live stock. The Department arranged to offer at least two hundred breeding sheep. The regulations and terms are similar to those under which the sales in Ontario are held.

All incoming and outgoing freights on pure-bred breeding animals are to be refunded to the consignors and purchasers by the Department of Agriculture. Any contributor to the sale could bring a herd bull and one cow for exhibition purposes, under the foregoing freight arrangement. Hay and straw are provided by the Department.

There is no organized provincial live stock association in New Brunswick, and, under such conditions, the details of this sale had to be arranged by the Department. The formation of a live stock organization at the time of the sale is contemplated.

QUEBEC

THE AGRICULTURAL REPRESENTATIVE SERVICE

SOON after THE AGRICULTURAL INSTRUCTION ACT came into force, Macdonald College opened Macdonald College Demonstration offices in several English-speaking counties of Quebec. The provincial Department of Agriculture opened similar offices in a number of counties where French-speaking farmers predominated. In 1916 all

of the Macdonald College Demonstration offices, with the exception of the one in Pontiac County, were taken over by the provincial Department of Agriculture, and some modifications were made in the territory covered. To Sherbrooke was added the county of Compton, and since then Stanstead has been further added. To Richmond has been added Shefford, and the Huntingdon district has been further enlarged by taking in the counties of Beauharnois and Chateauguay. In May last the remaining county of Pontiac was taken over by the Department of Agriculture.

The work being done is practically the same as that of Agricultural Representatives in other provinces, and includes the organizing of local associations; carrying on experiments with grains, clovers, alfalfa, etc.; visiting farmers with a view to helping the solution of problems; arranging for demonstrations in pruning and spraying orchards, land drainage; adoption of labour-saving machinery; the holding of school fairs, and arranging of exhibits at fall fairs; judging crops and school garden plots, and other activities that concern the welfare of the rural population.

Including the French-speaking Representatives, Quebec now has twenty Agricultural Representatives distributed over the province.

ONTARIO

HANDLING THE FARM LABOUR SITUATION

THE Ontario Government's system of Public Employment Bureaux constitutes the logical medium through which to recruit the supply of farm labour for the province. Through its main offices at Toronto, Hamilton, and London, the Employment Bureau system is in close touch with the districts which provided the largest sources of labour for farm work, as well as for all other occupations. The sub-zone bureaux located at Brantford, Kitchener, Walkerville, St. Thomas, Fort William, and Port Arthur also serve as channels through which the available labour of the smaller communities can be poured into the rural districts as the need arises. Forty-five offices of the provincial Agricultural Representatives constitute distributing centres for the labour recruited through the zone and sub-zone offices, and also serve as local farm labour employment offices for the recruiting and distributing of farm labour from the small towns to the rural districts.

Various agencies are constantly bringing to the attention of the public the need for assistance on farms. A large portion of the advertising done by the Canada Food Board, the Organization of Resources Committee, and other bodies, is directed towards the securing of a sufficient supply of labour to ensure the maximum of production. The Employment Bureaux also advertise, as occasion demands, for workers. The information obtained from the registration cards filled in last June was also instrumental in recruiting a large number of workers for the farms, who would probably not have been reached in any other way.

PART PLAYED BY BOYS AND GIRLS

As substitution is the secret of success in solving the labour problems of the factory, so it has proved an aid to the solution of the labour problem on the farm. The employment of boys and girls has brought results of undoubted value, both to the farmers and to the boys and girls. The appeal of the Canada Food Board and the campaigns carried on by the

Resources Committee and the Trades and Labour Branch brought forth a ready response from the young people of the province, with the result that fully 10,000 of them were engaged in every form of food production during the past summer. The cultivation of sugar beets, the harvesting of the flax crop, and the picking and packing of the fruit crop were all materially assisted by the efforts of boys and girls, many of whom had had no previous farm experience. The work of the boys has been recognized by a National S.O.S. badge issued by the Canada Food Board, while the work of the girls has been marked by a farm service corps pin, issued by the Ontario Government through the Trades and Labour Branch.

A total of 8,000 persons were placed on farms during the spring and summer of 1918. Of these 3,300 were men, 2,200 boys, and 1,500 women. Large numbers of retired farmers and farmers' sons who had come to the city to accept positions in factories, offices, etc., were induced to return temporarily, at least, to the farms. In view of the supreme importance of food production, the main emphasis of the work was laid on securing farm help.

SHYNESS OF THE FARMERS

One of the problems in connection with supplying farm labour has been the difficulty experienced in obtaining the applications from the farmers; this difficulty is rapidly being overcome by educating the farmers to a realization of the usefulness of the Employment Bureau in securing suitable farm help; at the same time, there are undoubtedly many farmers who could obtain help, and who have not done so, if they would make application to one of the Employment Bureaux, or to their Agricultural Representative, as far in advance of the time when help will be required as possible.

Free transportation to farms in the province of Ontario undoubtedly gave a great impetus to the work of supplying the farmer with help. The Directors of the Employment Bureaux, the Agricultural Representatives, and other organized agents of the Employment Bureau system situated in other parts of the province, made extensive use of the transportation order books, which permit them to issue transportation to *bona fide* farm workers travelling distances up to 300 miles.

PLANS FOR THE COMING YEAR

The plans of the Branch for 1919 do not involve any radical departures from the main policies followed during 1917 and 1918. The scope will be enlarged, however, and it is expected that even greater results will be obtained from the camps established for both girls and boys engaged in food production. The names of those who volunteered for farm work for short periods during the past summer will constitute a reserve from which may be obtained large numbers of workers for next year.

There are before us as a people now just two tasks of supreme importance: To win the war for freedom and democracy, and, let us hope, for permanent peace, and to fit ourselves and our children for life and citizenship in the new world which the war is bringing in. Both of these tasks must be performed with singleness of purpose and wholehearted devotion to the public welfare; and no sacrifice, however great, must be allowed to stand in the way of either.—*P. P. Claxton, United States Minister of Education.*

SASKATCHEWAN

NEW DAIRY COMMISSIONER

MR. F. M. Logan, who succeeded Mr. W. A. Wilson, having resigned the provincial Dairy Commissionership, Mr. Percy E. Reed has been appointed to succeed him. Mr. Reed hails from Georgetown, Ontario, and is a graduate of the Ontario Agricultural College. He has also taken the special dairy course at the Iowa State College and spent some time in inspecting the creamery and cold storage plants of Iowa, Nebraska, and Minnesota. Prior to his appointment as Dairy Commissioner, Mr. Reed was for three years Provincial Inspector of Co-operative Creameries.

MR. P.E. REED, DAIRY COMMISSIONER, SASKATCHEWAN

INTRODUCTION OF RAMBOUILLET RAMS

AT a meeting of the South Saskatchewan Wool Growers' Association at Maple Creek, Professor Shaw, Provincial Live Stock Commissioner, displayed two Rambouillet rams and also three fleeces weighing nineteen and twenty-one pounds. As a result of this exhibition the association decided to ask the provincial Department of Agriculture to assist in introducing the breed. Professor Shaw, as a result, was authorized by the provincial Department of Agriculture to secure some Rambouillet rams in Washington, Montana, and Idaho that will be offered to the ranchers under the terms of the Saskatchewan Live Stock Purchase and Sale Act.

FEED POLICY ACTIVITY

THE feed policy jointly adopted by the Federal and Provincial Governments with the railway companies has been put into effect with excellent results. The records show that during August, some 255 carloads of hay, or about 2,555 tons, were shipped south, and in September 228 carloads more, or about 2,290 tons, making a total of 483 cars or 4,845 tons of hay. A good many carloads of cattle and sheep have also been sent to thenorth for winter feeding. In August permits were issued for the shipment of 17 carloads, or 191 head, of cattle, and over 2,000 head of sheep were also shipped north during the same period. In September permits were granted for shipment to the north of 270 head of cattle, or 15 carloads.

CO-OPERATIVE BRANCH REPORT

THE fourth annual report of the Co-operative Organizations Branch to the end of the fiscal year, namely, April 30th, 1918, states that 304 associations had been heard from. These had 12,459 shareholders and the paid-up capital was $151,-805.56. The number of associations marketing live stock increased from 23 to 35 in the course of the year; the number of cars rose from 241 to 548, while the value of the live stock co-operatively marketed was $1,050,285 as compared with $323,171 in the previous year. The value of the farm products marketed by the associations more than doubled, the total turnover of the associations being $4,160,262, or $2,037,430 in excess of the business done in 1917.

WEEDS AND SEED BRANCH WORK

The work of the Weeds and Seed Branch of the Provincial Department of Agriculture was vigorously carried on during the past summer. For this purpose the province was divided into fourteen divisions with a representative in each. The most important line of work taken up by these representatives was that of weed eradication and control. They enlisted as far as possible the support of the municipal councils. Assistance was given to local weed inspectors in weed identification and other necessary ways. After the visit of the field representative to the local weed inspector, a statement is procured as to the location of weeds in the locality and the methods which are being adopted towards control. Following this the field representative mails a report to the secretary-treasurer of the municipality concerned commenting on the work of the local weed inspectors and pointing out where improvement might be effected. A special effort has been directed against the perennial sow thistle with valuable results. Several of the field representatives have recently been engaged in inspecting and reporting upon seed plots and multiplying fields belonging to members of the Canadian Seed Growers' Association.

ALBERTA

THE SUMMER SCHOOL FOR TEACHERS

BY G. FRED MCNALLY, M.A., DIRECTOR

THE sixth session of the Alberta summer school for teachers was held from July 2nd to August 3rd, 1918. The attendance at this session totalled 210, being somewhat smaller than that of the two previous years. This is explained largely by the great need for the services of both men and women in production, or some form of war work. A fine spirit of industry and earnest endeavour was evident and much effective work was done. The summer school has become an important factor in strengthening the qualification and professional spirit of the teaching force of the province.

Since the opening of the summer school, 1,358 teachers have completed courses. Of these, 596 have completed one or more courses in agriculture, 425 one or more courses in nature study, 229 in household science, 108 in household management, 99 in household art, 203 in physical training, 91 in first aid, 57 in home nursing, and 59 in botany and zoology. In addition courses for

high school instructors in physics and chemistry have been given from time to time.

Several courses were offered for the first time during the session of 1918. A course in primary work for teachers wishing to specialize in this type of teaching proved very popular. This course is so organized that on the successful completion of two summers' work a certificate of special qualification in primary work will be issued.

A class was also organized for the direct method of teaching French. This class met twice daily and was well attended. For the first time opportunity was given at the summer school for teachers holding permanent professional certificates of the second class and academic qualifications of the first class to qualify professionally. Judging by the enrolment this summer this class will probably be a large one each year.

As in the past the Department of Education provided transportation for teachers who completed successfully two of the regular courses of the summer school. Splendid weather, almost ideal conditions for study at the University, the fine spirit of co-operation on the part of the University authorities, popular courses, instruction of a high quality, and a generous response on the part of the student body, all contributed to make the summer school of 1918 a success.

There will never come a time when experimental work is not needed; it, like the brook, will go on forever. As improvement and advancement take place on the average farm, they must also take place on our college and experimental farms. These, to serve their purpose, must ever be one pace ahead of the average farm in agricultural thought and practice. Thus their work is becoming more difficult as the years pass.—*Farmer's Advocate*, London, Ont.

PART III

Junior Agriculture

DEMONSTRATIONS, COMPETITIONS, AND CLASS-ROOM STUDIES IN RURAL LIFE FOR BOYS AND GIRLS

COURSES IN RURAL IMPROVEMENT

The question of improving living conditions in rural districts is engaging the attention of many institutions. Not only are the agricultural colleges giving attention to this matter, but some, at least, of the universities include rural sociology in their courses of study. Following are brief reports on schools in rural welfare that were, or are, held at leading centres of education:

QUEBEC

McGILL UNIVERSITY, MONTREAL

BY J. E. HEMMEON, ASSOCIATE PROFESSOR OF ECONOMICS

McGILL University furnishes a series of lectures to third year students at Macdonald College on Rural Economics under the following headings: Agriculture as a part of the economic process, history of agriculture as an industry; a manufacturing as opposed to an agricultural national policy; present status of agriculture, particularly in Canada; factors of agricultural production; factors of agricultural distribution; co-operation in farming; problems of rural life.

The lectures are given by myself. I also lecture the fourth year students at McGill on Canadian industrial and economic problems. This latter series includes eight or ten lectures on agricultural conditions in Canada and embodies the rural questions in general, the tariff and the farmer, agricultural credits, rural isolation, rural emigration to the cities and to new lands, etc. I find that not only the agricultural students but those from the cities and towns are very much interested in the problems bearing on rural conditions.

MACDONALD COLLEGE

A SUMMER school for country clergymen and all others interested in rural welfare, was held at Macdonald College from August 5th to 16th. The course was financed by the Anglican, Congregational, Methodist, and Presbyterian churches through the co-operating theological colleges of Montreal. The course was under the joint direction of these colleges and Macdonald College. Lectures were given by members of the staff of Macdonald College and by a number of distinguished men who have made a special study of rural conditions and of social work on this continent. Three of the speakers were Dr. Warren H. Wilson, head of the department of Rural Sociology, Columbia University, New York; Professor E. R. Groves, Dean of the Arts and Science Faculty, New Hampshire State College, and Rev. John MacDougall, author of "Rural Life in Canada."

ONTARIO

THE UNIVERSITY OF TORONTO

IN the Department of Social Service of the University of Toronto a special course is given on rural conditions and problems. The following paragraph taken from the calendar of the University for the season 1918-1919 indicates the nature of this course: "Dealing with the meaning and importance of rural sociology; the development of modern agriculture, rural depopulation, rural credits, rural institutions and their improvement, adjustment of education to rural needs, rural social surveys, etc."

QUEEN'S UNIVERSITY, KINGSTON

BY PROFESSOR O. O. SKELTON, M.A., Ph.D.

THE Department of Economics has since 1916, been offering in alternate years, a special course in Agricultural Economics. The scope of the course is thus noted in the Calendar:

Agricultural Economics: This course deals with the general principles of Agricultural Economics, as illustrated by Canadian conditions. Special attention is given to such problems as the place of agriculture in the national life, the rural exodus, land tenure, extensive and intensive farming, the marketing and distribution of farm products, rural credit, farmers' movements, and the grain trade. Text books: Carver, Principles of Rural Economics; Macdougall, Rural Life in Canada; and Weld, Marketing of Farm Products.

This course has proved of interest to our students, and will be maintained and extended in the future. In addition, we give each year, in connection with the course in National Problems, a very brief introduction to the question of rural development, with suggestions for further study. Rural problems have also been the subject of much of the research work of the members of the Economics staff —Professor Clark, Professor Mitchell, and myself.

May I take this occasion to congratulate you on the very effective service you are doing for Canadian agriculture by bringing together, in THE GAZETTE each month, so much extremely helpful material for the improvement and for the study of Canadian conditions.

SASKATCHEWAN

THE UNIVERSITY OF SASKATCHEWAN

WHILE the University of Saskatchewan does not give a specific course in rural problems, a series of lectures on rural economics is provided. Professor W. J. Rutherford, Dean of the College of Agriculture, gives one lecture per week during the regular college term. This course treats of the history and development of agriculture from its earliest beginnings up to the present time with particular reference to its influence on American, Canadian, and Prairie Agriculture. It includes a study of the factors that have influenced the different phases of agricultural development; the relation of the different technical branches to a well-rounded out scheme for the development and conservation of our soil resources; the important bearing of the science upon technical agriculture, and the relations of other subjects to the improvement of rural conditions generally. The Saskatchewan University also provides twice a-week lectures on agricultural economics and rural economics. These are delivered by Dr. W. W. Swanson, Professor of Economics. This includes a study of agricultural problems from the social point of view, designed to equip the student for intelligent leadership in rural life. Consideration is given to agricultural production, prices, distribution, tenancy, credit, marketing, co-operation, and community life.

NOVA SCOTIA

TRAVELLING TEACHERS

IN Nova Scotia, as in other provinces, the final examinations impel teachers to lay special emphasis upon the examination subjects. In agricultural and home-making subjects, no examinations are required, resulting in less attention being given to them than to the other subjects. In order to assist the teachers in these newer subjects, travelling teachers are employed. Two such teachers were engaged last year. This year the number was increased to seven.

Each travelling teacher visits about a dozen schools within easy distance of a common centre. That brings her to each school once in eight or ten days. During the autumn she helps the regular teacher work up exhibitions. Where the regular teacher is not enthusiastic, the visiting teacher must assume leadership. This year every travelling teacher has given demonstrations in canning. Later she will do the same with milk testing. During the winter she will teach sewing and cooking. In short, the travelling teacher does all the agricultural and home-making work which the regular teacher should do, but cannot always find time for.

NEW BRUNSWICK

GIRLS' HOME EFFICIENCY CLUBS

BY MISS MAJORIE H. FLEWELLING, SUPERVISOR, HOME EFFICIENCY CLUBS

THE Girls' Home Efficiency clubs were organized in June, 1917, through the efforts of Mr. Peacock, Director of Manual Training and Home Economics in New Brunswick. They were formed as a war measure, and all the school girls, between the ages of ten and eighteen, were asked to serve their country by conserving food. Eighty active clubs were formed in the province, and thirty Home Economics teachers volunteered to give their time during vacation to serve these clubs.

During that first season of 1917, the members of these eighty clubs conserved upwards of fifty thousand quarts of food in their homes, and through the winter and spring months were still active in patriotic work. The girls in these clubs during the winter contributed five hundred and sixty-four dollars to the Red Cross Society in New Brunswick. They also made five thousand various articles which they handed to their local Red Cross societies.

All through the winter and spring of 1918 we were busy organizing new clubs. We found the work so popular that organization went on very rapidly, and we now have over two hundred and eighty clubs organized and doing active work.

These clubs are formed under the auspices of the Department of Education, and the work is carried on as education extension work. The school is the organization centre, but most of the work is carried on in the home. We are trying, through these Home Efficiency clubs, to introduce home economics into every locality in the province, and to help every girl in New Brunswick to become an efficient home maker in the broadest and best sense of the term. In January a supervisor was appointed to have charge of club work, but in less than a year our clubs have so multiplied that one leader cannot do the work. We hope very soon to have a supervisor appointed to have charge of the clubs in each county, and her work will be to visit these

clubs each month and give help in every way.

At present our work is war work, and shall be as long as there is need of such. This summer and fall we are stressing food conservation and have asked our clubs to conserve at least one hundred thousand quarts of food. During August, 1918, about forty Domestic Science teachers were working among the clubs giving lessons in canning and other methods of food preservation and conservation. In this way the club members were all visited by an expert during the canning season. In November we are planning to give instructions in war cookery and to hold a competition in war breads.

In January, February, and March, we will again take up Red Cross work and then in April, May, and June, we hope every club member will have a garden at home and produce the fruits and vegetables to be canned that season. In this way all year around programmes will be provided, and the girls of the province trained in the essential branches of home economics.

TEACHERS' WINTER SHORT COURSE

A TEACHERS' winter short course will he held in the agricultural school building at Sussex during the first school week in January. The aim of the Department of Education in holding this school is to aid teachers to teach the prescribed nature study and agricultural course so as to make it an effective and interesting part of the pupils' work. The school is well equipped and will be well manned with a staff of special lecturers.

ONTARIO

AGRICULTURAL AND FARM MECHANICS

ABOUT thirty high schools and collegiate institutes in the province of Ontario give courses in agriculture and farm mechanics. Agriculture is studied from two standpoints, that of the pupil taking the teacher's course, and that of the pupil desiring to get from his high school education, a training that will fit him especially to carry on farming as an occupation. In the teacher's course agriculture is a bonus subject on a par with Latin. Pupils that have taken this course at the high school, will be required to attend the summer course at the Ontario Agricultural College only one year instead of two, in order to qualify for an elementary certificate in agriculture. As an explanation of what these courses provide, the following is taken from the announcement of the Whitby High School for 1918-1919:

COURSES OF STUDY

The course as arranged at present covers two years and includes (1) the regular academic subjects such as, Reading, Writing, Spelling, English Grammar, English Composition, English Literature, Canadian History, Geography, Arithmetic, Science, Book-keeping; (2) the Agricultural subjects, and Farm Mechanics.

The above course may be modified to suit special conditions.

AGRICULTURAL SUBJECTS

Drainage.—Measurement of fields, use of a dumpy level, making of drainage plans, etc.

Beekeeping.—Class work and practical work in apiary.

Botany.—Weeds and weed seeds, control of weeds, seed germination and selection, plant diseases and their control.

Entomology.—Common insect pests and methods of control.

Dairying.—General Principles. Testing of whole milk, cream, skim milk for butter fat. Cow testing.

Poultry.—Principles underlying successful poultry keeping. Incubation. How to pick out laying hens.

Animal Husbandry.—Study of the more common breeds of cattle, horses, pigs, and sheep. Stock judging.

Field Husbandry.—Study of the more common field crops of Ontario. Crop rotation and crop improvement.

Soils.—Analyses of the different classes; determination of air and water capacities.

Fruit Growing.—Pruning, grafting. Care of the orchard. Packing of fruit.

Chemistry.—Study of the more common substances found around the home. Testing of water, insecticides, fungicides, etc.

Physics.—Principles of the various farm implements.

Rural Economics.—Laws relating to agriculture. Co-operation, good roads, rural advancements, etc.

Bacteriology.—Study of the influence of bacteria upon soil, milk, etc.

Gardening.—General principles underlying successful gardening.

FARM MECHANICS

The workshop is fitted with three forges and the necessary equipment for each. There is also a complete equipment for wood-working, metal-work, soldering, rope-splicing, etc.

The following is a general outline of the work followed:

Drawing.—Simple plans and elevations applied to the erection of farm buildings. Correct use of drawing board, T-square, triangle and compasses. Construction of the common geometrical figures. Simple lettering and figuring. Working drawings for use at the bench or in the construction of dwellings, barns, granaries, silos, poultry houses and machine sheds and cupboards, cases and other outdoor structures.

Wood Work.—Growth, structure, identification and characteristics of the woods used in the locality; methods of seasoning. Warping, twisting, checking, how caused and counteracted. Making of simple objects required on the farm or in the home according to drawings previously prepared. Proper use of nails, screws and glue. Use of simple joints in articles made; for example, end half lap, centre half lap, mitre, housing. Use, mechanical construction, and care of common wood-working tools, such as may be used on the farm.

Miscellaneous Farm Work.—Repairing harness, making gates and fences, painting and whitewashing, mending windows, soldering, making concrete posts, building pens and fences; splicing and tying ropes, mixing and applying paints, assembling machines, etc.

Forging.—The forge, the fire, the heat, the height of anvil and its position. The ordinary tools, how to use and care for them. Hammer, sledge, chisel, fuller, and swage. Drawing, forming, upsetting, bending and twisting iron, stamping and forge-blacking and finished piece. How to fashion from iron stock various articles used on the farm, such as tongs, cold chisels, punches, rings, chain links, brackets, harrow teeth, etc.; how to use and take care of files; how to construct a serviceable forge, and otherwise equip a shop for farm blacksmithing; repairing broken parts of farm machinery; welding and tempering.

HOME PROJECTS

Each pupil is supposed to undertake some work at home in connection with the above outline and carry it through to completion. This work will be under the supervision of the teacher and will be inspected during the term.

SHORT COURSE IN AGRICULTURE

During the winter months a short course will be provided for the boys and girls from the country who find it impossible to attend school for the full year. These classes will commence the middle of November and continue until Easter. The terms of admission to the short course are the same as those for the Department of Agriculture.

The work is divided into two parts;—(a) General Instruction, including Arithmetic, Spelling, Composition, Literature and Bookkeeping (specially adapted for farm accounts); (b) Agricultural Instruction in Chemistry, Dairying, Stock Judging, Seed Testing and Farm Mechanics.

DETAILS OF SHORT COURSE

Chemistry.—The study of the plant substances, soils, insecticides, fungicides, water, fertilizers, and other common substances used on the farm. Uses of manures and artificial fertilizers, calculation of values, mixing, etc.

Dairying.—The Babcock test for milk fat in whole milk, cream and skim milk. The use of the lactometer. Pasteurization and sterilization. Experimental work to show the effect of bacterial and mould contamination.

Stock Judging.—Principles involved in the judging of cattle, horses, pigs, sheep and poultry. Practical work also will be taken and supplemented by the use of motion pictures.

Seed Testing.—Study and identification of the more common weed seeds found in grains and clovers. Germination test, seed judging, Seed Control Act. Methods of combatting weeds.

Farm Mechanics.—One afternoon each week will be spent in the workshop. The course will be prefaced by a series of lessons on the use and care of the various tools. Practical work in wood-working, forging, rope splicing, harness mending, etc.

Pupils attending the above course will have the privilege of taking up the study of gasoline engines in the night classes.

MANITOBA

BOYS' FAT CALF COMPETITION

THE Manitoba Winter Fair Board will hold the usual competition in boys' fat calves at the Fair to be held at Brandon in March, 1919. One thousand dollars in prizes is offered in twenty awards. The competition is open to boys resident in Canada between the ages of nine and seventeen years, who have the opportunity of showing steers or grade heifer calves born in 1918. The calves must be fed, cared for, and fitted by the competitors for at least four months immediately previous to the date of the show. The competitors must also have charge of the exhibits at the fair. The prizes run from one hundred dollars down to twenty-five dollars with cups and medals. An additional class designated "Continuation Class" is being added this year for boys who had entries in the boys' fat calf show of previous years and for steers calved in 1917. Good prizes are available for this competition. The management of the Manitoba Agricultural College are offering free tuition for one college term to the winners of the first, second, and third prizes in the Continuation competition.

"There can be no objection to the poetic interpretation of nature. It is essential only that the observation be correct and the inference reasonable, and that we allow it only at proper times. In teaching science we may confine ourselves to scientific formulas, but in teaching nature we may admit the spirit as well as the letter."

"The child should be set at these things that are within its own sphere and within the range of its powers. Much so-called nature-study teaching is merely telling the child what some man has found out."

"Thoroughness consists only in seeing something accurately and understanding what it means. We can never know all that there is to be learned about any subject."

"One is not superficial merely because he does not delve deep into subject-matter. He should try to be accurate as far as he goes."—*L. H. Bailey.*

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications, and Notes.

ASSOCIATIONS AND SOCIETIES

EVENTS OF THE COMING MONTHS

Nov. 7th.—Breeders' consignment sale of horses, cattle, sheep, swine and poultry at the Exhibition Grounds, Fredericton, N.B.

Nov. 13th to 14th.—The annual meeting of the Provincial Association of Beekeepers, Quebec, in Montreal. Secretary-Treasurer Oscar Comire, St-Francois-du-Lac, Yamaska Co., Que.

" " Annual meeting of the Agricultural Society of the Province of Quebec, in Montreal, Secretary, O. Comire, St-Francois-du-Lac.

Nov. 13th to 15th.—Western Canada Live Stock Union annual meeting, Winnipeg, Man., Secretary, E. L. Richardson, Calgary, Alta.

Nov. 27th to 29th.—Alberta Provincial Poultry Show, Calgary, P. J. Timms, Calgary, Secretary.

Dec. 6th to 12th.—Annual Provincial Winter Fair, Guelph, Ont., Secretary, R. W. Wade, Parliament Buildings, Toronto, Ont.

Dec. 10th to 13th.—Alberta Winter Fair, Calgary, Secretary, E. L. Richardson, Calgary.

" " Alberta Auction Sale of Cattle, Females of Beef Breeds, Calgary, Secretary, E. O. L. Richardson.

CANADIAN SEED GROWERS' ASSOCIATION

BY L. H. NEWMAN, SECRETARY

The annual meeting of the Canadian Seed Growers' Association was held at the headquarters of this organization in Ottawa on September 26th. Owing to the unusual conditions incident to the great war, the meeting was confined to a discussion of matters of business. Among those present from a distance were Mr. M. P. Tullis, Weed and Seed Commissioner for Saskatchewan, Regina, Sask.; Mr. F. C. Hart, Director of Co-operation and Markets Branch, Department of Agriculture, Toronto, Ont.; Mr. Justus Miller, Assistant Commissioner of Agriculture, Toronto; Mr. F. N. Savoie, Secretary of Agriculture, Quebec, P.Q.

The reports of the Board of Directors and of the Secretary showed that in spite of war conditions substantial progress had been made. During the year 194 growers had operated seed plots and had made careful selections of plants from which to obtain seed for the following year's propagation. Applications for membership received during the year numbered 156, while 65 applicants were admitted to full membership. There are now 393 members in full standing, and 1,018 applicants for membership, making a total of 1,411 affiliated with the Association. These growers are distributed throughout all the provinces. The report indicated a greater appreciation of the value of systematic work in seed selection and propagation on the part of the average farmer. A number of very gratifying letters from purchasers of registered seed were presented.

One of the important steps taken during the year was that of encouraging the organization in Manitoba and in Saskatchewan of a Co-operative Seed Association modelled somewhat after the Co-operative Seed Society in the Province of Quebec. The latter society has its headquarters at Ste. Rosalie, P.Q., where it has a commodious warehouse equipped with up-to-date cleaning

and grading machinery. Here Registered Seed and other good seed grown in the province is assembled, recleaned, and graded when necessary. The Society, although only three years old, has made excellent progress and is winning a reputation for itself on account of the excellent quality of seed which it distributes. The report emphasized the need for such an organization in other provinces.

A most important and far reaching amendment to the regulations regarding the registration of seed was passed during the convention. The regulations as now amended permit any grower, whether he is a member of the Association or not, to purchase first or second generation Registered Seed and have the immediate progeny registered, providing proper inspection has been made, both of the growing crops and of the threshed seed, and providing the seed is up to the standards required for Registered Seed. Heretofore all growers have been required to become members of the Association and to produce their own Elite Stock Seed before they could have any seed recognized officially as Registered Seed. This restriction has resulted in curtailing the quantity of Registered Seed available to the trade each year. It is believed that the new arrangement will increase the quantity enormously, will encourage a greater number interested in the matter of improved seed, and will provide a wider market for those growers who operate seed plots and produce Elite Stock Seed.

The greater production of Registered Seed resulting from this amendment will render more imperative than ever the existence of central cleaning plants and agencies for handling and distributing Registered Seed in a larger way.

The following officers were elected for the ensuing year:

President: Dr. Jas. W. Robertson;

Vice-presidents: Dr. C. A. Zavitz, O. A. College, Guelph, Ont.; Prof. M. Cumming, Truro, N.S., and Prof. James Murray, Macdonald College, P.Q.;

Secretary-treasurer: L. H. Newman, 114 Vittoria Street, Ottawa, Ont.;

Executive Council: Dr. Jas. W. Robertson; L. H. Newman; Dr. C. A. Zavitz; T. J. Harrison. Agricultural College, Winnipeg, Man.; M. P. Tullis, Weed and Seed Commissioner, Regina, Sask.; Justus Miller, Assistant Commissioner of Agriculture, Toronto, Ont.; F. N. Savoie, Secretary for Agriculture, Quebec, P.Q.;

Directors: W. B. Scott, Victoria, B. C.; M. P. Tullis; T. J. Harrison; Justus Miller; F. N. Savoie; W. L. MacFarlane, Fork Harbour, N.S.: M. A. MacLeod, Dept. Agriculture, Fredericton, N.B.; W. H. McGregor, Miscouche, P.E.I.; G. H. Hawden, Duncan, B.C.: H. A. Craig, Deputy Minister of Agriculture, Edmonton, Alta.; Prof. John Bracken, Agricultural College, Saskatoon, Sask; Geo. Dow, Gilbert Plains, Man.; Dr. C. A. Zavitz; Prof. Jas. Murray; Prof. M. Cumming; W. E. Palmer, Scotch Lake, N.B.; J. L. Tennant, Dept. of Agriculture, Charlottetown, P.E.I.

THE HOLSTEIN-FRIESIAN ASSOCIATION OF CANADA

BY W. A. CLEMONS, ST. GEORGE, ONTARIO, SECRETARY

A delegation from the Canadian Holstein-Friesian Association met with the Board of Directors of the American Holstein-Friesian Association in Detroit in July to take up the question of reciprocity in registration between the two associations. The principle was endorsed and the details left to be worked out by the secretaries of the associations. This was done later at a meeting held in Brattleborough, Vermont, on September 16th, when the following form of agreement was drawn up:

(1) All Holstein-Friesian cattle entering the United States from Canada shall be registered in the Holstein-Friesian Herd Book of America, and all Holstein-Friesian cattle entering Canada from the United States shall be registered in the Holstein-Friesian Herd Book of Canada, on the strength of the official certificates of registry from the country of origin without the registration of ancestors.

(2) Each animal from the United States shall be accompanied by the American certificate of registry, the American certificate of transfer to the Canadian buyer, and a Canadian application for registry blank showing the colour markings, name and number of the sire and dam, name of breeder, and the signature of the importer as owner.

Each animal from Canada shall be accompanied by the Canadian certificate of registry, the Canadian certificate of transfer to the American buyer, and an American application for registry blank, showing the colour markings, name and number of the animal, name and number of the sire and dam, name of the breeder, and the signature of the importer as owner.

The signature of the breeder and the certificate of service of the dam shall not be required in either case.

(3) Both the Holstein-Friesian Association of America and the Holstein-Friesian Association of Canada shall charge their regular registration fees for the registration of such imported animals.

(4) In consideration of recognition by the Holstein-Friesian Association of America of the certificates of registry of the Holstein-Friesian Association of Canada, the Canadian Association shall reduce the fee for import certificate

required by the Canadian Customs Department to a nominal sum.

(5) The Secretary of each Association shall furnish free of charge to the Secretary of the other Association such progeny records and other information as may be required for the completion of office files.

(6) The final adoption of this basis of agreement shall be contingent upon its ratification by the annual meeting of each Association.

QUEBEC POMOLOGICAL SOCIETY

At the summer meeting of the Quebec Pomological Society held at the Forestry School near Berthierville, Que., September 9th and 10th, a number of interesting addresses were made, papers read, and reports presented. A resolution was passed urging the licensing of peddlers and dealers in nursery stock and the identification of stock by pernament labels giving the grade of the trees and the name of the vendor.

BRITISH COLUMBIA VETERINARY ASSOCIATION

The eleventh annual meeting of the British Columbia Veterinary Association was held in the Assembly Hall of the Provincial University at Vancouver on October 5th. Dr. Thomson of Keremecs read a paper on the "Necessity for Rural Meat Inspection by a System of Communal Slaughterhouses." Dr Howell, Vice-President of the Association, read a paper on "Post Parturient Diseases," and Dr. Bruce of Agassiz on the "Poisonous Plants of British Columbia." A visit was paid to the permanent site of the Provincial University at Point Grey, where special attention was paid to the modern dairy barn. A public meeting was held at which leading stock breeders and dairymen were present. The officers elected were:—President, Dr. F. S. Tolmie; Secretary-Treasurer, Dr. Kenneth Chester, New Westminster, B.C.; Council Dr. A. Damman, Dr. J. W. Darby, Dr. W. Thomson, Dr. F. W. Ottewell, and Dr. L. D. Swenerton.

ALBERTA LIVE STOCK ASSOCIATIONS

Owing to the spread of influenza the auction sales of live stock to have been held at Calgary on October 30th and 31st were cancelled. The sales will be held during the winter fair at Calgary on December 10th to 13th.

THE ENTOMOLOGICAL SOCIETY OF ONTARIO

Owing to the epidemic of influenza the annual meeting of the Entomological Society of Ontario to have been held at the Ontario Agricultural College, Guelph, on November 6th and 7th has been postponed to be held on the 4th and 5th of December.

NEW PUBLICATIONS

QUEBEC

Efficient Poultry Production in War Time—Bulletin No. 57, by M. A. Jull, Manager and Lecturer, Poultry Department of Macdonald College, treats of the profitable production of eggs and poultry, feeding, care, and marketing. A section is given to sanitation.

The Cultivation of Vegetables, by Francisque Petraz, Landscape Horticulturist, with the collaboration of Mr. L. H. Lavoie, Chief of the Horticultural Service. This is a very complete illustrated treatise dealing with the cultivation of vegetables in practically all its phases. The bulletin is divided into four parts. The first part deals with the selection and preparation of the ground and is divided into six chapters. The second part is devoted to "special cultures" and comprises four chapters. The third part gives a quantity of useful information, and the fourth part treats in four chapters of injurious diseases and insects. The bulletin consists of fifty-four pages.

ONTARIO

The Ontario Department of Agriculture has issued "Circulars No. 14 and 15," the first giving advice on the saving of seed corn by P. L. Fancher, Corn Specialist, and the second telling how to organize and manage live stock shipping associations, by E. G. Gordon, B.S.A., Assistant in Live Stock Marketing.

Books on Agriculture and Household Science—Mr. O. J. Stevenson, M.A., D. Paed., Professor of English, has prepared as "Bulletin 259" a catalogue of books on agriculture and household science, with the names of the authors, the addresses of the publishers, the prices and memoranda regarding the contents.

Entomological Society of Ontario.—The Forty-eighth annual report of the Entomological Society of Ontario, being for the year 1917, contains a detailed report of the fifty-fourth annual meeting held at Macdonald College on November 8th and 9th. It also contains reports on insects of the year from the different Divisions and much matter of special interest to entomologists.

BRITISH COLUMBIA

The Twelfth Annual Report of the Provincial Department of Agriculture covering the year 1917, has recently been issued. Plentifully illustrated, the report makes a book of 132 pages and covers all the activities of the different branches of the Department.

MISCELLANEOUS

Canadian Good Roads Association—The proceedings at the annual congress of the Good Roads Association have been published in pamphlet form and make a book of 70 pages. It contains many invaluable and instructive addresses, special attention having been paid to the important matter of drainage.

Canadian Holstein-Friesian Year Book—This is a book of 682 pages and contains, besides the Record of Merit rules, a list of all official and semi-official butter and milk records of The Holstein Friesian Association of Canada that have been admitted to the Record of Merit and Record of Performance, together with a list of record cows under their sires and under their dams, with the proven sons of such sires and dams, and the highest record cows in each division.

NOTES

There are 2,300 county agents in the United States, representing more than 80 per cent of the agricultural counties and 97 per cent of agriculture.

Mr Wilfrid Sadler, M.Sc., N.D.D., has resigned from the position of Assistant in Bacteriology at Macdonald College to accept the Associate Professorship of Dairying in the University of British Columbia.

The Red Cross Pig Club in Carroll County, Miss., has a membership of 3,000 and has contibuted $10,000 to the Red Cross funds and sent 600,000 pounds of pork to the soldiers overseas.

The Winnipeg Poultry Association, instead of holding comprehensive breed exhibitions of poultry, has adopted the plan of having exhibitions of different types, first of Plymouth Rocks and then of Wyandottes, and so on.

Mr. Alva H. Benton, B.S.A., M.S., a graduate of the Ohio Agricultural College, and, until recently, farm manager for the University of Minnesota, has been appointed Professor of Farm Management at the Manitoba Agricultural College.

The directors of the New Brunswick Agricultural Societies United have secured supplies of acid phosphate, nitrates, and mixed fertilizers, which are made available to members of agricultural societies and United Farmers at cost price.

The British Columbia Department of Agriculture, in its weekly Fruit Markets Bulletin for October 12th, reminds packers and shippers of the amendments that have been made this year to the Inspection and Sale Act dealing with the grades and with overfacing, and recommends every packer and shipper to study these amendments for their guidance in putting up apples for market.

Mr. R. W. Clemens, Agricultural Representative for Wellington County, Ontario, organized an automobile excursion of the Arthur Junior Farmers' Improvement Association. Twenty-five motor cars were volunteered by their owners for the day, which was spent in visiting stock farms, the Ontario Agricultural College, and the prison farm. The excursion party consisted of 125 young men and women.

The organized text book on agriculture for Alberta schools, prepared by Mr. J. McCaig, M.A., editor of Publications for the province, has been accepted for use in he Khaki University, both in France and England. The Toronto rm publishing the work has re eived an initial order for one thousand copies and a request for an arrangement to publish an edition in England.

At the Brampton, Ontario, Fair this autumn an interesting new feature consisting of a canning competition between five teams of four girls each was held under the direction of the Agricultural Representative for Peel County. The teams were selected from the

girls who had taken short courses in home economics during the previous winters. The competition was held in the Agricultural Representative's tent and the agricultural society made a grant of thirty dollars for prizes.

In a lengthy report of his visit to the principal fairs in Canada and the northern section and north-west section of the United States, Mr. W. J. Stark, Manager of the Edmonton Exhibition, remarks: "Already representatives from Belgium have been going through our province looking to purchase breeding stock for their country, and all Europe will be looking to us, and, situated as we are, nearer than any of the countries which can compete with us, such as the Argentine Republic or Australia, we have a great natural advantage which should not be lost sight of."

Western Canada scored high at the International Soil-Products Exposition at Kansas City, capturing a total of one hundred and four prizes. These include first, second, third and sweepstakes in wheat; first, second, third and sweepstakes in oats; first, second, third and sweepstakes in barley; first and second in flax. Seager Wheeler of Rosthern, Saskatchewan, won first, sweepstakes and the $500 silver cup offered by the Canadian Pacific Railway Department of Colonization and Development for the best half bushel of hard spring wheat. H. B. Sheeley, of High River, Alberta, was second in this competition. Nick Taitinger, of Claresholm, Alberta, won first and sweepstakes for barley; the Provinde of Manitoba first for state vegetable collection and Kildonan first for county vegetable collection.

INDEX TO PERIODICAL LITERATURE

The Agricultural Journal, Victoria, B.C., September, 1918.
Poultry Husbandry and the War. H. E. Upton, Provincial Poultry Instructor, page 160.

British Columbia Farmer, Vancouver, B.C., Oct., 1918.
A Community Selects a Breed. J. A. McLean, Professor Animal Husbandry, University of B.C., page 3.

The Canadian Countryman, Toronto, Ont., Sept. 28, 1918.
A Comparison of Profits from Selling Milk. H. H. Dean, Professor of Dairy Husbandry, Ontario Agricultural College, Guelph, page 1211.

Canadian Farm, Toronto, Ont., Sept. 25, 1918.
Keep Cows Inside During Cold Nights. Prof. H. H. Dean, page 4.

Canadian Home Journal, Toronto, Ont., Oct, 1918.
The Home Garden. Geo. Baldwin, F.R.H.S., Secretary Toronto Vacant Lot Cultivation Association, page 20.

Canadian Poultry Review, Toronto, Ont., Oct., 1918.
Inheritance in Fecundity in Domestic Fowl. M. A. Jull, B.S.A., Manager and Lecturer, Poultry Department, Macdonald College, Quebec, page 391.

Farmer's Advocate and Home Magazine. London, Ont., Oct. 3, 1918.
The Agricultural College, H. H. Dean, page 1594.

Farmer's Advocate and Home Journal, Winnipeg, Man., Sept. 25, 1918.
The Cabbage Root Maggot. A. V. Mitchener, Lecturer in Horticulture, Manitoba Agricultural College, page 1510.

Oct. 16—Straw as a Feed. W. H. J. Tisdale, Professor of Animal Husbandry, University of Saskatchewan, page 1609.
Straw as Roughage for Live Stock. W. H. Gibson, Superintendent Experimental Farm, Indian Head, page 1607.

Farmers' Magazine, Toronto, Ont., Oct. 1, 1918.
The Modern Dairy Cow, Professor H. H. Dean, page 30.

Oct. 15—The New Maritime Outlook, W. R. Reek, Secretary for Agriculture, New Brunswick, page 6.

The Farm and Ranch Review and The Country Home, Calgary, Alta., Sept. 20, 1918.
The Progress of the Whiteface, A. A. Dowell, Professor of Animal Husbandry, College of Agriculture, Edmonton, page 1012.

Oct. 5—The Crate Fattening of Poultry, T. A. Benson, Edmonton, Dominion Poultry Representative for Alberta, page 1085.
The Kubanka Wheat, G. H. Cutler, Professor of Field Husbandry, Alberta College of Agriculture, Edmonton, page 1062.
Possibilities for Canadian Sheep Raising, T. Reg. Arkell, Manager of the Canadian Co-operative Wool Growers, Ltd., page 1062.

The Grain Growers' Guide, Winnipeg, Man., Oct. 9, 1918.
The Cabbage Root Maggot, A. V. Mitchener, Lecturer in Horticulture, Manitoba Agricultural College, page 21.

The Monetary Times, Toronto, Ont., Oct. 4, 1918.
Marketing Canada's Grain, W. R. Bawlf, President Winnipeg Grain Exchange, page 14.

The Nor'-West Farmer, Winnipeg, Man., Oct. 5, 1918.
The Orientation of Agriculture, J. McCaig, M.A., Editor of Publications, Alta., page 1279.

O.A.C. Review, Guelph, Ont., Sept., 1918.
Get a Good Crop of Strawberries, Austin Richardson, O.A.C., Horticultural Dept., page 17.

PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K Doherty International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

616—**The Nutritive Value of Yeast, Polished Rice and White Bread as Determined by Experiments on Man.**—FUNK, CASIMIR, LYLE, W. G. and MCCASKEY, DONALD, in co-operation with CASPE, JOSEPH and POKLOP, JOSEPH, in *The Journal of Biological Chemistry*, Vol. XXVII, No. 1, pp. 173-191, Bibliography of 23 publications, Baltimore, Md., 1916.

617—**The Digestion of Aleurone Cells Incorporated in 85% Bread; Experiments Made in France.**—LAPICQUE, L. and LEGENDRE, A., in *Comptes rendus des Séances de la Société de Biologie*, Vol. LXXXI, No. 5, pp. 217-220, Paris, March 9, 1918.

The envelope which encloses the wheat seed, the fragments of which, more or less mixed with flour form the bran, contains on its inner surface the layer of aleurone cells. The authors' experiments confirm the fact, shown first by POGGIALE, then by AIME GIRARD that the eminently digestible and nutritive contents of these cells are protected from the action of the digestive ferments by the cellulose walls.

Resistance to digestive ferments is clearly connected with the integrity of the walls. Baking does not affect the result, but, nevertheless, by rupturing the walls mechanically it is possible to render the nutritive substances accessible to the action of the digestive juices. In bran of the first milling which does not pass a No. 70 sieve, the walls of the layer of aleurone cells are intact, and the aleurone thus resists baking and digestion. If, however, the bran is re-milled so that most of it passes through a No. 100 sieve, the walls of the aleurone cells retained by a No. 200 sieve are still intact, but nearly all of these break during baking, and, after digestion, only the empty walls are found in the faeces, the contents having been digested, as the authors proved experimentally. It is for this reason that in bread made with 85% flour, the bran of which is mixed with fine flour and re-milled (as decreed in France at the present time) without any systematic preparation, the greater part of the aleurone cells is digested, thus increasing the total food value of the bread by 1 to 2%.

618—**Physiological and Pharmacological Studies on Coal Tar Colours, Experiments with Fat-Soluble Dyes.**—SALANT, WILLIAM and BENGIS, ROBERT, in *The Journal of Biological Chemistry*, Vol. XXVII, No. 2, pp. 403-427, Bibliography of 20 publications. Baltimore, Md., 1916. (1 page in Institute Bulletin.)

CROPS AND CULTIVATION.

621—**Method for Calculating the Length of the Growing Season at any period of the Year and in any Locality.**—REED, G. W., in the *Monthly Weather Review*, Vol. XLIV, No. 9, pp. 509-512, Washington, 1916. (3 pp. in Institute Bulletin.)

623—**Researches on Certain "Soil Sicknesses" in the Netherlands.**—SOLMGEN, N. L., KNETEMANN, A. and WIERINGA, K. T., in *Verslagen van Landbouwkundige Onderzoekingen der Rykslandbouwproefstations*, No. XXI, pp. 121-165 The Hague, 1917. (3 pp. in Institute Bulletin.)

624—**Studies on Nitrification in Natural Soils and Its Importance from an Ecological Point of View, in Sweden.**—HESSELMANN, H., in *Skogswardsforeningens Tidskrift*, Year XV, No. 4-6, pp. 312-446. Stockholm, 1917. (3 pp. in Institute Bulletin.)

626—**On Green Manures**—SCHRIBAUX and BRETIGNIERE, L., in *Comptes rendus des Séances de l'Academie d'Agriculture de France*, Vol. IV, No. 10, pp. 354-357 and 360-365. Paris, March 13, 1918.

M. SCHRIBAUX (professor of the "Institut National Agronomique") communicated to the Academy a note by M. BRETIGNIERE (professor of Agriculture at the "Ecole Nationale d'Agriculture" at Grignon) in which M. BRETIGNIERE, describes the results he obtained with clover and black medick

as green manures. The sowing of these two Leguminosae in cereal fields is highly recommended. The practice, which is already adopted in some cases, should be general, especially in view of the shortage and high price of nitrogenous manures. By this means, as at Grignon from 1913 to 1916, the growing of three successive cereal crops becomes possible.

Besides the black medick and clover recommended by M. BRETIGNIERE, M. SCHRIBAUX also advises the use as green manure of crimson clover, which is to be recommended on account of its rapid growth and the relatively low cost of its seed. Fenugreek might also be useful for the same purpose, especially in the south of France, on account of its hardiness and well developed roots. The adoption as a green manure of white melilot, already used as such in America, might also be studied.

627—**Fertilizers in South Africa**—in *The South Africa Journal of Industries*, Vol. I, No. 5, pp. 465-467, Pretoria, 1918 (2 pp. in Institute Bulletin).

628—**Plants Imported into the United States by the Bureau of Plant Industry of the Department of Agriculture, during the Half Year July 1 to December 31, 1917.** —*U. S. Department of Agriculture, Bureau of Plant Industry, Inventory of Seeds and Plants Imported by the Office of Foreign Seed and Plant Introduction:* I. *During the Period from July 1 to September 30, 1914* (Inventory No. 40; Nos. 38,666 to 39,308), pp. 110. II. *During the period from October 1 to December 31, 1914* (Inventory No. 41, Nos. 39,309 to 39,681), pp. 67, Washington, 1917. (4 pp. in Institute Bulletin.)

630—**The Direct Influence on the Stock of the Sap produced by the Scion, and the Action on the Plant of Acid Solutions Absorbed Directly: Experiments in Italy,** —CAMPBELL, C., in the *Acti della Reale Accademia dei Lincei*, Series V, *Rendiconti*, Vol. XXVIII, 1st Half-Year, No. 1, pp. 57-61, Rome, January 6, 1918.

Plants that are wild or have become so are usually more resistant to parasites than cultivated plants; this has suggested the hypothesis to Prof. COMES that this difference in behaviour is due to the greater acidity of the sap of wild plants (1).

The author has tested Prof. COMES' hypothesis in two different ways: (1) by grafting a wild plant on a cultivated plant of the same genus (plum on peach or wild apple on an ungrafted apple) and studying the influence on the latter of the sap produced by the former; (2) by making the plant take up acid solutions through its aerial parts by the method of Prof. ACQUA (*Rendiconti della R. Accademia dei Lincei*, 1914).

(1) See Agricultural Gazette, May 1917, p. 428, No. 937.

ACTION OF THE SAP PRODUCED BY THE WILD SCION ON THE CULTIVATED STOCK.—If Prof. COMES' hypothesis is correct, the sap produced by the scion, being more acid, should increase the resistence of the stock to parasites. This was confirmed experimentally; in fact, after the 2nd and 3rd year of grafting, the influence of the scion on the stock is shown by the deeper colouring of the leaves of the cultivated plant (more marked in the peach) and its greater resistance both to drought and certain parasites: in the peach, against *Exoascus deformans;* in the apple, against *Oidium farinosum.*

DIRECT ABSORPTION OF ACID SOLUTIONS BY THE AERIAL PARTS.—Up to the present, the author has studied 0·5, 1 and 2‰ solutions of tartaric, citric and malic acids in pure distilled water or plus a little saccharose to vary the osmotic pressure. By means of a cut branch immersed in water, an apple-tree heavily attacked by *Myzoxylus laniger* (= (*Schizoneura lanigera*) and peach-trees heavily attacked by the aphid *Anuraphis persicae* (=*Aphis persicae*) were made to absorb acid solutions at first in 1915, then in 1916 and 1917. In the spring of 1917, it was found that, as regards the apple-tree which had absorbed the acid solution, the *Myzoxylus laniger* had almost completely disappeared and that, in comparison with the controls, the upper leaves were better developed and of a deeper green. The infection with the conidial form (*Oidium farinosum*) of *Podosphaera leuco-tricha*, with which all the other ungrafted plants were attacked, did not affect the plant in question or the wild plants. Of the 2 peach-trees most severely attacked by the aphids, the one that had absorbed the acid solutions (and which was in worse condition than the other at the beginning) has survived, while the one that was not treated died.

The author has the intention of continuing and enlarging these researches, and he considers it will be useful to try again the influence of an American vine-scion on a European stock, as regards resistance to phylloxera, to establish the value of the change taking place in the chemical conditions and to include the direct absorption of liquid in his experiments.

631—**The Influence of Acids on Germination.** —MAQUENNE, L. and DEMOUSSY, E., in the *Comptes Rendus des Seances de l'Academie des Sciences*, Vol. CLXVI, No. 14, pp. 547-552. Paris, April 8, 1918.

Mineral acids should be placed among the substances that are most injurious to germination. Their toxic action which, when the acid is free from other substances apparently cannot be changed to a favourable one, can be modified by the presence of electrolytes of salts.

632—**Some Effects of Organic Growth-Promoting Substances (Auximones).** — I. BOTTOMLEY, W. B. Some Effects of

Auximones on the Growth of *Lemna minor* in Mineral Culture Solutions, in the *Proceedings of the Royal Society* (Biological Sciences), Series B, Vol. 89, No. B621, pp. 481-507. London, 1917.—II. MOCKERIDGE, F. A. Some Effects of Auximones on the Soil Organisms concerned in the Nitrogen Cycle. *Ibid.*, pp. 508-533, 1917.

I.—In a previous communication (1) the author showed that bacterised peat contains certain organic growth-producing substances which he calls "auximones" and which, when added in very small amounts to wheat seedlings growing in water culture, cause a marked increase in growth.

The author started fresh experiments with *Lemna minor*, a plant whose rapid growth can be easily noted. A number of comparative culture tests (control cultures in Detmer's culture solution—cultures in that solution plus small quantities of extracts of bacterised peat as:—(*a*) aqueous extract; (*b*) alcoholic extract; (*c*) phosphotungstic acid fraction) have led to the following observations:—

(1) The auximones contained in bacterised peat have an enormous influence on the growth of *Lemna*, even when added in small quantities: the plants grow in number and weight, the cells are larger, the protoplasm is denser, the nucleus larger and the chloroplasts are more numerous.

(2) In *Lemna* normal growth and multiplication cannot be sustained for any length of time in the absence of auximones in an exclusively mineral solution; auximones are essential for the effective utilization and assimilation of the mineral substances supplied to these plants.

The addition to the mineral culture solution of 368 parts per million of organic matter from the water extract of bacterised peat resulted, after 6 weeks, in multiplication of the number to 20 times, and an increase in weight to 62 times, that of the control plants.

(3) It is highly probable that these auximones are organic decomposition products, for bacterised peat is simply organic matter, already partly decomposed by anaerobic action, which has been further decomposed by the agency of aerobic bacteria under suitable conditions. Some of them may be absorbed and utilized directly as plant nutriments. SCHREINER and SKINNER have shown that such nitrogenous decomposition products as creatinine, histidine and arginine can replace nitrates in a culture solution, and that, even when nitrates are present, these substances are absorbed by the plants; these compounds are absorbed as such and utilized directly for building up the proteins and other complex nitrogenous constituents of vegetable material. They also suggest that the energy required for the transformation of inorganic nitrogen into an organic form being no longer required, it can be expended otherwise when these substances are supplied to the plant and results in more rapid growth and increased plant efficiency. Other auximones may have a similar effect to the accessory food bodies or growth vitamines concerned in animal growth, which would explain the enormous effect produced in comparison with the quantities present.

(5) The great sensibility of the plant to the action of these substances is shown clearly when the quantity of auximones is progressively diminished or when the culture solutions are exchanged.

(6) The fact that plants can grow in exclusively mineral solutions does not constitute an objection to the suggestion that the presence of organic substances is necessary, for BROWN has shown that nitrogenous organic growth-promoting substances may be produced in the endosperm during germination and absorbed by the embryo.

II.—The author has made different cultures of the organisms concerned in the nitrogen cycle (nitrogen-fixing, nitrifying, ammonifying and dentirifying bacteria), which were mixed with extracts of bacterised peat. The results of the researches indicate that:—

(1) Soluble humus is a very important factor from the point of view of the activities of soil bacteria. Its effect on the organisms appears to be largely independent of any organic matter it may contain; it is shown to be due to the presence of auximones;

(2) auximones increase the rate of nitrogen fixation and nitrification, depress the rate of denitrification and do not appreciably affect the rate of ammonification.

If auximones play some definite part in the building up of the complex nitrogenous molecules of the organism, it follows that a directly opposite effect should be produced on the two classes of bacteria (nitrifying and denitrifying) whose activities are directed upon such widely divergent lines.

(1) See Agricultural Gazette, Sept., 1917, p. 825, No. 21.

636—**Maternal Inheritance in the Soy Bean.**—TERAO, H., in *The American Naturalist*, Vol. LII, No. 613, pp. 51-56. New York, January, 1918. (3 pp. in Institute Bulletin.)

637—**Hybridisation Experiments between Different Varieties of the Cultivated and Wild Strawberry, in Alaska, U. S. A.**—*Annual Report of the Alaska Agricultural Experiment Station* for the Years 1904-1915. Washington, 1905-1916. (1 page in Institute Bulletin.)

638—**Acclimatisation, Selection and Hybridisation Experiments with Fruit Trees in Alaska, U. S. A.**—*Annual Reports of the Alaska Agricultural Experiment Stations for the Years* 1904-1915. Washington, 1905-1916. (5 pp. in Institute Bulletin.)

The results are given of a series of acclimatisation, selection and hybridisation experiments, carried out from 1903 to 1915 at the Agricultural Station of Sitka, in order to obtain types of apple, plum and

cherry trees capable of growing and bearing fruit in the coastal regions of south-east Alaska.

The details of the experiments are given in the article in the Institute Bulletin. The article concludes as follows:

(1) *Plum trees*, results almost completely negative; the fruit and wood ripen in exceptional cases only; (2) *Cherry trees*, certain cultivated varieties of sour cherry may, without any morphological change, develop in the south-west of Alaska, limiting the duration of the 3rd sub-period to a minimum of one month, in spite of the damp and coolness of the coastal districts; (3) *Apple trees*, none of the cultivated varieties of *Pyrus malus* can be successfully imported, hybrids obtained from crosses with crab-apples give no regular annual crop, and only bear fruit every two years or more rarely. Nevertheless the wild Alaskan *P. rivularis* may be crossed with *P. Malus*, and it is probable, that, by a series of such crosses, the small fruit of the wild apple might be improved without decreasing the resistance which allows the tree to flower and bear fruit regularly each year. Alaska can certainly never become a fruit-producing country, but this in no way diminishes the great practical and scientific importance of these investigations, the results of which may be profitably applied in the high mountains and vast northern regions of America, Asia and Europe.

639—**The Germination and Purity of Seeds in Montana**—ATKINSON, A. WHITLOCK, B. W. and JAHNKE, E. W. *Universitiy of Montana, Agricultural Experiment Station, Bulletin No. 113, Third Annual Report of the State Grain Laboratory of Montana*, pp. 79-100. Bozeman, Montana, December, 1916. (2 pp. in Institute Bulletin.)

The work of the Montana State Grain Laboratory during the year 1915-1916 consisted of:—(1) Purity and germination tests of 5,035 samples received; (2) a study of the seed value of frosted wheat; (3) a continuation of the study, begun in 1915, of hard seeds in clover samples; (4) a study of the germination of seeds at different periods after harvesting; (5) co-operation with the Association of Official Seed Analysts of America in studies on the standardization of grain laboratory methods; (6) a continuation of milling and baking studies of Montana wheat.

Some details of the work are given in the article in the Institute Bulletin.

640 — **Study on Two Spring Wheats: "Aurora" and "Blé des Allies".** — PIEDALLU, A., in the *Comptes rendus des Séances de l'Academie d'Agriculture de France*, Vol. IV, No. 11, pp. 369-372. Paris, March 20, 1918.

641—**Marquis Wheat.**—I. CARLETON R. B. and ALLEN, C. J., in *Farmers' Bulletin* 732, pp. 7+2 Fig. Washington, May 29, 1916.—II. SCHRIBAUX, in *Comptes rendus des Séances de l'Academie d'Agriculture de France*, Vol. IV, No. 10, pp. 351-354. Paris, March 13, 1918.

1.—Marquis wheat is a hybrid produced by Dr. Wm. SAUNDERS and Dr. C. E. SAUNDERS at the central experimental farm of Ottawa, Canada. It is one of the progeny of a cross made about 1892 between an Indian wheat, Hard Red Calcutta, as the female parent, and Canadian Red Fife. The different forms obtained from this cross were separated in 1903 at Ottawa, and one of them, selected between 1905 and 1907, was called Marquis. On account of its good milling qualities, this wheat was sent to Manitoba in 1906 to undergo cultivation tests. Its earliness enabled it to resist the rust that so ravaged that province in 1907. Soon it became one of the chief varieties grown in Manitoba and Saskatchewan. The yields obtained from this wheat at the agricultural experiment stations of these provinces for the 8 years 1907 to 1914 were from 13·5 to 38% higher than those obtained from Red Fife.

Marquis wheat is a beardless spring wheat with hard straw and chaff and a red, hard grain. It has the appearance of the wheats belonging to the Fife group of the Northern Great Plains States, and is therefore classified in that group. It is an early variety ripening 98 to 135 days after sowing, according to the district and year; its average growing period in the northern Great Plains is 115 days, so that it is 3 or 4 days earlier than the other Fife varieties.

Thanks to this earliness it is able to a certain extent to resist drought in dry years, rust in wet years, and early frosts which, in this northern district, sometimes overtake wheat at the period of ripening. These characters make it a very valuable wheat for Canada. As the season favourable to growth increases as one goes further south in the United States earliness becomes of less advantage.

Experiments with Marquis wheat have been carried out at the Experiment Stations of 13 states, from Iowa to Minnesota in the east to Oregon and California in the west. In this vast stretch of land the adaptation and value of the new variety vary with the local conditions. This part of the United States may be separated into four divisions according to the chief conditions of the districts; (1) the northern Prairie or sub-humid zone. (2) the northern Great Plains or semi-arid zone; (3) the western Basin and the Coast or arid zones, (4) the irrigated districts of the northern Rocky Mountain region and great Basin zone.

A.—VALUE IN THE SUB-HUMID ZONE.—Wherever possible winter wheat should be grown. Where spring wheat can be grown the Marquis variety may be recommended. The varieties of Fife, Bluestem, and Preston

grown should not be hastily discarded; the Marquis should be compared with these spring wheats and the best one chosen.

B.—VALUE IN THE SEMI-ARID ZONE.—(1) The winter varieties are best wherever they can be grown in the north of the Great Plains districts; (2) durum wheats are better than any common spring wheats in this zone; (3) Marquis is better than any other variety of common spring wheat in some parts of this zone and equal to any throughout the district. Where spring wheat is grown and durum is not used Marquis is a safe variety to cultivate.

C.—VALUE IN THE ARID ZONES.—The dry lands of the States west of the Rocky Mountains are included in the arid zones. Marquis wheat is not to be recommended for this district.

D.—VALUE IN THE IRRIGATED ZONES.—Marquis wheat has not yet been largely grown in the irrigated valleys of the western States. According to the information available it has given good results in western South Dakota and in Montana. In Idaho and Nevada the soft white spring wheats, such a Dicklow, Defiance, Palouse, Bluestem and Little Club all outyielded Marquis under irrigation.

MILLING VALUE.—Marquis is a first class wheat for flour making, being at least equal to Fife and Bluestem in this respect.

II.—The results obtained with Manitoba wheat in France and North Africa have exceeded all expectations; it has proved to be a spring wheat suitable to all the districts of France, and in the south of this country, in Algeria and Morocco it seems capable of replacing winter wheat, Marquis wheat appears to have all the good qualities of this wheat without its defects.

Marquis wheat was studied by the author in the Paris district, at Grignon, and by M. SEBASTIAN in the south of France, in the Bouches-du-Rhone. The results confirmed those of M. DE VILMORIN.—Marquis wheat proved earlier and more productive than Manitoba wheat. In M. SEBASTIAN'S field it developed in 107 days, ripened 8 days before Manitoba and 12 days before Red Fife (the chief variety of the mixture of wheats forming Manitoba). It yielded 0·030 lb. per square foot, whereas the two other varieties barley yielded 0·024 lb. per square foot.

642—**The Origin, Characteristics, and Quality of Humpback Wheat.**—THOMAS, LEVI M., in *U.S. Department of Agriculture, Bulletin* No. 478, 4 pp. Washington, D.C., December 30, 1916.

Humpback wheat is a bearded spring wheat characterized by a velvet chaff. It is being grown in increasing extent in Minnesota and to a limited extent in the Dakotas. This wheat has found favour with the producers because of the large yields claimed for it, but it is generally discriminated against by the grain trade because of its alleged inferior milling qualities.

Details of its origin, its milling and baking qualities are given in the article in the Institute Bulletin.

645—**The Nature of the Soil and Manuring as Factors Determining the Tendency of Beets to Bolt (Set Seed) the First Year.**—MUNERATI, O. and ZAPPAROLI, T. V., in *Le Stazioni sperimentali agrarie italiane*, Vol. LI, Pt. 1–2, pp. 24–40 Modena, 1918 (*Authors' summary*).

The observations and researches of various experimenters (PRASKOWETZ, HERZOG, HOLRRUNG, DEUTSCH, MONTEMARTINI) had already shown that the tendency of the beet to become annual is favoured by special external conditions, particularly by heavy applications of manures, especially organic ones, but no information was available derived from careful and systematic work. At the R. Statione Sperimentale di Bieticoltura (Royal Beet-growing Station) the authors, after some preliminary work carried out between 1912-1914 (which shows that the phenomenon of "bolting" is certainly favoured by external conditions which place the plants in a condition to benefit from a copious supply of food material), started more rigorous and far-reaching experiments in 1916, both in the field and in boxes (DEHERAIN type), by varying the kind of soil and using, as well as various fertilisers, exaggerated quantities of farmyard manure, in order to reproduce the case, fairly common in practice, of badly spread farmyard manure or of heaps washed for a long period by the rain. The following results were shown:—

(1) It is clearly shown that the nature of the soil and manuring influences the bolting of beets

(2) The soil has an influence all the more as its fertility and richness in organic matter are greater.

(3) The manuring, whether chemical or chemical plus organic, caused a considerable increase in the percentage of annual plants.

(4) With the same seed sown at the same time, the extremes in the number of plants that bolted varied from 1–2% in sandy, unmanured soil, to 55% in fertile, heavily-manured soil.

(5) It is impossible to say whether the increase in soil temperature caused by a heavy dressing of farmyard manure, independently of the food material it contains, has any influence; in any case, the number of plants that set seed was considerable even in those plots and boxes that had only received a dressing of mineral manure.

(6) It cannot be stated whether the organic, chemical, or mixed manuring causes an increase in the number of annual plants on account of the finer growth of the plants in the beginning, as the same tendency was shown even by weakly plants.

(7) These observations confirm the necessity of considering *Beta vulgaris* as a facultative biennial and annual form (DE VRIES). It appears inexact to consider the

setting of seed by the beet during the first year as a phenomenon of atavism.

649—**The Common Honey Bee as an Agent in Plum Pollination.**—HENDRICKSON, A.H. in the *College of Agriculture, Agricultural Experiment Station, University of California Bulletin* No. 274, pp. 127-232. Berkeley, December, 1916.

The experiments described, carried out in the Santa Clara Valley, form part of a series undertaken to determine why, under certain conditions, some plums bear abundant crops and under other conditions bear light crops or none at all.

The results of the experiments show the honey bee to be one of the most important factors in carrying pollen from one tree to another. The most satisfactory method of introducing bees into orchards has not yet been decided, but it seems as if the best results would be obtained by placing about one hive to the acre during the blossoming period, after which the hives could be removed.

LIVE STOCK AND BREEDING

653—**Studies in Forage Poisoning (1).**—GRAHAM, R.; BRUECKNER, A. L. AND PONTIUS, R. L. I.—A Preliminary Report on an Anaerobic Bacillus of Etiologic Significance. *University of Kentucky, Agricultural Experiment Station, Bulletin No.* 207, pp. 49-113. II.—An Anaerobic Organism Isolated from Ensilage of Etiologic Significance. *Ibid., Bulletin No.* 208, pp. 117-133, Lexington, Ky., June and July, 1917. (2 pp. in Institute Bulletin).

I.—Forage poisoning has long been known in the United States, where it has caused serious loss in cattle, but more particularly in horses and mules. Previous experiments have already proved that *B. botulinus*, which causes botulism or meat poisoning in man, is pathogenic to horses and donkeys, producing symptoms closely resembling those of forage poisoning. The authors were able to confirm these results by experiments with horses and mules. The whole series of experiments described in the article in the Institute Bulletin seems to prove that *B. botulinus*, which is known to be capable of developing in forage, is the pathogenic agent in forage poisoning.

654—**The Toxic Action of *Thlaspi alliaceum* and the Active Principles of Some Poisonous or Suspected Cruciferae.**—BEGUINOT, AUGUSTO, in *Atti dell' Accademia Veneto-Trentino-Istriano*, Vol. X, pp. 99-110. Padua, 1917.

655—**Researches on the Malady "Trembles" or "Milk Sickness," Caused by *Eupatorium ageratoides* in North Carolina, U. S. A.**—CURTIS, R. S. and WOLF, F. A., in the *Journal of Agricultural Research*, Vol. IX, No. 11, pp. 397-404. Washington, June 1, 1917.—WOLF, F. A. CURTIS R. S., KAUPP, B. F., in the *Journal of the American Veterinary Medical Association*, Vol. LII, New Series, Vol. V, No. 7, pp. 820-827. Ithaca, N.Y., March, 1918 (1 page in Institute Bulletin).

656—**Investigations on the Etiology and Control of Infectious Abortion in Mares, in Kentucky, U. S. A.**—GOOD, E. S., and SMITH, W. V., in *Kentucky Agricultural Experiment Station, University of Kentucky, Bulletin* No. 204, pp. 337-395 + 18 Tables, Bibliography of 29 works, + 13 Pl. Lexington, 1916. (3 pp. in Institute Bulletin).

(1) See also the Agricultural Gazette, May 1918, page 536, No. 1032.

657—**The Amino-Acid Minimum for Maintenance and Growth, as Exemplified by Further Experiments with Lysine and Tryptophane.**—OSBORNE, THOMAS B. and MENDEL, LAFAYETTE B. with the Cooperation of FERRY, EDNA L. and WAKEMAN, ALFRED J., in *The Journal of Biological Chemistry*, Vol. XXV, No. 1, pp. 1-12. Baltimore, Md., May, 1916

658—**The Effect of the Amino-Acid Content of the Diet on the Growth of Chickens.**—OSBORNE, THOMAS, B. and MENDEL, LAFAYETTE B., in The Journal of Biological Chemistry, Vol. XXVI, No. 2, pp. 293-300. Baltimore, Md., September, 1916. (1 page in Institute Bulletin).

659—**Studies on the Nutritive Deficiencies of Wheat and Grain Mixtures and the Pathological Conditions produced in Swine by their Use.**—HART, E. B., MILLER, W. S. and MCCOLLUM E. V., in *The Journal of Biological Chemistry*, Vol. XXV, No. 2, pp. 239-259. 9 Diagr. Baltimore, Md., June, 1916.

In earlier studies on the influence of restricted natural feeds on growth and reproduction it was observed that a ration from the wheat plant—wheat grain plus wheat straw—was wholly inadequate with heifers for reproduction and in some instances for continued growth. With swine, confined to the wheat grain and a suitable salt mixture, growth soon ceased and the animals passed into a poor condition, while a maize and salt mixture ration was at least sufficient for slow growth and continued well-being. Similar results are on record with rats, and only when a liberal supply of casein and fat-soluble *A* was added to a wheat grain and salt mixture was growth continuous and, in the case of rats, reproduction possible.

In earlier papers the authors have expressed the view of the possibility of inherent toxicity in the wheat kernel, a view now made probable by the fact that the wheat embryo yields by ether extraction an oil of distinct toxicity and a residue far more innocuous than the embryo itself. That this embryo carries a considerable quantity of a toxic substance is further shown by the fact that, on increasing the mass of embryo in the rations of herbivora, earlier abortions are produced than when the ration carries the whole wheat grain only. When the diet of swine consisted of whole wheat gluten plus a suitable salt mixture the individual soon failed to grow and passed into a pathological condition. Loss of weight, rough coat, emaciation, lack of muscle co-ordination, laboured breathing, and even blindness manifested themselves. Experiments with rats showed that with abundance of better proteins from milk powder or casein, a more efficient salt mixture and the addition of fat-soluble *A*, and with whole wheat constituting approximately 65 per cent of the ration, the depressing action of this toxicity could be overcome.

With swine receiving similar additions to the wheat grain, but not in the same quantitative order, growth was normal but reproduction failed. It is important in this connection to call attention to the fact that when the additions to wheat were only salts and butter fat but without casein, the curve of growth was improved, but ultimately these animals failed with symptoms similar to those shown on the wheat, salt mixture diet. It became evident as this work with swine progressed that these pathological conditions manifested by swine are, as far the histological picture of the spinal cord is concerned, analogous to, if not identical with, the pathological condition recorded for polyneuritis in fowls, but here induced by an inherent toxicity and not by a deficiency. Therefore malnutrition, histologically characterized by nerve degeneration, may result from the absence of certain factors in the diet as in the case of beri-beri. A similar condition may likewise arise from the presence of toxic materials in apparently normal food products, and in the presence of all known factors essential for continued growth and well-being.

With a large mass of wheat in the ration of swine toxicity will follow even in presence of all the recognized factors for growth. Only in the presence of very liberal quantities of all these factors can the effect of the toxicity be overcome. No one important factor for growth, such as better proteins, salts, or fat-soluble *A*, appears able to act as a complete corrective for this toxicity.

It also appears possible to produce similar pathological conditions in swine in the absence of all known toxic material and in the presence of a fair quality of protein, a plentiful supply of fat-soluble *A*, and water-soluble *B*, but a poor salt mixture; namely, that natural to the grains used.

Excellent supplementary materials to the grains even in the presence of the toxicity of the wheat products, have been found in alfalfa and commercial meat scraps. Probably milk, if used in sufficient quantity. would also serve this purpose admirably, The factors introduced by alfalfa are undoubtedly an abundance of fat-soluble *A* and a better salt mixture. Its richness in calcium may be important. With commercial meat scraps the factors for improvement are undoubtedly better proteins, more fat-soluble *A*, and a liberal supply of calcium phosphate resident in the bone material it carries.

660—**The Stability of the Growth Promoting Substance in Butter-Fat.** — OSBORNE, THOMAS B. and MENDEL, LAFAYETTE B. with the co-operation of FERRY, EDNA L. and WAKEMAM, ALFRED J., in *The Journal of Biological Chemistry*, Vol. XXIV, No. 1, pp. 37-39. Baltimore, Md., 1916.

662—**The Nature of the Dietary Deficiencies of the Wheat Embryo.**—MCCOLLUM, E. V., SIMMONDS, NINA and PITZ, WALTER, in *The Journal of Biological Chemistry*, Vol. XXV, No. 1, pp. 105-131, Baltimore, Md., May, 1916.

The experiments reported in this paper reveal the fact that the wheat embryo contains qualitatively all the factors essential for the promotion of growth and well-being in an animal, but these are not so proportioned that it can serve as a satisfactory diet without several modifications.

The mineral content must be modified in certain respects before growth can proceed at all.

The character of the proteins is excellent; no other proteins from plant sources which the authors have studied are superior to them. Rations containing but 10 per cent of these proteins are wholly adequate for growth at the maximum rate.

Both the fat-soluble *A* and the water-soluble *B* are present; the first, in moderate concentration; the second, in very high concentration as measured by the needs of the growing animal. Two per cent of wheat embryo supplies enough of the water soluble *B* to promote growth at the normal rate for several months.

There is contained in the wheat germ a substance which is distinctly toxic to animals. This is in great measure removed by extraction with ether, and is found in the fat fraction. The writers have not yet determined whether the toxicity is due to peculiarities in the chemical nature of the fats themselves or to something which is associated with the fats.

663—Studies of Cotton-seed as Food.—I. WELLS, C. A. and EWING, P. W., Cotton-seed Meal as Incomplete Food, in *The Journal of Biological Chemistry*, Vol. XXVII, No. 2, pp. 15-25, Bibliography of 8 publications, Baltimore, Md., 1916.—II. OSBORNE, THOMAS B. and MENDEL, LAFAYETTE B., The Use of Cotton-seed as Food, *Ibid.*, Vol. XXIX, No. 2, pp. 289-317, Baltimore, Md., March, 1917.

I.—The results of former experiments (WELLS and EWING, Acidosis and Cotton-seed Meal Injury, *Georgia Agricultural Experiment Station*, Bulletin 119, 1916) had indicated that in feeding cotton-seed meal to pigs to ascertain the injury said to result from this it is necessary to balance the ration, not so much as to the nutritive ratio, determined by the amounts of fats, carbohydrates, and protein present, but rather as to the so-called accessory food factors. The present paper relates the writers' further experiments bearing upon this phase of the question. They were carried out on Duroc Jersey pigs; the conclusions arrived at are as follows:—

Cotton-seed meal is an incomplete food. This is true even when it is fed with sugar and starch to a wide nutritive ratio.

Pigs upon an absolute maintenance diet ate in addition only small quantities of cotton-seed meal and were not greatly injured by it.

So called cotton-seed meal injury is due in large part to inadequate diets.

II.—Cotton-seed meal is one of the most valuable feedstuffs at the command of the American stockman. After the animal has digested it, the value of the residue as fertilizer is about three-fourths the original value of the meal. The United States uses only part of the cotton-seed meal which it produces and one of the reasons which prevent a larger domestic consumption of this by-product of the cotton industry is the danger that sickness and death may follow its use. Cattle fed for more than 90 to 120 days on a heavy cotton-seed meal ration (6 pounds or more per head daily) become lame, and their eyes discharge freely, blindness often resulting. Deaths may occur, especially in young animals. Pigs are peculiarly susceptible to the effects of cotton-seed meal, possibly because they are usually fed a larger quantity of the meal in proportion to their body weight. In feeding pigs, symptoms of sickness may appear at any time after 3 weeks of feeding, and deaths frequently occur with little warning. Various systems of feeding cotton-seed meal to pigs have been devised. Some of them appear to minimize its danger somewhat, but none of them prevent it entirely. This product, therefore, can not be regarded as a safe feed for pigs in the combinations in which it has heretofore usually been fed. (ROMMEL, G. M., and VEDDER, E. B., *Journal of Agricultural Research*, Vol. V, p. 489, 1915.)

Referring to the experiments in feeding cotton-seed meal which have been made by various agricultural station workers, WELLS, C. A., and EWING, P. V. (*Georgia Agricultural Experiment Station, Bull.* 119, 1916) state that the results of such experiments do not entirely agree and few absolute conclusions can be drawn from them. They indicate, however, that swine (particularly young pigs), calves, sheep, horses, cows, steers, dogs, cats, guinea pigs, rabbits, fish, poultry, and other animals may be injured by eating cotton-seed meal. Some of the smaller animals, such as pigs and calves, seem to be more susceptible to its injury than cows, steers, and similar animals. This, however, may have been due to their youth, or, more probably, to a consumption of larger quantities of meal in proportion to their live weight. When the meal was fed in connection with pasturage, or when it had been steamed, boiled or fermented, or when fed with mineral matter, particularly iron compounds, it often seemed to exert no apparent injury to pigs even when fed in rather large quantities. The injury resulting from the feeding of cotton-seed meal to stock has been attributed to: (*a*) the oil in the meal; (*b*) its crude fibre; (*c*) excess of nitrogen and perverted metabolism; (*d*) the action of bacteria and moulds; (*e*) presence of betain, cholin, or other alkaloids, and to gossypol; (*f*) to injurious phosphorous compounds; (*g*) to a protein group containing loosely bound sulphur, which interferes with normal iron metabolism; (*g*) to worms and certain other causes of minor importance.

Cotton-seed products for feeding purposes are available in several commercial forms. Cotton-seed *kernels* are obtained when the whole cotton-seed is decorticated and freed from most of the hulls. Cotton-seed *meal* is the term applied to the ground cotton-seed cake from which most of the oil has been pressed. Cotton-seed *flour* is prepared by finely grinding and sifting the meal, whereby the lint, etc., are removed more completely than from cotton-seed meal.

Two processes are commonly employed in preparing cotton-seed meal. In the first process the seeds are decorticated, ground, and then steamed for about ¾ of an hour. The hot mass is freed from most of the oil by means of hydraulic presses and the resulting press cake is then ground to a meal. In the second process the oil is expressed from the seeds by means of Anderson expellers whereby the meal becomes heated. The residue is then ground as in the first process. The second procedure is frequently called the cold process. Nearly all of the mills in the United States use the method employing live steam.

MARCHLEWSKI, L., (*Journal fur praktische Chemie*, Vol. LX, p. 84, 1899) isolated from the "foots" from cotton-seed oil a substance which he named gossypol. WITHERS, W. A. and CARRUTH, F. E. (*Journal of Agricultural Research*, 1915, Vol. 261), have isolated this

from cotton-seed *kernels*, by extraction with fat solvents and they report it to be highly toxic to rabbits, guinea pigs, rats, and pigs. They state that the ether-extracted *kernels* are rendered non-toxic by removal of gossypol. According to WITHERS and CARRUTH, "cotton-seed meal and flour were found toxic to rabbits but the flour produced no ill effects on rats". The non-toxicity of flour to rats is explained by the variation in alteration or removal of gossypol in the manufacture of the *meal* from the *kernels*.

To ascertain whether the cotton-seed proteins are, like some proteins from maize, notably deficient for the purposes of nutrition the authors have conducted feeding experiments on white rats for which cotton-seed proteins furnished practically all of the food nitrogen and for which the other essential dietary components were supplied by adding to the products to be tested a suitable mixture of protein-free milk, butter fat, and starch which, with the addition of adequate protein, is sufficient for perfect growth. In this way they have found that satisfactory growth can be made by rats when either cotton-seed *globulin*, or the total cotton-seed protein precipitated from alkali extracts of cotton-seed meal is employed without significant amounts of other protein in the mixture.

The facts now available are briefly summarized below.

Cotton-seed *kernels* are unsatisfactory for nutrition Cotton-seed *meal* and *flour* are valuable foods for growing rats, both when used as the sole source of protein in the food, or when used in smaller quantity to supplement other less efficient protein concentrates. The excellent "quality" of the cotton-seed proteins as a whole is attested by the satisfactory growth made on diets furnishing the equivalent of only 9 per cent of protein (N x 5·4); even with 6 per cent of the protein considerable growth ensued. Cotton-seed *flour* gave good results when used as a supplement to such decidedly inferior protein concentrates as "corn gluten", distillers' grains, and "vegetable albumin flour".

The injurious substance in the *kernels* can be removed by extraction with ether and, according to WITHERS and CARRUTH, by extraction with carbon bisulphide, chloroform, benzene, or alcohol, but not with petroleum ether or gasolene. The ether soluble material is deleterious, either because it contains some toxic ingredient or because it renders the food containing it so unpalatable that the animals refuse to eat it. This agrees with the results obtained by WITHERS and CARRUTH and by MCCOLLUM, SIMMONDS and PITZ.

Foods containing cotton-seed oil prepared by pressing the kernels in the cold, or furnished as the crude unbleached commercial oil prepared by heating the kernels before pressing them, are eaten without detriment by rats.

By treatment with steam under suitable conditions the *kernels* lose their deleterious effect on rats. The variations in the results of feeding different samples of cotton-seed meal, which have been reported, may be due to differences in the mode of heating which the products have experienced in their preparation.

As regards the question as to whether so called "cotton-seed injury" in the feeding of domestic animals can be classed with the deficiency deseases, it is quite possible that, as ROMMEL and VEDDER maintain, food mixtures lacking some of the now recognized essential ingredients of an adequate diet have been employed in the past. The authors' experience with rats successfully grown on cotton-seed rations excludes the probability that there is ordinarily any lack of the water-soluble vitamine. Whether the quota of inorganic salts furnished in agricultural practice is always sufficient the writers are unable to answer. It is noteworthy, however, that they have induced young rats to double their weight at a normal rate of growth on a food mixture containing nothing except cotton-seed *meal*, starch, and lard. The deleterious effects of unheated cotton-seed *kernels* cannot be denied. Whether the reputed detrimental effect after feeding some of the commercial cotton-seed meals is associated with a failure to destroy a deleterious constituent or is attributable to unsuitable methods of feeding in some cases is still debatable.

664—**Test of Three Protein Concentrates and Two Leguminous Roughages in Milk Production.**—HUNZIKER, O. F. and CALDWELL L. R. E. in the *Purdue University Agricultural Experiment Station Bulletin* No. 203, pp. 1-20 Lafayette, Indiana, August, 1917.

Results of an experiment designed to give directions to feeders of dairy cows, regarding the type of protein-carrying concentrates and leguminous roughages best adapted for maximum and economical milk yield.

The three protein-carrying concentrates under test were cottonseed meal, linseed meal and gluten feed, and the hays fed were alfalfa hay and soybean hay; ground maize and maize silage were included in all rations.

The experiment covered a period of 180 days and was divided into six periods of 30 days each, 15 cows being used, divided into 3 lots of 5 cows each.

The rations used in the experiment are given in the following schedule:

1. Ground maize, cottonseed meal, alfalfa hay and maize silage.
2. Ground maize, cottonseed meal, soybean hay and maize silage.
3. Ground maize, linseed meal, alfalfa hay and maize silage.
4. Ground maize, linseed meal, soybean hay and maize silage.
5. Ground maize, gluten feed, alfalfa hay and maize silage.
6. Ground maize, gluten feed, soybean hay and maize silage.

The cows used were: 13 pure bred Jerseys and 2 pure bred Ayrshires fresh approximately 75 days before they were placed in the experiment.

The average daily feeds consumed during the entire experiment are shown in Table I.

TABLE I.—*Showing Average Daily Feeds consumed—Entire Experiment.*

Ration	Ground maize	Cottonseed meal	Linseed meal	Gluten feed	Alfalfa hay	Soybean hay	Maize silage
	lb.	lb.	lb.	lb.	lb.	lb.	lb.
1	7·88	0·49	—	—	8·52	—	24·50
2	7·44	0·78	—	—	—	7·43	25·07
3	7·66	—	0·55	—	8·54	—	25·00
4	7·40	—	1·06	—	—	7·65	24·81
5	7·24	—	—	0·90	8·27	—	25·10
6	6·02	—	—	1·61	—	7·62	25·24

The average daily production of milk for each of the 6 periods of the experment was not especially high, averaging 19.64 lb. for all cows when receiving alfalfa hay and 18.41 lb. for all cows when receiving soybean hay. The low daily milk production may be accredited to the fact that the cows were mostly pure-bred Jerseys, having a rather high fat content.

Table II shows the amount of dry matter required to produce a unit of product.

TABLE II.—*Showing the Amount of Dry Matter Required to Produce a Unit of Product.*

Ration	Average daily milk produced	Average daily butter fat produced	Average daily dry matter consumed	Dry matter required per 100 lb. milk	Dry matter required per pound butter fat
	lb.	lb.	lb.	lb.	lb.
1	20·18	0·9224	22·899	113·42	24·76
2	19·93	0·9346	22·901	121·99	25·88
3	19·85	0·9064	22·605	114·92	24·47
4	17·31	0·8161	21·120	113·75	24·35
5	18·89	0·8822	21·483	113·85	24·94
6	17·98	0·8246	20·817	115·74	25·25

The cost of the product, considering feed cost alone, is given in Table III together with the value of the product, calculating all butter fat at 30 cents per pound and the skim milk at 25 cents per hundred pounds.

TABLE III.—*Showing Cost of Product.*

Ration	Average daily cost of feed	Average daily value of product	Cost per 100 pound milk produced	Cost per pound butter fat produced	Production per $1 worth of feed
	$	$	$	$	$
1	0·1925	0·32	0·98	0·216	1·605
2	0·1901	0·28	1·10	0·234	1·464
3	0·1997	0·32	1·00	0·213	1·602
4	0·1990	0·30	1·05	0·226	1·523
5	0·1968	0·31	0·99	0·218	1·589
6	0·1895	0·28	1·05	0·229	1·478

The average daily cost apparently was not influenced by the type of protein-carrying concentrates used. The variation in cost was doubtless influenced chiefly by the roughage fed. The type of roughage used produced an average variation in the total value of the product from $9.52 when alfalfa hay was fed to $8.67 when soybean hay was fed, or about 4 cents per day.

The conclusions drawn as a result of the discussion of the data presented in the foregoing tables may be summarized as follows:—

A ration used in milk production, which contains ground maize, maize silage and a leguminous hay, requires a very limited amount of protein-carrying concentrates in order that it may be properly balanced. The three protein-carrying concentrates used in the experiment affected the cost of the ration less than any of the four feeds of which the ration was composed.

When fed in connection with alfalfa hay, cottonseed meal was the most economical source of protein, gluten feed ranking second

and linseed meal standing third, using prices as shown in the note (1).

Alfalfa hay was 12% more economical as a milk producing roughage than soybean hay, both selling at the same price per ton, and without taking into account the greater quantity of soybean hay refused, due to its unpalatable character. The cost of milk was affected to the greatest degree by varying the price of maize. Hay ranked second, maize silage third and the protein-carrying concentrates fourth. The hay and maize exert practically the same influence upon the cost of milk.

The use of soybean hay caused an increase in body weight and a decrease in daily milk and butter fat production.

Properly balanced rations were, approximately, equally efficient in the production of milk and butter fat per unit consumption of dry matter.

666—**The Role of Water in a Dairy Cow's Ration; Investigations made in U. S. A.**—LARSEN, C., HUNGERFORD, E. H. and BAILEY, D. E., in *South Dakota State College of Agriculture and Mechanic Arts, Agricultural Experiment Station, Bulletin* No. 175, pp. 648-691. Huron, April, 1917.

Some dairymen claim that if the amount of drinking water given to a cow is limited, the body temperature is raised and the composition of the milk modified, the percentage of fat especially being increased. In order to verify this assertion the authors undertook a series of experiments (2) on the effect of watering cows at different intervals with varying quantities of water on the following factors:—amount of food consumed, digestibility of food, quantity and composition of faeces and urine, quantity and composition of milk, composition and quality of butter fat, body temperature and physical condition of the cow. Data on the mineral metabolism of the cow were also obtained. The experiment, carried out on four animals, was divided into three periods, separated by a period in which the ration was normal. In the first period the animals were watered every 24 hours (an average of 61.65 lb. per head), in the second period every 60 hours (an average of 51.20 lb. per head), in the third period with half the normal ration of water (40.00 lb. per head).

A series of tables gives:—Composition of feed and water; weight of animals, amount of food consumed and daily milk yield, coefficients of digestibility of the rations, amount of water drunk and food digested daily, daily amount and composition of the faeces, relation of amount of water to dry matter consumed, average daily amounts and composition of the urine and the milk, analysis of butter fat, average temperature of the shed and cows, effect of room temperature on the total amount and percentage of fat in the milk; food constituents digested per 1,000 lb. of live weight daily, daily energy requirements per 1,000 lb. live weight, distribution of water in the cow's body, average daily rations and balance of food nutrients in the three periods of the experiment.

RESULTS.—1) *Food consumed.*—When the cows are watered once in 24 hours instead of two or three times there is a slight decrease in the total amount of food taken and in the quantity of milk produced, but this second decrease is not proportionate to the first. During the 30 days of the experiment the animals lost an average of 11 lb. per head. This loss was much greater during the second test (17 lb.) and the third (95 lb. per head on an average).

During the periods in which the cows received a full ration of water at long intervals, the expected decrease in milk production was not obtained. If the slight decrease in the amount of food consumed and the loss in weight be considered it must be concluded that cows can utilise the water stored in their systems for milk production and other functions. When the cows only received half the normal quantity of water (test 3) there was a marked decrease in the amount of hay consumed, milk produced and in body weight.

2) *Digestion of rations.*—The coefficient of digestibility was increased in each of the tests in which the intervals between watering were lengthened and in those in which the cows only received half the normal ration of water. This increase in the coefficient of digestibility is particularly marked in the case of crude fibre. Cows watered once in 24 hours digested 55% of crude fibre as compared with 54% digested by the control animals watered three times a day; cows watered once in 60 hours digested 71.07%

(1) Prices of feeds used were as follows: Cottonseed meal $30 per ton; linseed meal $36 per ton; gluten feed $28.50 per ton; ground maize $0.60 per bushel; alfalfa hay $15 per ton; soybean hay $15 per ton; maize silage $3.50 per ton.

(2) The effect of varying quantities of water in the ration or the composition of milk has been studied by many authors. TURNER, SHAW, MORTON and WRIGHT compared experimentally:—1) a full allowance with a limited allowance of water; 2) a heavy ration of turnips with a dry roughage ration; 3) wet beet pulp with dry beet pulp; 4) green clover with cured hay. They proved that, though individual cows produced milk with an abnormal fat content, the different rations did not as a rule influence either the quantity or the composition of the milk.

GILCHRIST (Variations in the Composition of Milk and their Probable Causes, *Durham County Council Education Committee Reports, Dairy Investigations, Offerton Hall*, pp.7-27: 1909) found little or no difference in the quantity and quality of milk produced by cows either on pasture or a heavy mangel ration and that produced by cows on a ration of hay and grain.

ARMSBY found that cows drink more when fed a heavy protein ration than when fed a low protein ration, and that cows fed dry roughage drink about 40 lb. more water per day than those fed green hay. (*Authors.*)

See also the summary of the results obtained by various workers in experiments on the influence of the composition of the ration on milk secretion, read by KELLNER at the International Dairy Congress held at Budapest, June, 1909, in the *Journal of the Board of Agriculture*, Vol. XVI, No. 8, pp. 649-654, London, November, 1909; the author proves the influence to be very slight. See also *B.* 1912, Nos. 150 and 682; 1916, No. 885; 1917, No. 347; 1918, No. 63.

of fibre as against 55.7% by the control animals, and those receiving half a ration of water digested about 2% more than the control animals.

The increase in the digestibility of the nitrogen free extract and of the protein is not regular and is less marked.

As regards the actual amount of crude fibre digested, the cows in test 1 digested about 0.09 lb. per head daily, and those in test 2 only 1.26 lb. more than the control animals, those of test 3 digested 1.125 lb. less than the control animals.

Numerous investigations have led to the general acceptance of the theory that the digestibility of crude fibre depends largely on the active bacteria present in the intestinal tract and the action of the digestive juices. It is probable that an increased amount of water retards bacterial action in digesting crude fibre, and that a decreased amount leaves the digestive juices more concentrated and, therefore, more efficient and makes the chyme firmer and slower in moving through the digestive tract so that it is exposed for a longer period to the action of the secretions in the tract.

These results show that to obtain the most efficient digestion of food it is wise not to water the animals too abundantly at feeding time or immediately before or after a heavy meal.

3) *Effects of the quantity of water ingested on the composition of the excreta.*—The percentage of water in the faeces and the urine varies but little with the different quantities of water ingested; there was almost no difference between the faeces of the control animals and those in tests 1 and 2; in test 3 there was a decrease of about 2%. Frequent watering seems to have no appreciable effect on the composition of the faeces except that lengthening the intervals between drinking slightly reduces the crude fibre. When the cows only received half the normal ration of water there was an increase in the protein, nitrogen-free extract and crude fibre contained in the faeces.

When the cows received an unlimited supply of water three times a day they drank 3.5 lb. for every pound of dry matter consumed, when watered once in 60 hours they drank 2.38 lb. per pound of dry matter, and when receiving half the normal ration of water every 24 hours they drank 1.8 lb. per pound of dry matter.

4) *Effect of the quantity of water ingested on the quantity and composition of the milk.*—In all the tests the composition of the milk and butter fat remained absolutely unchanged. It is for this reason that a cow receiving insufficient water goes dry without there being any modification in the composition of her milk. Frequent watering has little influence on the quantity of milk produced. When the normal water ration was reduced by half the milk yield was reduced a little at the beginning, this reduction increasing as the experiment continued till it was about ¼. There is no doubt that the cows would have gone dry if this ration had been continued.

5) *Effect of water on the body temperature of the cow.*—When the cows were watered every 24 hours the body temperature was lowered by the fraction of one degree Fahrenheit 15 minutes after watering. With intervals of 60 hours the temperature dropped 2°F. The minimum was obtained 1 to 1½ hours after watering (130 lb. of water per head). The temperature of cows receiving half the normal ration of water was 1°F. higher than when they received a normal amount, but there was no increase in the fat content of the milk.

During a special experiment the cows were exposed to room temperatures varying from 51 to 104°F. It was found that the fat content tends to increase with the body temperature, though the increase is but slight; about 4.4% for 69°F. and 5.04% for 104.8°F. Since, however, high temperature slightly reduces milk secretion, the total amount of fat increases in inverse ratio to the percentage, in the case quoted from 11.2 lb. to 10.2 lb. per head daily. In conclusion it may be said that keeping dairy cows in milk in hot sheds, blanketing them and withholding water in order to raise the fat content is very dangerous to their health.

6) *Physical condition of the cows.*—The abnormal conditions brought about by withholding water were nervousness, gauntness and high body temperature. When the animals were watered every 60 hours and when they received half the normal ration of water a larger amount of energy was required to accomplish the body functions.

7) *Chief functions of water in a dairy cow's ration.*—The results of their experiments led the authors to the following conclusions:—A good dairy cow probably requires more water than any other domestic animal. Water dissolves food (for this reason the more food an animal eats, the more drink it requires), distributes it to the different parts of the body and removes the waste products. The authors showed that more than 12% of the total water drunk is eliminated through the skin in winter in the shed, and 27% in August; 56% of the water drunk in eliminated in the faeces and 15% in the urine. On an average, 15% of the water drunk passes into the milk (in good milkers this percentage is higher; in one of the experiment animals, among which there were no choice cows, this percentage was 24%). Water regulates the body temperature; the loss of water through the body was twice as great in August as in January.

667—**The Influence of Parturition on the Composition and Properties of the Milk and Milk Fat of the Cow.**—ECKLES, C. B. and LEROY, S. PALMER, in *The Journal of Biological Chemistry*, Vol. XXVII, No, 2. pp. 313-326. Baltimore, Md., 1916.

669—**Fattening Western Lambs in U. S. A.**— SKINNER, J. H. and KING, F. G., in the *Purdue University Agricultural Experiment Station, Bulletin No.* 192. Vol. XIX, pp. 1-20. Lafayette, September, 1916. (2 pp. in Institute Bulletin).

670—**The Wintering of Bees in Ontario, Canada.** — PETTIT MORLEY in *Ontario Department of Agriculture, Bulletin No.* 256, pp. 24. Toronto, Ontario, October, 1917.

The beekeepers of Ontario lose each year from 10 to 50 % of their colonies through winter and spring losses.

American bee literature is full of theories on the wintering of bees and on the causes of the losses therefrom. Many of these theories have been rejected or ignored. As the result of numerous experiments and a free interchange of ideas, however, successful beekeepers have evolved methods of wintering based on principles which recent scientific research has on the whole proved to be correct.

Beekeepers in Ontario adopt two methods of wintering. Some place their hives in a cellar and attempt to keep the bees inactive by controlling the environmental factors, such as light, temperature, ventilation, etc., till the weather permits the bees to renew their summer activities. Others protect the hives on the summer stands, leaving the bees free to go out and to fly whenever the weather permits them to do so. Both of these methods, if intelligently carried out, give good results.

For outdoor wintering the hives are placed in collapsible wooden boxes the sides of which are joined by cleats. Many beekeepers place one hive in each box, others two and others four per box. In this last case two hives are placed facing west and the two others facing east. Between the box and the hive is a space of 3 inches, and between the roof of the hive and that of the box a space of 8 or 10 inches is left. The box is placed on a solid stand 8 inches high which prevents draughts of air underneath.

The entrance holes are cut in the side of the box so that the bees may go out in suitable weather. The hives are packed for winter as soon as possible after the supers have been removed, and in October the bees are given an abundant supply of maple sugar. The author gives the measurements of the different parts used for constructing wintering boxes, the size of which depends on that of the hives.

Till a few years ago the most common method of wintering in northern climates was that of keeping the hives in a cellar. Most beekeepers in Ontario and the northern States found that their bees wintered better in cellars than out of doors. Since the improvement of the method described above, however, outside wintering is generally preferred even as far north as New Ontario. Nevertheless, many still prefer cellar wintering. The general conditions required for cellar wintering are:—1) total darkness, 2) a uniform temperature between 40° to 45°F. The conditions are obtained most satisfactorily in cellars which are almost entirely underground as they are less subject to changes in outside temperature. The air of the cellar must be kept pure by a suitable system of ventilation, and must be neither too dry nor too damp.

The hives themselves must have good ventilation; this may be obtained by removing the summer covers and placing on the top a layer of felt, a cushion of chaff, etc. The hives are placed one above the other. those in the bottom row resting on a stand at least 1 foot above the cellar floor.

The hives are placed in the cellar before the frosts, in southern Ontario in the last days of November, and earlier in the northern districts.

Judgment must be exercised in the removal of the hives from the cellar, the date depending on the condition of the bees and on the season. The best time for setting them out is the evening before or the morning of a day which promises to be fine and calm, but not too hot (60 to 70°F.) When such a day is expected the doors and windows of the cellar are opened at sunset.

Directions are given for the protection of the hives in spring and for feeding the bees. There should be an ample supply of food to avoid any danger of starvation. Autumn is the best time for feeding bees for the following spring.

FARM ENGINEERING.

678—**British Agricultural Tractors.**— THE *Engineer*, Vol. CXXIV, Nos. 3233, 3234 3235; Vol. CXXV, Nos. 3236, 3237, 3238, 3239, 3240, 3241, 54 Fig. London, December 14, 1917—February 8, 1918. (15 pp. in Institute Bulletin.)

According to the President of the Board of Agriculture, 1,400 tractors had, by October 6, 1917, ploughed 14,500 acres of land for next year's harvest. Three years ago there were probably not 100 tractors in use in the United Kingdom. This progress, though considerable, has not been as rapid as it might have been owing to the objections raised by farmers against mechanical traction chiefly with regard to compressing the soil and the provision of inadequate power. In some recent models the latter defect is obviated by providing a 30 H.P. engine which should suffice for 3-furrow ploughs doing fairly deep work under favorable circumstances. British tractors are usually strongly built, and they are therefore very lasting. In time, standardisation will be probably arrived at in the various types of tractors, but the final type has not yet been decided upon. There are still numerous problems that remain to be solved by British makers, who are at present occupied in

delivering the machines that are required for bringing large areas under cultivation.

British agricultural tractors may be divided into 2 classes, those that are propelled by *a*) steam and *b*) by internal combustion engines. Contrary to the internal combustion engined machines, the steam driven ones follow, save in one or two cases, very closely the design of road locomotives, except they are lighter, the question of weight being of great importance.

A large number of tractors are described and illustrated in the article in the Institute Bulletin, pp. 730-744.

679—**Ploughing with Government Tractors in England.**—*Mark Lane Express Agricultural Journal*, Vol. CXIX, No. 4507, p. 141, and No. 4510, p. 228. London, February 11 and March 4, 1918.

In Herefordshire, 3 "Titan" tractor units ploughed over 520 acres in the last week of January, the division being: Hereford, 170 acres; Leominster, 142 acres, and Ross, 208 acres.

The Ross team's work, which was accomplished with 7 tractors, gave an average of 29⅝ acres per tractor; 9 tractors were used in the Hereford and Leominster units, which makes the work done by the Ross unit all the more creditable; the work done by the Ross tractors varied from 26 to 32 acres each, ploughed in from 53 to 68½ hours.

In Surrey, a Titan tractor ploughed 51 acres in a single week at Redhill. The county average for the week was 12 acres per tractor.

In Lancashire a tractor towing a 3-furrow RANSOME plough did 52¼ acres during the week ended February 23. No special provision was made for record breaking. The ploughing was 8 in. deep and 2·54 gallons of fuel were consumed per acre.

In 5 weeks this tractor has performed the following work (including that described above):—during the week ended January 25, 27½ acres were ploughed, 103 gall. of fuel; from January 25 to February 15, 21 acres were ploughed on an average per week, with an average consumption of 66 gall. of paraffin; the total consumption for the week February 15 to 22 for ploughing 52¼ acres was 133 gallons.

680—**The Use of Coal Gas for Ploughing Tractors.**—*The Implement and Machinery Review*, Vol. XLIII, No. 516, p. 1289. London, April 1, 1918.

As petrol is unobtainable and paraffin is both scarce and costly, it is of interest to note the use of coal gas for ploughing tractors.

Messrs. BARTON BROS., of Beeston, England, make a flexible gas container to be placed above the tractor. This system, already adopted for many commercial and pleasure vehicles, is the most economical as it does not require the gas to be compressed and only gives a slight loss in calorific efficiency. For farm work there is no objection to the use of a container, save that of its voluminous appearance. It is carried on a tray supported by wooden uprights bolted on to the tractor frame.

The containers' capacity is 250 cu. ft., and, it is reported that 500 cu. ft. of gas suffice to plough half an acre of level land.

The system can be employed to advantage by farmers within reasonable distance of a supply station. In England, as the companies usually give special conditions to users of gas for power purposes, the cost of ploughing by this means is very low In the case mentioned in the article the container is mounted over a Whiting-Bull tractor and the gas is brought to the field in a portable holder carried on a trailer and containing sufficient to charge the bag on the tractor three times, or enough to plough about three-quarters of an acre. To the cost of the gas must, therefore, be added the expense of the journeys with trailer between the field and the supply station.

The distance over which the owner can afford to transport the gas will probably be found to be fairly large considering the present price of other fuels.

RURAL ECONOMICS

683—**Organization of Ten Dairy Farms in the Bluegrass Region of Kentucky.**—ARNOLD, J. H., in *U. S. Department of Agriculture Bulletin* No. 548, pp. 1–12. Washington, D.C., May 24, 1917. (5 pp. in Institute Bulletin.)

AGRICULTURAL INDUSTRIES

688—**A Method for the Separation of Protein from Non-Protein Nitrogen in Wheat Flour.**—BLISH, M. J., in *The Journal of Biological Chemistry*, Vol. XXXIII, No. 3, pp. 551-559. Baltimore, 1917. (1 page in Institute Bulletin.)

692—**The Use of *Bacillus Felsineus* in Retting Various Textile Plants.**—CARBONE, D. in the *Bollettino di Studi ed Informazioni del R. Giardino coloniale di Palermo*, Vol. IV, Pt. 1-2, pp. 3-9, Palermo, 1917.

The author has found that *Bacillus felsineus* rets the following textile plants:—nettle; ramie (*Boehmeria nivea*); Spanish broom (*Spartium junceum*); *Agave americana, A. Zapupe, A. sisalana, A. Candelabrum, A. yuccaefolia, A. Rumphii; Furcraea gigantea, F. altissima; Sansevieria cylindrica, S. zeylanica; Yucca gloriosa; Sphaeralcea angustifolia, Grevia oppositifolia, G. orientalis, Sida Avicennae;* mallow; bark of mulberry branches; Jerusalem artichoke tubers.

695—**New Contribution to the Commercial Sterilisation of Milk.**—CORINI, C., in *Rendiconti del Reale Istituto Lombardo di Scienze e Lettere*, Series II, Vol. LI, Pt. 1-2, pp. 135-140 Milan, 1918.

The sterilisation of milk has already passed through two successive phases of technical progress. The first succeeded in preserving the milk from *rapid and violent changes*, the second from *retarded and slow changes*. By his present studies the author proves that if it be possible to say that this latter problem has been satisfactorily solved by means of improvements in technical methods, there remains yet a third, and perhaps final, obstacle to be overcome. This is the *insidious change* of sterilised milk which can be recognised only after the vessel has been opened and by heating This change differs from the others in that it is often very difficult to ascertain the bacterial cause so that mistakes may be made by attributing it to a purely chemical cause.

It is caused by the " acid-rennet producing " bacteria proved by the author to be present in the cow's udder, especially under conditions of inflammation, even when physiological, because the bacteria survive sterilisation owing to protective coverings which form in the udder or during heating. Moreover the milk may leave the udder containing already enough of this " rennet " enzyme to undergo the insidious change in question by the sole effect of heating even if the organisms are largely dead or inactive. Finally this change differs from the others in that preventative measures cannot be adopted against it in the dairy; they must be applied directly in *the shippon and on the dairy cows*. Methods must be used which will inhibit the abnormal development of the bacterial flora of the udder (careful and complete milking, discarding of the first streams of milk, exclusion of all milk left stagnant in the udder or from inflammed udders even under slight temporary physiological conditions, etc.) and *dairy cows should be selected according to the bacterial flora of the udder*, as proposed by the author in a previous paper. If these principles, as has been the case with previous ones, are adopted practically in the industry, the remaining difficulties attending the sterilisation and preservation of either sterilised or condensed milk may be elimated.

696—**The Composition and Market Qualities of Butter when Corn Silage is Fed with Cotton-seed Meal.**—PALMER, L. S and CROCKETT, D. P., in the *Journal of Dairy Science*, Vol. I, No. 3, pp. 235-245. Baltimore, September, 1917.

698—**Wool Studies.—Washing Sheep Before Shearing; Time of Shearing.**—HAMMOND—J. W., in the *Ohio Agricultural Experiment Station Bulletin No. 294*. pp. 309-322. Wooster, Ohio, April, 1917.

This experiment was undertaken for the purpose of securing data on the following points:—(1) The influence of washing sheep on the yield of grease and of scoured wool and on the rate of gain made by the sheep; and (2) the influence of the time of shearing on the yields of grease and scoured wool and on the rate of gain made by the sheep.

Plan of the Experiment.—One hundred lambs, practically pure bred Merinos, born in 1910, were divided into four lots as nearly alike as possible with respect to sex, weight and conformation. The experiment extended over a little more than 2 years, so that during its progress three clips of wool were removed.

The treatment of the lots with respect to washing and time of shearing was as follows —

Lot 1: Washed; shorn about April 12.
Lot 2: Unwashed; shorn about April 12.
Lot 3: Washed; shorn about June 1.
Lot 4: Unwashed; shorn about June 1.

Washing and shearing. The sheep were washed by hand in a stream 7 to 10 days before shearing with power-driven clippers.

Scouring the wool.—The scouring was done by the emulsion process, similar to that used commercially. The wool was put through three scouring liquors containing potash, soap and potassium carbonate of gradually diminishing strength, and finally through a rinse of clear warm water. The wool was dried to a constant weight at a temperature of 150° F. both before and after scouring to overcome any differences in moisture content.

From the results presented it appears that the washed sheep produced 1·49 pounds less grease wool per head when shorn April 12, and 2·64 pounds less per head when shorn June 1, than did unwashed sheep shorn on the same dates. Washing the sheep had practically no effect on the amount of scoured wool produced or on the rate of gain made by the sheep.

Wool shorn June 1, both washed and unwashed shrank more in scouring than did wool shorn April 12.

The results of this experiment also indicate that, in many cases at least, not sufficient premium is paid for washed wool to cover the cost of washing and for the loss in weight of the wool.

Since washing sheep does not improve the quality of the wool fibre and does not diminish the cost of scouring, the practice is not beneficial to the manufacturer.

Washed sheep shorn April 12 produced more grease wool than did washed sheep shorn June 1, while unwashed sheep shorn April 12 produced less grease wool than did unwashed sheep shorn June 1. This indicates that between these two dates there was an increase in weight of fleece due to the accumulation of a greater proportion of yolk or other foreign matter in the wool. Sheep shorn April 12, both washed and unwashed produced slightly more scoured wool than did sheep shorn June 1. Sheep shorn April 12 made slightly greater gains than did sheep shorn June 1.

699—**The Indian Hide and Leather Trade.**—LEDGARD HENRY (Late President, Upper India Chamber of Commerce), in the *Journal of the Royal Society of Arts*, Vol. LXVI, No. 3407, pp. 274-282. London, March 8, 1918.

The quality of the hides from Indian cattle is not so good as that from Argentine cattle, for, while Argentine cattle do no work, the Indian oxen are used for agricultural purposes. Moreover, in the Argentine, branding is used as a means of identification only, in India it is commonly adopted as a cure for various ailments. Fortunately the cows and female buffaloes are rarely worked, so that their hides are generally in good condition and are even superior to those of Argentine cows. In England the hide of a slaughtered animal is worth in normal times from $\frac{1}{15}$ to $\frac{1}{20}$ of its total value, in India, it is worth $\frac{1}{8}$ of the value of the animal. For this reason, when there is a large demand for hides, the cattle are often slaughtered for the value of their hides alone. The Indian hide trade is of a great importance, coming fifth in the value of exports, even preceding tea.

It has been shown that as a result of the increased consumption of meat throughout the world since the war, a great shortage of hides and leather is to be anticipated in the future. It is estimated that the world's meat-producing animals have decreased as follows:—cattle, 28,080,000 head; sheep, 54,00,000 head; hogs, 32,425,000 head; or a total of 115,005,000 head. Before the war the world's supply of hides was barely sufficient, and prices were steadily rising. The above figures show, that after the war there will be a serious shortage of this product.

In those parts of India where the climate is dry the hides are simply cleaned and dried in the sun or shade. Before baling they are dipped in arsenic solution and again dried. This is considered the best method. In the damp climate of Bengal and during the rainy season in other provinces, drying is difficult, and the hides are usually salted. This system does not always give satisfactory results. Arsenicated hides are sold by weight, salted hides by the piece after election and classification.

In the article in the Institute Bulletin details are given concerning the various classes of hides, the tanning process, and the export trade.

701—**Enzyme Activity at the Temperatures Maintained in Cold-Stores.**—BLANCHET, A., in *Le froid*, Year V, Vol. V., No. 1, pp. 6-9. Paris, January-March, 1917.

702—**Preserving Fish without Ice.**—Abstract from the *Bulletin mensuel de la Chambre de Commerce française de New York*, in *Le Froid*, Year V, Vol. V, No. 4, pp. 157-159. Paris, October-December, 1917.

In British Columbia and in England a new method has been adopted for keeping fresh fish. As ice is no longer necessary the fish can be sold cheaper because the expense incurred through the ice is done away with. The fish keeps its flavour perfectly, and the method may be applied to either fresh or smoked fish, and even to meat.

The whole procedure lasts only three hours. This fish is first placed in a cooling tank containing water at a low temperature. After half an hour the latent heat of the fish has completely disappeared. The fish is then placed in a tank containing sea water or fresh water to which salt has been added. To prevent the water from freezing it is stirred by a pump which sends it into a pipe in which it passes through a filter filled with willow charcoal which kills all bacteria and then passes out again. The extremely cold temperature of the salt solution closes the pores of the skin of the fish, prevents saturation and acts on the exterior as a disinfectant. At the end of three hours the fish is taken out and has the appearance of fresh fish. There is no danger of its going bad for 10 days and it may be kept for months in a cold room. A plant has been set up in Portugal for preserving fresh fish by this method. According to the English engineers who installed the plant the fish keeps fresh and in excellent condition for about 15 days even at a variable temperature. The flavour is that of fresh fish. It does not go soft like fish kept in ice, and may be smoked after having been treated. The method is highly recommended by the inspector of the Dominion Fisheries.

M. A. CLIGNY, Director of the Marine Station of Boulogne-sur-Mer, France, believes the method to be of the greatest value. It includes two independent parts, the first of which appears the more original, and may be called pre-refrigeration. It is always advisable to wash fish before any freezing procedure, and it would be excellent to wash it in very cold water which would bring it to a temperature of about 0°C. (=32°F.). This is an important improvement on the expensive and defective method of covering it with ice or laying it out in cold and relatively large stores for a period of time which must of necessity be very long. Pre-refrigeration by thorough washing in very cold water could be carried out advantageously in fishing boats. It might be of great importance in the mixed installations, proposed by M. CLIGNY for fishing boats in which the use of ice plays its essential part.

The second part of the method consists in freezing the fish previously cooled to 0°C. This second stage may be attained by the use of ice, dry cold or, as the author proposes, soaking in cold brine.

703—**The Supply of Canned Salmon in the United States.**—BRAND, C., J., in *U. S. Department of Agriculture, Office of the Secretary, Circular No.* 98, pp. 1-16. Washington, D.C., February 28, 1918.

Commercial stocks of canned salmon in the United States on August 31, 1917, amounted to approximately 310,000,000 pounds. Four-ninths of these stocks were located in the State of Washington.

Nearly three-fifths of the total stocks reported were held by canners of sea food. The stocks of these concerns were practically all reported from the states of Washington. Oregon, and California, the canners, in the first named state reporting more than three-fourths of these holdings.

One-eighth of the total commercial stocks was held in storage warehouses. As in the case of stocks of canners, those in storage were again chiefly located in the state of Washington, this state reporting two-thirds of these stocks. The wholesale stocks, which constituted more than one-sixth of the total commercial stocks, were fairly well distributed in proportion to population. The stocks of retail dealers, which constituted about one-eighth of the total, appear to bear a less close relation to population, the stocks of some of the Southern States being relatively small.

The results of the survey indicate further that the stocks of canned salmon in hand on August 31, 1917, were 18.2 per cent larger than those reported for August 31, 1916. The stocks of canners of sea food showed a marked increase, this increase being only partially offset by decreases in the stocks held in storage warehouses and by wholesalers. The stocks of retailers were practically equal in amount on the two dates.

This Bulletin gives detailed information concerning the extent and the distribution of the supply of canned salmon on the date of the survey.

AGRICULTURAL ECONOMICS

A STATISTICAL ENQUIRY INTO CO-OPERATIVE ORGANIZATION IN THE UNITED STATES.

The third installment of this article in the International Review of Agricultural Economics deals with the sources of credit of co-operative societies, official agencies assisting co-operation, and laws on co-operation, A short summary is given here(1).

SOURCES OF CREDIT OF CO-OPERATIVE SOCIETIES

Elevators.—The capital of farmers' grain elevators is generally only enough to provide the means of doing business and leaves very little excess as working capital. A considerable capital, however, is required during the season in which there is a rush of marketing, for an elevator usually pays cash for grain as the farmers deliver it. According to the organizations which reported during the enquiry loans were obtained on notes of the companies, mortgages, agreements to consign certain amounts of grain to commission houses making the loans, companies' notes endorsed by individuals, warehouse receipts for stored grain, and the personal security of responsible individuals. The data shows that at least one third of the elevators reporting have no credit acceptable to bankers except that given to responsible individuals who assume a personal responsibility. No co-operative organization should be so conducted that it is necessary for a few members to assume large personal risks in order that the business, which benefits all the members should be carried on. Each member should assume a liability proportionate to the benefits he receives or the amount of business he does through the organization.

Most of the loans made by banks and individuals to the elevators are for short periods of from one to four months. When commission firms advance funds the business is handled on open account and a final settlement made after the business year has closed. A number of elevators made advances to members on warehouse receipts. As a rule it is considered inadvisable for an elevator to make advances to members on stored grain for it is thus brought into a department of banking which is better left to local banks.

Creameries and Cheese Factories.—As a rule a farmers' creamery and cheese factory has little difficulty in financing its manufacturing and marketing, for it withholds payment to the producer until returns have been received from the products marketed. Manufacturing costs are small and can be met from the returns of sales. Where funds from outside sources are needed the plant and equipment are usually amply sufficient to cover any loans secured and to serve as basis for credit.

A great difficulty of the average co-operative creamery is due to the fact that it makes no provision for replacing plant and machinery. Organizations should form a reserve to guard against the depreciation of plant and equipment, so that replacements can be made without special assessments.

Fruit and vegetable Associations.—Organizations marketing fruit and vegetable produce generally require considerable sums of money in order to meet the expenses of early marketing and make advances to growers, for some weeks usually elapse between the delivery of members' produce and the receipt of returns from the market. It is necessary for the growers to have funds with which to meet the expenses of picking and packing. Since independent buyers are

(1) The first installments of the summary of this article appeared in the August and October numbers of the Agricultaral Gazette.

willing to pay for the fruit on delivery, the co-operative organizations make as liberal advances as possible to members at the outset.

Hitherto bankers have been unwilling to lend on the security of perishable produce, but they now consider such produce marketed through an efficient organization to be good security and make loans accordingly to co-operative marketing organizations. The returns show that more than one-half the organizations reporting can orrow the sums they need without security other than that which they can themselves give. The rates of interest vary from 6 to 12 per cent.

LAWS ON CO-OPERATION

In the main the laws regulating the formation of co-operative associations in the various States are of two types. Some are very general and others outline in detail the methods of forming an organization and managing its business. The general laws leave the details to be worked out by each individual organization, and supporters of this type of law argue that in allowing latitude to organizations they enable these to take the form which best suits the needs of a community. There is no doubt however that a detailed law secure the greatest uniformity of organization. If, moreover, detailed laws on co-operation had existed in all States when the movement for the organization of farmers began, the proportion of truly co-operative organizations now in existence would unquestionably be larger than it is.

The laws usually state the minimum number of persons who may organize and the kind of business in which they may engage. The method of incorporation is outlined sometimes but not always: in some States the associations are referred to the general corporation laws on this point. The laws often include restrictions as to the board of directors and the officers. General laws usually leave questions concerning the capital stock to the decision of each association, while detailed laws usually regulate the minimum and maximum amounts of capital stock, share values, the limit on the individual ownership of shares, the issue of shares and the transfer of stock. Most of the laws recognize the importance of regulating the voting power, the majority of them stating that each member is to have one vote irrespectively of the amount of stocks he holds. Regulations as to voting by proxy and by post are sometimes included.

The method of distributing any profits there may be does or should figure importantly in laws on co-operation. While some States leave this matter to be decided by each association others provide for it in detail. In the latter case dividends on stock are usually limited to a fair rate of interest; there is provision for a reserve fund and sometimes also for an educational fund; and for the distribution of remaining profits as a dividend to suppliers. Some laws specify that such dividends to suppliers are to be paid only to members; others allow each association to decide whether or not suppliers who are not members shall receive dividends. Several States provide that suppliers' dividends shall be paid at a lower rate to non-members than to members. In a few instances there is a detailed provision for the apportionment of profits, which associations may however revise. Since the desirability of a truly co-operative method of distributing the profits of an association is often not recognized, it is advisable that it should be made obligatory by the laws on co-operation. Non-co-operative organizations could thus be prevented from masquerading as co-operative.

The points to be covered by the by-laws of co-operative organizations are sometimes indicated in the laws on co-operation. Provision is sometimes made for the investment of the reserve fund and the purchase of the business of other associations. Frequently there are provisions which allow existing organizations to reorganize, complying with the requirements of the law. Regulations are also often included in the law for the dissolution of an organization, for making annual reports compulsory, and for limiting the use of the word "co-operative".

AGRICULTURAL STATISTICS

THE CROPS OF 1918

Countries	Area			Production		
	1918	1917	Five years' average 1912-16	1918	1917	Five years' average 1912-16
	Acres	Acres	Acres	Bushels	Bushels	Bushels
WHEAT:						
Spain	9,997,000	10,134,000	9,827,000	127,982,000	142,676,000	125,981,000
England & Wales	2,665,000	1,919,000	1,891,000	84,000,000	57,317,000	57,487,000
Italy	10,873,000	10,437,000	11,768,000	176,372,000	137,613,000	177,042,000
Switzerland	203,000	139,000	110,000	7,095,000	4,556,000	3,556,000
Canada	17,354,000	14,756,000	12,557,000	210,316,000	233,743,000	254,696,000
United States	58,881,000	45,941,000	52,558,000	918,920,000	650,828,000	809,357,000
India	35,342,000	33,029,000	30,521,000	380,202,000	379,232,000	348,996,000
Japan	1,236,000	1,236,000	1,193,000	31,127,000	25,850,000	24,372,000
Egypt	1,406,000	1,116,000	1,406,000	32,555,000	29,835,000	35,409,000
Tunis	1,413,000	1,310,000	1,353,000	9,406,000	6,963,000	5,600,000
Totals	139,370,000	120,017,000	123,184,000	1,977,975,000	1,668,613,000	1,842,496,000
RYE:						
Italy	272,000	271,000	291,000	4,724,000	4,334,000	5,042,000
Canada	555,000	212,000	126,000	10,376,000	3,857,000	2,421,000
United States	5,435,000	4,102,000	2,711,000	76,650,000	60,145,000	44,547,000
Totals	6,262,000	4,585,000	3,128,000	91,750,000	68,336,000	52,010,000
BARLEY:						
Spain	4,249,000	3,839,000	3,649,000	84,464,000	77,957,000	74,134,000
England & Wales	1,490,000	1,460,000	1,417,000	50,000,000	46,162,000	46,247,000
Scotland	151,000	159,000	181,000	5,584,000	5,875,000	6,635,000
Italy	494,000	468,000	605,000	9,186,000	7,422,000	9,420,000
Canada	3,154,000	2,392,000	1,642,000	83,263,000	55,058,000	46,141,000
United States	9,108,000	8,835,000	7,500,000	236,505,000	208,975,000	201,625,000
Japan	2,738,000	2,738,000	3,203,000	76,053,000	95,749,000	99,497,000
Egypt	412,000	445,000	412,000	9,870,000	13,598,000	12,267,000
Tunis	1,238,000	1,038,000	1,162,000	10,426,000	8,267,000	5,319,000
Totals	23,034,000	21,374,000	19,771,000	565,351,000	519,063,000	501,285,000
OATS:						
Spain	1,506,000	1,168,000	1,347,000	29,113,000	31,116,000	27,992,000
England & Wales	2,820,000	2,259,000	2,030,000	124,000,000	99,719,000	89,794,000
Scotland	1,237,000	1,041,000	957,000	53,223,000	49,984,000	42,449,000
Italy	1,112,000	1,091,000	1,190,000	38,907,000	31,345,000	28,836,000
Canada	14,790,000	13,313,000	10,603,000	456,734,000	403,010,000	396,908,000
United States	44,475,000	43,572,000	39,456,000	1,535,297,000	1,587,286,000	1,296,406,000
Tunis	156,000	124,000	134,000	3,599,000	3,761,000	2,243,000
Totals	66,096,000	62,568,000	55,717,000	2,240,873,000	2,206,221,000	1,884,628,000
CORN						
Spain	1,140,000	1,175,000	1,140,000	26,584,000	29,369,000	27,655,000
Canada	250,000	234,000	252,000	6,916,000	7,763,000	13,659,000
United States	113,835,000	121,045,000	105,566,000	2,717,775,000	3,159,494,000	2,761,252,000
Totals	115,225,000	122,454,000	106,958,000	2,751,275,000	3,196,626,000	2,802,566,000
POTATOES:						
England & Wales	645,000	508,000	451,000	153,000,000	124,693,000	103,018,000
Scotland	171,000	148,000	145,000	41,440,000	41,440,000	36,842,000
United States	4,113,000	4,390,000	3,678,000	391,279,000	442,336,000	361,753,000
Totals	4,929,000	5,046,000	4,274,000	585,719,000	608,469,000	501,613,000

BROOMHALL'S FOREIGN CROP SUMMARY, OCTOBER, 24th.

Italy.—Latest reports confirm that the wheat yield will approximate 160,000,000 bushels; Corn is considered fair. Preparations for autumn seeding are making satisfactory progress. Efforts are being made to encourage the use of tractors for ploughing a large acreage.

France.—Despite the unfavorable weather, threshing has been going on actively in the northern regions and in many parts is finished. Results of threshing operations are good and the quality of the wheat is excellent. Rye and barley have given a satisfactory out-turn, but oats are disappointing. Ploughing continues to make encouraging progress.

Spain.—Conditions appear about unchanged. Reports continue to mention that farmers are threatening to reduce their sowings as a means of showing their dissatisfaction with the Government methods of handling the 1918 wheat crop. Supplies keep small and there is a want of a steady stream of imports from the Argentine.

Sweden.—Late crops have been unfavourably affected by the severe frost which has been experienced. Winter sowings are under way, but progress is slow. Crops from the recent harvest are expected to show average yields.

Denmark.—Out-turn of the crops generally are over average. Preparations for the new crops have commenced in sections.

Roumania.—This year's crop is described as poor.

United Kingdom.—Unsettled weather interfered considerably with harvest operations in sections where parts of the crops were still uncut. Many reports of further sprouting and shedding have been received, especially from the northern regions. It is believed that considerable damage has been done to barley and oats.

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OF CANADA

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NEW CONDITIONS IN THE EXPORT MEAT TRADE

BY THE HONOURABLE T. A. CRERAR, MINISTER OF AGRICULTURE.

THE opportunity is now presented to Canada of placing herself in a powerful position commercially if proper measures are adopted as regards the sale of live stock products in Great Britain and on the continent of Europe. The coming of peace has created new conditions in the export of meat and produce and some uncertainty in the minds of Canadian farmers as to future markets. It is felt that a strong comprehensive effort must be made at this moment to establish the live stock industry of Canada upon a permanent basis as one of the most important commercial enterprises of the country, with the absolute assurance that a profitable business awaits maximum capacity production following the war. Information in my hands convinces me that the export market will continue to absorb at firm prices, as compared with the prices for all other agricultural products, every pound of beef, bacon, and other animal products that Canada can supply.

In view of the great scarcity of cattle and live stock of all kinds in Europe, and because of the great demand for live stock and live stock products of all kinds sure to continue for some years at least, I am going to ask the farmers and live stock men of Canada to maintain their breeding operations on a war-time scale, to properly finish all feeding stock, and to conserve all good breeding females, and to still further improve their herds and flocks by using even greater care in the selection of the sire.

In the formation of national plans for meeting the new situation the question, not only of producing the animals, but of marketing meat products as indicated by the judgment of breeders and meat packers, will receive full consideration.

PRODUCTION, PRODUCTION, AND AGAIN PRODUCTION

BY THE HON. SIR THOMAS WHITE, ACTING PREMIER AND MINISTER OF FINANCE

CANADA is on the threshold of a new industrial era—the era of readjustment and reconstruction. Notwithstanding the dislocation in certain war industries which is bound to ensue, I look forward with complete confidence to Canada's ability to adjust herself to the altered conditions. Canada's economic and financial strength during the war, and at its conclusion, has been due to the possession of almost unrivalled national resources, and the economic productivity of her people. In four years our exports have risen from less than six hundred million dollars to over a billion and a half. This was due to higher prices for our commodities, and to increased volume of production. Our principal items of exports have been agricultural products, foodstuffs, and manufactures, particularly of munitions and other products of war industries. There has been hand in hand with this a very considerable expansion of domestic trade. The question that now arises, and to which much attention has been, and is now being, given is this:—What will happen to our production in the period immediately succeeding the war. With regard to our agricultural production (including animal products) which last year enabled us after satisfying our domestic requirements to export products to the value of over seven hundred million dollars, the outlook would seem to be most hopeful and encouraging. With the end of the war there will be the increased demand for food for enemy populations numbering hundreds of millions of people, large numbers of whom will be in a condition of starvation and whose demoralized agriculture cannot be speedily restored. There would seem no reason to apprehend any failure of markets for all the food that Canada can produce. Our grain, livestock and their products, with those of our fisheries, should all be in keen demand at high prices. The policy would seem to be as during the war to increase to the utmost our agricultural and live stock production. We have the lands and a highly skilled agriculturist community. The slogan in this department of our national activity should be the same as during the war. Production, production and again production. Increase in our agricultural production will not only help to furnish food to a hungry Europe, but will be a chief factor in maintaining our favourable international trade balance as well.

An official statement from the British Ministry of Food gives the following as decreases of live stock so far as known in the countries of Europe:—Cattle; France, 2,366,000; Italy, 996,000; Denmark, 345,000; Sweden, 599,000; Germany, 2,200,000; Austria-Hungary, considerable. Sheep: France 2,258,000; Italy, 138,000; Denmark, 47,000; Holland, 200,000; Austria-Hungary, considerable. Pigs: France, 2,815,000; Italy, 354,000; Denmark, 1,873,000; Sweden, 352,000; Holland, 162,000; Germany, 19,306,000; Austria-Hungary considerable.

AGRICULTURAL TRAINING FOR RETURNED SOLDIERS

PREPARATORY AND FIELD INSTRUCTION

BY W. J. BLACK, B.S.A., COMMISSIONER, AGRICULTURAL INSTRUCTION ACT

ALL will admit that the country is under obligation to assist in the re-establishment of the ex-soldier in civil life. For economic reasons, for the good of the community at large, and for the welfare of the men themselves, it is necessary that they be given every possible opportunity to make their future lives successful and prosperous. This statement applies just as much to those who will engage in farming as it applies to other pursuits. In recognition of this fact, the Soldier Settlement Board is taking steps to enable men without experience who desire to farm to secure at least a general working knowledge of farming operations. The first step in this direction will be to organize training farms in Great Britain, so that the interval between the signing of peace and the return of the men to Canada may be profitably employed. To this end action is now being taken. Suitable farms will be secured and equipped with Canadian machinery and appliances, and a short courxe of about three months in practical farm operations will be offered. In no sense will the course be academic or scientific. It will rather be the aim to familiarize the men with the every-day pursuits of farm life, and with the things which every man must be able to do reasonably well before he can start to till the soil. For example, such a course should teach a man how to harness, hitch up, drive a horse; how to plough; cultivate, and sow seed; how to milk a cow, to care for and feed farm animals, and to perform the thousand and one manual operations that are inseparable from farm life.

At the request of the Soldier Settlement Board, the writer endeavoured to outline a course of training such as would meet the requirements of preliminary instruction for inexperienced men, particularly while idle in the old land pending demobilization. The following is an outline of the plan of instruction that has been submitted and adopted:

THE COURSE

The system of instruction adopted is in two parts, the first to be known as "Preparatory Instruction" and the second as "Field Instruction."

The preparatory instruction will include the necessary training and experience to enable a candidate to satisfy himself, on the one hand, whether farm life will be congenial and desirable and will enable the board to determine whether he has the necessary qualifications, and is fitted in general to make a success of the farming business. After these points have been settled the earlier an applicant for settlement can be placed on the land that is to become his future home, the better for all concerned.

Field instruction is to be provided after settlement by instructors who have had special training for this work. The method employed will be somewhat similar to that now followed by certain provinces of Canada in locating trained agriculturists as Agricultural Representatives of Departments of Agriculture for the purpose of advising and aiding farmers in farm management. In this way settlers will have the benefit of expert counsel and direction, while at the same time exercising their individuality and power of initiative.

During the winter months following the first summer's experience on the farm, settlers will find it advisable to take the regular short course in agriculture given at the Agricultural Colleges or by the Departments of Agriculture at convenient points throughout the country.

PREPARATORY INSTRUCTION

As a means of providing candidates for settlement with the preparatory training they will require, in the minimum amount of time and in the most efficient manner possible, two courses have been adopted; one to be known as—The Practical Farming Course—and the second as—The Institution Course. Candidates will have the option of selecting either one of these courses.

THE PRACTICAL FARMING COURSE

It is generally recognized that there is no better way by which those inexperienced can secure the training, and knowledge necessary to engage successfully in farming, than by spending at least the summer months of one year at work on a farm under the guidance of a practical and successful farmer. In no other business than in farming does experience count for more. A knowledge of the real meaning of farm life can be obtained nowhere as well as on an up-to-date farm. In view of these facts, it is hoped that a large percentage of veterans will elect to take this course.

In the various provinces, advisory boards made up of well known citizens having a wide acquaintance with farmers have already been, or will be, appointed for the purpose of selecting farms that are sufficiently up-to-date to provide proper facilities for successful training, and are managed by men who are sincerely interested in solving the problem of agricultural instruction for veterans.

Those who elect to take their preparatory instruction on farms, and the farmers assisting in the work, will be visited from time to time during the year by representatives of the Soldier Settlement Board and a record will be kept of the progress being made by each student or veteran. At the end of the year the board will determine by this record whether he is qualified to commence settlement work.

THE INSTITUTION COURSE

For the benefit of those who cannot be accommodated on individual farms, or who, for other good reasons, cannot conveniently go direct to work with farmers, an institution course covering three months will be available. It is believed that a percentage of veterans who have had considerable experience of a character similar to certain fundamental farming operations, such as the management and control of horses, may be able to acquire in a shorter time than others, a fair degree of skill in the use of farm equipment.

QUALIFICATION FOR ADMISSION

A candidate for admission must satisfy the board:—

(1) That he is or will be physically fit to engage successfully in the business of farming;

(2) That he is aware of the individual responsibility resting upon those who would engage in farming successfully, and that he has the required energy to carry on farming operations in a creditable manner.

(3) That he is sincere in the intention to make farming his life work.

TIME OF COURSE

It is intended that this course may be commenced at any time during the year, convenient to training institutions when men are available to receive instruction. The method of instruction in regard to certain subjects described in the course will necessarily vary according to the season in which the work is being taken up. For example—it obviously will be impossible for men to secure experience in the actual operation of farm machinery, such as ploughs during the winter months, whereas, during the summer season practical instruction in ploughing can be given in the fields. For this reason it will be greatly in the interest of men in training to require that a considerable percentage of those who commence their instruction during the winter months shall spend at least three summer months under the guidance of a successful farmer, as in the practical farming course.

RECORDS AND TESTS

As the course proceeds records will be kept of the progress being made by each student, and at the end of the term tests will be made to determine the extent of the student's knowledge in such subject as it may deem necessary to do so. As the teaching will be very practical in character most, if not all, tests or examinations will be practical, in order that the skill as well as the general knowledge of the student, may be determined.

HOURS OF TRAINING

As a considerable part of each day's course of instruction will be very similar in character to the work carried on daily on an up-to-date farm, it will be considered that the courses commence at seven o'clock in the morning and continue until six, with one hour for lunch. Arrangements will be made to give the men one-half day per week for attention to private business excepting when courses are in operation during seed time or harvest, in which cases the practice followed as to hours in conducting farm work at these seasons by practical farmers may be adopted.

DILIGENCE IN TRAINING

Arrangements will be made with all institutions putting on this course to keep a record of the diligence shown by each man in following the details of the course, and the earnestness in general displayed in endeavouring to fit himself to qualify for settlement. This record will be made use of by the Board in determining when candidates are fitted to receive settlement privileges under the Soldier Settlement Act.

OUTLINE OF COURSE

1. *Horse Power.*—Instruction in horse power will include daily practice in grooming, harnessing, hitching, and driving horses. Depending on the season, the implements

of the farm on which horse power is most commonly used such as wagons and ploughs will be used in gaining practical experience. Skill in handling horses is of fundamental importance in farming. The time given to this will be the maximum depending upon the teaching equipment available. If possible from ten to twelve hours per week should be set apart for this purpose.

2. *Gas Engines.*—Owing to the fact that very few, if any, settlers will require gas engines during the first year or two of settlement, it is not proposed to provide a complete course in this subject. Since ultimately, however, some farm operators are likely to find it profitable to utilize gas engine power a beginning may be made in acquiring a knowledge of how to operate these machines. Those desiring additional instruction will be able to get it no doubt later through short courses made available at Agricultural Colleges, or under the auspices of Extension Services provided by Departments of Agriculture.

FARM MACHINERY

Farm Machinery.—Instruction in farm machinery will include management and use of the principal implements of the farm. Training will be given in knocking down, assembling and adjusting the various parts, and, as far as climatic conditions will permit, opportunities will be provided for becoming skilled in the practical operation in the field of the machines most used on a farm. The course will include special attention to such machines as ploughs, grain drills, cultivators, mowers and binders. Six hours per week will be given to this work.

1. *Building Construction—General.*—Practical instruction will be given in the erection of farm buildings and in the construction of fences and other similar equipment. The laying out of buildings, putting in of walls and floorings will be taken up, and practice will be given in the preparation and use of concrete.

Considerable attention will be given to such matters as rope-splicing, and the care and handling of the common tools of the farm, including the sharpening of axes and saws, and the repairing of harness and other similar equipment. Four hours per week is the attention that will be given to this action.

2. *Carpentering.*—In order that settlers may become sufficiently skilled in the use of the common tools of the carpenter shop, to enable them to assist themselves in the erection of certain necessary buildings, and in providing equipment, and in making repairs, about six hours per week will be given to practical work in a wood shop. The exercise will deal with the making of common articles of farm equipment.

3. *Blacksmithing.*—The course in blacksmithing will be such as to enable those who take it to become proficient in keeping farm machinery in repair. It will include the building and managements of a forge fire, the care of forge tools, the drawing out of plough-shares, the making of hooks, staples, bolts, chain-repairing, etc. Time, six hours per week.

FARM MANAGEMENT

1. *Farm Management—General.*—As previously intimated, comparatively little time will be given to lectures or class-room work. The chief need of those who take this course will be the acquirement of skill in the use of farm equipment, and a good general knowledge of farm procedure. It is, however, desirable that all should receive a course of lectures on the business management of a farm. This course will take up such matters as the laying out of a farm, co-operation, the keeping of farm records, and the importance of system and organization in farm management, in order that best results may be obtained. It will be intended to show that the exercise of business ability is a most important factor in successful farming.

2. *Feeds and Feeding.*—Instruction in the use of the principal feeds of the farm will be provided, and students will be given practice in the selection and classification of all feeds commonly used in stock-raising. There will be, also, practice feeding so that they become familiar with the best methods of feeding the various classes of farms animals, and the precautions to be taken in order that profitable results may be obtained. Time, six hours per week.

3. *Soils, Cultivation, and Farm Crops.*—The study of soils and crops will be taken up and will include the control of weeds, the class of farm crops most suitable to different districts, the selection of seed, preparation for and methods of seeding, grain, root-crops, hay-making and harvesting. During the summer season instruction in these subjects will be given mainly in the field provided, weather conditions permitting. When this is not possible the instructions will be given elsewhere in the most practical manner consistent with the equipment available. Six hours per week may be given to work of this character.

4. *Live Stock.*—Instruction in live stock will include the selection and judging of horses, cattle, sheep, swine, and poultry. Every one will be required to take part in the management of live stock, as indictated heretofore in connection with the course in feeds and feeding. Three hours per week will be given to instruction in judging, selection, and management, in addition to the time spent in feeding work.

A FOLLOW-UP SCHEME

It is the intention to inaugurate a follow-up scheme with the co-operation of provincial agricultural departments, whereby the men will be advised and instructed after they go upon the land. This plan contemplates the provision of local short courses dealing with the more advanced phases of instruction, similar to those now provided for farmers and farmers' sons by the local representatives of agricultural departments and by other extension services.

THE KHAKI UNIVERSITY

BY GEO. C. CREELMAN, B.S.A., LL.D., PRESIDENT OF THE ONTARIO AGRICULTURAL COLLEGE AND PROVINCIAL COMMISSIONER OF AGRICULTURE

THE Khaki University grew out of a desire on the part of the Y.M.C.A. and the Army chaplains to do more for the men than mere entertainment or spasmodic attempts at instruction.

The name is, perhaps, misleading, as there is little real University work attempted; men wanting educational assistance of any kind are provided for, from learning to read and write to instruction and final examination in higher mathematics. Four main departments are already organized, namely, the general course; the commercial; the engineering, and the agriculture, and from October, 1917, to July, 1918, 9,000 men in all were enrolled.

The head of the institution is Dr. H. M. Tory, president of the University of Alberta, and he is gradually acquiring a staff, for the most part from the active Canadian militia, such men giving their time freely.

The Dominion Government has voted some five hundred thousand dollars for the maintenance of the institution, and the Canadian Y.M.C.A. has promised as much more.

Ninety-three libraries have already been established in England and France, and many more will be furnished for the period of demobilization.

Two classes of work are to be undertaken. First, instruction will be given and examinations held for all students wishing to "carry on" with their college duties, and so shorten their academic work when they return home. Second, instruction is given by lecture and demonstration to all who wish to fit themselves for doing better work in their chosen trade or calling when they return to Canada.

Short courses on all sorts of popular subjects, from electric wiring to milk testing, are the order of the day, or rather, of the night, for more of the instruction is given after the camp work of the day is finished.

I visited most of the large camps in England, where the University was doing its work in a Y.M.C.A. hut, a big tent, a "movie" hall, or a house nearby, rented for the purpose.

Everywhere I was astonished at the eagerness for education exhibited by the men. During the first two years of war the men were kept busy with war work: the life was new and the work was new, and the change was great and universal. After a time, however, drilling and marching and shooting, and even fighting, became more or less mechanical, and then the men began to think again of the old life to which they hoped soon to return. Then came the desire for improvement; a desire to obtain a good job, better than the old one; a desire to pass from the class of nondescript labour or handy man into the class of trained artisan or skilled workman.

I was, of course, specially interested in the boys who were thinking about farming. Thousands of letters had been received at the headquarters in London, from the several camps, and

I went out to their camps and talked with the men. I assured them all there was plenty of room on the land in Canada for all those who were willing to work hard, learn the business, and be content in the end with a good living and a comfortable home.

All experienced men I advised to take up land at once on their return, and as soon as possible to get together a few head of well-bred live stock. It looks as if meats will be high for some time, and as all classes of farm animals tend to increase the fertility of the soil, they have a "double" value at this time.

To the unexperienced I pleaded for time—time to learn the business. I insisted that going on a good farm as a hired man until such time as one had mastered the details was not only "good business," but actually saved time in the long run.

I tried to explain how complicated a business farming was; how dependent on the elements, and uncertain the returns. I advised all inexperienced men, therefore, to put what money they had in the banks, get a job with a farmer, and at his expense get thoroughly familiar with ordinary farm methods.

The work of instruction in agriculture is essentially elementary, but the instructors being agricultural college graduates serving in the army, and using neighbouring farms and flocks and herds for demonstration, their men are getting really practical and helpful instruction.

The Khaki University, then, has made a real start, and during demobbilization should help materially with the discipline, and at the same time supply real help to the soldiers.

The University also has been, like many other Canadian activities, a real pioneer in this war. Australia, New Zealand, Great Britain, and the United States are all making enquiries and expect to follow our example.

A HOUSEHOLD SCIENCE COURSE FOR SOLDIERS' WIVES

IN response to a request from the men taking the agricultural course, the Khaki University of Canada in London is organizing a division for the wives of soldiers. The courses in Horticulture and Poultry will be extended to women, and, in addition, a Household Science course will be offered.

Mrs. G. C. Cunningham, formerly Domestic Science instructress in Manitoba, has been placed in charge of this branch of work.

CHAIRMAN OF THE SOLDIERS' SETTLEMENT BOARD

Mr. W. J. Black, B.S.A., who as been Commissioner under THE AGRICULTURAL INSTRUCTION ACT since the demise of Dr. C. C. James, and who is the author of the article "The Training of Returned Soldiers" commenced on page 1123 of this number of THE AGRICULTURAL GAZETTE of Canada, has been appointed Chairman of the Soldiers' Settlement Board.

PART I

Dominion Department of Agriculture

THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF ANIMAL HUSBANDRY

THE CONTROL OF TUBERCULOSIS

BY E. S. ARCHIBALD, B.S.A., DOMINION ANIMAL HUSBANDMAN

EVERY possible precaution is taken at the Experimental Farms against the introduction of tuberculosis through animals purchased for the herds, and, briefly, these precautions are as follows:

Knowing from experience that some farmers, suspecting animals in their herd to have the disease, send them to the open markets, and by so doing spread the infection to other herds, all cattle purchased for the Experimental Farms, whether pure-breds or grades, are bought direct from the farmers, or preferably from the breeders. All animals over six months of age are purchased subject to a tuberculin test, and, in addition, are given the most careful physical examination, knowing the possibilities of the animals being so treated that the test would have no effect on the animals, and also knowing that the test in certain peculiar instances is not absolutely reliable.

All animals after purchase are isolated for at least sixty days, and re-tested before being allowed with the main herd. Calves under six months of age, which are too young to test at time of purchase, are isolated until old enough to test. Before finally making any purchases, however, all possible information is sought as to the general health of the herd, whether or not unpasteurized skim milk, butter milk, or whey from a creamery is being used, and all similar details which might lead to the discovery of the presence of the disease in the herd; but, above all, only farmers and breeders known to be reliable are dealt with.

ANIMALS THAT REACT

Animals that react to the subcutaneous tuberculin test are generally slaughtered, and the carcasses, if passed by competent veterinary authorities, sold as meat. If, however, the carcasses are not passed, they are either burned or buried deeply in the ground; but any reacting cows which are nearing calving, are segregated from the healthy herd and calved. In the case of valuable pure-bred animals, it has, in a few instances, been found convenient to segregate on a neighbouring farm, or in some building at a safe distance from the healthy herd, and maintain this herd on the principle of the "Bang" system. This, however, can only be followed where the animals are of sufficient value to warrant the extra heavy expenditure in maintaining separate herds, separate pastures, and all the accompanying extra charges of labour, feed, building materials, etc. Generally speaking, the average farmer in Canada could not afford to follow this system of eradicating tuberculosis.

RIGID SANITARY PRECAUTIONS

The most sanitary precautions on all the Dominion Experimental Farms have been scrupulously followed. It is a well-known fact that the germ of tuberculosis is readily killed by direct sunlight, hence, in building or re-modelling cattle barns, every means have been taken to allow as much sunlight directly into the cattle stalls as is possible. The narrow type of stable, thirty-six to forty-two feet in width, with sufficient glass (at least ten square feet per cow) allows the sun to reach every corner of the interior of the stable. Sunlight is the surest and cheapest disinfectant. Generally speaking, the wide, dark stable has proven a sure breeding ground for the disease if it ever becomes established therein. As to disinfection, the practices have been most thorough. The walls and ceilings are smooth and painted; this is usually sufficient. Where, however, the woodwork is rough and unfinished, a thorough white-washing is given, using a mixture containing a disinfectant. The walks, mangers, stanchions, and gutters of the stable are also thoroughly scraped and soaked with a disinfectant at least twice per year. Any good cold tar disinfectant, such as Wescol, Lysol, Fenoleum, Cresol, etc., etc., used in strengths varying from three to eight per cent, kills all disease and also vermin. The cost of this disinfection has been more than re-paid in the cleanliness and comfort of the animals and the consequent increased production. In addition, however, mangers, stanchions, feed passages, and gutters have been sprayed once per month on all farms where any reactions have occured during the year, and, if the outbreak reaches more than an isolated individual, this spraying is continued once each week until the next test. A knap-sack spray pump, useful elsewhere about the farm, does this work quickly and thoroughly.

Since the practice of pasteurizing milk is commonly followed on farms where any tubercular outbreak has appeared, there is little danger of infection of the swine or poultry, or, what is fully as important, the infection of the calf herd. Swine are never allowed to run over the manure of cattle where any outbreak whatever has appeared until the premises are thoroughly cleaned and the reactors segregated or slaughtered. In fact, with but one or two exceptions, swine are never allowed to run in the barnyard owing to the general inconvenience.

SINGLE TESTS NOT INFALLIBLE

The above comments might lead the reader unacquainted with tuberculin testing to the conclusion that if these precautionary measures were continued, there could be no outbreak of tuberculosis in a herd which had formerly proven healthy, as judged by the tuberculin test. However, it is but fair to explain that, although the subcutaneous tuberculin test is the best single means of diagnosing the disease, yet it is not infallible even in the hands of most competent veterinarians, and when applied to cattle owned by the most conscientious stockman. Again, the herd which passes the tuberculin test once, is probably clean, but there may be an animal in which the disease has become established, but not sufficiently to cause a reaction, or, what is worse, there may be an animal so badly affected that it will not react. Either animal may in a few months become spreaders, and infect all animals in their vicinity; hence, there is every need of at least two tests at about six months' intervals to definitely prove the health of the animal.

Generally speaking, the experience of the Experimental Farms system has proven that the tuberculin test as commonly applied, is not infallible, but that, nevertheless, it is the best individual means of diagnosis at hand, and also that it is, as a rule, wise to breed up the herd rather

that take constant risks by purchasing to replenish the herd of mature animals. Until every Canadian stockman faces the tuberculosis question, ceases deceiving himself as to the health of his own herd, follows perfect honesty in tuberculin testing, and does everything possible to guard against future infection of his herd, he will have constant disappointments in animals reacting or dying from the disease, or carcasses being rejected at the abattoirs.

NOTE.—The actual testing of the cattle of the Dominion Experimental Farms is carried on under the direction of the Veterinary Director General. The policy under which this work is done is described by Dr. Torrance in this number of THE AGRICULTURAL GAZETTE. Editor.

THE DIVISION OF CHEMISTRY

THE AGRICULTURAL SOURCE OF BENZOIC ACID

BY P. J. MALONEY, M.A., AND FRANK T. SHUTT, D.SC.

THE two chief sources of the benzoic acid of commerce are (1) toluene and (2) gum benzoin: From the first is manufactured, by oxidation, practically all the benzoic acid used in the coal-tar industry, and from the second is obtained, by sublimation, that employed in pharmacy and as a food preservative.

The price of benzoic acid is five or six times higher than it was previous to the war, and the thought occurred to one of the writers that it might be possible to find a cheaper source in the urine of the herbivoræ, provided one or other of the methods that have been proposed, and, to some extent, used, could be so simplified that the first stages could be conducted on the farm without any special apparatus.

Scheele obtained benzoic acid from cow's urine in 1785, Liebig in 1829, demonstrating that it was not present as such in the urine, but was formed by the decomposition of hippuric acid. The fact, therefore, that benzoic acid could be obtained from the urine of the herbivoræ has been known for more than a century, but the fact has been one of scientific interest rather than of commercial importance.x

Benzoic acid has been prepared from urine by three methods: (1) The urine is allowed to putrefy in order to induce the hydrolytic decomposition of the hippuric acid into benzoic acid and glycocolic according to the equation—

$$CH_2{}^{NHC_7\ H_5O}_{COOH} \times H_2O = CH_2{}^{NH_2}_{COOH} \times C_6\ H_5\ COOH$$

Milk of lime is then added, the solution filtered, and the benzoic acid, after concentration of the filtrate by evaporation, precipitated with strong hydrochloric acid. (2) The putrefied urine after addition of milk of lime is treated with Co2. This removes the excess of lime. Ferric chloride is now added and the insoluble ferric benzoate after filtration is decomposed by hydrochloric acid. (3) The fresh urine is evaporated to about one third its original volume, filtered, acidified with hydrochloric acid and allowed to cool. Hippuric acid crystallizes out and may be hydrolized to benzoic acid and glycocoll by boiling with

*Summary of paper read before Section III, Royal Society of Canada, May, 1918. It constitutes one of a series of contributions from the Laboratories of the Dominion Experimental Farms.

(x) Benzoic acid from this source has been characterized by a slight smell of urine, "removed or concealed by mixing the acid with a small quantity of gum benzoin and subliming it."

concentrated hydrochloric acid or sodium hydrate.

All three methods present certain difficulties, especially when considered as processes for use on the farm. Methods (1) and (2) involve expensive and disagreeable evaporation, and (3) requires the necessary apparatus for the preparation of carbonic acid gas and includes the troublesome filtration of a fine, voluminous precipitate.

From a consideration of the change of solubility of benzoic acid with the temperature, the possibility suggested itself of separating benzoic acid from putrefied urine and also hippuric acid from fresh urine by precipitation at low temperature.

SOLUBILITY OF BENZOIC ACID IN WATER

Temperature	Grams-Benzoic acid per 100 grams solution
0	0.170
10	0.209
20	0.289
25	0.343

From these data it may be shown that by a cooling solution of benzoic acid to 0° C. an amount of acid will separate out equivalent to an amount obtained by concentration of the solution to one-half its volume and cooling to 25° C.* This, from a solution of benzoic acid containing 0.5 grams per 100 cc.; 330 grams will separate out on cooling to 0° C, leaving in solution 0.170 grams. The same solution (0.5 gram per 100 cc.) concentrated to one-half its volume, *i.e.*, 50 cc., precipitates 0.329 grams on cooling to 25° C., leaving in solution 0.171 grams.

No table of solubilities for hippuric acid could be found, but conjecturing that its curve of solubility would approximatey parallel that of benzoic acid, the work about to be described in the paper was undertaken, the method used for determining the benzoic content, i.e., the total amount of benzoic acid after hydrolization of the hippuric acid, of the urine in the several experiments being that of Steenbock.† (J. Biol. Chem. XI, 204, 1912.)

BENZOIC ACID FROM COW'S URINE

	gram.
1. 100 cc. fresh urine, total	0.64
2. 100 cc. fresh urine evaporated to one-half original volume, acidified with HO[1] and cooled to room temperature and the benzoic acid content determined in the precipitated hippuric acid	0.35
3. 100 cc. fresh urine, acidified with H.C.L. cooled to 0°C. and the benzoic acid determined in the precipitated hippuric acid	0.35

From these results it will be seen that a method for obtaining benzoic acid from urine by cooling the fresh acidified urine to 0° C. is as efficient as evaporating the fresh urine to one-half its original volume and precipitating the hippuric acid at room temperature.

Using the above data as a basis of calculation and assuming 20 pounds of urine daily per 1,000 pounds weight of cow, the total daily benzoic acid output would approximately be 1 pound per 8 cows. By acidifying and cooling 0° C, as described above and assuming that all the urine is collected, the amount of benzoic acid

*To avoid loss of benzoic acid by volatilization during evaporation it would be necessary to first convert into sodium salt by addition of caustic soda.

†100 cc. fresh urine is boiled with 10 grams NaOH for 2 hours under a freflux condenser in order to hydrolize the hippuric acid to benzoic, and then acidified with 20 per cent H_2So_4. Bromine water is added to precipitate phenols—and the solution cooled and made up to 250 cc.—A 50 cc. aliquot is extracted with 4 portions—50 cc.,—40 cc.,—20 cc.,—20 cc. of sulphuric ether solution. The combined ether solution is slowly dropped into a U tube through which a current of air is drawn, the U tube being kept in a water-tight bath which is kept at a temperature of 40°C.

The benzoic acid is then sublimed from the U tube into a tared condensing tube—the condensing tube consisting of a glass tube 25 cm. long, 9 Mn. bore, 25 grams in weight, with 3 glass bulbs blown on it, the bulbs being filled with glass wool.

The sublimation was carried out at a temperature below 130°C.

available daily, would be approximately 1 pound per 15 cows.

In the case of putrified urine, i.e., urine in which the hippuric acid had hydrolized by the bacterial action to benzoic acid and glycocoll, it was found that very little benzoic acid separated out after acidification and cooling to 0° C. However, if the putrified urine is first clarified with milk of lime, allowed to stand until clear, and the supernatant liquid poured or siphoned off, the benzoic acid readily separates out on acidification and cooling, the percentage of efficiency being practically that obtained in working on fresh urine.

On account of the possibly greater value of the products, hippuric acid, benzoic acid, and glycocoll, it would seem desirable to use fresh urine, but so far it has not been determined if this would be generally possible under ordinary stable conditions.

In this simple method of acidification and cooling to 0° C. it would appear that we have the basis of an economic process for the production of benzoic acid from urine which might be employed over a large part of the Dominion during the winter months. The modern cow barn, with its concrete gutter would much facilitate the collection of the urine, and where twenty-five or more head of stock are housed in the same building, as is now frequently the case on dairy farms, there would seem to be the possibility of making the preparation of this by-product a profitable adjunct to the dairy business.

THE HEALTH OF ANIMALS BRANCH

TUBERCULIN TESTING

BY FREDERICK TORRANCE, B.A., D.V.S., VETERINARY DIRECTOR GENERAL

THE testing of cattle by federal inspectors free of charge is done under the following circumstances:—

(1) Pure-bred cattle exported to the United States are required by the United States regulations to be accompanied by a certificate of tuberculin test (chart of test included), signed by a salaried veterinary inspector of the Dominion Department of Agriculture. Exporters desiring to have cattle tested for export should notify the Veterinary Director General at Ottawa, or the chief veterinary inspector of their province. The test is made free of charge.

(2) Owners of herds who desire to eradicate tuberculosis and are willing to submit to certain rules imposed by the Department will have their cattle tested free of charge. The owner will be required to sign the following agreement:—

AGREEMENT

I.....

of (Lot.....Sec.,.....Tp.,....Rge....)

P.O.....

in the (County) of.....

in the Province of.....

in consideration of my herd of cattle being submitted to the tuberculin test by an Officer or Officers of the Health of Animals Branch of the Department of Agriculture, acting under the direction of the Veterinary Director General, do hereby agree:—

THAT I will honestly and faithfully carry out any instructions which may be received by me from the said Officer or Officers in regard to the disposition of any or all of the animals comprising the said herd, especially as regards the separation, segregation, quarantining, retesting, or selling of any such animal or animals, or the use for food for such animals of milk or any of the by-products thereof.

I further undertake to carry out in a manner satisfactory to the said Officer or Officers any instructions which may be issued by them in regard to the ventilation and sanitation of any building or buildings in

which the said animal or animals are or may be housed.

I further undertake to duly notify the Veterinary Director General of any purchase or intended purchase of new cattle, and to take such precautions in regard to the testing, isolation and retesting of these, as he may deem necessary or advisable.

I further undertake not to permit my bulls to serve any cow other than those comprised in my own herd and kept on the above described premises.

AND I further agree that upon being notified of the arrival of the said Officer or Officers of the Health of Animals Branch, I will arrange for their conveyance from and to the nearest railway station free of charge; and during the time that the said Officer or Officers are engaged on my premises in carrying out the provisions of this Agreement I will board and lodge them at my own expense.

Dated at.....

P.O.....

County / Municipality } of.....

this.....

day of.....191..

Sgd.

.....

Owner.

Witness.....

(3) Cities and towns which have accepted the conditions of the federal order respecting tuberculosis will have all cows in licensed dairies supplying unpasteurized milk submitted to the test by federal inspectors free of charge.

Cities and towns desiring this aid in the control of tuberculosis should make application to the Veterinary Director General.

(4) By agreement with the government of British Columbia, all pure-bred cattle imported into that province from other parts of Canada must be accompanied by a test certificate signed by a veterinary inspector of the federal Department of Agriculture. This test is made, free of charge, on application to the Veterinary Director General.

No other free testing is done, but the Department will furnish tuberculin free of charge for use by veterinarians only under the following conditions:—The owner of the herd to be tested must write to the Veterinary Director General stating the number of cattle to be tested and the name of the veterinarian to make the test. The necessary number of doses of tuberculin is then sent to the veterinarian with blank charts which he is required to fill in with the record of the test and return to the Veterinary Director General. Any animals which react are permanently marked by punching out the letter T in the right ear.

NOTE.—The testing of the herds on the Experimental Farms and Stations as carried out by the Health of Animals Branch is performed under the same regulation as is outlined in Clause 2.—Editor.

MARKETS INTELLIGENCE CHIEF RESIGNS

Mr. A. P. Westervelt, Chief of the Markets Intelligence Division of the Federal Live Stock Branch, has resigned to devote his full time to his fruit farm at Clarkson, Ontario. Mr. Westervelt entered the service of the Live Stock Branch in the fall of 1914. When the Patriotism and Production campaign was instituted at the beginning of 1915, Mr. Westervelt was prominently associated with its promotion. He returned to the service of the Live Stock Branch the following July, and in April last year he was appointed chief of the Markets Intelligence Division.

ASSISTANT LIVE STOCK COMMISSIONER

Mr. W. R. Reek, B.S.A., Secretary of Agriculture for the province of New Brunswick, has been appointed Assistant Live Stock Commissioner for Canada. Mr Reek has been Secretary for Agriculture in the province of New Brunswick since the spring of 1917.

THE ENTOMOLOGICAL BRANCH

THE PEAR PSYLLA

BY W. A. ROSS, DOMINION ENTOMOLOGICAL LABORATORY, VINELAND STATION, ONT.

THE pear psylla is frequently very destructive to pear orchards in Ontario, notably in the fruit growing sections bordering Lake Ontario from Burlington to the Niagara river. Many pear growers who have suffered from its depredations are persuaded that this pest is the most troublesome insect with which they have to contend.

It is believed that the psylla was first introduced into North America in 1832 on pear trees imported into Connecticut from Europe. Since then, it has become generally distributed over the Eastern States and parts of Eastern Canada. In Ontario it was first discovered in 1894 at Freeman, Halton County, at which place it was found seriously injuring a block of 300 Dwarf Duchess pear trees.

NATURE OF INJURY

The psylla causes injury by extracting with its sucking mouth parts the sap from the leaves, leaf stems, fruit stems and tender wood on which it feeds. On badly infested trees, the continual sapping of the life juices by myriads of psyllas robs the trees of vitality, dwarfs the fruit, produces brown dead areas on the leaves (Fig. 1) and in extreme cases causes the foliage to drop prematurely. Trees seriously weakened by the psylla are especially susceptible to winter injury, and in a hard winter like that of 1917-18 readily succumb to low temperatures.

Large quantities of a sweet sticky liquid, called honey-dew, are excreted by the psylla nymphs, and on attacked trees the foliage, fruit, twigs and branches may be covered with this sticky material and with a sooty fungus which grows in it (Fig. 2). This coating of honey-dew and sooty fungus not only makes the trees and fruit very unsightly but it is very probable that it is also detrimental to the physiological functions of the leaves.

DESCRIPTIONS

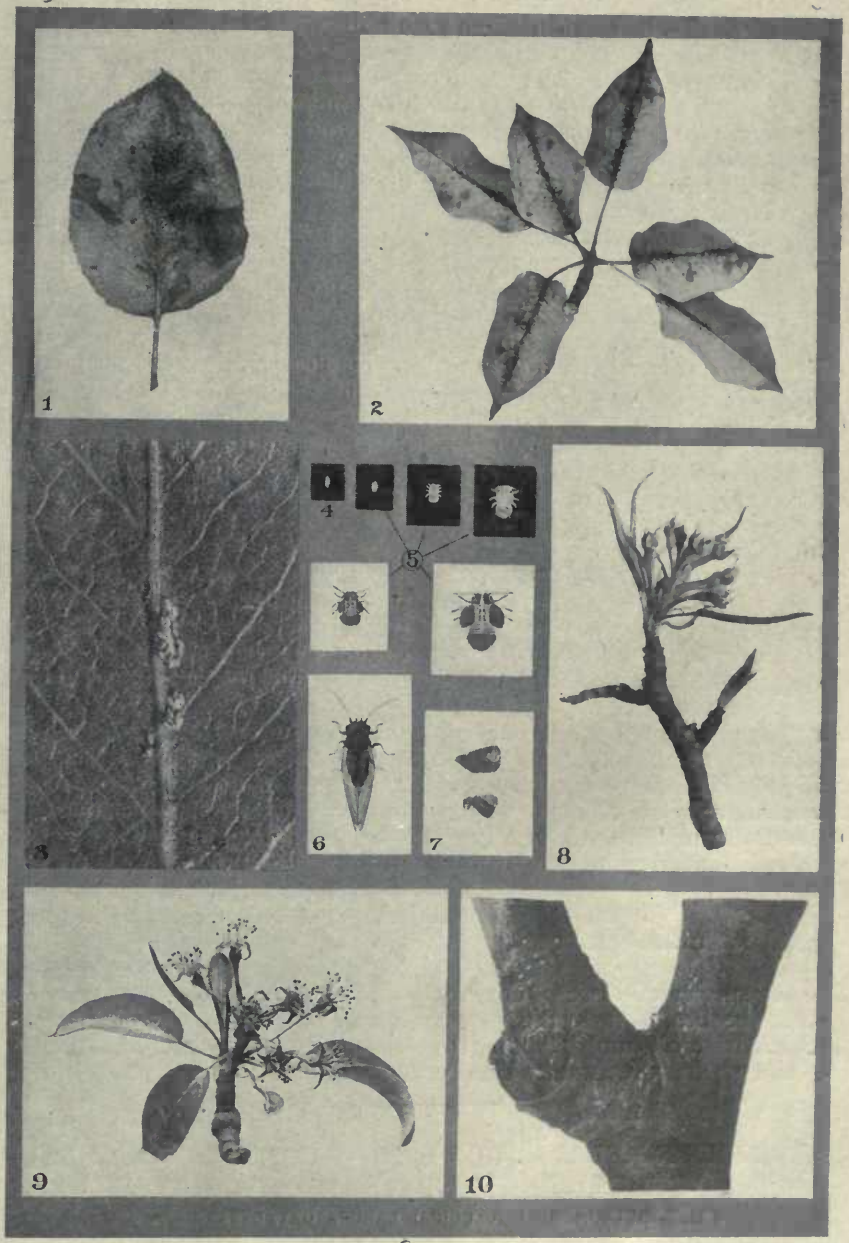
Adult.—The adult psylla (Fig. 6) is a tiny, four-winged insect about one-tenth of an inch in length. The transparent wings slope roof-like over the abdomen and the legs are adapted for jumping. The summer form is reddish with dark markings whereas the winter or hibernating form is dark brown or black. The differences in the external appearance of the male and female are shown in Fig. 7.

Egg.—The egg (Fig. 4) is a minute, sub-oval, yellowish body just visible to the naked eye. It is attached to the leaf or bark by means of a short stalk near the basal end.

Nymph.—The nymph (Fig. 5) is oval and very flat in shape. In growing, it passes through five stages or instars. In the first three instars it is yellowish; in the last two it is dark brown or black and has conspicuous wing pads.

LIFE-HISTORY

The winter is passed in the adult stage. The adults hibernate under the rough bark on the trunks and main limbs, and under grass, leaves and rubbish near the infested pear trees. In late March or early April, the insects leave their winter quarters, congregate on the twigs and fruit spurs and, in a short time, provided the weather remains propitious, commence to lay eggs. Each female is capable of laying from 200 to 400 eggs. Oviposition may continue until about the time the petals drop; however, the vast majority of the eggs are laid by the time the fruit



1,—Leaf injury caused by pear psylla; 2,—Leaves showing honey-dew fungus and nymphs; 3,—Showing eggs laid along midrib of leaf; 4,—Egg; 5,—Various stages of pear psylla nymph; 6,—Adult pear psylla; 7—Abdomen of male and female pear psylla, female above, male below; 8,—Showing stage of fruit-bud development at the time of first application of spray; 9,—Blossoms fallen, time for second application of spray; 10,—First generation eggs laid on bark. (All figures original, 3, 4, 5, 6, 7, 10, much enlarged).

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buds have burst. The eggs are deposited on the twigs, fruit spurs and smaller branches, chiefly on the under surface (Fig. 10). They commence to hatch when the fruit buds are beginning to break and nearly all have hatched by the time the petals drop. The period of incubation varies, according to temperature, from nine to thirty-two days, the average being about three weeks. The newly hatched nymphs migrate to the opening buds where they feed chiefly on the petioles and blossom stems. They grow rapidly and after moulting five times reach the adult stage in about one month. This first brood is then succeeded by three other broods and the life-cycle is finally completed in the fall by the appearance of the winter adults—the hibernating forms.

The summer adults are more prolific than the hibernating forms. Their reproductive capacity according to our observations may vary from an average of about 500 to a maximum of nearly 700 eggs per female. Their eggs are laid on both sides of the foliage, principally along the midrib (Fig. 3). They hatch during warm weather in about eight to ten days and the nymphs derived from them reach maturity in two to four weeks.

NATURAL CONTROL

Several species of insects, notably lady-bird beetles, attack the psylla and check its rapid multiplication to some extent; however, undoubtedly the most important control agency afforded by Nature is the weather. Our observations indicate that protracted periods of cold, wet weather in spring may be disastrous to the eggs and newly hatched young and that long spells of hot dry weather are fatal to many nymphs.

ARTIFICIAL CONTROL

According to our experiments in Ontario and to more extensive experiments in New York State the most economical and satisfactory method of combatting this pest is to make the following modifications in spraying practices in the pear orchard:

1. Postpone the so-called dormant application of lime sulphur (winter strength) until shortly before the trees bloom, (See Fig. 8), and then thoroughly drench all parts of the trees including the under side of the twigs and branches. This application destroys the newly hatched nymphs and the eggs about to hatch.

2. Add nicotine sulphate (40 per cent)—at the rate of three-quarters of a pint to eighty gallons of spray mixture—to the spray applied just after the blossoms fall (Fig. 9) and again spray with great thoroughness. This application kills the nymphs which at this time of the year are situated chiefly in the axils of the leaf petioles and blossom stems.

It cannot be too strongly emphasized that in spraying for psylla thoroughness is more than half the battle.

NOTES ON THE RELATION OF INSECT CONTROL TO CULTURAL PRACTICES IN WESTERN ONTARIO

BY H. F. HUDSON, ENTOMOLOGICAL LABORATORY, STRATHROY, ONT.

THE importance of crop protection, by this is meant the freedom of the plant from insects and fungous diseases, is of vital importance, especially at this time when the food supply of the world is distressingly short, and only by the greatest care in the conservation of our food supplies can we hope to feed, not only ourselves, but also our huge armies now engaged in a world-wide conflict. The writer hopes in this article to point out a few ways in which the

loss by insect pests may be partly reduced; they can never be entirely eliminated. We have wisely advocated greater production as a means to an end to supplement the shortage of food supplies, but how many have taken into consideration that with greater production, and an acute shortage of agricultural labour, our efforts are likely to be seriously curtailed by the unwelcome visitation of insect pests and fungous diseases. While the writer does not wish to dampen the ardour of those who are putting forth extraordinary efforts to overcome the acute shortage of food supplies, he would at least like to sound a note of warning, that while he strongly advocates increased production he also wishes to emphasize the imperative necessity of the efficient control of insect pests, and both the farmer and the market gardener must not release their efforts one particle, in fact they should doubly concentrate their attention on these points so that they may be well prepared for the coming spring. The demands for grain and farm produce generally is steadily increasing, and to offset this larger acreages are being planted every year, but unfortunately through lack of capable help, a great many seed beds have been poorly prepared. This can have only one result, namely a decreased crop by the growth of weeds, and the probable infestation by some insect pest.

In conjunction with our work on the white grub, we have made numerous inquiries into the general method of farm rotation, and we have under observation several farms where insect pests cause little or no injury, while others in close proximity have been distinctly injured. The reason for this is largely due to the system of rotation followed, crops grown and the amount of labour expended on the land prior to planting. This has been particularly noticeable on the corn crop this year. Usually corn is planted on spring-ploughed sod, usually two years old, the bulk of which is principally timothy. Such procedure almost invariably entails loss by cutworms, white grubs, wireworms, etc., unless the ground has been very thoroughly worked, and even then the possibility of injury is not entirely eliminated. Why then does one farm secure an excellent stand of corn and an adjoining field be from one-third to one-quarter injured? The reason for this is because in one case clover has been ploughed under, and in the other a two-year stand of timothy and clover, practically all of which is timothy. Why timothy has become so popular is difficult to understand, as it is extremely hard on the land, and the hay is not considered to be first-class from a feeding standpoint.

The aforementioned farms where practically no injury occurs follow excellent agricultural procedure—one that can be very profitably followed with very beneficial results.

In this discussion we are not considering old sod or pasture land, but rather that portion of the farm that the farmer depends upon to secure his grain, root, and hay crops. The system followed with such excellent results is as follows: first year red clover for hay, 9 pounds of seed per acre; this is ploughed in the fall and planted to wheat. In the spring of the second year clover is again sown on the wheat field, and in the following spring the wheat stubble and clover are ploughed under together with a good top dressing of barnyard manure, and the ground planted to corn and potatoes. The cultivation through the summer cleans the ground and the ground is ploughed and planted to oats in the following spring and re-seeded to clover. It will thus be seen that two clover crops are turned under in four years. In conversation with farmers who follow this rotation they inform me their crops are always good, very free from insect pests and they attribute the latter chiefly to short rotations of hay crop and the elimination of

timothy. It may not always be possible to follow such a rotation. but a general casual survey through the country suggests an immediate change in general farm rotations. Grain crops are following one another in quick succession and some fields under observations are again planted to wheat for the third year in succession. This can only mean soil depletion and lighter crops. With a light crop, and the soil in poor heart, what chance would such a crop stand by an invasion of injurious insects? It is the light crop that suffers most; a strong vigorous plant can repel an extraordinary amount of injury before it finally succumbs.

A few observations on the effect of the fall manuring of land intended for truck crops may not be out of place. The writer has never seen so much injury done to young spring crops such as cabbage, cauliflower, radishes, onions, etc., as he witnessed last spring. Practically all the early crops as mentioned above were wiped out by the various species of root maggots. In view of our knowledge of the cabbage maggot there is no reason why there should be any injury to speak of; the tarred felt paper discs have given ample proof of this and the onion maggot can also be controlled by applying poisoned spray baits which attract and kill the adult flies. Nevertheless land manured in the spring seems to attract the various species of flies in greater proportion than that fertilized in the fall. I know of one field that has been continuously in onions for the past six years, and not a sign of root maggot was present. This particular field is regularly manured and ploughed in the fall, a similar field close by manured and ploughed in the spring, and bearing its second crop of onions sustained a loss of over 25 per cent due to the onion maggot. Sufficient data have not been obtained to prove the above statement, but casual observations seem to support it. In conclusion the writer believes that clean farming, systematic rotation and seed selection will materially reduce the farmer's losses from insect pests.

QUEBEC CITY NOW A PORT OF ENTRY FOR EUROPEAN SHIPMENTS OF NURSERY STOCK

BY a recent Order-in-Council, Regulation 6 of the Destructive Insect and Pest Act was amended to include Quebec City as a port of entry for shipments of nursery stock originating in England and other parts of Europe. The season for importing such nursery stock began on September 15 and will continue until May 15. Formerly European shipments destined to the district of Quebec City had to enter at the Port of Montreal.

The Order in Council passed on August 5, 1918, is as follows:—

"His Excellency the Governor General in Council, on the recommendation of the Minister of Agriculture, is pleased to order and it is hereby ordered, that the regulations under the 'Destructive Insect and Pest Act,' established by the Order in Council of the 17th day of July, 1917 and amendments thereto, shall be and the same are hereby further amended by striking out the word 'and' in the seventh line of these regulations and adding the words 'and Quebec, P.Q.' after the letters 'P.Q.' in the same line thereof."

ENTOMOLOGICAL LABORATORY FOR SASKATCHEWAN

THE Entomological Branch has established a laboratory and office at the University of Saskatchewan, Saskatoon, through the courtesy of the President and Board of Governors, by whom this accommodation is being furnished. This laboratory will serve as headquarters for the work of the Branch in Saskatchewan, and Dr. A. E. Cameron has been given charge. During the last two years Dr. Cameron has been studying some of the chief blood-sucking and other insects affecting live stock in Saskatchewan, and this work is to be continued, on account of its importance to the live stock interests in Western Canada. In addition, the laboratory will serve as a local bureau of information on insect pests affecting agricultural crops in the province, and it will be possible to render assistance more rapidly in case of serious insect outbreaks.

Apart from the value of the special investigations that the officers in charge of these laboratories are conducting, no less important is the immediate assistance that they are able to render agriculturalists from time to time on the sudden outbreak of an insect pest, and the increasing correspondence is indicative of the fact that the farmers are looking to these officers for assistance in dealing with the enemies of their crops and stock, etc.

THE SEED BRANCH

IMPORTATION REGULATIONS

THROUGH an Order-in-Council of October 26th important new regulations regarding the importations of seeds have been brought into effect as follows:—

1. IMPORTATIONS OF UNFIT SEED PROHIBITED

On and after the first day of November, 1918, the importation into Canada of seeds of any or all kinds of clovers, grasses, vetches, rape, other forage plants, field root and garden vegetables in lots of ten pounds or more which are unfit for seeding purposes under the terms of this order, is hereby prohibited.

2. WHAT CONSTITUTES UNFIT SEED

Any seed named in Regulation 1 hereof shall be considered unfit for seeding purposes (a) if it does not comply with the Seed Control Act requirements respecting the sale of seed in Canada, or (*b*) if it has been refused admittance into any other country on account of low vitality.

3. COLLECTORS OF CUSTOMS TO TAKE SAMPLES

The collectors of customs, under instructions which may be issued by the Minister of Customs and the Minister of Agriculture, shall draw and forward to a Canadian Government seed laboratory for examination samples of all lots of the seeds named in Regulation 1 hereof which are entered for consumption in Canada.

4. DELIVERY ON EXAMINATION OR IN BOND

Except as provided by Regulation 5 hereof, seeds offered for importation in Canada from any foreign country, after samples of each lot have been taken for examination, shall be admitted only after the samples have been examined and pronounced fit for seeding purposes within the terms of this order: Provided, however,

That the collectors of customs may deliver shipments to consignees when sampled, on the execution of a bond in a sum equivalent to the invoice value of the seed, together with the duty thereon, if any, conditioned upon the delivery of the shipments or any part thereof to the collector when demanded by him for any reason.

5. DELIVERY WITHOUT EXAMINATION OR BOND

Under authority of the Minister of Agriculture, which may be withdrawn at any time, the collectors of customs may deliver to consignees upon sampling, and without a bond, shipments of (*a*) clover or grass seed which are marked with a grade number in accordance with the provisions of the Seed Control Act, if a Canadian Government seed laboratory test number is given as authority for the grade; and (*b*) root and vegetable seeds which are apparently of strong vitality.

6. RELEASE OR CLEANING UNDER BOND

If examination of the sample submitted shows that any lot of seeds is fit for seeding purposes under the terms of this order, the collector of customs when so informed shall no longer detain the shipment, and the bond, if any, given pursuant to section 4 hereof shall be cancelled; but if the seeds are found to be unfit for seeding purposes within the terms of this order—the collector may permit the importer to reclean or label the seeds under bond at the expense of the importer in accordance with regulations 7, 8, and 9 hereof.

7. RECLEANED SEED TO BE SAMPLED

The collector of customs or a seed inspector authorized by the Minister of Agriculture shall draw and forward to a Canadian Government seed laboratory a sample of the recleaned seeds, together with a sample from each sack of the screenings or other refuse removed from the seeds in the course of cleaning, accompanied by a statement of the weight of the recleaned seeds and the weight of each individual sack of screenings, and the same procedure shall be followed if further cleaning is done.

8. UNFIT SEED TO BE DEPORTED

If the examination of the sample submitted shows that the recleaned seed is not fit for seeding purposes within the terms of this order, or if the importer shall decline to reclean or label any shipment of such seeds, the collector of customs shall refuse delivery of the shipment and require it to be deported under customs supervision.

9. RELEASE OF CLEANED SEED

If the examination of the sample submitted shows that the recleaned seed is fit for seeding purposes within the terms of this order, such seed may be released to the owner or consignee upon condition that the screenings and other refuse removed in the course of recleaning are disposed of to the satisfaction of the Minister of Agriculture.

10. MIXING UNFIT SHIPMENTS WITH OTHER SEED PROHIBITED

Mixing any seed with a lot or shipment of imported seed which has been found to be unfit for seeding purposes within the terms of this order is prohibited.

11. NOTICE OF REMOVAL FROM PORT OF ENTRY

The collectors of customs shall notify the Minister of Agriculture whenever seed which has been sampled under this order is moved from one port to another port before being finally released.

12. DISPOSITION OF DETAINED SHIPMENTS TO BE REPORTED

The collectors of customs shall inform the Minister of Agriculture of the disposition made of every shipment detained under these regulations.

13. FAILURE TO EXPORT TO BE REPORTED

Should the importer fail to export within three months from the date of refusal of delivery of any seed the delivery of which has been refused under these regula ions, the collector of customs shall report the facts to the Minister of Agriculture.

14. PENALTIES

Failure to comply with any provisions of this order shall be punishable by a fine not exceeding $500 for the first offence, and not exceeding $1,000 for a second and subsequent offence.

INSTRUCTION FOR IMPORTERS

INSTRUCTIONS recently issued under the foregoing Order-in-Council contain the following:

SEED WHICH MAY BE DELIVERED WITHOUT BOND

Under the authority of the Minister of Agriculture, given in section 5 of the Order-in-Council grass and clover seed may be considered to be marked within the requirements of this section—

(a) When the grade and test number are given on the invoice, or,

(b) When the consignee presents with the invoice a certificate of analysis from a Canadian Government Seed Laboratory with a written statement that the certificate was issued on a sample which represents the seed covered by the invoice, provided that the certificate shows the seed to be salable in Canada.

Until notification is received to the contrary shipments of root and vegetable seeds may be delivered without a bond to all consignees.

PRIVILEGE OF DELIVERY WITHOUT BOND MAY BE WITHDRAWN

The privilege of securing delivery of seed without a bond under the terms defined in the paragraph above may be withdrawn from any firm or individual upon written notification to the collector of customs from the Seed Commissioner.

WHERE TO SEND SAMPLES

All samples drawn under the Order in Council shall be forwarded to the respective seed laboratories under which the ports of entry are located as follows:

All ports East of Port Arthur, Ont., Seed Laboratory, Dept. of Agriculture, Ottawa Ont.

All ports including Port Arthur and west thereof to Saskatchewan and Alberta boundary, Dominion Seed Laboratory, 173 Portage Avenue, Winnipeg, Man.

All ports in Alberta and British Columbia, Dominion Seed Laboratory, North-West Travellers Bldg., Calgary, Alta.

DELIVERY OF GOOD SEED FACILITATED

The above regulations and instructions have been drafted so that the regular legitimate seed trade will be interfered with to the least possible extent, while the importation of unfit seed will be prevented.

The samples taken by the customs officers will be tested in the seed laboratories. When test numbers are given, or certificates presented under (a) or (b), paragraph 1, of "Instructions Under Order-in-Council" for delivery without a bond, the samples taken by the collectors of customs will be compared with those on which the certificates, as indicated by the numbers, were given. When there is evidence that any firm or individual is attempting to secure delivery of grass or clover seed by giving inaccurate information respecting laboratory tests, or is importing root or vegetable seeds of unreasonably low vitality, the privilege of securing delivery without bond, and before samples have been tested, will be withdrawn from that firm or individual, as provided by paragraph 2 of the Instructions.

THE STANDARDS OF SEED WHEAT, OATS, BARLEY, AND RYE

BY Order in Council of October 26th the Seed Control Act is amended in so far as it relates to the grades of wheat, barley and other classes of grains used for seed purposes. The Order reads as follows:—

Whereas in virtue of the provisions of section 2 of the Seed Control Act, 1911, an Order in Council was passed under date the 7th day of October, 1916 (P.C. 2429), by which special grades of grain were established exclusively for seed purposes without affecting the commercial grades fixed under the authority of the Canada Grain Act;

And whereas on the advice of the Seed Purchasing Commission and in view of the present condition and available supply of grain from the crop of 1918, it is thought desirable that a modification to the established grades of seed grain be made in order to secure a plentiful supply of good seed for the ensuing year:

Therefore, His Excellency the Governor General in Council, on the recommendation of the Minister of Agriculture, is pleased to order that the Order-in-Council of date the 7th day of October, 1916 (P.C. 2429), shall be and the same is hereby amended by rescinding that portion thereof establishing the nomenclature of grades of grain for seed purposes and substituting the following definitions in lieu thereof:—

The grades of grain for seed purposes shall be as follows:—

WHEAT

"No. 1 Canada Western Seed Wheat" shall be composed of grades No. 1 Hard or No. 1 Northern; shall be at least 85 per cent Red Fife or Marquis variety, shall be sound, of strong vitality, clean and practically free from other grain; shall be free from noxious weed seeds within the meaning of the Seed Control Act, and shall weigh not less than 60 pounds to the measured bushel.

"No. 2 Canada Western Seed Wheat" shall be the same as No. 1 Canada Western Seed Wheat in all respects except that it shall be composed of grade No. 2 Northern.

For seed purposes Red Fife and Marquis wheat shall be kept separate.

OATS

"No. 1 Seed Oats" shall contain 95 per cent of white oats; shall be sound, of strong vitality, clean and practically free from other grain; shall be free from noxious weed seeds within the meaning of the Seed Control Act, and shall weigh not less than 34 pounds to the measured bushel.

"No. 2 Seed Oats" shall be the same as No. 1 Seed Oats in all respects except that it may contain up to but not exceeding an average of ten wild oats per pound.

BARLEY

"No. 1 Canada Western Seed Barley" shall be composed of six-rowed barley; shall be of strong vitality, sound, plump, practically free from other grain, of fair colour, free from noxious weed seeds within the meaning of the Seed Control Act, and shall weigh not less than 45 pounds to the measured bushel.

"No. 2 Seed Barley" shall be the same as No. 1 Seed Barley in all respects except that it may contain up to but not exceeding an average of ten wild oats per pound.

RYE

"No. 1 Canada Western Seed Rye" shall be sound, of strong vitality, plump, and practically free from other grain; shall be free from noxious weed seeds within the meaning of the Seed Control Act, and weigh not less than 56 pounds to the measured bushel.

"No. 2 Canada Western Seed Rye" shall be the same as No. 1 Seed Rye except that it may contain up to but not exceeding an average of ten noxious weed seeds per pound.

GENERAL

The maximum tolerance under the words "practically free from other grain" as used above shall be at the discretion of the seed inspector.

The above standards are to apply to seed grain that is shipped from any of the Canadian Government elevators. Grain coming into the elevators may be accepted for seed subject to cleaning if, in the opinion of the seed inspector, it can be cleaned to the standard of the seed grade indicated in the certificate issued; provided, however, that no grain shall be accepted for seed which in the opinion of the inspectors will require excessive dockage, or is otherwise unsuitable for seed.

THE FRUIT BRANCH

BRITISH APPLE EMBARGO REMOVED

BY C. W. BAXTER, FRUIT COMMISSIONER

THE British apple embargo was put into effect on February 24th, 1916, owing to the urgent demand for ocean space to accommodate food stuffs and munitions for the effective prosecution of the war. Subsequently, at the urgent request of the British Fruit Trade and the Canadian growers, this embargo was modified so that during the season of 1916-1917 apples could be shipped to Great Britain until July 31, 1917, provided that the quantity imported into Great Britain must not exceed 50% of the total import during the previous season. Thus the embargo automatically came into effect again on August 1, 1917.

During the fall of 1917 very energetic efforts were made to have the embargo again modified. The trade in Great Britain was particularly active, and apple exporters in Canada took every possible step, and made every possible plea, to have a satisfactory adjustment made. These efforts were all without avail. The food situation in the Old Country was in a more or less critical condition, and apples were not considered as essential as other food stuffs. It was, therefore, necessary for the Nova Scotia crop to move westward in Canada and for many Ontario apples, which might otherwise have been exported, to be disposed of in our home markets. The apple crop that year was light, and was, therefore, distributed and disposed of at excellent prices for first quality fruit.

On November 15, 1918, a general license was issued to the British trade permitting the import of apples in an quantity. It was pointed out that exporters must find their own space. As soon as we received this information, we at once cabled our representative in Great Britain asking him to keep us advised, by cablegram, immediately upon the completion of arrangements. As it was understood that sales in the United Kingdom would be subject to controlled prices and as the ocean transportation rate was very indefinite, it was of the greatest importance that these two figures, namely, the transportation rate and the British fixed or controlled price, be obtained as quickly as possible.

Our next information was received on November 18th, when we learned that all arrangements for shipping space were to be made through the office of the British Ministry of Foods (Canada), at Montreal, and that applicants for space would be

furnished with the necessary forms when space was available.

On November 25th, we learned that the ocean rate would be $5.00 per barrel and $2.00 per box, with no discrimination between Ontario and Nova Scotia barrels. We also received a cable from our British representative to the effect that while no apple order had been issued, it was probable that the retail maximum price would be fixed at 9 pence per pound and the primary distributors' maximum at 6¼ pence per pound. It was also pointed out that importations would probably be restricted to licensed importers.

Thus the situation stands at the time of writing. The removal of the embargo will particularly affect Nova Scotia, where there are approximately 200,000 barrels of apples still in storage. These can be readily exported from Halifax to Great Britain, and even if the quantity of available space is small on individual steamships, yet in the aggregate it is probable that no difficulty will be met in obtaining all the space required. The situation is hopeful, and one, which after nearly three years of restricted markets, will afford the Canadian grower and the British fruit merchant very necessary encouragement.

THE LIVE STOCK BRANCH

MARITIME PROVINCES SHEEP IMPROVEMENT POLICY

BY NORMAN STANSFIELD, ACTING CHIEF, SHEEP AND GOAT DIVISION

As a war measure and for one year only it was decided to change the policy of distribution of pure-bred sires in the three maritime provinces this year. The old policy of distributing pure-bred sires to live stock associations has, undoubtedly, accomplished great improvement in the districts where these sires have been placed, but it was felt that the improvement was not as fast as it might be. Therefore the policy has been changed and the following method was inaugurated as a war measure for one year only and to test out the workability of the policy.

The Dominion Live Stock Branch co-operated with the provincial departments of agriculture in the work of distribution of sires and encouragement of the sheep industry. The provincial departments of agriculture notified the sheep raisers within their provinces, through the medium of advertisement, that it would be possible to obtain pure-bred sires at very little above the market value of grade sires, and pointed out that under such circumstances there was no excuse for the using of grade sires. After all applications were collected and tabulated, the pure-bred rams within the province were purchased by the provincial department and re-distributed under this policy. The supply of home-bred rams was insufficient in all these three provinces to supply the demand, so that it was necessary to purchase in other provinces other rams to supply the demand. A representative of the Sheep Division of the Dominion Live Stock Branch, with a representative from each of the three provinces, purchased over 200 rams in Ontario for this distribution policy, and at the same time approximately 200 pure-bred breeding ewes were purchased for distribution by the provincial authorities. Twenty-five dollars was the price at which ram lambs were distributed, and thirty dollars for shearling rams. The work of distribution was in each instance done by the provincial authorities, and the work of collection by the Dominion authorities, the expense being borne co-operatively. In the past the Dominion Live Stock Branch has distributed pure-bred rams and good results have occurred, but this new policy was tried as an experiment to find out if more immediate good might not be the result with the same expenditure.

PART II

Provincial Departments of Agriculture

THE CONTROL OF TUBERCULOSIS

NOVA SCOTIA

BY M. CUMMING, B.S., B.S.A., PRINCIPAL, AGRICULTURAL COLLEGE, TRURO

THE herd of cattle at the College of Agriculture, Truro, Nova Scotia, was placed under the "Bang" system for the eradication of tuberculosis in the year 1911. Fortunately, we had a barn removed about half a mile from the main barns and we decided to place the reacting cattle in this barn. We fancy that our successful experience with the tuberculin test since we began the system is partly attributable to the fact that the reacting cattle were kept so far away from the non-reacting cattle.

The non-reacting cattle are kept in the main stock barns and are tested twice a year. During the past six years there have been a number of tests when there were no reactions whatever in this herd, but occasionally we do get some reactions which are difficult to understand, and up to date we have no adequate explanation. Whenever any reaction does occur, the reactor is at once removed to the reacting herd.

The cows of the reacting herd are, as already stated, kept in a separate barn and are pastured separately. Their calves are removed immediately and brought to the main stable. Up to the present time only an odd one of these has reacted to the tuberculin tests which are commenced when they are one year old and continued regularly at six-month intervals after that.

The milk from the reacting herd is all pasteurized and separated, the cream being used in the ordinary way and the milk being fed to calves and pigs. Our herdsman is of the opinion that this pasteurized milk is not quite as satisfactory as the normal milk, but, none the less, the difference is not great.

Our experience in buying cattle has not been very satisfactory. Since we began the system, we have always bought subject to the tuberculin test but, fortunately for ourselves, have also adopted the principle of placing the newly purchased animals by themselves for at least three months, after which they were re-tested. Unfortunately, quite a percentage of these animals after passing the test at time of purchase, reacted three months later, and still more unfortunately, some of those that passed this second test and were then placed with the main herd, reacted subsequently. For this reason we have been careful in regard to purchasing, and, in fact, have added no females to the main herd for a number of years, confining our purchases entirely to males.

We have had some seven years' experience with tuberculin testing followed in a systematic way, and yet there are some problems connected with the procedure which we do not fully understand. For example, there are occasional reactions in the main herd for which we have no explanation to give. But, however, that may be, we are highly satisfied with our experiences with tuberculin testing, and consider that it should be much more extensively adopted.

However, there is no use shutting one's eyes to the fact that the person who adopts this must temporarily have to stand a substantial loss, but ultimately the fact that such person has a healthy non-reacting herd is bound to prove to his financial advantage.

QUEBEC

BY BRO. ISIDORE, PROFESSOR OF DAIRYING, OKA AGRICULTURAL INSTITUTE

DURING the last few years our herds, especially the dairy herd, have been submitted to a thorough and continued examination, and tuberculin tests have been made regularly each year. In so far as this tuberculin test may be taken as a guide, we believe that our herds are practically exempt from tuberculosis.

When cattle are bought, which seldom happens, we invariably ask for a tuberculin test certificate, attesting that the animal is exempt from the disease. No other guarantee is considered as sufficient.

For the tuberculin test, the subcutaneous injection method is employed. It is the most commonly used method, and the easiest to apply, if not the best.

Calves are tested when they are six months old. Adult animals are tested every year, as previously mentioned.

When the animal tested reacts in a doubtful manner it is isolated from the rest of the herd and retested at the end of three months.

All those that react in a positive manner are invariably slaughtered, under the supervision of a special inspector or a veterinary, who settles the method of disposal of the carcass.

As a preventive remedy our stables are kept in the best possible condition of cleanliness. Twice a year, in the spring and in the fall, after antiseptic washing and fumigation, they are completely whitewashed with lime and carbide residue. The latter process is the best.

The milk fed to our calves comes only from our dairy herd and such milk is always pasteurized before being used, although the healthy condition of our cows is guaranteed by this tuberculin test. It is considered necessary to take this precaution, as milk is brought to our butter and cheese factory by farmers of the neighbourhood, and our young herds might thus contract the disease which might be present in the surrounding herds.

Our herd of pigs which is composed of Tamworths, Berkshires and Large Yorkshires has never shown any symptoms of the disease. A thorough examination is made at the slaughtering of each animal and no symptoms of the disease have ever been found. The customary preventive sanitary precautions are followed and the herd is kept in a good condition of health.

Our poultry flock, which is large, is absolutely exempt from tuberculosis. The fowls for breeding are selected with the greatest care among the hardiest and the strongest. Any bird showing the least sign of weakness is at once sent to the butcher. All undesirable subjects are eliminated by a very thorough and judicious selection.

SCHOOL OF AGRICULTURE, STE ANNE DE LA POCATIERE

BY REV. NOEL PELLETIER, DIRECTOR

WE are pleased to give, for the benefit of readers of THE AGRICULTURAL GAZETTE an account of the method adopted on this farm to control tuberculosis.

No breeder has, I believe, suffered as much as we have from the dreadful ravages of the disease, and our experience in its extirpation has been a very costly one, indeed.

Twelve years ago, our entire herd of Ayrshires composed of eighty head of cattle, very carefully selected, had to be slaughtered. Desiring to check once for all the propagation of the disease, the old stable was disinfected in the most thorough and painstaking manner. The woodwork and the wood partitions were taken down, carefully washed and scrubbed; the floors were taken up, scrubbed, and washed with a solution of chloride of lime. But, despite all these precautions, tuberculosis introduced itself once more in the new herd, although all animals were supposed to be free from it when purchased.

It was decided to build elsewhere a new and thoroughly up-to-date dairy barn, with cement floors, cement mangers, and iron partitions and stanchions. Every animal in the herd was tested with tuberculin before being placed in the new barn, and any animal showing the slightest reaction was slaughtered for the butcher.

No animal is now introduced in our herd without being tested with tuberculin. The adults are injected at the tail. As soon as an animal reacts, it is slaughtered.

The calves, the largest proportion of which come from our herd, are tested at the age of eight months.

Our stables are thoroughly disinfected every year, in summer. Steam is first applied to the walls, stalls, mangers, and floors. Everything is then scrubbed and washed, and, lastly, thoroughly whitewashed with lime.

To protect the consumer, all milk intended for consumption is pasteurized. Skim-milk is sterilized before being given to pigs.

Such is, briefly stated, the method that has been successful in eradicating the disease from our herd and in preventing its return. We are pleased to state that there is not now a single tuberculous animal in our breeding herd.

MACDONALD COLLEGE

BY H. BARTON, B.S.A., PROFESSOR OF ANIMAL HUSBANDRY

MACDONALD College is following a system of controlling tuberculosis in the herds of cattle that is proving satisfactory.

All cattle purchased are bought subject to test, and precaution is taken to see that the test is performed by a reliable man. The cattle are submitted to a retest at the end of thirty days. It is not always possible to buy subject to retest, but in no case are cattle purchased without the initial test at the time of purchase.

Tuberculin test is applied twice yearly to mature stock. Calves are first tested after they are six months of age. The test is applied in the spring before the cattle go to pasture and in the fall when they are put in the barns.

Reactors are segregated, as are also any with suspicious temperatures. In our experience nothing but complete segregation is safe, but I can personally testify to herds having been cleaned up where young animals had reacted and been retained for some time.

Once yearly our stables are thoroughly disinfected. They are whitewashed twice yearly as a rule. A certain amount of disinfectant is used regularly, and, in case of any sickness, thoroughly, after which the stall is limed.

The only precaution taken with hogs is the pasteurization of any milk which might be supplied from reactors for animals that were not in good health.

ONTARIO

BY WADE TOOLE, B.S.A., PROFESSOR OF ANIMAL HUSBANDRY, ONTARIO AGRICULTURAL COLLEGE

I SHALL endeavour to describe our system of controlling tuberculosis in the Agricultural College herds:

The precautions taken at this institution to guard against the introduction of tubercular animals into the herds are simply the use of the tuberculin test. All animals now purchased are bought subject to the test. In this way we hope to be reasonably sure that we are not introducing the disease when we bring in new animals. We practise testing all mature stock every six months. Calves under six months of age are not tested.

For some years the practice at this institution was to isolate in a special stable valuable animals which reacted. These cows were kept away from the rest of the herd and their offspring, immediately it was born, was removed to a clean stable and got none of the milk from the infected dams. The practice was fairly satisfactory, and the calves grew up healthy and fairly free from the disease. Some changes are being made, however, in the general practice of handling the herd at the college. In future it is planned to test the cattle regularly every six months and slaughter reactors immediately after the test. Our experience is that those animals which react for the first time usually show very little of the disease in the carcass and there is little loss from slaughtering them. Moreover, in our case it seems necessary that a new barn far remote from our present stables be erected if we are to continue the "Bang" system and isolate infected cows and remove their calves as soon as dropped. This seems rather expensive, and we have decided that in the interest of the herds it is advisable to attempt to keep a tubercular free herd by practising the method of slaughtering immediately reaction is shown.

It may be necessary, too, in test work to go a little further than the tuberculin test. It has been found that some cattle suffering from the disease do not react and these, of course, remaining in the herd are carriers. We are thinking of supplementing the tuberculin test with further tests to make sure that we get all the animals suffering from the disease removed from the herd.

Stables should be kept clean at all times and should be thoroughly sprayed or white-washed at least twice yearly with a whitewash to which five per cent carbolic acid is added. In every herd such disinfectants as carbolic acid, boracic acid, and some such product, as creolin or zenoleum, should be on hand and should be used wherever circumstances indicate the need. Any by-products from the herd fed to swine are pasteurized, and the swine are not allowed to run anywhere near the tubercular animals.

The biggest trouble in combatting this disease is the danger of animals suffering from the disease not reacting to the tuberculin test. One or two of these in a herd may prove to be carriers of the disease and, consequently, it is difficult to absolutely stamp out the trouble. I believe that something like the "Field" system together with a thorough application of the tuberculin test will ultimately prove necessary to make sure that herds are clean. However, the tuberculin test alone proves satisfactory in most cases and should be used wherever a man is interested in developing a clean herd.

SASKATCHEWAN

BY W. J. RUTHERFORD, B.S.A., DEAN OF THE COLLEGE OF AGRICULTURE

ALL cattle purchased for the college herds with the exception of three head have been tested on the premises before shipment to us. The cattle were selected from non-tuberculous districts and herds so far as it was possible to ascertain this fact from practising veterinarians or others. The testing was done by veterinarians who had been previously employed by the Federal Branch in doing similar work. The three head mentioned as the exception were purchased at a public auction sale. They were isolated and tested; all reacted. They were carefully isolated until two crops of calves were secured when they were isolated.

For three years our veterinarian has tested the cattle every six months.

Calves are not tested until six months old or thereabouts.

Mature stuff are tested every six months.

We use the subcutaneous test. Only on a few occasions was the interdermal test used and then simply for verification.

We have had very few reactors to the test. In one case a pure-bred animal reacted. She was slaughtered and on a most careful examination no evidences of tuberculosis could be found. This was one of our strongest and best dairy cows. Since the first three years our herd has been under the supervision of the Health of Animals Branch of the Federal Government as per the Contagious Diseases Act. The last test of over 100 head gave only one reactor. Only slight evidences were found in the glands of the throat.

All animals reacting since the herd was put under Dominion supervision have been slaughtered. These, as I said before, have been very few in number, and losses have been very light.

Our stable is well lighted on all sides especially on the south. We disinfect the whole stable frequently with creoline or other coal tar disinfectants.

We have had no indications of tuberculosis either in poultry or swine. The swine get no milk except from our own herd.

ALBERTA

BY JAS. MCCAIG, M.A., EDITOR OF PUBLICATIONS

CATTLE before being placed on the Provincial Demonstration Farms are subjected to the tuberculin test and must take the test without reacting.

Calves are tested after they are six months old.

All matured stock is tested annually. All methods of tests have been employed, the opthalmic, interdermal, and subcutaneous. The subcutaneous method is the one which we now employ. It is thought to be the most satisfactory, but this is rather difficult to establish.

Animals that re-act are immediately sold to the packing plants and slaughtered under Government inspection. We do not maintain any tubercular herd in segregation.

The interior of stables is whitewashed twice a year.

No precautions are taken with poultry and swine beyond that of maintaining as good sanitary conditions as possible in care and housing.

NEW AGRICULTURAL REPRESENTATIVE SERVICES

Perhaps no class of workers undertake a greater variety of duties than the Agricultural Representatives. Their activities, in numerous cases, are limited only by the requirements and vicissitudes of the respective localities. While many of the services are common to all Representatives and are continuous from year to year, new services are constantly being inaugurated. For the information of officials engaged in this work and for others who are interested in it there have been brought together in the following series statements covering the more important new undertakings of individual representatives in various parts of Canada. This truly co-operative service constitutes the medium of communication between agricultural government departments and the farmers and is supported in the majority of instances by funds derived under THE AGRICULTURAL INSTRUCTION ACT as well as by provincial and municipal appropriations.

NEW BRUNSWICK

NORTHUMBERLAND, RESTIGOUCHE, AND GLOUCESTER COUNTIES

BY JAMES BREMNER, JR., B.S.A., AGRICULTURAL REPRESENTATIVE

ONE of the features of our office this year was the establishing of two potato seed centres, one at Chatham, and the other at Charlo, both districts being well known for the exceptional quality of potato they produce. In March I called on the potato growers of each district, and talked the matter over. A meeting was called, and officers appointed, who looked after the distribution and payment of seed when it arrived. These potatoes were inspected during the growing season for diseases, and each farmer kept separate, each by itself, about twenty-five or more of the highest-yielding, healthy hills when harvesting.

This is only a beginning, and no registered seed is for sale yet by these clubs, but next year several carloads will be available for shipment.

PIG CLUBS ORGANIZED

Another line, that is becoming general throughout Canada, that we carried on this year, was the sucessful forming of several pig clubs, but it is not necessary to go into this work, as it has already been quite fully discussed in THE GAZETTE.

EXERCISING OF HERD BULLS

One phase of our work that I intend broadening out in the near future is the education of our farmers to the exercising of their herd bulls. Many of the agricultural societies own pure-bred bulls, which are kept by some members of the society for the use of the community. Now these bulls are kept in the barn so much, that in many cases they will not do service, and, therefore, are of practically no value in that condition. Those bulls that do get offspring generally throw weak stock. The tendency of this is to force many to believe that this fault is characteristic of all pure-breds, and, therefore, the advisability of breeding only the common stock of the country. In order to overcome this difficulty, I am assisting the farmers in putting up a wire line, about fifty yards long, a convenient height above ground, so that the bull cannot come in contact with it, and as much higher as the means of fastening, etc., require. The wire, the ordinary soft No. 9, galvanized, used for bracing, when putting up wire fences, is what I have been using so far. One wire has been in service for two years, and still seems to be as serviceable as ever. A little axle grease applied to the wire about once a month enables the light chain, which leads from the wire to the ring in the bull's nose, to slip very easily.

It is remarkable how the bulls

like to get out, and how soon they get used to the wire. They will gallop back and forth, and go through all sorts of antics on that wire, but taking good care to stop before they come to the end; and, what is better still, they are kipp in a vigorous condition.

Unfortunately time has not permitted my putting very much work on this line yet, but I hope to see, not only the bulls in my district, but in every district in Canada, get more exercise, and then the pure-breds, will come into their own much quicker.

WESTMORLAND, ALBERT, AND KENT COUNTIES

BY J. H. KING, B.S.A., AGRICULTURAL REPRESENTATIVE

AN Agricultural office was opened in Moncton, Westmorland County, N.B., in September, 1917. The provincial Department of Agriculture realizing that, generally speaking, dairying must form the foundation for successful farming in the province, and believing that creameries and cheese factories were not as much in evidence as they should be, arranged to carry on propaganda work in Westmorland, Albert, and Kent counties during October and November for the purpose of encouraging and assisting the farmers of these counties to organize a co-operative company to conduct a general creamery business in Moncton. The arrangement of the details naturally fell to the lot of the Agricultural Representative and became the first important work of the writer, who was appointed Agricultural Representative for the three counties named above.

A good deal of work was entailed in connection with the organization of the company. Meetings were held in practically every district in which milk is produced and the project explained in full. Illustrations of what had been accomplished elsewhere were given. It was shown as well that a creamery at Moncton should be a success, as, being an important railway centre, it would be an excellent collecting and distributing point, as well as providing a good market for all kinds of dairy products.

THE FARMERS' CO-OPERATIVE CO.

Our work was not in vain. On December 27, 1917, The Farmers' Co-operative Creamery Company was organized. In February work was commenced in remodelling a newly bought building on Main street, Moncton, and in installing the machinery, and on June 5 operations were begun in one of the best equipped and most up-to-date creameries in the Maritime Provinces.

In this section of New Brunswick, dairying in past years has been carried on as a side line only. It was hoped that through the establishment of a creamery at Moncton, a greater stimulus would be given the dairy industry. That such will be the case is now assured. A large number of patrons have stated that it was their intention to increase the number of their milch cows as fast as possible. One patron speaking to the writer a few days ago said, "Why this (meaning the creamery) is the greatest thing that ever struck the country. Instead of having five cows next year, as I had this, I will have fifteen, perhaps twenty." Out best farmers are beginning to realize that not only is there good money in dairying, but are noting as well that for maintenance of soil fertility, dairying, with hog raising in conjuction, "beats them all."

WOOL SELLING

Another important work that has occupied a good deal of time was the organization of the sheep farmers in Westmorland, Albert, and Kent for the purpose of having them sell their wool co-operatively. Our method for carrying on this work, and the results obtained, was outlined

by Mr. E. M. Taylor in the October number of THE GAZETTE. It is sufficient to say here that this was the first year that co-operative wool marketing was conducted to any extent in the province, and while only 18,000 pounds were handled at Moncton, it can safely be stated that the undertaking was a pronounced success, and that several times this amount will be handled next year. A direct saving of at least $1,500 was made for the farmers who shipped their wool to the Moncton Wool Grading Station.

The two lines of work mentioned above have been featured much more than any other. Most of the remaining time has been spent in giving assistance in carrying on extension work for the Live Stock, Cereal, and Poultry Divisions of the Agricultural Department.

QUEBEC

ABITIBI

BY J. M. LECLAIR. B.S.A., AGRICULTURAL REPRESENTATIVE

THE work of the agriculturist is rather slow and difficult in a new district like that of Abitibi, where agriculture is still in its infancy. The organization of associations was taken up in addition to the regular work. An association designated "The Abitibi District Agricultural Association" was formed last spring, and it has accomplished the following:

(1) A resolution was passed to the effect of holding one or two district agricultural fairs at different places each year. Makamik was chosen this year, and the fair was held on the 9th of October. The organization of the fair was left entirely to the Representative.

(2) The purchase of breeding horses and other pure-bred animals was discussed, and steps were taken to introduce only one breed of each kind in the district. Once a breed is chosen, no change will be allowed. Up to the present, the working out of this programme had been left entirely to the farmers' clubs. Both organizations will now work in co-operation.

There are eight farmers' clubs, two of which were formed this year. All are prosperous and some of them have more than one hundred members. They purchase timothy and clover seed.

(3) Five co-operative associations were organized this year. The first dates from January. Last spring, these associations purchased $19,000 worth of seed grain and $8,000 worth of various supplies. From 8 per cent to 10 per cent of the profits are set aside as a reserve fund. Up to the present, the Agricultural Representative has been the organizer and the soul of the movement. The seed grain was purchased by him. Three weeks ago an attempt was made to combine these five co-operative associations into one district association. The work is still proceeding.

GREATER PRODUCTION CAMPAIGN

To encourage settlers to sow all the farm land, two series of lectures were given in the district. Greater production contests were organized in every parish and prizes were granted to the amount of $75 for each parish.

In order to get a maximum yield from the land already tilled, the adoption of a rotation system, suitable to the conditions of the Abitibi, was urged by means of lectures. Two-year-old clover meadows are to be ploughed, and the second growth of clover is to be ploughed under as green manure.

Live stock raising was urged, and means were taken to introduce breeding animals, especially swine and

poultry. Eight hundred Red Rhode Island eggs were sold to settlers or distributed free of charge to school pupils.

Two school gardens were established in two new places of the district, and both have held a fair; 45 pupils enlisted as gardeners. Home gardening contests have been organized wherever school gardens have been established.

An exact record of agricultural statistics is kept year by year by this office, as a record of the progress made. The nine demonstration plots established three years ago were given up and replaced by one field, under the supervision of the Representative. Experiments are carried on to find the most profitable methods of culture on soil containing the original humus, and on soil where humus has been destroyed by fire.

BELLECHASSE AND MONTMAGNY

BY ARTHUR LANDRY, AGRICULTURAL REPRESENTATIVE

BETTER farm buildings has been one of the main items on the programme in 1918. I took advantage of the series of lectures on greater production to say a few words, at each place, on the importance of having large, sanitary, and commodious barns. A poor rotation can be altered and improved at any time; a crop failure may be made up the following year; but the owner of a barn will find it a different matter to remedy a defect in construction due to the lack of a well-conceived plan.

The barn frame that has been recommended by several representatives in Lower Quebec is of the "Round Truss" type. This method of construction was first introduced by the Reverend Mr. H. Bois, professor of agronomy at the school of agriculture of Ste-Anne de la Pocatière. The principle of the frame is very simple, The strength resides in the trusses themselves, which are the soul of the frame.

The trusses are made of boards one inch thick (of well-seasoned wood) and laid in more or less thicknesses, according to the width of the barn. These boards are bent on the flat, in following the outline of the circle, and tightly nailed together. Those who made these trusses were always afraid to see the ends fly open with irresistible strength when taken out of the vice, and they were much surprised when nothing of the kind happened. A well made truss does not open one inch. This was always a revelation and it greatly encouraged those who were afraid to see the barn open, even before placing the trusses.

In concluding, I would like to state that most of the failures that have occurred are the results of the following:—

1. Inexperienced workmen, who raise such frames for the first time, such as the contractor so upset that he was no longer able to make a key to join two beams longitudinally.

2. The use for the truss of boards not well seasoned or of poor quality. The dry board is harder to bend, but does not warp, and the truss does not become twisted.

3. Too weak trusses.—A barn 50 feet wide requires trusses at ten-foot centres, made of 10 thicknesses of boards 5 inches wide.

4. Braces too short or posts too short.—As always was explained by the Reverend Mr. Bois, to obtain the maximum strength a full truss is necessary. This requires posts at least 22 feet long for a barn 50 feet wide.

5. The braces of the truss have been forgotten. I mean, the ends of planks or braces which are to be inserted tight and nailed between the truss and the rafter which is above. Trusses not braced have no more strength than other frames which would not bend.

BONAVENTURE, GASPE

BY J. N. ALBERT, B.S.A., AGRICULTURAL REPRESENTATIVE

THE district of Gaspe—which is formed of Bonaventure and Gaspe counties, a peninsula 200 miles long and 80 miles wide, bathed by the St. Lawrence, the Atlantic, and the Baie des Chaleurs—may rightly be considered one of the good agricultural districts of Quebec. At harvest time the cleared lands along the coast form a crown of golden yellow, around a magnificent virgin forest: a huge valley traversed by mountains and watered by a number of fine rivers in which trout and salmon abound. The fluvial and oceanic waters of the Gaspe peninsula constitute one of the finest fishing territories of the east.

Fishing and lumbering are two profitable industries, but the main industry is agriculture. After many years of neglect, agriculture is now rapidly progressing. The population of the two counties numbers 53,081, 75 per cent of whom are tillers of the soil. About 30 per cent of those who farm in Gaspe, and in the eastern part of Bonaventure, are also fishermen.

TWO YEARS SERVICE

I have been at work for the last two years in this district. My time has been taken up by the execution of the following programme:

(a) Development of dairying and hog raising, the latter as a side line. In order to accomplish this, I have introduced breeding animals of the cattle and hog species, through farmers' clubs, agricultural associations, and breeders' associations. I am now trying to introduce cow testing, so that herds may be selected on a rational basis, and so as to complete the system of farm book-keeping which is now followed by a large number of farmers. Fifteen factories of dairy products, butter and cheese, are now working in the district on the co-operative plan. The establishment of new factories is one of the items of the programme.

(b) *Co-operation.*—During the last two years, I have organized six co-operative associations, making twelve associations of the kind in the district. Agricultural products are exported and imported by these associations for their farmer members, who number over 2,500. All these local associations are affiliated with the Quebec central Cheesemakers' Co-operative Association and with the Co-operative Store of Montreal.

(c) *Live Stock.*—The fattening of veal calves was introduced two years ago. These animals are sold in Montreal by the Co-operative Association. Experimental shipments of mutton, beef, and pork are being made and the farmers are urged to send to the market only finished animals, as the advantage of this system has been amply demonstrated. The co-operative sale of wool is also part of our programme.

(d) *Poultry.*—With the introduction of up-to-date poultry houses and dual purpose breeds, poultry production has doubled since 1916. The co-operative sale of the products has contributed in no small degree to the success of this industry.

(e) *Cereals—Production and Selection.*—Grading machines have been purchased by clubs and co-operative associations as well as by individuals, after practical demonstrations on selection have been given in various parishes. The wasteful method of purchasing seed grain will soon be a thing of the past, thanks to the systematic and mechanical selection, the necessity of which is now well understood. In cases of necessity, I recommend the co-operative purchase of seeds. The production of clover seed has been tried with the best of results. A demonstration field of one acre in area gave a yield of 294 lb. Such a result removed any doubt there might have been as to the possibility of making a success of this culture. With this object in view, four clover

threshers were imported in this region, and most of our farmers practically produce their own timothy seed.

(f) *Fruit and Vegetable Culture.*—Gaspe women have distinguished themselves in vegetable culture. For a long time, this branch of agriculture has received a great deal of attention. Fruit culture is as yet in a rudimentary state. A few demonstration orchards have been planted and the adoption of practical methods urged.

(g) *School Fairs.*—This important work takes a large place in my duties. The school garden is very popular, and four school-fairs were held this fall in which 957 young gardeners participated. More than $350 was distributed in prizes.

(h) *Greater Production.*—This movement was launched in December, 1917, and lectures were given by the Agricultural Representative. The farmers have answered in a splendid manner to the call for production, and the sowings of wheat and beans were three times greater than usual. Good results have been obtained for the wheat, but the beans were rather poor on account of frosts. There is a big increase in cereals, as well as in potatoes. All possible attention has been given to hog raising.

My programme bearing on general agriculture is being carried out by means of lectures, advice from the office, practical demonstrations, correspondence, and distribution of agricultural literature.

HUNTINGDON, CHATEAUGUAY AND BEAUHARNOIS COUNTIES

BY E. N. BLONDIN, B.S.A., AGRICULTURAL REPRESENTATIVE

DURING the winter meetings were held in every parish. At these meetings the food situation was clearly explained and the urgent need for increased production was made clear. Every man was asked to keep more hogs and grow more wheat, beans, and peas. As a result of this the farmers organized in each parish and purchased brood sows from the Department of Agriculture. These were high-grade sows selected by experts from the market and bred to registered boars. In the same way the farmers and village people who were keeping hogs, purchased carloads of wheat screenings to feed these hogs.

This spring every parish was called upon to organize a parish committee. These committees ordered seed and assisted in the distribution of labour, and in July the secretary visited the farmers and took a census of acres of each crop grown. There were points given for the different crops and the farmers having the most number of points received prizes.

During the early spring two judging teams were organized, one in Huntingdon county and the other in Chateauguay, to judge at the judging competition at Ormstown Horse Show.

A demonstration field was established this year, to test the value of corn silage versus oat, peas, and vetch silage, the idea being to find a crop that would give equal or greater results than corn and one that would require less labour. The results of this experiment are not complete yet, but will be later in the winter when this silage is fed.

School fairs occupy a considerable portion of my time. This year six school fairs were held. Last spring 83 schools with 1,544 pupils were supplied with eggs and seeds for the school fairs. The material was taken home and cared for during the summer under our supervision and this fall fairs were held. The number of entries and quality of exhibits this year were much better than in previous years. The Bankers' Boys' and Girls' Calf and Pig competition was held in conjunction with the school fairs, and this feature is also steadily improving each year.

Several farmers' clubs and co-operative societies have been organized

this year. It is hoped that every parish will soon be organized so as to enable the farmers to co-operatively buy and sell their produce. In some cases our farmers' clubs have sold products to other clubs in the district to the advantage of each club concerned.

PONTIAC COUNTY

BY C. H. HODGE, B.S.A., AGRICULTURAL REPRESENTATIVE

THE principal new undertakings of this office in 1918 are not numerous. With five school fairs, comprising seventy-five schools, and the usual number of visits to farmers, meetings to attend, etc., there has been but little time for new undertakings.

The campaign for increased production was carried on throughout the beginning of the year, and each municipality, or parish, was organized with a parish committee, consisting of the mayor, the president and secretary of any local farmers' club or agricultural society, the parish priest or minister, and two other members appointed by the above. The parish committee listed the needs of the farmers for seed grain, formalin, labour, etc., and passed them on to the Representative's office, which acted as a clearing house for the county, filling the requirements from one township with the surplus from another, or, when not available, securing supplies from other counties or provinces. All purchases and sales of seeds and supplies, were made through the Pontiac Wool Growers' and Sheep Breeders' Co-operative Agricultural Association, who supplied the necessary capital.

During the summer, through the Greater Production Service of the Quebec Department of Agriculture, competitions were put on in several townships, by means of which prizes were awarded to those farmers who had made the greatest effort toward increasing the acreage under field crops in 1918. The organizing of these competitions was left to the parish committees and the Agricultural Representative.

THE CO-OPERATIVE MOVEMENT

The line of work which will be of most value to the farmers of Pontiac is that in connection with the co-operative movement. While the farmers of Pontiac have co-operated in the sale of their wool for five years and of their lambs for two, yet their final decision, taken in the early part of 1918, to incorporate their association, subscribe some working capital and have the association serve as the co-operative selling and buying agency for the entire county in all the principal products and supplies of the farm, shows that they appreciate the value of co-operation. Needless to say, the Representative was obliged to spend considerable time, in holding meetings and discussing the various problems with the prospective members, before the work of the association would be fully understood and appreciated, and, even yet, much remains to be done in the way of explanation and education. With the purchase of their own elevator and warehouse, and the employment of a competent manager, the Representative will be able to devote more time to new lines of work.

The co-operative shipment of live stock through the association has provided an excellent opportunity to impress upon the farmers the importance of properly finishing stock before placing it on the market, and much stock that would otherwise have gone to market in a half finished condition has been held-over and fed until it would fulfill the market requirements, this being especially true of hogs.

A SEED CENTRE ORGANIZED

One feature of the Representative's work in Pontiac that may be new to some of the Representatives in other counties, although started prior to 1918, is the organization of a Seed Centre in conjunction with the Canadian Seed Growers' Association. The Shawville Seed Centre, as it is known, has not yet produced much seed suitable for registration, but, starting in 1915 with registered seed secured from members of the C.S.G.A., it has produced several carloads of improved Banner Oats and Arthur peas, some of which have been shipped to other parts of the province, while a large amount has been sold to farmers within the county, who were anxious to secure supplies of good seed near at hand. This work has tended to greatly improve the general stock of seed in the county, and this year a number of cars of practically pure Banner Oats will be available for seed purposes. All the fields of the members of the Seed Centre are inspected and scored by the Representative, and a report on them sent in to the secretary of the C.S.G.A.

These undertakings, together with the usual number of demonstrations in spraying and pruning of orchards, potatoes, etc., attendance at meetings of farmers' clubs, clover fields, flocks and herds, making of drainage surveys, preparation of building plans, and the various subjects on which the opinion of the Representative is asked, has filled up the Representative's time rather completely, and many important lines of work that might have been undertaken have had to be postponed for the present.

ONTARIO

BRUCE COUNTY

BY N. C. MCKAY, B.S.A., AGRICULTURAL REPRESENTATIVE

BRUCE county being largely a beef section, Shorthorn cattle are the most numerous, and a large number of small breeders are scattered all over the county.

For the past two years a breeders' club has been in operation in the southern part of the county. In June an excursion under the auspices of this club was arranged, and a trip was made to the Elora and Guelph district, where seven of the best herds in the Dominion were inspected. Invitations were extended to Shorthorn men all over the county, and a good many of them were ready to accept. A little later in the month an open meeting was held at one of the farms, and again invitations were extended to all the breeders in the county.

This meeting was held well towards the north and about fifty men were in attendance. Professor Day of Guelph, Secretary of the Dominion Association, gave an address, and a society was formed with the following officers:—President—Wm. McIntosh, Southampton, Ont.; vice-president—Jno. Scott, Port Elgin, R.R. No. 2; Secretary treasurer—N. C. McKay, Walkerton, Ont.

A constitution and by-laws was adopted, and it is expected that the North and South Bruce Breeders' Association will co-operate in holding a sale each spring, conducting excursions and holding meetings from time to time in the interest of live stock.

DUFFERIN COUNTY

BY H. A. DORRANCE, B.S.A., AGRICULTURAL REPRESENTATIVE

ONE of the more recent important activities undertaken by the Department of Agriculture was the organization of the Grand Valley Pure-Bred Yorkshire Pig Club. Each member is supplied with a pure-bred registered Yorkshire sow safe in pig, carrying her first litter, to farrow sometime in February or March. The sows are being purchased by a qualified buyer and selected for breed and bacon type: prolific strains are secured as far as possible, and purchased as cheaply as is consistent with the quality of pigs it is desired to distribute.

The pigs are registered in the name of the member and all progeny will belong to the member, and an effort will be made to secure animals of as near equal value as possible. The member is required to settle for his sow at time of delivery by note at the Royal Bank, Grand Valley, endorsed to the satisfaction of the manager, bearing interest at six per cent per annum. This has been arranged so that all members of the club will start on an equal basis, and we feel, that by giving this note, the member will have an added responsibility in looking after his sow in that he will have the note to meet, and by handling the note will acquire some business experience.

The Department of Agriculture will endeavour to assist in the marketing of surplus stock and to arrange for the service of a pure-bred Yorkshire boar among the club members. The members are to sign an agreement with the Department of Agriculture in connection with the handling of the sow and the surplus stock.

DUNDAS COUNTY

BY E. P. BRADT, B.S.A., AGRICULTURAL REPRESENTATIVE

IN order to have some definite information as to the extent to which the formalin treatment would control smut on oats, we arranged six farm demonstrations on the following farms:—

Cephus Smith.....Iroquois.
Floyd Shaver.....Winchester Springs.
Bruce Rood.....Brinston.
Morley Sullivan.....South Mountain.
Fay Merkley.....Williamsburg.

Each was supplied with 4 ozs. of the formalin, or sufficient to treat seed grain for five acres. The following instructions were sent out with each lot:—

Mix the one quarter pint of formalin supplied you with ten gallons of water, mixing thoroughly. Spread ten bushels of seed oats that have been well cleaned with the fanning mill on the barn floor, spreading about three inches deep. With a common garden sprinkling can put on three or four gallons of the mixture and then shovel over. Sprinkle again and shovel, repeat this until every kernel is thoroughly wet. Then shovel up in a cone-shaped pile and cover over with an old blanket or canvas. Leave for three or four hours and then spread out and dry as quickly as possible. Shovelling over occasionally will hasten drying. If this treatment is given very long before seeding be sure that you get the grain well dried before placing in bags, otherwise it will mould and injure the germination. After grain is thoroughly dry, place in clean bags that have not previously held oats.

In sowing this grain it would be well to sow it first before you run other oats through the seeder, in order to avoid some of the smut spores again getting on the oats from the drill. Mark the place in the field where you leave off sowing the treated seed. It would be advisable however for you to treat all your seed, in this event mark where you complete the seeding with the oats treated with the formalin supplied by us.

Compare this field during the summer with any untreated oat fields in your district. We will visit you sometime during the summer-growing season and see how successfull your experiment has been.

Forms were filled out by the men conducting the demonstration giving results.

These demonstrations proved of considerable value on these farms.

I inspected the fields during the summer and found that the sprinkling method of treatment had been quite effective in controlling the smut. On the untreated portions, in each instance at least 10% was affected. On the treated portions I did not find more than two smut heads in any one of the fields examined.

LATE BLIGHT ON POTATOES

Demonstrations in spraying for this fungus were arranged on the following farms:—

Bruce Rood.....Brinston.
Frank Greaney.....Mountain.
Morley Sullivan.....South Mountain.
Donald McIntyre....Mountain.
Floyd Shaver.....Winchester Springs.

Sufficient blue stone and lime were supplied for spraying ¼ of an acre of potatoes, giving four applications. The following directions were issued:

1. Dissolve 8 lb. of Blue Stone in a couple of gals. of warm water and make up to 8 gals. of solution.

2. Slake 8 lb. of fresh lime in water and make up to 8 gals. Keep the above mixtures in separate vessels until ready toe spray.

3. Start spraying when plants are 6–8 inches high and spray approximately every 2 weeks until four applications have been put on. This would be putting on, say two applications in July and two in August, which should run your crop past the danger of blight.

4. In making up the spray mixture from the above add 2 gals. of the Blue Stone to 10 gals. of water. Add 2 gals. of the lime solution after it has been well stirred to 10 gals. water and then pour the two mixtures together just when you are ready to spray. This will make up 20 gals. of sufficient mixture to cover nearly half an acre of potatoes. Spray with a fine mist spray if possible. An apple tree spraying outfit does very well. Try to get the mixture on under surface of leaves as well as on top.

5. Leave a few rows next to the sprayed portion without spraying and dig them and measure or weigh for comparison in the fall.

NOTE.—Do not mix the remaining portions of the material until ready to spray each time.

6. The Agricultural Representative will endeavour to inspect your plot during the summer.

7. A bulletin is being enclosed outlining the nature of the Late Blight of Potatoes.

In spite of the fact of an unfavourable season for work of that kind two of the demonstrations showed marked results. In one instance, when I inspected in August the sprayed portion, the tops showed up distinctly green and growing, while on the unsprayed part they were completely dead. In every instance the sprayed part showed up to good advantage, it being possible to detect the row where spraying left off.

Forms were filled in by the men conducting the experiment, giving results.

JUNIOR FARMERS' PLOUGHING COMPETITION

In order to encourage an interest in ploughing among the Junior Farmers a Ploughing Competition was arranged. Two classes were provided for as follows:—

Class 1—In sod, single ploughs, 5 acres in one block to be ploughed—Open to young men over 20 and under 30 years of age.
Class 2—In stubble, single ploughs, 5 acres in one block to be ploughed—Open to young men 20 years of age and under.

There had to be at least 5 entries in each class, and unless four completed the contest, no prize was awarded.

Ploughing had to be done on the home farm, or on the farm where the contestant is working.

The judge was required to consider conditions for the following year's crop, as well as crown, finish, and general land. The decision was based on the following score card:—

Strike	15
Crown	15
Ins and outs and headland	10
Uniformity of depth	5
Straightness of furrows	10
Finish	20
Gen. appearance	20
Uniformity of width	5
Total	100

MANITOULIN ISLAND

BY J. F. METCALF, B.S.A., AGRICULTURAL REPRESENTATIVE

THIS is largely a live stock district and a large number of sheep are kept. Recently some of our farmers have lost a number of sheep and lambs due to wolves and bears. The bears have been here for some time, but the wolves are recent arrivals and, estimated by the present prices of wool and mutton, the damage that they are doing is considerable. It was at first thought that the animals could be driven to the water's edge and then shot, but a number of large drives were arranged with no results. We came to the conclusion that the best method would be to pay substantial bounties for the destruction of these animals.

The provincial Government offers bounties on wolves, but it was considered that the bounties were not large enough, as what we wanted were quick results—in particular, the extermination of the wolves. We considered that it was far better to pay a large bounty for these animals killed now than to have the matter drag over a number of years with constant reproduction taking place. The matter was placed before our local boards of agriculture and it was decided to appeal to the various townships for funds, as there is no county council here. Many of our townships are not organized, and the money in them is being raised by subscription, while the township councils pay grants. The district is divided in two parts, each having a Board of Agriculture working independent of the other, but the methods and management are the same.

Each Board of Agriculture asks each township in it's jurisdiction to contribute ten dollars for each wolf and five dollars for each bear killed, and half price for wolf pups and bear cubs (under one year). If a man kills a wolf or bear in one of the townships contributing, he takes the hide to the Reeve, if an organized township, or the local School Board, if unorganized, and gets an order on the Secretary Treasurer of the Board of Agriculture for the full amount of the bounty from all contributing townships in that part of the district, who in turn gives him a cheque on the local bank. The hunter also receives a similar bounty as given by a township from the bank and the provincial Government bounty.

It can be seen that when a man receives from fifty to eighty dollars for killing a wolf, and half of that for killing a bear, there is considerable inducement to gather this harvest, and the fact is that quite a number of the wolves and some bears have been killed recently.

LADIES' HOG FEEDING COMPETITIONS

Following the hog production campaign last fall, it was thought by those who had conducted the campaign in this district that one good way to get an increase was to interest the ladies in the proposition. Hog feeding is not ordinarily looked on as an occupation for ladies, but the farmers seemed to have all the stock they could look after. If we could popularize the feeding of hogs by the ladies we thought we might be able to get a considerable increase. Accordingly competitions were arranged for the ladies in feeding hogs, and we secured eighty entries in the two competitions, one being for West Manitoulin and the other for East. There has been intense rivalry going on all summer to see who could produce the best results, and the whole island has been watching these competitions with interest. This does not by any means tell the whole story, as a number of other ladies have been feeding hogs who would not have otherwise considered the proposition.

Most of the results are now in, and we have been able to publish the results for West Manitoulin. Mrs.

Dougal Campbell of Kagawong won the first prize in West Manitoulin, her two pigs weighing 504 lb. It looks as though Mrs. Campbell will also be the winner of the Department's prize and get the trip to Guelph, as so far there has been no weight as good as hers reported from East Manitoulin.

THE RULES

The rules of the Ladies' Hog Feeding competitions are as follows:—

Open to all ladies (old or young) in West Manitoulin.

Two or more hogs are to be fed until 22 weeks old—only the two heaviest ones to count.

Pigs may be weaned at any time and may be given any feed at any price, but must be fed by competitor.

Prizes will be awarded to heaviest two hogs at 22 weeks old.

Applications must be made to the Department of Agriculture, Gore Bay, before feeding starts and pigs will be marked. Included in the application must be a signed statement of the date of the birth of the pigs.

Arrangements will be made by the Department to have the pigs weighed on approximately the date when they are 22 weeks old.

Thirteen prizes ranging from $12 to 50c. are to be awarded in each district, and the Ontario Department of Agriculture will give a special of expenses and board for a two weeks' course in poultry raising at the Agricultural College, Guelph, next winter.

NORFOLK COUNTY

BY E. R. NEFF, B.S.A., AGRICULTURAL REPRESENTATIVE

SINCE the beginning of the war, and perhaps more particularly during the past year, co-operation has received an increased impetus in Norfolk County. Co-operative methods have been used in this county for some years now, principally through the workings of the Norfolk Fruit Growers' Association, which has become so well known throughout our Canadian West because of the honest packs of apples that are shipped.

In January of this year, after several meetings had been held to discuss the advisability of organizing an association that would be able to serve a great number of the farmers in the county in more ways than by simply marketing apples, it was decided to take out a charter for a co-operative association.

A board of seven directors was appointed, and from this a president, vice-president, and secretary were elected. The Board of Directors appointed as manager, Mr. Jas. E. Johnson, who was already manager of the Norfolk Fruit Growers' Association.

It may be remembered that just at this time of the year, there was a great scarcity of bran and shorts. The business ability of the manager was at this time very clearly demonstrated, since he was able to secure for the association several carloads of these mill feeds. These coming at the time when hog feed, and, in fact, feeds of all kinds were extremely scarce and hard to get, was largely the means of securing a large number of members early in the year, adding greatly to the success of the association.

THE FINANCES

Each member at the time of uniting with the association gave a promissory note payable on demand and renewed every three years for the sum of $100. In order that the local trade might not be antagonized the goods handled by the association are sold at the regular market price, or very slightly below it. All goods are paid for in cash, and anyone may buy through the association, whether a member or not, but members only get the benefit of the profits made in business during the year.

A reserved fund of not less than 10% and not more than 20% of the surplus funds is to be set aside at the end of each year for the purpose of meeting contingencies for maintaining, or repairing, the property of the association, or for any other purpose that the directors think conducive to the interests of the association. All surplus moneys of the association derived from the sale of produce to be divided among the members shall be proportioned to each member on the basis of the value of the business done by each member with the association.

The assocation has handled since its inception a great variety of goods; feeds, including oil cake, bran, shorts, oats, corn, mixed feeds and, more recently, standard dairy and hog feeds; seeds, including oats, barley, wheat, corn, garden seeds, potatoes, clover and timothy, beans, peas, buckwheat; also fertilizers, binder twine, sprayers and spray material, salt, poultry supplies and incubators.

BUSINESS TO DATE

While the main business to date has been in supplying the needs of the members with the above materials, the main object of the association is to assist them in marketing their produce. During the summer months a number of carloads of cabbage, tomatoes, strawberries, and raspberries were shipped, mostly to points north and west. A splendid trade was worked up in these commodities, and it is hoped that another year will see the handling of a greater variety of goods. The value of the business done in the first nine months of this new association has reached $75,000, and it is apparent that the total will be considerably greater than this before the end of the fiscal year. Over two hundred and fifty members have given their notes for $100 each, so that the manager has now a substantial purchasing power.

The warehouse of the Norfolk Fruit Growers' Association has been used this year for storage purposes, but it is expected that another year the two associations will be amalgamated and the storage building, which has been found insufficient in size, will be extended.

THE ADVANTAGES

Some important points that have been brought out are:

1st—The greater the number of members doing business the cheaper the business can be handled, and since the manager's salary is paid in proportion to the business done, that is, the gross sales, it is in his interests, as well as that of the members, to have a large membership.

2nd—Co-operation works well with a few, but better with a large number.

3rd—As the members are doing business with themselves, it adds greatly to their interests since the profits go to them instead of to the retailers.

PEEL COUNTY

BY J. W. STARK, B.S.A., AGRICULTURAL REPRESENTATIVE

THE important activities that have been inaugurated this year by the Peel County Branch of the Department of Agriculture include the organization of a Dairy Calf Club, a Sheep Club, a Pig Club, and the campaign that was organized and carried through for increased crop production.

THE DAIRY CALF CLUB

Distribution of the calves was made on Saturday, Oct. 19th. Each member was notified by letter to be on hand at two o'clock. At that time members drew for the animals and the cards were marked with the number and price. Members were

required to fill in a form signed by themselves and a parent or guardian, saying the breed of grade calf or pure-bred calf desired at a stipulated price, for which a twelve-month note satisfactorily endorsed and bearing 6 per cent interest was required. Boys and girls between the ages of 10 and 18 were eligible for membership.

Fifty-eight cattle between the ages of 20 and 24 months were given out altogether, the breeds and average prices being as follows:—

Holstein grades	26 at $73.
Holstein pure-breds	10 at $159.
Ayrshire grades	8 at $65.
Jersey pure-breds	11 at $106.
Jersey grades	3 at $73.

These cattle were bought by Mr. A. Leitch, Animal Husbandry Department, O.A.C., Guelph, and Mr. R. S. Stevenson, of Ancaster. The Holsteins and Ayrshires were secured in the vicinity of Ingersoll, and the Jerseys were bought near Brampton. The members were charged the same as the farmer received for the cattle, plus three dollars. This was supposed to cover freight and insurance, the other expenses being paid from other sources. I should say that it would cost five to seven dollars a head if the members paid the entire charge. The Milk Producers' Association agreed to carry the insurance on the heifers as far as possible, and unless the losses are very heavy, they are to pay half of the original cost price in case of death of any of the heifers, due to accident or other causes beyond the control of members.

The executive of the Peel County Milk and Cream Producers' Association gave a note to finance the buying of the cattle, and this was retired by the notes of the members and parents. When all the notes were turned into the bank, it was found that they totalled $5,379.50.

A Record Form is to be kept to be used by the member for keeping an account of feed, milk production, etc., and liberal prizes are being offered. By having each member's name put on mailing lists of the Department of Agriculture to receive up-to-date literature on the subject of dairying, and by visiting each member at his or her home, we hope to keep the interest at the highest point. There are quite a number of girl members, and they seemed to be as much interested in the club as the boys.

An auction sale will be held next Fall, shortly before the notes become due, when all the cows will be brought in and we shall see then how much was made by the members. I may say that some of the members when applying for a calf stated the definite purpose for which they wished to use the money, it being to pay expenses at High School, or buying Victory Bonds, or some such thing. The parents took very kindly to the whole scheme of the Calf Club, and already we have received enquiries as to the formation of a similar club next year. This year we included both grades and pure-breds, as I thought it was better to do this on account of the club being a new kind of undertaking, but there is quite a possibility that next year we shall deal only in pure-breds.

Members were required to fill in a form signed by themselves and a parent or guardian saying the breed of grade calf or pure-bred calf desired at a stipulated price, for which a twelve-month note satisfactorily endorsed and bearing 6 per cent interest was required. Boys and girls between the ages of 10 and 18 were eligible for membership.

THE SHEEP CLUB

The membership of the Sheep Club is open to boys and girls between the age of 12 and 18 years inclusive. Each member will be notified to call at the town of Caledon on a certain date in December to receive two pure-bred Oxford shearling ewes in lamb. Each pair will be marked with price and number, and the member will draw a number from a box, which number will represent the sheep that the member shall

accept. A similar rule has been adopted by the Calf Club. Members who wish to do so will be permitted to pay cash at the time of delivery, or may give a note for ten months, endorsed to the satisfaction of the local bank by a parent or guardian, and bearing interest at six per cent, as in the case of the Calf Club. The ewes will be registered in the name of the member, and they with their progeny will be the sole property of the member. The club will by means of a small assessment insure the ewes that have been distributed against loss by death during the first ten months for an amount equal to one-half of the original cost of the ewes. The members will be encouraged by special prizes to take care of the sheep and keep a record of the profits. The sheep were purchased under the direction of Mr. R. W. Wade, Secretary of the Ontario Sheep Breeders' Association, from different flocks in Ontario.

THE PIG CLUB

The organization and methods of operation of the Pig Club was described in THE AGRICULTURAL GAZETTE for September on page 897.

THE GREATER PRODUCTION CAMPAIGN

In common with all other Agricultural Representatives this Branch was very active in the carrying out of plans that are already familiar to readers of THE AGRICULTURAL GAZETTE.

WATERLOO COUNTY

BY J. S. KNAPP, B.S.A., AGRICULTURAL REPRESENTATIVE

AMONG the new features undertaken by this office this year were two courses in gasolene engines which were conducted at Ayr and Preston. These courses were each of three days' duration, and were conducted principally by Professor W. H. Day, of the Department of Physics, Ontario Agricultural College, assisted by the representative of a firm manufacturing gasolene engines. There was an attendance of from fifty to seventy-five every afternoon at both courses. Interest seemed to be particularly keen, as many are interested in tractors and gasolene engines as the coming farm power.

ALBERTA

BY JAMES MCCAIG, M.A., EDITOR OF PUBLICATIONS

THE Agricultural Representative service in this province so far differs from that in Ontario and other eastern provinces, inasmuch as our men are not established permanently in districts the year round, but are taken from other branches of the service such as the Agricultural Schools, for example, in which the vacation season corresponds with the season of production. The duties of the men are likewise variable, and they are called on to make quick adjustments to present and pressing duties. Their work this year has had the aspect of the promotion of national rather than individual thrift, that is, the whole of detailed effort has been co-ordinated by large general ends.

DUTIES OF THE REPRESENTATIVES

Early in the spring the Department of Agriculture, in answer to the call for greater production, increased the number of its Agricultural Representatives to fifteen and turned them into the field to promote increased cropping and better methods for the season of 1918. They looked up vacant land and

available power, helped to furnish seed grain to those requiring it, and instructed farmers generally with respect to such matters as breaking, seeding, summer fallowing, weed destruction, etc., and it is believed that these men did very energetic and satisfactory work.

In districts where school fairs had been inaugurated, and in a few new districts, these men also took charge of the carrying on of school fairs. At midsummer, when the effects of the drouth were so apparent in the south country, these agents were turned on to the work of cruising hay resources and of trying to bring the stock of the south country and feed of the north country together, and, following the arrangements made between the Provincial and Dominion Governments for the free transportation of feed and stock, they helped to conserve the live stock interests of the province. This was also a very important and desirable piece of work. The amount of hay that has been put up to be moved south is very large and a great deal of stock in sheep, cattle and horses has been moved north.

From this it will be seen that our Representatives in 1918 devoted their attention more especially to greater production and in meeting the feed difficulty due to drouth.

ONTARIO

THE ANNUAL LIVE STOCK SALE AT THE AGRICULTURAL COLLEGE

THE annual sale of live stock of the Ontario Agricultural College was held on October 31. The offerings consisted of Shorthorn, Aberdeen Angus, Holstein, Ayrshire, and Jersey cattle; Shropshire, Southdown, Oxford, and Leicester sheep, and Berkshire and Yorkshire swine. The Shorthorns consisted of nine head of pure-bred, and one grade with a high milking record. These brought an average of $436.65. The top price made was $950 for Augusta O. A. C. 5th, a yearling heifer. Two Aberdeen Angus bulls brought $145 and $170 respectively. The Holsteins consisted of five bulls under one year old that sold from $47.50 to $150 each The Ayrshires included two young bulls that brought $80 each. The Jerseys consisted of two young bulls that brought $55 and $25 respectively. Eleven Shropshires averaged $48; one Southdown, $22.50; nine Oxfords, $53; and nine Leicesters $50 each. Twenty-two Berkshires brought an average of $24.55 and forty-five Yorkshires an average of $45.80. Advices indicate that many possible buyers were prevented from attending by the prevailing epidemic of influenza.

VARIETIES OF POTATOES THAT ARE IDENTICAL

A correspondent has expressed his inability to understand the statement that appears on page 992 of the October AGRICULTURAL GAZETTE with reference to identical varieties of potatoes. The statement was intended to convey the idea that the experts who pronounced upon the matter declared that all the twelve varieties named are identical and are classed as Green Mountain.

THE PRAIRIE PROVINCES

THEIR SUCCESS AT THE SOIL PRODUCTS EXHIBITION

BY S. T. NEWTON, DIRECTOR AGRICULTURAL EXTENSION SERVICE, MANITOBA

THE Thirteenth Annual Soil Products Exhibition got away to a good start at Kansas City on Oct. 16, but the rapid increase of Spanish Influenza resulted in all the meetings being prohibited and the Soil Products Exhibition itself abandoned.

COMPREHENSIVE VIEW OF MANITOBA EXHIBIT AT THE INTERNATIONAL SOIL PRODUCTS EXPOSITION, KANSAS CITY, MO., OCTOBER, 1918.

In view of the fact that several states and provinces had gone to the expense of putting up elaborate exhibits, the Board of Governors decided to have the exhibits judged and award the trophies and prize ribbons.

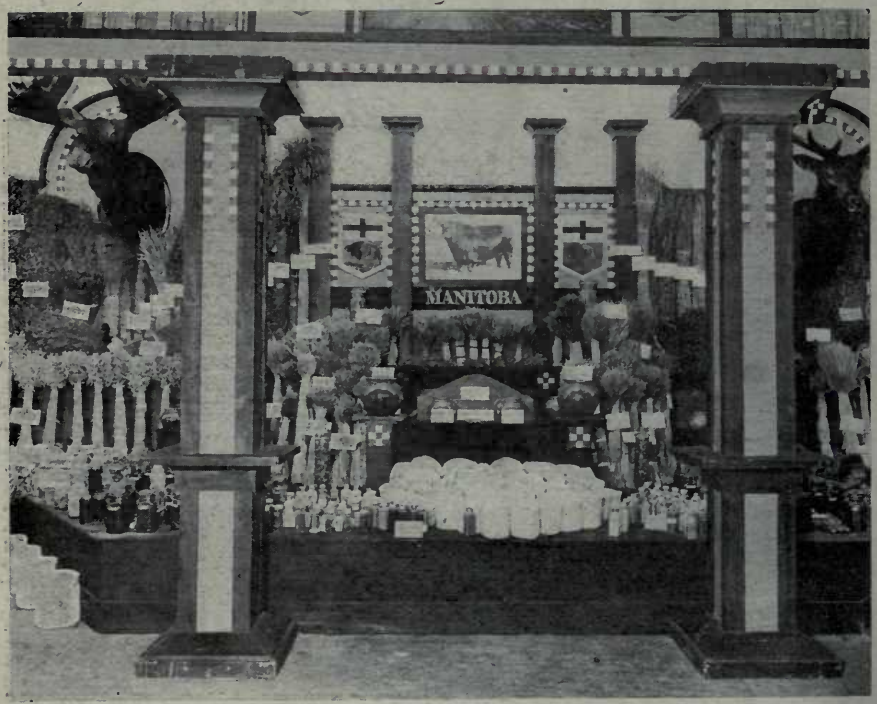
In the individual contests, exhibits were placed by eighteen or nineteen states, and Alberta, Saskatchewan, and Manitoba. In the state contests, eight states had entries as well as Manitoba. In all cases the competition was extremely keen, but Canada had the honour of winning several trophies; chief of these being the sweepstakes in hard red wheat, which went to the Veteran Seed Grower, Saeger Wheeler of Rosthern, Saskatchewan. Mr. Wheeler also won the C.P.R. $500 cup and a McCormick binder. Sweepstakes in oats was won by Manitoba; F. H. Dickenson of Birtle having produced the best sample. Alberta won the sweepstakes in barley; Nick Taitinger

of Clairsholme having a sample of two-rowed barley which would be hard to beat anywhere.

Second in wheat also went to Alberta; second and third in oats to Manitoba, also second in barley. Saskatchewan got third in wheat and third in barley. The flax prizes went to Manitoba, and all the rye prizes remained South, as did all the prizes for fall wheat and corn.

vegetable classes, Canada also won the major portion of the prizes. Manitoba secured first place for the most artistic and attractive exhibit and third for the most comprehensive display; Nebraska and Kansas City having been placed higher. Manitoba took second place for small grains, Kansas winning first.

In the competition for sheaves of grain and fodder crops, the prizes were



A SECTION OF THE MANITOBA EXHIBIT AT THE INTERNATIONAL SOIL PRODUCTS EXPOSITION, KANSAS CITY, MO., OCTOBER, 1918.

S. Larcombe of Birtle secured the sweepstakes in wheat in the dry farming section, second prize going to Saeger Wheeler. First, second, and third in dry-farmed oats went to Manitoba, and second and third in barley. Alberta won first in dry-farmed barley.

First and second in peas were also won by Manitoba.

Possibly the most notable feature of the exhibition was the winning by Manitoba of the State Sweepstakes for vegetables. In the individual

pretty evenly divided between Manitoba and Saskatchewan. Altogether Manitoba won eight cups, 33 first prizes, nineteen seconds, and eighteen firsts; Saskatchewan two cups, 5 first prizes, 3 seconds, and 3 thirds; Alberta one cup, 1 first, two seconds, and 3 thirds.

The field husbandry exhibits were placed by Professor T. J. Harrison, of the Manitoba Agricultural College, and the vegetables by Professor F. W. Brodrick.

MANITOBA

THE FARM MANAGEMENT COURSE AT THE AGRICULTURAL COLLEGE

MR. A. H. Benton, B.S.A., M.S., recently appointed Professor of Farm Management and Agricultural Economies at Manitoba Agricultural College, has outlined a course in farm bookkeeping and legal forms pertaining to the farm; a course in farm management, administration, and organization; a course in agricultural economics, pertaining largely to production, and a course in marketing, co-operation, land tenure, etc. He also proposes that there shall be advanced work in farm cost accounting and farm efficiency factors. He is engaged in the preparation of a farmers account book that he proposes to have ready by the first of the new year.

SUMMER FALLOW COMPETITIONS

SUMMER fallow competitions in Manitoba were inaugurated in 1917 by the agricultural societies, when twelve contests were held. This year the contest was taken up by twenty-seven counties with a total of 325 competitors. In spite of the acute labour situation, there was a noticeable improvement in the summer fallows this year over those of last year. The following is the score card used in judging summer fallows:

	Possible Score
Freedom from harmful weeds, viable (germinable) weed seeds, and live roots	30
Moisture in first two feet of soil	15
Well prepared seed bed-level, fine, deep and firm	15
Prevention of soil drifting (fibre in soil, corrugated surface, lumpy mulch, manure, cover crops)	20
Headlands, Field Corners and Strike Out (Field Corners free from weeds; Headlands clean and straight; weeds cut in strike out)	10
Feed or Pasture produced on land	10

This was sometimes modified slightly to suit local conditions. An auger was used to determine the amount of moisture stored in the sub-soil.

EXTENSION SCHOOLS

THE Agricultural Extension Service of the Manitoba Department of Agriculture has arranged for the holding of a comprehensive series of extension schools for the present winter. These schools will cover the following subjects: Gas engines, live stock, field crops, vegetable growing, poultry, dairying, bee-keeping, farm bookkeeping dressmaking, millinery, tailoring, cookery, and home nursing. In organizing these schools no attempt is made to cover the whole range of subjects; instead, those subjects are chosen on which the people living in any community centre consider there is the greatest need for instruction.

To best serve the needs of the different communities the short unit system has been adopted. In the short unit method of teaching, every subject is carefully analyzed and divided into separate units, each one of which is complete in itself and can be taken by the student with profit,

even though he may not have been present when the preceding units of the course were being studied.

This is accomplished (1) by making the unit so small that it can be completed in the time given; (2) by dealing with one specific thing at a time; (3) by making the instruction as practical as possible; (4) by applying it to local conditions.

Both ten-day and four-day courses are being provided for. To secure either of these schools for a district, any local organization, such as the agricultural society, home economic society, grain growers' association, or school board, may take the initiative. The instructors for these schools will, as far as practicable, be graduates of the Agricultural College, or those who have had technical training in addition to years of experience with the subjects they shall undertake to teach.

The organization for a district, and the management of the course, is left in the hands of the local authorities. The society taking the initiative is expected to complete the organization, which includes among other things the forming of committees to take charge of the different courses to be held. It will devolve upon these committees to provide the necessary demonstration materials, such as engines and other machinery, live stock, seeds, cooking stoves, canning equipment, etc.

SASKATCHEWAN

THE RECOMMENDATIONS OF THE ROYAL LIFE STOCK COMMISSION

THE Royal Commission appointed by the Government of Saskatchewan in 1915 to study and report upon all matters connected with the handling, marketing and disposal of the live stock and live stock products of Saskatchewan have issued a final report. The Commission is composed of The Honourable W. C. Sutherland, M.L.A., Chairman; The Honourable W. R. Motherwell, Minister of Agriculture; Dr. J. G. Rutherford, Department of Natural Resources, Canadian Pacific Railway Company; Dr. O. D. Skelton, Political Economist, Queen's University; Mr. James D. McGregor, Brandon, and Mr. W. A. Wilson, formerly Dairy Commissioner, as Secretary.

The Commission held public sittings in various parts of the country where evidence was taken on all matters concerning marketing. The Commission makes the following recommendations:

(1) Co-operative shipping agencies should be vigorously encouraged, in order to increase the marketing of stock through these agencies.

(2) The greater potentialities of the live stock industry in Saskatchewan, together with the long haul to existing market, make it advisable to establish a public central market in Saskatchewan as soon as financial and marketing conditions warrant.

(3) To complete marketing facilities, packing plants are a prime necessity, first at the central market and later at local points.

(4) A number of cold storage warehouses should be established as rapidly as possible at strategic points throughout the province.

(5) As far as organization is concerned, the best course would be to take advantage of existing machinery, and by utilizing the Saskatchewan Co-operative Creameries, Limited, a ready-made nucleus is found for subsequent development in the desired direction.

(6) In financing this development, the Commissioners are of the opinion that the method which has already been tried and proven successful in Saskatchewan of seeking from the farmers mainly concerned subscriptions to the shares, of a co-operative company, together with a loan from the provincial Government to cover a definite proportion of the capital outlay, would be most satisfactory. In view, further, of the concentration of the company's activities, in large measure, at the centre where it is recommended that substantial assistance, in the form of a stock subscription, should be sought from each municipality, assuming that an arrangement is effected with the Saskatchewan Co-opera-

tive Creameries, Limited, the immediate programme suggested is an extension of the aid given it by the province so as to provide for the opening of cold storage warehouses such as are now operated or under construction at Regina, Saskatoon, North Battleford, and Vonda at each of the other twelve creamery centres operated by the company, as rapidly as conditions warrant.

As soon as the establishment of the stock yards and packing plant is found feasible, the Commission recommends that the province should make a loan, at cost, and repayable on an amortization basis in thirty years, for an amount not to exceed two-thirds of the expenditure so incurred, and conditionally on the subscription of the requisite amount of stock by new and old shareholders in the company.

SHEEP SALES

The Live Stock Commissioner for Saskatchewan reports the sale to farmers in the province of a large number of pure-bred rams, including a consignment of Rambouillets secured in the Western States. In addition some 1,250 ewes have been similarly disposed of to forty individual purchasers. In addition the Saskatchewan Sheep Breeders' Association have purchased a large number of sheep which have been distributed amongst their membership.

TRANSPORTATION OF FEED AND LIVE STOCK

Since the policy for meeting the feed shortage situation described in the October number of THE AGRICULTURAL GAZETTE came into force, the Department of Agriculture of Saskatchewan, up to the end of October, had issued permits for the free transportation of 918 carloads of hay, 12 carloads of haying outfits, and 89 carloads of cattle. Of this number, 435 carloads of hay, 5 carloads of haying outfits, and 57 carloads of cattle were transported in the month of October. Officials of the Department now hold the view that the feed situation has been relieved and that the coming winter can be faced with equanimity by the stock men in the afflicted district.

INSTITUTIONAL FARMS

Saskatchewan, like several other provinces, operates Institutional Farms. These farms embrace a total of 4,544 acres situated at the Moosomin, Prince Albert, and Regina gaols and at the hospital for the insane at Battleford, where they are devoted to the production of field and garden crops. Mr. C. M. Learmonth, B. S.A., Superintendent of these farms outlines their future policy. He believes that the farms can and should be successfully operated from a revenue producing standpoint, and that the available patient and prison labour should be utilized to the full: "The men in charge of the different farms are keenly awake to the possibilities of greater extension in live stock work and larger operations. Nothing adds to the interest and revenue of any farm like the successful handling of live stock. A Government institution should be prepared, especially with the labour question solved, to lead out and develop this phase of farming so strongly that in time the surrounding country would be benefited by having such an institution in its locality, and the Department should operate a branch that can be made, with the acreage at its disposal, a permanent Government asset. The inevitable result would be that revenues would increase, those in charge would be more enthusiastic, and greater co-operation would exist and strengthen from year to year. Good live stock and good land cultivation always go together."

PART III

Junior Agriculture

DEMONSTRATIONS, COMPETITIONS, AND CLASS-ROOM STUDIES IN RURAL LIFE FOR BOYS AND GIRLS

MANITOBA

INTEREST IN BOYS' AND GIRLS' CLUB WORK

AS an evidence of the interest taken in boys' and girls' club work, I am sending THE AGRICULTURAL GAZETTE a photograph taken at the Gonor Fair. This is a three-roomed school located 23 miles from Winnipeg in the centre of a Ruthenian settlement, and, we believe, exceeds anything given in the "Brown Mouse."

The picture includes the following people who are prominent educationists of the Province :—The three teachers of the school; Dr. Thornton, Minister of Education; R. Fletcher, Deputy Minister of Education; W. A. McIntyre, Principal, Normal School; Ira Stratton, Provincial School Organizer; W. J. Spence, Registrar, Manitoba University; W. J. Sisler, Principal, Strathcona School, Winnipeg; A. Willows, Public School Inspector; R. L. Richardson, M.P., Editor, "Tribune"; D. A. Ross, M.P.P., formerly, Chairman, Winnipeg School Board; W. W. Fraser, Provincial Live Stock Commissioner; J. H. Kiteley, in charge of Boys' and Girls' Club work, Manitoba; E. Robinson, Agricultural Teacher, Stonewall; W. J. Major, a prominent Winnipeg Lawyer; G. G. Gunn, President, Manitoba Bee-keepers' Association.

PROMINENT EDUCATIONISTS AT THE GONOR, MAN., BOYS' AND GIRLS' FAIR.

BOYS' AND GIRLS' SHEEP CLUBS

THE Extension Service of the Manitoba Department of Agriculture was successful last year in establishing boys' and girls' pig clubs throughout the province. With a view to interesting boys and girls in the raising of sheep, a movement has been set on foot to form sheep clubs among the youth of the province. Each district in which a club will be formed is permitted to decide the breed of sheep it wishes to own, but the clubs are urged to confine one breed to a district. A representative of the Department of Agriculture is purchasing the ewes, which are from one to three years old and good grade specimens. Pure-bred males will be supplied for grading up the flocks. Clubs owning twenty-five ewes or more will be supplied next fall with a pure-bred sire free. The Department pays the transportation on the sheep for any club, provided it has not less than ten members and purchases twenty-five sheep. The ewes will be in lamb when supplied to the clubs. The Department will assist in marketing the wool and secure a sale for all surplus stock, supply instruction on caring for the sheep, and provide fifty per cent of the amount of money paid out in cash prizes for sheep and lambs at the Boys' and Girls' club fair.

SUPERVISOR OF SHORT COURSE SCHOOLS

W. B. VAUGHAN, M.S., has joined the Manitoba agricultural extension service and will have charge of all short course schools, which have now become an important feature of extension work in this province, over forty being already scheduled for the coming winter.

Mr. Vaughan was brought up on a farm at Sheffield Mills, Nova Scotia, and lived there until he was twenty-two years of age, when he went to British Columbia, where he spent some time in the wholesale grocery business, after which he moved to Manitoba and secured a position on the Winnipeg Teaching Staff, being for five years in charge of the architectural and machine drawing department of the Kelvin technical school. He graduated from Columbia University, New York, in 1917, with the B.S. degree, and received his Master's degree in 1918.

During his year in post graduate work, he specialized in the administration of vocational education, paying special attention to the organization and management of intensified courses designed with particular reference to industrial and agricultural education.

A COURSE FOR FARM BOYS

In addition to the regular four-year course for agricultural students provided by the Agricultural Institute at Oka, which leads up to the B.S.A. degree, there is also provided a practical course of two years' tuition for the sons of farmers who cannot take the whole of the regular curriculum. The duration of this course varies with the importance of the special work in which the pupils desire to perfect themselves, but it is generally two years. The boys learn to do everything themselves under the direction of an instructor: ploughing, hoeing, feeding of animals, care of poultry planting, and grafting fruit trees, handling machinery, gardening; thus acquiring experience, which it would be necessary for them to have on the home farm, or on any of the farms which they may be called to manage.

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications, and Notes.

THE ACCREDITED HERD SYSTEM FOR TUBERCULOSIS CONTROL

IN this issue of THE AGRICULTURAL GAZETTE there are published the policies of the federal Department of Agriculture and of several of the provincial departments, that are in operation for the control of tuberculosis in cattle. In Part I the Veterinary Director General describes the policy of the Health of Animals Branch in combatting this disease, while the Dominion Animal Husbandman describes the method adopted for the control of tuberculosis on the experimental farms and stations throughout Canada. In Part II officials representing provincial Governments that operate farms on which herds of cattle are maintained, deal with their methods of control.

GENESIS OF THE MOVEMENT

The breeders of pure-bred cattle in the United States, more especially in certain sections, have for years been working to reduce the losses that have been experienced from this disease. In this direction what is known as the "Accredited Herd" system has been adopted. Until last year certain of the states were working upon this problem individually, but at a meeting of the United States Live stock Sanitary Association held in Chicago in December, action was taken to bring about the promulgation of uniform regulations for the whole republic. At that meeting a breeders' committee of five was appointed to confer with a special committee of the Live Stock Sanitary Association. This joint committee has worked out a model plan for the establishment of the accredited herd system throughout the United States by State sanitary officials, of which pure-bred live stock producers may avail themselves for the protection of their herds against tuberculosis. An accredited herd is one that has successfully passed two annual, or three semi-annual, tuberculin tests applied by regularly employed veterinary inspectors of the Bureau of Animal Industry, or of the state where co-operative work is conducted, and has otherwise complied with the regulations governing the system. Animals from an accredited herd are not required to be re-tested in order to cross State lines, but are admitted on the certificates of a Bureau or State official that they are from an accredited herd. The breeders have entered heartily into the work and on July 1st, 1918, there was published by the Bureau of Animal Industry of the United States Department of Agriculture, a list of herds officially accredited as free from tuberculosis, and of herds that had passed successfully one test with a view to certification. The list includes fifteen breeds. The following table shows the number of herds of each of the several breeds that have been tested once without reactors, and herds that have ful-

filled the requirements of being recognized as fully accredited:—

Breed.	Once tested without reactors.	Accredited.
Aberdeen-Angus	28	5
Ayrshire	17	4
Brown Swiss	1	2
Devon	1	.....
Dutch Belted	1	.....
Galloway	2	.....
Guernsey	122	35
Hereford	58	12
Holstein	257	48
Jersey	205	48
Milking Shorthorn	1	.....
Polled Durham	7	3
Polled Hereford	1	.....
Red Polled	10	15
Shorthorn	170	39
Totals	881	211

It is fair to assume that a large percentage of the 881 herds that have passed the test once will have qualified to enter the accredited list.

RULES FOR ACCREDITED HERDS

Following are the rules for tuberculosis free accredited herds of pure-bred cattle adopted by the United States Live Stock Sanitary Association, and by representatives of the Pure-bred Cattle Breeders' Association, and approved by the United States Bureau of Animal Industry:

1. A tuberculosis-free accredited pure-bred herd is one which has been tuberculin-tested by the sub-cutaneous method, or any other test approved by the Bureau of Animal Industry, under the supervision of the Bureau of Animal Industry, or a regularly employed veterinary inspector of the State in which co-operative tuberculosis-eradication work is conducted jointly by the United States Department of Agriculture and the State. Further, it shall be a herd in which no animal affected with tuberculosis has been found upon two annual or three semi-annual tuberculin tests, as above described, and by physical examination.

2. The entire herd, or any cattle in the herd, shall be tuberculin-tested or retested at such time as is considered necessary by the Federal and State authorities.

3. No cattle shall be presented for the tuberculin test which have been injected with tuberculin within 60 days immediately preceding or which have at any time reacted to a tuberculin test.

4. No herd shall be classed as an accredited herd in which tuberculosis has been found by the application of the test, as referred to in paragraph 1, until such herd has been successfully subjected to two consecutive tests with tuberculin, applied at intervals of not less than six months, the first interval dating from the time of removal of the tuberculous animal from the herd.

5. Prior to each tuberculin test satisfactory evidence of the identity of the registered animals shall be presented to the inspector. Any grade cattle maintained in the herd, or associated with animals of the herd, shall be identified by a tag or other marking satisfactory to the State and Federal officials.

6. All removals of registered cattle from the herd, either by sale, death, or slaughter, shall be promptly reported to the said State and Federal officials, giving the identification of the animal and, if sold, the name and address of the person to whom transferred. If the transfer is made from the accredited herd to another accredited herd, the shipment shall be made only in properly cleaned and disinfected cars. No cattle shall be allowed to associate with the herd which have not passed a tuberculin test approved by the State and Federal officials.

7. All milk and other dairy products fed to calves shall be that produced by an accredited herd, or, if from outside or unknown sources, it shall be pasteurized by heating to not less than 150° F. for not less than 20 minutes.

8. All reasonable sanitary measures and other recommendations by the State and Federal authorities for the control of tuberculosis shall be complied with.

9. Cattle from an accredited herd may be shipped interstate, by certificate obtained from the office of the live stock sanitary officials of the State in which the herd is located, or from the office of the Bureau of Animal Industry, without further tuberculin test for a period of one year, subject to the rules and regulations of the State of destination.

10. Strict compliance with these methods and rules shall entitle the owners of tuberculosis-free herds to a certificate, "Tuberculosis-Free Accredited Herd", to be issued by the Bureau of Animal Industry and the State live stock sanitary authority. Said certificate shall be good for one year from date of test unless revoked at an earlier date.

11. Failure on the part of owners to comply with the letter or spirit of these methods and rules shall be considered sufficient cause for immediate cancellation of co-operation with them by the State and Federal officials.

PROGRESS OF THE WORK.

In a letter dated at Washington, November 15th, Dr. J. R. Mohler, Chief of the Bureau of Animal Industry, writes as follows:—

Since the adoption of the uniform plan co-operative tuberculosis eradication work has been taken up in, approximately, 40 states. The work is progressing as well as any of us anticipated, and we believe that it will continue to grow in favour with the pure-bred cattle breeders until a large part of the pure-bred herds of every state are under supervision for the control and eradication of tuberculosis.

In addition to the Accredited Herd Plan, work has been taken up at several points, the object of which is to eradicate tuberculosis from circumscribed areas. We have found it convenient to take the county as a unit. In one section of Alabama the work has been extended into several counties. A very good plan has been adopted, in that section, of grouping the cattle up at central points, rather than to have the inspectors visit each herd individually. At one test made some time ago there were more than 80 herds of cattle, representing an aggregate of nearly 2000 animals, that were assembled at one point and were tested in 24 hours by two inspectors. If they had followed the old-time custom of visiting each of the farms, you can readily see that it would have taken many weeks to complete that amount of work. Or course, the herds in that section are small and it is more feasible to have them grouped than in areas where larger herds exist, but it is believed that even in a dairy section where the herds are large, the smaller herds can be brought to central points and thus facilitate the work very materially.

A NATIONAL FLOWER FOR CANADA

BY J. H. C. DEMPSEY. HAMILTON, ONT.

Our American cousins in selecting a national flower for the United States of America, canvassed all the states of the Union before deciding. After great care exercised in seeking a flower indigenous to all the states, they finally settled on the "Golden-Rod," the generic name of which is *Solidago*, and which was settled, by Act of Congress, as the national flower. Ella Wheeler Wilcox, the poetess, has immortalized the flower in one of her best poems, "The Beautiful Land of Nod:"

Come cuddle your head on my shoulder, dear,
Your head like the golden-rod,
And we will go sailing away from here
To the beautiful land of Nod.

I will croon you a song as we float along,
To that shore that is blessed of God.
Then lo! for that fair land, we're off for that rare land
That beautiful land of Nod.

So the Americans were happy in their selection of a flower, known of all and a general favourite, blending as it does with the autumn landscape of scarlet oaks, sumachs, and the many varieties of Michaelmas daisies.

The flower which I would modestly suggest is *Trillium alba* (three-leaved nightshade), commonly known as the white lily or Trinity lily, the most beautiful of our spring wild flowers. With a slightly pleasant odour like rare Japanese perfume, it is *un symbole de l'innocence, de la candeur, de la pureté* in its beauty.

John Macoun, M.A., F.L.S., F.R.S.C., Naturalist of the Geological and Natural History Survey of Canada, has it as a habitat of all the provinces of Eastern Canada, and it is found in all the woods of the Pacific coast. It decorates the altars in our churches teaching the same lesson the shamrock taught the Irish when St. Patrick explained the doctrine of the Trinity. It beautifies our homes, in drawing room or on supper table, and will last for longer than most flowers, as it turns a delicate lavender from the purest of white.

As a motive for decoration, it will lend itself to the most beautiful of designs, whether natural or conventionalized. The children bring their teachers them to school, as you often see them adorning the kindergarten windows, an innocent offering of love.

Blooming, as they do, about "Empire day," they could be used in the years to come to decorate the monuments to our noble and sacred dead, who lie in "Flanders Fields," as they can be made into beautiful wreaths. The corm, or bulb, can be taken up when they are fading, and transplanted, and will bloom the next season; and could be gathered by the school children and sent through the Canadian Club, or some such society, to sunny France, and planted in clumps on the graves.

Maybe in the future Canadians will see it in the forest alleys of St. Cloud, Fontainbleau and Rambouillet. It will grow and bloom with no special attention.

THE LILY OF THE VALLEY SUGGESTED

BY MISS ADA B. CURRIE, GUELPH, ONT.

In a letter which I wrote to the "Toronto Globe" respecting a national flower I expressed a strong preference for the wild rose and the lily of the valley. I am now even more impressed with the suitability of the latter. During the season of its blooming it is surprising to observe the vast numbers who, in the early morning, wear a sprig of it to office, store or factory. Apparently it is a favourite with men and women in all walks of life.

The valley lily lends itself most readily to design. If sentiment be a consideration, and I understand it is, then what flower have we which plays such a part more than this one? From its growth at my own home I know it to flourish and bloom in places where other flowers and bulbs would die. The scarcity of labour and the great number of soldiers' graves ought to make this a consideration. The foliage being so trim and attractive, it is a desirable plant at any time of the year.

Next to the valley lily I think the rose holds such a high place in the regard of the Canadian people (possibly it stands first) that I should like to cast my word in favour of either.

ASSOCIATIONS AND SOCIETIES

EVENTS OF THE COMING MONTHS

Dec. 5th to 6th.—Toronto Fat Stock Show, Union Stock Yards, Manager, T. E. Good, Toronto.

Dec. 6th to 11th.—Annual meeting of Western Ontario Poultry Association, R. W. Wade, Parliament Buildings, Toronto, Secretary; also of the Confederation of Local Poultry Associations, J. E. Peart, Hamilton, Ont., Secretary, and of the following breed clubs; Rhode Island Red, Orpington, Mottled Ancona, Black Minorca, White Wyandotte, Barred Rock, Leghorn, Bantam, and Jacobin, at Guelph, during the Ontario Winter Fair.

Dec. 6th to 12th.—Ontario Provincial Winter Fair, Guelph, Ont., Secretary, R. W. Wade, Parliament Buildings, Toronto, Ont.

Dec. 10th to 12th.—Women's Organization Conference, Winnipeg, Man.

Dec. 10th to 13th.—Alberta Winter Fair and Auction Sale of beef cattle and fat stock, at Calgary, Secretary, E. L. Richardson, Calgary.

Dec. 11th to 12th.—Annual meeting of the Pomological and Horticultural Society of Quebec at Macdonald College, St. Anne de Bellevue, Peter Reid, Chateauguay Basin, Secretary.

Jan. 14th to 17th 1919.—Convention of Agricultural Societies, Poultry Show and Provincial Seed Fair, Saskatoon, Sask.

Jan. 14th to 17th.—Ottawa Winter Fair, Secretary, W. D. Jackson, B. S. A., Agricultural Representative, Carp.

Feb. 17th to 21st.—Provincial Dairy Show, Winnipeg, Man., Secretary, L. A. Gibson, Dairy Commissioner, Winnipeg, Man.

THE GRAIN GROWERS' ORGANIZATIONS

BY GEO. F. CHIPMAN, EDITOR AND MANAGER, GRAIN GROWERS' GUIDE

There is a great deal of misunderstanding, particularly in Eastern Canada, as to the constitution and function of the various organizations which the grain growers of Western Canada have developed. The writer will briefly outline the origin, scope, and purpose of these organizations. By name, the various organizations of the grain growers in the Prairie Provinces are as follows:—

1. Manitoba Grain Growers' Association.
2. Manitoba Women Grain Growers.
3. Saskatchewan Grain Growers' Association.
4. Saskatchewan Women Grain Growers.
5. The United Farmers of Alberta.

6. The United Farm Women of Alberta.
7. The United Grain Growers Ltd.
8. The Saskatchewan Co-operative Elevator Co., Ltd.
9. The Canadian Council of Agriculture.
10. *The Grain Growers' Guide*, Ltd.

1. The Manitoba Grain Growers' Association was organized in 1902 as a purely educational association, which it continues to be at the present time. The President is R. C. Henders, M.P., Winnipeg. The membership is approximately 8,000 farmers, comprised in 450 local community associations throughout the province of Manitoba. The head office is in Winnipeg.

2. The Manitoba Women Grain Growers is the auxiliary of the men's organization in the same province. It was organized only a year ago, and has now 40 local community associations carrying on educational work among the women of the province. The President is Mrs. J. S. Wood of Oakville, Manitoba, and the head office is in Winnipeg.

3. The Saskatchewan Grain Growers' Association was the pioneer grain growers' organization, and was started in 1901. It is an educational organization with a membership of 40,000, comprised in 1,100 local community associations. The President is J. A. Maharg, M.P., of Moosejaw. Three years ago the association entered into the distribution of commodities used on the farm, and has built up a large business, which is carried on through its trading department at its head office, Regina.

4. The Saskatchewan Women Grain Growers organized four years ago as the auxiliary of the men's organization, and have a membership of 5,000 comprised in over 200 local associations, and are devoted solely to educational work. The President is Mrs. C. E. Flatt, Tantallon, Sask.

5. The United Farmers of Alberta was organized in 1908 by the amalgamation of the Alberta Farmers' Association and the American Society of Equity, both of which organizations had been carrying on educational work in Alberta for a number of years. The U.F.A. is devoted to educational work, and has a membership of 17,000 in 650 local associations or unions. The President is H. W. Wood, Carstairs, Alta., and the head office is in Calgary.

6. The United Farm Women of Alberta is the auxiliary of the United Farmers of that province, and was organized three years ago. Its head office is in Calgary, its membership is upwards of 2,000 in 120 local associations, and its work is purely educational. The President, is Mrs. J. F. Ross, Duhamel, Alta., and the head office is in Calgary.

7. The United Grain Growers', Limited, with head office in Winnipeg, is an amalgamation of the Grain Growers' Grain Company, which was the pioneer grain growers' company established in 1906, and the Alberta Farmers Co-operative Elevator Company, with head office in Calgary, established in 1913. The United Company has 35,000 farmer shareholders, operates over 300 country elevators throughout the three Prairie Provinces, two terminal elevators at the lake front, a flour and feed business in British Columbia, a large sawmill at Hutton, B.C., and handles live stock in large volume through the Calgary, Edmonton, and Winnipeg stockyards. The company also does a large business through its co-operative supply department in all kinds of machinery, and other commodities used on the farm, and maintains warehouses in Winnipeg, Regina, Saskatoon, and Calgary. It also owns the Grain Growers' Export Company, with offices in Winnipeg and New York, which, before the war, was the largest grain export company on the continent. Another enterprise of the company is the United Grain Growers' Securities Company devoted to selling farm lands. The President of the United Grain Growers', Limited, is Hon. T. A. Crerar, Minister of Agriculture, Ottawa. The First Vice-President and Acting General Manager is C. Rice-Jones, Calgary.

8. The Saskatchewan Co-operative Elevator Company was organized in 1911 with head office in Regina, and has devoted its efforts exclusively to the handling of grain, and now operates over 300 country elevators in Saskatchewan, and two large terminal elevators at the lake front. It has over 20,000 farmer shareholders. The President of the company is J. A. Maharg, M.P., Moose Jaw, the Vice-President, Hon. Geo. Langley, Regina, and the General Manager, Fred. W. Riddell, Regina.

9. The Canadian Council of Agriculture is the federal organization through which all these other organizations unite together with sister organizations in the province of Ontario. The Council of Agriculture has been organized for eight years, and is composed of the executive officers of these other organizations. The head office of the Council is in Winnipeg. The President is H. W. Wood, President of the United Farmers of Alberta, and the Secretary is Norman P. Lambert.

10. *The Grain Growers' Guide* is the official organ of the associations described above It was established in 1908 as the official organ of the grain growers in all three provinces, and is still employed in the same capacity. It is published in Winnipeg in a $250,000 plant owned by the Grain Growers, and is issued weekly to 51,000 subscribers in the Prairie Provinces.

NEW BRUNSWICK WOMEN'S INSTITUTES

The sixth convention of the Women's Institutes for the province of New Brunswick was held at Fredericton on October 1st, 2nd, and 3rd. Miss Hazel McCain, Supervisor of Women's Institutes, in her annual report stated that during the past year, fifteen new branches had been organized, making a possible membership of 3,000. Twelve institutes had been organized among the French-speaking people of the province, under the supervision of Miss Alice Michaud. The receipts from 76 of the institutes amounted to $16,288.60, and the expenditures to $13,620.19. Sixty of the institutes contributed between them $1,000 to the Women's Auxiliary Army Corps. There were 1,824 women and girls enrolled in the short courses held at Woodstock, Fredericton, Sussex, St. John, and Chatham. Miss Nutter, Demonstrator for Women's Institutes, reported that 40 demonstrations had been held in the southern and eastern sections of the province, 36 on wheat substitutes, one on sewing, two on canning, and two on home nursing. Miss Michaud reported that 13 demonstrations had been made in the French-Canadian sections of the province. Resolutions were passed petitioning the provincial Government to place a lady member on the Censor Board for the province; approving of the medical inspection of schools, and urging the appointment of women on the health Boards of the province, also that women be placed on the School Boards in rural districts and on the governing boards of hospitals, and promising hearty co-operation with the Canada Food Board. *The Maritime Farmer* was appointed official organ of the Women's Institutes of New Brunswick. At the close of the session the delegates visited the Experimental Farm and the new convalescent home at Fredericton.

QUEBEC GENERAL BREEDERS' ASSOCIATION ANNUAL SALE

BY J. A. COUTURE, SECRETARY

The General Breeders Association of the Province of Quebec, held its ninth annual sale of pure-bred breeding animals in Montreal on the 16th of October, and in Quebec on the 23rd of October. The dates were, unfortunately, when the influenza epidemic was at its height, and the results were not quite as satisfactory as they have been in past years. The attendance was only about one-third of that usual. The number of animals sold was 235, including 71 cattle (11 of which were French-Canadians, 45 Ayrshires, and 15 Holsteins); 114 sheep, and 50 hogs. The following statement shows the number of animals of each kind sold in Montreal and Quebec, the maximum and minimum prices paid, and the average price for each species and breed:—

Cattle	Sold in Montreal	Sold in Quebec	Maximum price	Minimum price	Average
			$ cts.	$ cts.	$ cts.
French-Canadian	1	10	150 00	40 00	80 90
Ayrshire	15	30	126 00	40 00	67 75
Holstein	10	5	101 00	37 00	71 25

Average price for 71 heads of cattle, $73.30.

SHEEP					
Leicester	19	22	65 00	27 00	38 39
Cotswold	13	4	59 00	32 00	44 05
Lincoln	2	3	40 00	31 00	34 80
Oxford	19	3	55 00	28 00	40 77
Hampshire	9	6	49 00	31 00	36 40
Shropshire	1	9	47 00	35 00	41 30
Cheviot	0	4	30 00	30 00	30 00

Average price for 114 sheep, $37.95.

HOGS					
Yorkshire	11	17	105 00	32 00	45 32
Chesters	4	11	71 00	27 00	41 46
Berkshire	0	3	55 00	39 00	49 00
Tamworths	0	4	70 00	42 00	55 50

Average price for 50 hogs, $4.82.

The Association is organizing a travelling sale on the Canadian Northern, in the district of Chicoutimi, Lake St. John, from Chicoutimi to St. Felicien. French-Canadian and Ayrshire cattle, sheep and hogs of the above-mentioned breeds, will be offered for sale.

The great work which is being done by women in connection with food production is deserving of the widest recognition. Women have entered the field—in the literal sense of the word—in all branches of farm work, from motor-ploughing to thistle-cutting, and from stock-rearing to thatching and hedging.—*British Board of Agricultural Journal.*

NEW PUBLICATIONS

DOMINION EXPERIMENTAL FARMS

THE DIVISION OF ANIMAL HUSBANDRY

Fish Meal as a Live Stock Food, by E. S. Archibald, Dominion Animal Husbandman. This is a four-page leaflet dealing with the use of meal maede from fish and fish-scrap as a food for cattle, swine, and sheep.

THE SEED BRANCH

Red Clover and Its Impurities, by John R. Dymond, B.A., Seed Analyst. This is "Pamphlet No. S-2" of the Seed Branch, and comprises 20 pages. It describes the object and intention of the "Seed Control Act" as it relates to clover, with notes on the relative prevalence of weed seeds found in clover seed; on weed eradication; of the methods of cleaning red clover seed; on getting the stand of clover, and on seed testing. A series of illustrations relating to the subject are also given.

PROVINCIAL DEPARTMENTS OF AGRICULTURE

QUEBEC.

Pomological and Fruit Growing Society.—The annual report of the Pomological and Fruit Growing Society of the province of Quebec for 1917 has just been issued. It contains the full proceedings of the annual summer meeting held at Lennoxville on August 14 and 15, and also of the regular annual meeting held at Macdonald College, Ste. Anne, on December 4 and 5, 1917. It makes a book of 76 pages.

Protection of Plants from Insects and Fungous Diseases.—The Tenth Annual Report of the Quebec Society for the Protection of Plants from Insects and Fungous Diseases for the year ending March 31, 1918, has been published as a supplement to the Report of the Provincial Department of Agriculture. It contains a list of the members and full accounts of the proceedings, with the papers read, at the annual meeting held in Macdonald College on March 21, 1918.

ONTARIO.

Cheese and Butter Making.—By the staff of the Dairy School, Ontario Agricultural College, Guelph. In this blue book of 56 pages, information generally is given on cheese and butter making, including milk and cream testing, care of and use of the implements and machinery, and especially on farm butter making and dairy cheese.

Live Stock Branch Annual Report.—In 72 pages, Mr. R. W. Wade, Director of Live Stock for the province, has brought together ull reports of the winter fair, stallion enrolment, co-operative car shipments, and chronicles of the proceedings of the different provincial live stock associations.

Bacteria Friends and Foes.—Bulletin 265 of the Ontario Agricultural College, prepared by Mr. D. H. Jones, B.S.A., Professor of Bacteriology, deals with its subjects in seven groups as follows:—Bacteria of the Soil and Manure Pile, of the Water Supply, of Sewage Disposal, of Food Preservation, of Milk and Milk Products, of Infectious Diseases of Man and Animals, and of Diseases of Plants. The bulletin, which consists of 100 pages, is illustrated with a variety of three-quarter and one-half page plates.

MANITOBA

Lessons on Weeds, Extension Bulletin No. 30, issued by the Manitoba Department of Agriculture, like previous bulletins on birds and gophers, is prepared for the special use of the schools of Manitoba; but it is also intended for farmers as well. It illustrates and gives descriptions of about sixty weeds found in the province.

The Live Stock Trade of Manitoba, Extension Bulletin No. 31, issued as a number of the Manitoba Farmers' Library, deals in a comprehensive way with the live stock trade in Manitoba as it exists to-day and its relationship to the world's supply of meat. It is illustrated.

BRITISH COLUMBIA

The Provincial Department of Agriculture has issued the following series of Horticultural circulars;—

No. 44—"Apple-Scab"
No. 45.—"Anthracnose of Apple-Trees'
No. 46.—"Egg-Plant and Pepper Growing in the B.C. Dry-Belt"
No. 47.—"Cucumber and Cantaloupe Growing in the B.C. Dry-Belt"
No. 48.—"Forcing Houses and Frames for Producing Early Vegetable-plants"
No. 49.—"Tomato-Growing in B.C. Dry-Belt"
No. 50.—"Potato-Diseases"
No. 52.—"Diseases of Stone-fruits in B.C."

Other circulars recently issued in the same series treat of "The Currant Gall-Mite" and of "Apple-Aphides."

MISCELLANEOUS

Minutes of Annual and Directors' Meeting of the Canadian Ayrshire Breeders' Association.—This year book of the Ayrshire Breeders' Association gives the constitution, by-laws, rules of entry, scale of points, rules and regulations for record of performance, and other matters of interest to the breeders of Ayrshire cattle.

NOTES

Mr. E. A. Weir, B.S.A., formerly associate editor of the *Grain Growers' Guide*, has been appointed agricultural director of the Rural Credits Association of Manitoba.

Mr. J. L. Dougherty, Agricultural Representative for Kent County, Ontario, has organized a central association of the Farmers' Clubs, chiefly for educational purposes.

The Secretary of the Canadian Ayrshire Breeders' Association observes that fully eighty per cent of the inquirers for Ayrshire cattle want certificated Record of Performance stock.

Dr. W. E. Martin of Winnipeg has been appointed Professor of Veterinary Science at the Manitoba Agricultural College, in succession to Dr. C. D. McGillivray, who recently accepted the principalship of the Ontario Veterinary College.

Dr. F. C. Harrison, Principal of Macdonald College, has left for Europe to undertake responsibilities in connection with demobilization. Dr. Harrison's services have been placed at the disposal of the Militia Department for this work.

The death from influenza was announced towards the end of November in Winnipeg, of Mr. A. J. Galbraith, Professor of Chemistry at Manitoba Agricultural College. At the time of his death Professor Galbraith was engaged on a soil survey of the province of Manitoba.

The annual sales of sheep and swine to have taken place last month at Saskatoon and Regina, Sask., were called off on account of the epidemic of influenza. Catalogues had been prepared and are being circulated with a view to the encouragemet of private sales, either direct with the breeders or through the provincial Live Stock Commissioner.

Dr. J. G. Rutherford, Veterinary Director General of Canada from 1901 to 1912 and also Live Stock Commissioner from 1906 to 1912, and for six years head of the Natural Resources Department of the Canadian Pacific Railway Company at Calgary, has been appointed Railway Commissioner, succeeding Mr. D'Arcy Scott, whose ten year period of service has terminated.

The death occurred at Toronto on November 22nd, following an operation for appendicitis, of Mr. Sydney C. Johnston, B.S.A., Director of Moving Pictures for the Ontario Government. After graduating from the Ontario Agricultural College, Mr. Johnston became a Vegetable Specialist in the Department of Agriculture, and in 1917 was appointed Chief of the newly organized Moving Picture Bureau.

The annual sale of sheep and swine to have been held by the Alberta Provincial Sheep Breeders' and Swine Breeders' Associations at Edmonton on October 23rd and 24th were cancelled in accordance with the order of the Board of Health to prevent the spread of influenza, arrangements are being made by the secretary of these respective associations to assist in bringing buyers and sellers together for private sale.

County tours are being utilized to raise the efficiency and comfort of farm kitchens of the United States. In Vandeburg County, Ind., a string of motor cars one-half mile long, carrying 150 people, visited six homes on one tour. A kitchen planned scientifically was used as a model by the home demonstration agent to compare with others less convenient. Suggestions were made as to how the inefficient kind might be re-adjusted or changed, with the expenditure of a little money, to become a comfortable workroom for the housewife.

Thirty-six Model School pupils at Saanich, B.C., only fifteen of whom were boys, and eight little fellows from the Junior Department, succeeded in raising six and one-half tons of potatoes and a quantity of other vegetables. When sold, this produce cleared $200 of all expenses, which was turned over to the Belgian Relief Fund. The school proposes in the coming year to adopt three Belgian orphans. The gardens covered two acres, and a grant of $50 was made by the Provincial Department of Education towards fertilization and cultivation.

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PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K Doherty International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

719—**The Chemical Nature of the Vitamines. Isomerism in Natural Antineuritic Substances.**—WILLIAMS, ROBERT R., and SEIDELL, ATHERTON, in *The Journal of Biological Chemistry*, Vol. XXVI, No. 2, pp. 431-456. Baltimore, Md., September, 1916. (3 pp. in Institute Bulletin.)

720—**Experimental Studies on the Food Value of Bran, in France (1).**—LAPICQUE, L., and CHAUSSIN, J., in *Comptes rendus des Seances de la Societe de Biologie*, Vol. LXXXI, No. 7, pp. 319-323. Paris, April 13, 1918.

The present percentage of flour extraction in France is between 82 and 83%; if 85% extraction were again adopted would the 2 or 3% of extra flour obtained be only an inert mass, or, given that this addition increases the amount of food substance, would the benefit in food material be lost by the increased work of the intestines?

The authors previously studied experimentally on man the food value of wheat flour containing slightly more husk than white flour and found no difference in their food values. They again studied this question in the following form which seemed to them more conclusive:—the subject was placed on a strict maintenance diet, the greater part of which was composed of flour containing the debatable product, which was removed later on; if the product is really useless maintenance will still continue.

The subject chosen was a dog, and it was found that when the bran was withdrawn from the ration gradual starvation occurred. Consequently bran (including the products of commercial milling which are discarded in an 80% extraction but included in a 90% flour) is decidedly nutritious for a carnivorous animal like the dog and obviously much more so for man.

721—**Determination of the Indigestible Residue *in vitro* by the Action of Pancreatin on Wheat or its Milling or Baking Products.**—DEVILLERS, L., in *Comptes rendus des Seances de l'Academie des Sciences*, Vol. CLXVI, No. 17, pp. 700-702. Paris, April 29, 1918.

[1]See also Agricultural Gazette, Aug., 1918, No. 344, and Sept., 1918, No. 379.

Investigations into the utilization of wheat as a food have shown the inaccuracy of the proportion of wheat believed to escape assimilation in man.

As chemical methods attack wheat by too diverse actions, by forces having an action different to that of the digestive juices, and physiological methods were impracticable because of their slowness, artificial digestion was resorted to. The author describes his method of digestion by Defresne's pancreatin in the presence of sodium borate, crystallized calcium chloride, hydrochloric acid and distilled water.

The residue undigested by the pancreatin reduced to 100 parts of product dried at 105-110° was 8·26 to 12·86 for the wheats tested, 35·22 for the bran (sharps), 4·87 to 8·17 for the flours analysed, and 7·53 to 8·24 for the bread.

722—***Phymata noualhieri*, a Hemipterous Enemy of *Musca domestica* in Mexico.**—DE LA BARREDA, L., in *La Revista agricola, Organo oficial de la Direccion de Agricultura, Secretaria de Fomento, Mexico*, Vol. 1, No. 7, pp. 282-284. Mexico, December 1, 1917.

At the Agricultural Station of Oaxaca (Mexico), the author observed that a branch of "lila" (*Melia sempervirens*) infested with larvae of *Phymata noualhieri* was soon covered with numerous dead flies. He bred the hemipteron, which hunted flies energetically. It is also possible that it kills them by some poisonous secretion.

723—**A First-year Course in Home Economics for Southern Agricultural Schools in the United States.**—STANLEY, L., in *U.S. Department of Agriculture Bulletin No. 540* pp. 1-58, Washington, D.C., July 27, 1917.

724—**Experimental Projects of the Division of Pomology of the University of California.**—HOWARD, W. L., in the *Monthly Bulletin of the California State Commission of Horticulture*, Vol. VII, Nos. 1 and 2, pp. 62-64. Sacramento, California, January-February, 1918.

CROPS AND CULTIVATION

726—**Orchard Heating against Frost in Utah, U.S.A.**—WEST, F. L., and EDLEFSEN, N. E., in *Utah Agricultural College Experiment Station, Bulletin* No. 161, pp. 1-47. Logan, Utah, October, 1917. (1)

In the states of Florida, Ohio, Washington, Colorado, and California and Oregon in particular, the protection of orchard trees against frost by heating with heavy oil has been adopted on a large scale with distinctly positive results. In Utah, every three years out of ten the fruit crop is reduced by spring frosts, so that the question of protection by heating should not be neglected, but it must first be shown whether it would prove economically practical. To decide this it is necessary to determine for each species of fruit tree:—(1) the average number of times the fires must be lit and the expense entailed; (2) the amount and price of the fruit thus saved. The study made on this subject by the author from data supplied by five of the most important fruit centres (Utah, Box Elder, Salt Lake City, Weber, and Cache) leads to a negative conclusion as is shown by the results given below.

NUMBER OF TIMES THE FIRES SHOULD BE LIT.—The critical period for fruit trees with respect to frost coincides with the interval between the beginning of flowering and setting. Table I gives the figures concerning apple, apricot, cherry and peach trees collected by the Agricultural Stations of Provo (Utah), Corinne (Box Elder), Salt Lake City, Ogden (Weber), and Logan (Cache). Table II shows the number of times which, according to the author, it would have been necessary to light the fires. In the case of the peach trees they should be lit an average of three times a year.

EXPENDITURE AND PROFIT.—For the peach tree, taking as a basis the calculations drawn up with the greatest care, the total annual expenditure is $50.50 per acre. The average yield is 400 bushels per acre, and the loss due to frost about 80 bushels (20%) to a net value of $28 (the average price of peaches on the Utah market is about $0.55 a bushel).

The figures would be slightly better for apple but it must be remembered that in this case too, the number of heatings proposed by the author represents a minimum which would always be much exceeded in reality as a precaution, as is proved in all orchards fitted up with necessary apparatus.

This study shows that the advisability of heating and fumigating Utah orchards at the present price of fruit and fuel is doubtful, for the benefit obtained would hardly cover or justify the expense, even under the most favourable conditions of good weather forecasting and capable staff.

[1]See Bulletin of Foreign Agricultural Intelligence, November, 1916.

728—**Salts Injurious to Vegetation and their Relationship to the Irrigation of Arid and Semi-Arid Regions.**—PERKINS, A. J., in *Department of Agriculture of South Australia, Bulletin* No. 103, pp. 24. Adelaide, 1916.

Present Australian irrigation areas, and in particular those situated on the banks of the Murray, are under the influence of arid conditions of climate. Land so situated will become exceedingly productive when brought under cultivation and irrigated. Experience throughout the world, however, teaches that all such land, when brought under the influence of irrigation, is liable to become salt-impregnated to the extent of barreness. At times, when first handled, such land shows no apparent signs of the presence of salt; salt, however, is present, but distributed evenly and invisibly through the depth of several feet of soil. A few seasons subsequent to the application of irrigation, salt may become apparent either uniformly throughout a block, or in scattered patches which gradually increase in area. This salt has risen to the surface through surface evaporation; and, knowing this it is the business of irrigators to do everything in their power to hinder the action of surface evaporation and hold in check the rise of salt.

Towards this end the tillage of irrigated areas, when given in the way of initial preparation of the soil, must be deep and thorough, infinitely more so than is the case in the average routine of farming. In addition to this it is essential to keep the surface soil well screened from the direct rays of the sun during the summer months and where circumstances do not permit of this the moister layers of the subsoil must be kept well-protected by a deep layer of soil mulch. Nor should this be forgotten in autumn, when irrigation areas are bare, in the interval that lies between the removal of the summer crop and the seeding of the winter crop.

Over-irrigation, leaky water channels, shallow drainage channels, and the slow removal of salt-impregnated drainage waters must be avoided.

Irrigation waters that are unduly charged with soluble salts must be avoided. Irrigation water showing 20 grains of soluble salts to the gallon, and used on the 3 acre feet basis, will add to the soil annually more than one ton of soluble salts to the acre; 40 grains to the gallon nearly 2½ tons to the acre and so on. A portion of these salts will no doubt be taken up by the plants; another portion, however, will go towards swelling the existing stocks of injurious salts originally present in the soil.

If, in spite of these precautions, it is impossible to prevent the ultimate rise of salt, or again, if from the outset the land is evidently over-charged with surface salts, special steps towards the removal of the salts must be taken. Whatever steps may eventually be decided upon, none are likely to prove

effective unless adequate provision is made for the systematic removal of drainage waters. Naturally, pipe drainage should be avoided if possible. Ultimately, however, in many cases it will be necessary to determine whether the cost of establishing an adequate system of pipe drains is not amply set off by the extremely high productivity of land so treated and irrigated under arid conditions of climate.

If the land shows 0.1 per cent of sodium carbonate it should be treated with gypsum prior to leaching operations. This, however, is a contingency rare in local experience; under Australian conditions the flood waters pass through the soil, dissolve the soluble salts, and convey them without hindrance through the drain pipes into the country drainage.

The profits resulting from properly conducted irrigation operations under Australian conditions of climate are enormous; the indirect advantages to the State as a whole are equally great. If, however, Australian irrigators are not prepared to take into account this important salt question, and to guard themselves adequately against it, all the expenditure of time and capital will in the end prove vain, and the irrigation areas will revert to the condition of those of Mesopotamia.

730—The Relation of Weed Growth to Nitric Nitrogen Accumulation in the Soil.—CALL, L. E., and SEWELL, M. C., in the *Journal of the American Society of Agronomy*, Vol. X, No. 1, pp. 35-44. Washington, January, 1918.

The favourable effect of tillage upon nitrification is generally attributed to the incorporation of organic matter, the distribution of bacterial flora, aeration, and moisture. The authors attempt to prove that too much importance has been attached to these factors and that the good effects of tillage are due above all to the destruction of weeds which might absorb the nitrates.

After reviewing the publications on this subject (which show that nitrification is not essentially increased by greater aeration and a higher water content, though these factors are necessary) the authors give the results of various experiments made at the Kansas Agricultural Station during several years on plots of wheat cultivated by eleven different methods. A comparison of the yields, moisture contents and nitrate contents shows that marked differences in yield cannot be attributed to the water content which is nearly always constant, but that there is a close relation between yield and nitrate content. Experiments conducted by the authors themselves showed that the accumulation of nitrates is much larger in soils free from weeds even when such soils are not farmed. They conclude that, in a sufficiently light soil, much labour may be saved by adopting only the essential cultivation processes and destroying the weeds by other methods such as rotation and grazing by livestock, especially sheep.

731—Protozoa and the Phenomena of Reduction in Soil.—VON WOLZOGEN KUHR, JR., C. A. H. in *Archief voor de Suikerindustrie in Nederlandsch Indie*, No. 27, pp. 1125-1182 Soerabaja, 1917. (2 pp. in Institute Bulletin.)

739—The Decomposition of Green and Stable Manures in Soil.—POTTER, R., S., and SNYDER, R. S., in the *Journal of Agricultural Research*, Vol. XI, No. 13, pp. 677-698 Washington, December 24, 1917.

This paper is a continuation of previous studies the principal aim of which was to determine the rate of decomposition of original or added organic matter in soil by estimating the amount of carbon dioxide evolved from manured soils. The last experiments were made in two series—one with applications of calcium carbonate, the other with liming.

The principal results show that the organic matter in soil decomposes more rapidly in soil treated with calcium carbonate or lime than in untreated soil. The decomposition of the total organic matter of a soil treated with stable manure or green manure (clover or oats) is hastened by the addition of calcium carbonate or lime.

Stable manure seems to hasten slightly the decomposition of green manures accompanying it, and these two forms of manure help to preserve the lime in the soil. No appreciable difference was noted in the rapidity of decomposition of green manures when applied dry and as a fine powder or fresh and in large pieces.

740—Sulphuric Acid and Fertiliser Industries in the United Kingdom.—I. *The Board of Trade Journal*, Vol. C. No. 1110, pp. 268-271. London, March 7, 1918.—II. *The Chemical Trade Journal and Chemical Engineer*, Vol. LXII, No. 1607, pp. 203-207. LONDON, March 9, 1918.—III. *Mark Lane Express Agricultural Journal*, Vol. CXIX, No. 4511, p. 258. London, March 2, 1918. (3 pp. in Institute Bulletin.)

742—The Identification of Grasses by their Vegetative Characters.—CARRIER, LYMAN, in *U.S. Department of Agriculture, Bulletin* No. 461, pp. 30. Washington, January 19, 1917.

748—The Effect of One Plant on Another.—PICKERING, SPENCER, in *Annals of Botany* Vol. XXXI, No. 122, pp. 181-187. London, April, 1917.

As a result of numerous investigations started in 1895 the author noted the injurious effect which one plant may have on another. In a series of pot experiments he found the following species to be subject to such influence:—apple, pear, cherry, plum, six kinds of forest trees, mustard, tobacco, tomatoes, barley, clover and two varieties

of grasses. The plants exercising the injurious effect were apple seedlings, mustard, tobacco, tomato, two varieties of clover and sixteen varieties of grasses.

Some plants can exercise this action on other individuals of their own species; this is the case with tobacco, tomato, mustard and apple. This may be compared with the well-known phenomenon of the bad development of a young plant near an older one. The author believes that the roots of the plant exercising the injurious influence secrete a toxic substance. Recent experiments confirmed this theory. He made three pot experiments with mustard. On the surface of the first pot was placed a tray containing soil, and so perforated that the water percolated through to the pot below. In this case growth was normal and there was no injurious effect. In the second test a crop of mustard was grown in the tray, but the holes were stopped and the water for the plants in the pot below was given to them direct. Growth was also normal in this case. The conditions in the third test were similar to those of the second, except that the holes were left open and the water for the plants below only reached them after having passed through the tray. In this test the growth of the mustard in the large pot was *reduced to* $\frac{1}{100}$ *of the normal growth.*

The extent of this action varies greatly; in pot experiments reduction in growth varies from 6 to 97%; in field experiments with trees it may be very small or sufficient to kill the plant.

Attempts have been made to explain this phenomenon by many hypotheses, such as rapid exhaustion of the soil, etc., but they have all been rejected. The toxic substance which appears to cause the action oxidises rapidly; water containing it loses its toxic properties when exposed to the air for 24 hours.

751—**Selection Experiments with Two Cultivated Oats According to the Position of the Seed in the Spikelet, in France.**—DANIEL, L., and MIEGE, E., in *Annales des sciences naturelles*, Vol. XX, Nos. 1-6, pp. 289-308. Paris, 1917. (2 pp. in *Institute Bulletin.*)

754—**Sugar Beet Seed Production and Stock of the United States.**—I. BEET SEED Crop of 1917 Larger; Acreage Smaller, in *Facts About Sugars*, Vol. VI, No. 2, pp. 27, New York, 1918.—II. Beet Seed Report Issued. *Ibid.*, No. 13, pp. 253.—III. Country has Ample Beet Seed Supply for Season. *Ibid.*, No. 15, pp. 287.

The sugar beet seed production of the United States during the year 1917 is reported by the Department of Agriculture at 5,546,000 lb., an increase of 335,000 lb. or rather more than 6 per cent over the crop of 1916. While the seed production was larger, the acreage devoted to cultivation of seed beets was 13 per cent less than in 1916, the crop of 1917 being grown on 4,579 acres, as compared with 5,268 acres devoted to seed beets in the preceding year.

The far western states of California, Idaho and Utah were responsible for the increase in production in 1917, the other seed producing areas showing a decrease. In these three states the crop last year was 2,458,000 as against 1,628,000 lb. in 1916, a gain of 51 per cent. The acreage devoted to seed production in these states was 2,523, as compared with 2,178 in the year before, an increase of 15 per cent.

In the other great seed producing area, embracing the states of Colorado, Kansas, Nebraska and Montana, the seed crop of 1917 was 12½ per cent smaller in 1917 than in 1916, the figures being 3,030,000 lb. for last year and 3,445,000 lb. for the year before. In 1916 this territory produced 66 per cent of the country's total seed crop while last year its production was only 54.5 per cent of the total. The acreage devoted to seed beets decreased in this territory from 2,725 acres in 1916 to 1,978 acres in 1917, a decrease of nearly 28 per cent.

Beet seed production in Michigan and Ohio in 1917 was only 58,000 lb., as compared with 128,000 lb. in 1916, a falling off of more than half. The area in seed beets in these states decreased from 365 acres in 1916 to only 78 acres last year.

In point of production per acre the Colorado-Kansas-Nebraska-Montana territory made the best showing, obtaining an average of 1,532 lb. of seed to the acre, as against an average of 974 lb. to the acre for California, Idaho and Utah and an average of 744 lb. to the acre for Michigan and Ohio. The Great Western Sugar Company, the Utah-Idaho Sugar Company and the United States Beet Seed Company were the country's largest producers.

According to the final figures on sugar beet seed stocks in the United States on January 31, 1918, as collected by the War Emergency Seed Survey, there were on hand 19,240,571 lb. of imported beet seed and 7,927,614 lb. of home-grown seed, a total of 27,168,185 lb.

As compared with the corresponding date of 1917, the report shows an increase of 3,740,918 lb. in the stock of imported and 2,495,443 lb. in the stock of domestic seed, making a combined increase of 6,236,361 lb. or nearly 30 per cent, during the year. Importation of sugar beet seed into the United States during the twelve months' intervals, as reported by the Department of Commerce, amounted to 15,437,797 lb.

Checking up these figures for stocks on hand at the two dates and of receipts in the interim, it appears that the domestic sugar beet crop of 1917 required in the planting a total of 14,747,436 lb. of seed. The beet acreage for 1917 is estimated by the Department of Agriculture, at 675,400 acres, which works out at an allowance of

21.8 lb. of seed to the acre. This, however, takes no account of replantings nor of acreage planted which yielded no crop.

As regards seed supplies for the coming season and for that to follow it is apparent that there is sufficient seed on hand to plant a normal beet acreage for 1918, including the necessary replantings, and that after the planting season is over there should be a surplus of from 20 to 25 per cent of the sugar beet seed requirements for 1919. Very little sugar beet seed has been imported since January 31, 1918, and it is not probable that any large quantity will be imported before the close of the 1918 planting season.

In view of the small surplus that will remain after the 1918 planting has been finished, it is evident that a considerable increase in domestic seed production, together with a large importation of seed, will be necessary in order to make possible a normal sugar beet acreage in 1919. Reports indicate that the beet sugar companies are awake to the situation and are preparing to increase their seed production this year.

765—**Marvel of Peru (*Mirabilis Jalapa*), a Plant which should be Utilized.**—MANCADA-GUIGNONES, FRANCESCO, in *La Rivista Agricola*, Year XIV, Pt. 302, pp. 142-143. Rome, May 1, 1918.

The author has made a long study of this plant and concludes that its cultivation for various industrial uses is advisable.

When grown in gardens the plant flowers excessively, to the detriment of the seed, which is small. In arid soil, however, especially if fertilized with ashes, it flowers less, and the seeds are much larger and richer in starch.

The stamens, pistils, and perianth (which dries up without separating from the seed) gives a fast purplish colour, which dyes silk.

The starch contained in the seed is of very good quality. When freed from the husk and germ the seeds give a very fine flour, which may be used for making bread, paste, biscuits, etc.; they may also be subjected to alcoholic fermentation, as they contain a sugar.

The cultivation of this plant in malarial districts would be very advantageous; the flowers open during the evening and during the night give off a very strong smell, which keeps away mosquitos, or stupifies them, thus making them inoffensive.

768—**Soil Management Investigations in a Young Apple Orchard.**—WOODBURY, C. G., NOYES, H. A., and OSKAMP, JOSEPH, in *Purdue University Agricultural Experiment Station, Bulletin* No. 205, Vol. XX, 52 pp. Lafayette, Ind., September, 1917.

The object of this investigation (carried on at Laurel, Indiana) has been to study the effects, and particularly the factors responsible for the effects of tillage with cover crop, mulch, and sod on apple trees. The present report covers the formative period of the life of the trees. The land comprising the experimental plots had been used as a permanent pasture for nearly 40 years previous to planting the orchard. The investigation has to do mainly with the upland area, the hillside plot being included for any additional light it might throw on the behaviour of the upland plots. The systems of soil management include four major treatments, viz., clean cultivation with a winter cover crop; a heavy mulch of straw applied to the trees, and the grass cut and let lie; the grass cut and allowed to lie where it falls, no mulch given the trees; the grass cut and raked up to form a mulch collar about the trees.

The Laurel soil contains a high percentage of silt and clay, and varies but little in its physical composition, specific gravity, and water-holding capacity. The soil (to a depth of 9 in.) is not notably deficient in any essential element, however it is not very productive. The low organic matter content and the high proportions of silt and clay, make the soil one through which water percolates slowly and one which is easily puddled; coupled with these conditions is a slight acidity. The subsoil is not greatly different from the surface soil.

The average annual precipitation during the five-year period, 1912-1916, has been 38.71 in. The spring months are usually much better supplied with moisture than the autumn months. Periods of dry weather frequently prevail in June and July, which are commonly broken by heavy precipitations in August.

While there have been no wide variations in phenological behaviour of trees under different systems of soil management, yet there does occur a marked slacking up of growth on grass plots during dry periods in summer.

Trees grown under a clean culture cover crop system or under a heavy mulch made 44.5 per cent greater average yearly gains in trunk girth than trees grown in grass with a light mulch or no mulch at all. There was no significant difference between the three varieties, Grimes, Jonathan, and Stayman, in their response to soil management treatments. The Stayman variety made slightly greater gain in girth of trunk on all plots than did the Grimes or Jonathan.

It is largely in dry periods that the value of certain systems of management in conserving soil moisture are made manifest. During two such periods, occurring in June two out of the five years, where an adequate mulch was maintained on the surface of the ground, either through the agency of cultivation or a heavy supplemental covering, the percentage of soil moisture was more then twice that in grass land. These soil moisture conditions are closely correlated with the girth increase made by the trees. The great importance of water in tree growth is further emphasized by a study of the precipitation data which show that the variation in growth due to seasonal moisture

conditions, appears to have been quite as large as that due to cultural practices.

The soil temperature studies were carried out under field conditions (at a uniform depth of 9 in. on all plots) by means of soil thermographs. As the soil temperature is largely a reflection of the air temperature, the extent to which soil temperature can be controlled by cultural practices is quite limited. The data do not support the opinion that rain is of importance in warming the soil. There is no indication that the single factor of soil moisture had an influential bearing upon the temperature existing under the different systems of soil management. The temperature range varies inversely with the amount of mulch covering the soil. The role of soil temperature within the limits of ordinary cultural practice appears to be a neutral factor in tree growth in Indiana.

From a study of the chemical changes induced in the Laurel soil by cultural practices during the period 1910 to 1915, it appears that clean cultivation tends to deplete the soil of its organic matter, despite the fact that a cover crop is being turned under each year. The straw mulch plot has increased slightly in organic matter, while the sod plots have, as a whole, come nearer to holding their own in volatile matter, humus and nitrogen, than the clean culture cover crop plots. There is no apparent correlation between the previously mentioned chemical factors and tree growth.

A study of the average bacterial population shows that there are, in most cases, more bacteria present in the sod ground at Laurel than in the clean culture cover crop plots; that the variations in mulch on the sod plots have some influence on bacterial numbers; that tree growth and soil moisture cannot be correlated with bacterial numbers.

Tests show that ammonification varies with the season. Differences between plots are not consistent with seasonal climatic variations, and it is impossible to say that cultural practice has affected the ammonifying power of this soil. Tests show that nitrification varies with the season, but that a growing crop of grass or rye lowers the nitrate content of the soil; that the most nitrates are found under the clean culture cover crop system, the straw mulch ranking second in amount of nitrates; that the girth gains of the trees are roughly proportional to the nitrate content of the soil; that there is no relation between the nitrifying power of the soil and either cultural practice or tree growth; however, the ratio between the nitrates present in the field and the nitrifying power of the soil does bear a relation to tree growth.

771—**The Larch.**—SCHOTTE, J. (Meddelanden fran Statens Skogsförsoksanstalt), in *Skogsvardsföreningens Tidskrift*, Year XV, No. 4-6, pp. 445-706. Stockholm, 1917. (3 pp. in Institute Bulletin.)

This paper is a study on the genus *Larix* and its different species spread through the various countries of the globe made in view of their importance to sylviculture in Sweden. At the same time it is an important contribution to sylviculture in all countries. The author and his collaborators study above all the identification and geographical distribution of the different species of larch known throughout the world, their varieties, forest characteristics, susceptibility to disease and insect attack, production of wood, the quality and utilization of this wood, and the division of the different species of larch into pure and mixed stands. To distinguish the species are given two tables of identification, which enable the forester to distinguish 11 species of the 16 already known.

LIVE STOCK AND BREEDING.

774—**Studies on Toxicity to Insects of Various Organic Conpounds.**—MOORE, WILLIAM: I. Toxicity of Various Benzene Derivatives to Insects; II. Volatility of Organic Compounds as an Index to the Toxicity of their Vapours to Insects. *Journal of Agricultural Research*, Vol. IX, No. 11, pp. 371-381, and Vol. X, No. 7, pp. 365-371, Washington, June 11 and August 13, 1917. (3 pp. in Institute Bulletin.)

778—**Thyroid Hyperplasia and the Relation of Iodine to the Hairless Pig Malady** (1).—HART, E. B. and STEENBOCK, H., in *The Journal of Biological Chemistry*, Vol. XXXIII, No. 2, pp. 313-323. Baltimore, Md., February, 1918.

The writers' experience with the hairless pig malady supports the view that it is occasioned by a low iodine assimilation by either intestine or thyroid, resulting in a goitrous condition in both mother and young. This condition interferes more severely with foetal development than with the normal maintenance of the mother. It appears to be produced by rations with high protein levels and low laxative effects, with the accompanying condition of lack of exercise and unclean surroundings. Young sows exposed to such conditions are more prone to develop thyroid enlargement than are mature sows. The authors recognize that there is the possibility that some rations from certain regions are naturally so low in iodine as to make the scarcity of iodine the direct cause. They have found it possible to grow sows to maturity on natural feeding materials grown in southern Wisconsin, but of relatively low protein content and good laxative properties, with the production of normal offspring. On the other hand, these same feeds combined in different proportions and fortified with protein concentrates lead to the production of hairless pigs.

The authors are of the opinion, for the present at least, that they have not reached the stage where it is wise to advocate the general use of iodine in the feed of all brood sows; that the conditions leading to the pro-

(1) See also Agricultural Gazette, August, 1918, page 837, No. 305.

duction of hairless pigs should first be analysed fully in order that we may acquire a complete understanding of the reasons for the successful rearing of sows intended for breeding purposes through the use of natural materials, unfortified with potassium iodide. However, in regions and on farms where hairless pig production is endemic or persistent in character the direct use of iodides should be made.

779—**Poultry Parasites.**—HADLINGTON, J., in *the Agricultural Gazette of New South Wales*, Vol. XXVIII, No. 9, pp. 671-673. Sydney, September 3, 1917.

780—**Infections Caused by *Bacterium pullorum* in Adult Fowls.**—HADLEY, PHILIP, assisted by CALDWELL, D. W. ELKINS, M. W. and LAMBERT, D. J., in *Agricultural Experiment Station of the Rhode Island State College, Bulletin* 172, 40 pp. Kingston, R.I., November, 1917.

782—**The Nutritive Properties of Maize.**—HOGAN, ALBERT A., in *The Journal of Biological Chemistry*, Vol. XXVII, No. 1, pp. 193-208. Baltimore, Md., 1916.

The nutritive deficiencies of maize have been ascribed by the different investigators to: its lack of certain inorganic constituents; protein deficiencies; too small quantities of vitamines.

Most of the data described in this report were obtained by using albino rats as experimental animals. Some of them were given maize alone, others maize plus a salt mixture, a third lot maize plus an "ash-free" protein and a fourth maize plus "ash-free" protein plus a salt mixture. The results are summarized as follows:—

The evidence indicates that when maize is fed to rats as the sole dietary the mineral constituents are the first limiting factor, and then the protein. In the case of swine these findings are apparently reversed. Protein is here the first limiting factor, and then the mineral element. The data also indicate that the maize proteins are less efficient for growth than casein. The addition of lysine and tryptophane to maize did not increase its efficiency for growth. The addition of some of the adequate proteins (egg white) seemed of only slight benefit. In view of these facts it seems possible that one of the limiting factors in maize as a food for growing rats is one or more of the growth accessories.

Young rats on a maize diet grow more rapidly when the grain is supplemented with casein than when supplemented with egg white. This observation assumes added significance since food mixtures containing protein free milk, butter, and egg white are more efficient for growth than mixtures of maize and egg white, even though the protein of the maize mixture furnishes a relatively higher per cent of calories than does the protein of the more efficient diet.

Autoclaved maize mixtures failed to maintain body weight and ultimate failure resulted.

Since swine grow rapidly on a mixture of maize and egg white, it is believed that maize contains sufficient of the growth accessories for normal growth in swine.

783—**Sudan Grass Silage.**—FRANCIS, C. K. and FRIEDEMANN, W. S., in the *Oklahoma Agricultural and Mechanical College, Agricultural Experiment Station Bulletin*, No. 115. Stillwater, Oklahoma, April, 1917.

784—**Nutrition Investigation upon Cottonseed Meal and Cottonseed Flour.**—RICHARDSON, ANNA E. and GREEN, HELEN S., in *The Journal of Biological Chemistry*, Vol. XXV, No. 2, pp. 307-318. Baltimore, Md., June, 1916; Vol. XXX, No. 2, pp. 243-258, June, 1917; Vol. XXXI, No. 2, pp. 379-388, August, 1917.

785—**Food Value of the Pea Nut (*Arachis hypogœa*).** — DANIELS, AMY L. and LOUGHLIN, ROSEMARY, in *The Journal of Biological Chemistry*, Vol. XXXIII, No. 2, pp. 295-301. Baltimore, February, 1918.

Up to the present the pea nut has been used chiefly as a cattle feed with such excellent results that the authors undertook a study to determine more exactly its food value. Feeding experiments on young rats showed the pea nut to be lacking in McCollum's fat-soluble food accessory. When 2% of butter fat was added to the ration the subjects improved, and with 5% showed absolutely normal appearance and development in every way. This, moreover, proves that the pea nut contains a sufficient quantity of McCollum's water soluble food accessory, as 56% of pea nut in the ration suffices to supply the necessary quantity of this accessory.

If the pea nut is compared with the soya bean it is found to be poorer in mineral matter, especially in calcium, potassium, magnesium and sulphur. If a pea nut ration be completed by the minerals necessary to give it a mineral content equal to that of milk, which has been shown to be adequate for growing animals, a suitable food is obtained. Pea nut meal, which contains a large proportion of hulls, seems to contain sufficient mineral matter to maintain normal growth in young animals if 5% of butter fat be added.

In view of the large acreage suitable to the cultivation of the pea nut and the fact that there is a tendency to use considerably more plant seeds in the diet, the authors do not hesitate to suggest the use of the pea nut as a human foodstuff. As in the case of the soya bean it is only necessary to add to it those elements in which it is lacking, *i.e.* certain inorganic material and the fat-soluble food accessory, to make it a complete food.

787—**A Study of the Rate and Economy of Gains of Fattening Steers.**—MUMFORD, H. W., GRINDLEY, H. S., EMMETT, A.D. and BULL, S., in *University of Illinois Agricultural Experiment Station, Bulletin No.*

197, pp. 567-604. Urbana, Illinois, March, 1917.

This bulletin is one of a series reporting the findings of an investigation in regard to the effect of variations in the amount and character of feed consumed upon the nutrition of two-year-old steers. It gives the results relating to the effect upon the rate and economy of gains:—1) of variations in the amount of feed consumed ranging from maintenance to full feed rations; 2) of variations in the proportions of roughage and concentrates in the ration; and 3) of the substitution of a nitrogenous concentrate for a part of the grain of a ration of clover hay and ground maize in the ratio of 1 to 5. Details of the experiment are given in the Institute Bulletin.

The following conclusions were drawn:

Two-year-old steers may be maintained on 8 to 9 lb. of dry substance, 0·39 to 0·44 lb. of digestible crude protein and 6·5 to 6·8 calories of net energy per 1,000 pounds live weight.

Fattening two-year-old steers may make satisfactory gains over a period of twenty-seven weeks on 14·3 to 22·1 lb. of dry substance, 0·72 to 1·44 lb. of digestible crude protein, and 11·9 to 13·0 calories of net energy per 1,000 pounds live weight. Fairly good gains may be made even on less amounts than these.

The rate of gains of two-year-old steers depends upon the amount of feed consumed. However, the amount of feed consumed between one-third feed and full feed apparently has no effect upon the economy of gains as measured by the consumption of feed, of total dry substance, of digestible dry substance, and of net energy per pound of gain.

When a ration consisting of clover hay and ground maize in equal parts is changed to a ration consisting of one part of clover hay and three parts of corn, the amounts of digestible dry substance and net energy remaining pratically unchanged, but the protein being reduced 10 to 12 per cent, the rate of gains and the economy of gains are considerably decreased. When a ration consisting of one part of clover hay and three parts of ground maize is changed to one consisting of one part of clover hay and five parts of ground maize, the digestible dry substance, digestible protein and net energy also being slightly reduced the rate and economy of gains are decreased.

The substitution of one part of linseed meal for one part of maize in a ration of clover hay one part and ground maize five parts, materially increases the rate of gains and the economy of gains. Steers which have been kept on a low plane of nutrition (maintenance) for a considerable time make more economical gains when put upon a full-feed ration than steers which have been upon full feed for some time. However, steers receiving more than a maintenance but less than a full-feed ration make no more economical gains when put upon full feed than steers which have already been on full feed.

From the results obtained in this investigation it seems safe to conclude that steers may be maintained or fattened with the ordinary rations of the corn belt on less digestible dry matter, on less digestible protein and on less net energy than the amounts prescribed by the generally accepted feeding standards.

788—**Influence of the Age of the Cow on the Composition and Properties of Milk and Milk Fat.**—ECKLES, C. H. and PALMER, L.S. in the *Journal of Agricultural Research*, Vol. XI, No. 12, pp. 645-658. Washington, D.C., December 17, 1917.

The question of the changes in the composition of milk with successive lactation periods and particularly the question relative to the percentage of fat in the milk of the heifer has been of great practical importance to the dairyman, as a possible index of what may be expected from the mature animals. The conclusions so far reached from data compiled by several investigators have not been entirely uniform. This paper offers new data on the question, taken from the records of the University of Missouri dairy herd, composed of pure-bred animals of the Jersey, Holstein, Ayrshire and Shorthorn breeds.

The data showing the average percentages of fat for the successive lactation periods of all animals of each breed and similar date for the entire herd are given in tables in the article in the Institute Bulletin.

These data show that the percentage of fat in the milk of Jersey cows attains its maximum with respect to the average for the entire lactation period during any one of the first three periods, but the chances appears to be greater that this will be attained in the second or third period rather than the first.

Holstein cows on the contrary almost invariably show the highest average percentage of fat for the lactation period during the first period and the conclusion seems justified that this a is breed characteristic.

Ayrshire cows more frequently show a higher average lactation test during the first than during subsequent periods, but less frequently than in the case of Holstein cows.

The variations in the average percentage of fat among the first few lactation periods are not sufficiently great to be of much practical importance but the gradual decline in average test accumulates to a figure of considerable importance as the number of lactation periods becomes greater.

The fact that certain of the animals of the Jersey and Holstein breeds whose records are included in the data, comprised an experiment to determine the influences of the plane of nutirtion during growth and age of first calving upon the dairy qualities of cows, suggested that the two factors may

have contributed to the difference in the character of the data from the two breeds.

The data concerning the influence of the plane of nutrition during growth, indicate that this factor may be of importance in connection with the average fat test for the first lactation period. The light-fed Jerseys showed both a lower average test in the first lactation period and also a less frequent tendency for this period to show the highest test, while the heavy fed Jerseys showed exactly opposite results. The strong breed tendency for the Holsteins to show a higher average test in the first lactation period than in any subsequent period was also materially diminished by light feeding during the growth of the animals.

It must also be considered that the light feeding of the animals for both breeds was by no means extreme, although it was widely different from the heavy feeding carried out with the other animals in the experiment.

The data bearing on the age of first parturition indicate that a difference of 16 months between the first parturition of the Jerseys had little influence upon the breed tendency already noted for the higher test to accompany the second lactation period. In the case of the Holsteins, however, calving at a more advanced age seemed to decrease the breed tendency for the first lactation period to show the higher average test. As far as the composition and properties of milk of aged cows is concerned neither the percentage composition of the milk nor the physical and chemical constants of the milk fat of aged cows show any abnormalities attributable to old age.

Butter made from the milk of a cow 19 years old and in her thirteenth lactation period was pronounced to be of excellent quality and kept for a period of three months at a temperature of 8° to 10° C, (46° to 50° F.), without showing any marked deterioration.

789—**Researches on a New Galactogogue, in Italy.**—BRENTANA, D., in the *Rivista di Agricultura*, Year XXIV, No. 18, pp. 141-142. Parma, May 3, 1918.

The author has studied the effect of injecting the animal with its own milk on the milk produced. The experiments were carried out on various cows and are still in progress. The results so far obtained appear to show that the injections really have an effect on the increase in milk yield of cows. The author, who will shortly deal with the matter more fully, presents the following note.

The best practical application of the method is to give a subcutaneous injection of 10 or 20 cc. of the cow's own milk every 10 or 20 days, commencing the tenth day after calving. The increase in milk production will be about 2 litres a day, and the composition of the milk will hardly vary. The technique of the method is very simple:—

(1) Collecting 20-30 cc. of milk in a sterile recipient, after thoroughly cleansing the udder and the milker's hands.

(2) Subcutaneous injection, under perfectly aseptic conditions, of 10-20 cc. in the cow from which the milk has been taken.

The author never had any trouble whatever with the injections that he made.

The treatment should be accompanied by adequate feeding for, if the udder can be stimulated, it is still necessary to provide the substances required for milk-formation.

790—**Breeds of Dairy Cattle in the United States.**—DAVIS, H. P., in the *United States Department of Agriculture, Farmers' Bulletin 893*, pp. 1-36. Washington, D.C., November, 1917.

In the United States five breeds of dairy cattle have attained considerable prominence, namely, the Ayrshire, Brown Swiss, Guernsey, Holstein-Friesian and Jersey. These breeds have been developed carefully for a considerable time for the purpose of dairy production and in consequence each transmits its characteristics with regularity to its offspring. Certain distinct features distinguish each breed from the others but all possess ability as milk producers.

THE AYRSHIRE BREED.—The first importation of Ayrshires in the United States was made in 1822, since which time there have been frequent importations into both the United States and Canada. New England, New York and Pennsylvania probably contain the largest number of representatives of the breed. There is a small distribution in the middle Atlantic States and the Pacific Northwest. In Canada Ayrshires have had great popularity and the breed seems able to withstand the rigour of the Canadian climate. In weight the cows vary from 900 to 1,300 pounds with an average for the United States of about 1,000 pounds; bulls weigh between 1,400 and 2,000 pounds averaging about 1,600 pounds.

Probably none of the other dairy breeds can compare with the Ayrshires in ability to obtain a livelihood on scanty pastures and this ability has made them very useful in sections where there is much rough land in pasture.

Ayrshire milk is only slightly coloured, and the fat is divided in uniformly small globules which on the average are smaller in size than those of any other breed.

The average of the 2,598 cows that have completed yearly records for advanced registry to July 1, 1917, is 9,555 lb. of milk testing 3·95% butterfat; amounting to 377·51 lb. of fat.

The 10 highest producers of the breed for butterfat to July, 1917 (the milk yields given first being for comparison only) were:—(1) Lily of Willowmoor (22269): 22,596 and 955·56 lb.; (2) Auchenbrain Brown Kate 4th (27943): 23,022 and 917·60 lb.; (3) Imp. Garclaugh May Mischeif (27944): 25,329 and

894·91 lb.; (4) Auchenbrain Yellow Kate 3d (36910): 21,123 and 888·33 lb.; (5) Jean Armour 3d (32219): 21,938 and 859·65 lb.; (6) Agnes Wallace of Maple Grove (25171): 17,657 and 821·45 lb.; (7) Netherhall Brownie 9th (23985): 18,100 and 820·91 lb.; (8) Garclaugh Spottie (27950): 22,589 and 816·25 lb.; (9) Gerranton Dora 2d (23853): 21,023 and 804·79 lb.; (10) Jean Armour (25487): 20,174 and 774·73 lb.; the *average* being 21,356·1 lb. of milk and 855·4 lb. of butterfat.

Families. On account of the comparatively recent origin of the breed few families have been developed. The more prominent in the United States are the Brownie, Auchenbrain, Finlayston, White Cloud, Jean Armour and Garclaugh May Mischeif.

Bulls. The 10 Ayrshire bulls having the largest number of daughters with advanced-registry records to July, 1917, are listed below, in Table I, together with the average production of their daughters.

The official organization of the Ayrshire breed in the United States is the Ayrshire Breeders' Association, with headquarters at Brandon, Vt. The secretary resides there and has charge of both registration and advanced registry work.

THE BROWN SWISS BREED.—The first importation of this breed into the United States was made in 1869 and comparatively few animals have since been brought into the country. The breed is not widely distributed in the United States being found principally in the States of New York and Wisconsin. The cows when mature weigh from 1,100 to 1,600 lbs., with an average for the United States of about 1,250 lb.; bulls range from 1,500 to 2,500 lb.

TABLE I.—*Ten Ayrshire Bulls with largest number of advanced-registry daughters.*

Names	Number of daughters	Average pounds of milk	Average pounds of butterfat
1. Imp. Finlayston 882	78	10,513	431
2. Nox'emall 7,312	79	9,646	367
3. Earl's Choice of Spring Hill 8,289	58	8,918	375
4. Imp. Morton Mains' Queechy 11,537	40	9,244	374
5. White Clond of Hickory Island 10,377	36	11,133	435
6. Imp. Moonstone of Drumsnie 8,228	30	8,797	358
7. Imp. Holehouse White King 10,348	35	10,125	397
8. Imp. Howie's Dairy King 9,855	28	11,668	457
9. Benchan Peter Pan 12,971	27	11,414	438
10. Willowmoor Robin Hood 11,900	26	9,621	419

In disposition the cattle are mild and docile and for their size are very active; they are excellent grazers, especially on rough land.

In milk production this breed ranks well in the United States, with a moderate percentage of fat. The average of the 199 cows that have completed yearly records of production to June, 1917, is 10,868·7 lb. of milk testing 3·995%, amounting to 433·45 lb. of butterfat.

The 10 highest butterfat producers of the breed (the milk yield given first being for comparison only) were:—(1) College Bravura 2d (2577): 19,460·6 and 798·16 lb.; (2) Ethel B. (3842): 18,816·2 and 779·97 lb.; (3) Rosalind B. (3905): 16,804·4 and 727·64 lb.; (4) Iola (3923): 16,844·6 and 685·47 lb.; (5) Edna C. 3d (5092): 16,496·7 and 669·35 lb.; (6) Lottie G. D. (3530): 17,595·3 and 664·25 lb.; (7) Brownie F: 17,420·8 and 662·25 lb.; (8) Kaliste W. (2905) : 16,609·2 and 650·32 lb.; (9) Flora Duwire (4105) : 16,538·1 and 649·42 lb.; (10) Nau of Lake View (4061) : 17,136·4 and 647·30 lb.; the average yield being 17,065·6 and 683·72 lb. respectively.

Families. Families of Brown Swiss have not been developed to any great extent in the United States.

Bulls. Only few bulls have more than one daughter in the Register of Production; the 11 with the largest number of daughters to June, 1917, are: McAvoy, 2,068; Zell, 2,512; Reuben, 2,927; Casper C., 1,999; Ben Hanson, 2,373; Collier, 2,075; Junker, 2,365; Mack IV, 2,901; Meeta's Son, 1,747; Richard Esmond, 1,342; Speedwell, 2,582. The official organization of the Brown Swiss breed in the United States is the Brown Swiss Cattle Breeders' Association and the secretary for both registration and Register of Production resides at Beloit, Wisc.

THE GUERNSEY BREED.—The first representatives of this breed were imported into the United States in the early part of the nineteenth century, but not until the last quarter of that period were efforts made to keep the breeding pure by the establishment of a herd register. Since that time there have been importations almost every year and the breed has grown steadily in numbers and popularity. At present the largest numbers are found in the Eastern States, the Middle Western States coming next.

Milk from Guernsey cows is noted for its extremely yellow colour and high percentage of butterfat. The fat globules are larger than those in milk from either Holstein or Ayrshire cows and consequently the cream rises more rapidly upon setting. The average of 6,200 cows that have completed a year's record for the advanced Registry to Aug. 15, 1917, is 8,934·44 lb. of milk testing 4·99 % amounting to 446·01 lb. of butterfat. The 10 highest butter-fat producers of the breed to Aug. 1, 1917 (the milk yield given first being for comparison only), were:—1) Murne Cowau (19,597): 24,008 and 1,098·18 lb.; 2) May Rilma (22,761): 19,673·0 and 1,073·41 lb.; 3) Laugwater Hope (27,946): 19,882·0 and 1,003·17 lb.; 4) Yeksa's Tops of Gold's Fannie (22,362: 19,794·9 and 981·53 lb.; 5) Spotswood Daisy Pearl (17,696): 18,602·8 and 957·38 lb.; 6) Julie at the Chêne

(30,460): 17,661·0 and 953·53 lb.; 7) Belladia (3,1909); 19,631·9 and 934·05 lb.; 8) Imp. Dairy Moon III (28,471): 18,019·4 and 928·39 lb; 9) Miranda of Mapleton (19,606): 16,630·7 and 927·16 lb. ; 10) Dairymaid of Pinchurst (24,656: 17,285·3 and 910·67 lb.; the average yields being 19,118·9 and 976·75 lb. respectively.

Families.—There are a number of well-developed families of Guernseys, of which the following are among the more widely known:—May Rose, Glenwood, Masher's Sequel, Governor of the Chêne, Yeksa, Tricksey, and Sheet Anchor.

Bulls.—Some of the leading sires, with their advanced-registry progeny are given below in Table II. They are arranged according to the number of their advanced-registry daughters to May, 1916.

The official organization of the Guernsey breed in the United States is the American Guernsey Cattle Club, and the secretary for both registration and Advanced Registry resides at Peterboro, N.H.

THE HOLSTEIN-FRIESIAN BREED.—The Dutch settlers in the State of New York were probably the first to import individuals of the Holstein-Friesian breed, but the first importations of which records exist were made between 1857 and 1862 and many of the present day animals are descended from these importations.

TABLE II.—*Sixteen Guernsey bulls, with largest number of advanced-registry daughters.*

Names	Advanced registry daughters	Sons with one or more daughters in advanced registry
1. Masher's Sequel 11,462	63	20
2. Governor of the Chêne R.G.A.S. 1,297 P.S.	52	20
3. Galaxy's Sequel 16,904	37	16
4. Masher, R.A.A.S. 63 F.S.	28	8
5. Cora's Governor of the Chilmark 8,971	28	3
6. Glenwood Boy of Haddon 4,605	26	22
7. Glenwood's Main Stay 6,067	25	18
8. Lord Mar 14,357	25	3
9. Golden Noble 2d. R.G.A.S. 1,836 P.S.	24	4
10. Starlight's Exclesior 7,992	23	3
11. Princess's Jewel 24,877	23	1
12. King Coral 5,238	22	1
13. Governor 1st of the Chêne 105,63	22	0
14. Glenwood's Champion 15,639	20	0
15. Justinée's Sequel of the Précl R.G.A.S. 2,119 P.S.	21	1
16. King of the May 9,001	17	9

Holsteins have grown greatly in numbers and popularity in recent years, owing in a great degree to the increased demands in large cities for market milk. Cattle of the breed are most numerous in the Eastern and Middle Atlantic States, with the Middle Western and Pacific sections next in order. With the exception of the Jersey, there are more Holstein cattle in the United States than of any other dairy breed. The Holstein is the largest of the dairy breeds of the United States. Cows at maturity vary in weight from 1,100 to 1,800 lb., with an average for the United States of about 1,250 lb.; bulls range from 1,500 to 2,600 lb. averaging 1,800 lb.

In disposition Holsteins are docile and rather lazy in general habits as shown in their poor "rustling" ability in grazing scanty pastures. They are large consumers of feed, especially roughage, and do best when plenty is readily available. From the point of view of milk production Holsteins average higher than any other breed. The percentage of butterfat, however, which averages lower than that of any other dairy breed, tends to counterbalance the advantage of a greater production. The 3,220 cows that have completed a yearly record for the Advanced Registry to February 19, 1917, averaged 14,622·7 lb. of milk testing 3·424% butterfat amounting to 500·7 lb. of fat.

The ten highest butterfat producers among Holsteins (the milk yield given first being for comparison only), were:)—1) Duchess Skylark Ormsby (124514): 27,761·7 and 1,205·9 lb.; 2) Finderne Pride Johanna Rue (121083): 28,403·7 and 1,176·47 lb.; 3) Finderne Holingen Fayne (114551): 24,612·8 and 1,116·5 lb.; 4) Queen Piebe Mercedes (154610): 30,230·2 and 1,111·56 lb.; 5) Ona Button De Kol (115939): 26,761·2 and 1,076·44 lb.; 6) Maple Crest Pontiac Application (141158): 23,421·2 and 1,075·44 lb.; 7) Banostine Piebe De Kol (90441): 27,404·4 and 1,058·34 lb.; 8) Royalton De Kol Violet (86460): 29,949·6 and 1,036·45 lb.; 9) Keystone Beauty Plum Johanna (161616): 25,787·5 and 1,035·77 lb.; 10) Pontiac Clothilde De Kol 2d (69991) 25,318·0 and 1,017·28 lb.; the averages being 26,965·03 and 1,090·98 lb. respectively.

Families.—The families of the Holsteins are very numerous and it is difficult to determine which are the more important. Probably the following are among the more widely known:—Aaggie, Abbekerk, Artis, Beets, Burke, Butter Boy, Carlotta, Clothilde Colantha, De Kol, Fayne, Gerben, Hartog, Hengerveld, Johanna, Korndyke, Mechthilde, Mercedes, Mutual, Netherland, Ormsby, Pietertje, Pietje, Pontiac, Sarcastic, Segis, Spofford, Vale, and Veeman.

Bulls.—The bulls having the largest number of progeny with records, according to volume 27 of the Holstein-Friesian Blue Book, are listed below. (The records are for seven days).

The Holstein-Friesian Association of America is the official organization of the breed in the United States, with headquarters at Brattleboro, Vt., where the secretary resides. The headquarters of the Advanced-Registry work of the association is at Delavan, Wis.

TABLE III

	Number of tested daughters	Number of proved sons	Number of proved daughters
1. King of the Pontiacs 39,037	186	99	46
2. Pontiac Korndyke 25,982...	135	69	66
3. Lord Netherland De Kol 22,187.....	125	37	140
4. De Kol 2d's Butter Boy 3d, 23,260.....	118	94	80
5. Hengervel De Kol 23,102..	116	65	84
6. Poul Beets De Kol 22,235.	105	49	92
7. Homestead Girl De Kol Sarcastic Lad 32,558.....	105	38	56
8. Aaggie Corrucopia Johanna Lad 32,554.....	102	68	68
9. Colantha Johanna Lad 32,481.....	100	70	35
10. Pietertje Hengerveld's Count De Kol 23,224.....	99	56	65
11. Lilith Pauline De Kol's Count 28,430.....	93	55	67
12. Korndyke Queen De Kol's Count 28,430.....	88	17	47
13. King Segis 36,168.....	87	80	55
14. Mercedes Julip's Pietertje's Paul 29,830.....	84	35	49
15. Tity Abbekerk Prince 37,770	80	8	

THE JERSEY BREED.—Jerseys were first imported into the United States about the middle of the last century, and since that time importations have been made practically every year. The breed probably has the largest numbers and widest distribution of all the dairy breeds of the United States. Large numbers of Jerseys may be found throughout New England, the Middle West, the South and the Southwest. Jerseys are the smallest of the dairy breeds. Mature cows range from 700 to 1,300 lb., with an average for the United States of about 900 lb. Bulls vary from 1,400 to 2,000 lb., averaging 1,500 lb.

Jerseys have a distinctly nervous disposition and are usually somewhat excitable. Their highly organized nervous system causes them to respond quickly to good treatment and abundant feed.

In natural yellow colour the milk of Jersey cows ranks next to that of Guernsey cows and is usually slightly richer in butterfat. The large fat globules causes the cream to rise readily upon standing. The average of the 5,244 cows that have completed yearly records for the Register of Merit is 7,792 lb. of milk, testing 5·35 p.c., making 417 lb. of butterfat.

The ten highest butterfat producers among Jerseys (the milk yields being given first for comparison only) were:—

(1) Sophie 19th of Hood Farm (189748), 17,557·7 and 999·1 lb.; (2) Spermfield Owl's Eva (193934), 16,457·4 and 993·3 lb.; (3) Eminent's Bess (209719), 18782·9 and 962·8 lb.; (4) Dosoris Park Lily (233783), 16,728·1 and 957·4 lb.; (5) Jacoba Irene (140443), 17,253·2 and 952·9 lb.; (6) St. Mawes Poppy (219992), 15,782·4 and 952·3 lb.; (7) Olympia's Fern (252060), 16,147·8 and 937·8 lb.; (8) Lass 66th of Hood Farm (271890), 17,793 and 910·6 lb.; (8) Lass 38th of Hood Farm (223628), 15,284 and 890·4 lb.; (10) Spermfield Owl's Temisia (215982), 15,147·1 and 875·2 lb., the averages being respectively 16,693 and 943·1 lb.

Families.—A considerable number of families have been developed and it is difficult to determine which are the most prominent, but probably the following are among the best known:—St. Lambert, Rioter, Tormentor, Golden Lad, Flying Fox, St. Helier, Combination, Oxford, Financial King, Owl, Jacoba, St. Mawes, Eminent, Diploma, and Torono.

Bulls.—Some of the Jersey bulls having the largest number of Register of Merit daughters to July, 1916, were:—

(1) Hood Farm Pogis 9th (55552) with 78; (2) Hood Farm Torono (60326) with 71; (3) Spermfield Owl (57088) with 48; (4) Loretta's King (65050) with 40; (5) Interested Prince (58224) with 39; (6) Raleigh's Fairy Boy (83767) with 39; (7) Hector Marigold (59121) with 33; (8) Gomboge's Knight (95698) with 33; (9) Noble of Oaklands (95700) with 33; (10) Saydn's Heir (45360) with 33; (11) Royal Majesty (79313)with 32.

The American Jersey Cattle Club is the official organization, with headquarters at 324 West Twenty-third Street, New York, N.Y., which is the address of the secretary for both registration and Register of Merit.

791—**Establishment and Management of the Dairy Farm in India.**—KELKAR, RAO BAHADUR, G. K., in *Department of Agriculture, Bombay, Bulletin* No. 86, pp. 1-60. Poona, 1917. (3 pp. in Institute Bulletin.)

792—**Testing of Purebred Dairy Cows in New Zealand.**—SINGLETON, W. M., in *The Journal of Agriculture*, Vol. XVI, No. 2, pp. 63-75. Wellington, February 20, 1918. (2 pp. in Institute Bulletin.)

793—**Development of Cow-Testing Associations in the United States.**—*The United States Department of Agriculture Weekly News Letter*, Vol. V, No. 24, p. 5. Washington, D.C., January, 16 1918.

794—**Goat Milk Records of the New York Agricultural Experiment Station.**—JORDAN, W. H., and SMITH, G. A., in *New York Agricultural Experiment Station Bulletin* No. 429, pp. 1-20. New York, 1917.

For three years an accurate record was kept, at the New York Agricultural Experiment Station, of the individual milk production of the animals included in the herd of milk goats; the cost of maintenance was determined, as well as the cost of milk and the composition of the milk.

The quantity of food consumed by 31 adult and 9 partially grown animals during the third year was as follows: dry coarse food, 37,740 lb.; beets, 1,550 lb.; cut grass, 24,000 lb.; pasture, 132 days; grain, 14,688 lb.

The total cost of this food at the prices then ruling was $441.95. The average cost per month per goat varied from $.0·481 to $0·992. The average cost of food per goat per year was $11·05, making the daily cost $0·03.

The average yearly yield for 10 animals during 3 years, including 28 lactation periods was 800·4 pounds.

The food cost of the milk per goat for all the goats during the third year was 4 cents per quart, and for the three years during which the record was kept, 3·4 cents. The lowest cost was with the Saanen goat No. 11 for the second year, which was estimated to be 1·27 cents per quart. The other items of cost, such as care and overhead charges, it is not possible to give with any accuracy. The average food cost for a quart of milk from the Station herd of 25 Jerseys during the three years has been found to be 0·92 cents per quart.

The range of composition of the mixed milk of the whole flock as determined during the third summer was as follows: solids, 11·4 p.c. to 11·9 p.c.; solids not fat, 7·72 p.c. to 8·61 p.c.; fat, 3·5 p.c. to 3·8 p.c.

The composition of milk from individual goats was found to vary in total solids from 9·22 p.c. to 18·55 p.c.; in protein, from 2·24 p.c. to 4·96 p.c.; in casein, from 1·56 p.c. to 4·6 p.c.; in fat from 1·08 p.c. to 8·4 p.c.; and in ash from 0·43 p.c. to 0·8 p.c.

A chemical study of goat's milk indicated no essential difference between the constitution of its casein and that of cow's milk. Marked and probably important differences were observed in the salts of the ash as compared with the ash of both cow's milk and human milk.

796—**A Study of the Effect of Cottonseed Meal versus Beef Scrap Upon the Egg Production, Fertility and Vitality of Poultry.**—AHRENS, B. A., in *Oklahoma Agricultural and Mechanical College, Agricultural Experiment Station, Stillwater, Bulletin* No. 112, pp. 20. Stillwater, January, 1917.

The object of these experiments was to determine the value of cotton seed meal as a feed for egg production when compared with beef scrap, and to determine also the effect of cottonseed meal in moderate as well as in excessive quantities upon the fertility and hatchability of eggs. The discussion of the data from these experiments is divided into two parts: Part I contains all data relating to the breeding; Part II contains data which show the value of the protein from the two sources as a factor in egg production. The conclusions arrived at are as follows:—

(1) Cottonseed meal fed in combination with other feeds to form a proper nutritive ratio, or even when fed in excess, does not lower the fertility of domestic fowls, but in many cases the fertility was higher than when beef scrap or animal protein was used.

(2) The percentage of fertile eggs hatched shows greatly in favour of cottonseed meal when compared with beef scrap if fed in a properly balanced ration, but when fed in excess gives rather poor hatching results.

(3) The percentage of all eggs hatched also shows in favour of cottonseed meal compared with beef scrap when fed in a properly balanced ration, but when fed in excess the results are very poor.

(4) As a feed for production of eggs only, and not considering effect on hatchability, beef scrap is superior to cottonseed meal, and more than makes up for its greater cost by apparently causing greater production.

(5) The mortality of chicks was a great deal higher in pens fed cottonseed meal, both the normal and excessive ration.

797—**Capons and Caponizing.**—SLOCUM, R. B., in *U. S. Dept. of Agriculture, Farmer's Bulletin 840*, pp. 15, 10 Fig., Revised Edition. Washington, December, 1917.

A bulletin for the use of poultry-farmers.

Large breeds, such as the Plymouth Rocks, Light Brahmas, Cochins, Indian Games, Langshans, Wyandottes, Orpingtons, and various crosses of these make the best capons. Cockerels should be caponized when they weigh from 1½ to 2½ lb. or when from 2 to 4 months old. The capons should be sold when 10 months old.

FARM ENGINEERING

801—**State Motorculture in France and Italy.**—I. *Journal Officiel de la République Francaise*, Year XLIX, No. 312, pp. 9207-9214, Paris, November 17, 1917.—II. *Le Génie Rural*, Year X, No. 78, pp. 10-12, Paris, 1917.—III. MAROZZI, ANTONIO, in *L'Industria*, Vol. XXXII, No. 2, pp. 37-39, Milan, January 31, 1918. (3 pp. in Institute Bulletin).

802—**Agricultural Tractors in the United States, in 1918.**—*Farm Implement News*, Vol. XXXIX, No. 11, pp. 38-66. Chicago, March 4, 1918.

A description, with many illustrations, of 161 tractors made by 104 American firms, giving the chief characteristics and noteworthy details of the construction:—size; number of driving and steering wheels, or if on chaintrack system; H.P.; draw-bar pull; speeds; number of ploughs that can be hauled; size of thresher that can be driven; engine; cylinders and bore; stroke; carburettor; ignition; pumps; drive; shaft-speed; fuels that can be used; tank capacity; total weight; works price at date of publication and liable to alteration without previous notice. The characters of the 161 tractors described in the text are summarized in table form.

803—**Traction on Bad Roads or Land.**—LEGROS, L. A., in *Engineering*, Vol. CV, Nos. 2717, 2718, 2719, 2720, 2721, 2722, 163 Figs., 2 Tables + an Historical and

a Bibliographical Appendix, London, January 25 to March 1, 1918. (2 pp. in Institute Bulletin).

805—**Disc-Harrow Trials at Montpellier, France.**—CLAROU, C., in *Le Progrès Agricole et Viticole*, Year XXXIX, No. 15, pp. 343-350. Villefranche, April 14, 1918. (2 pp. in Institute Bulletin).

806—**A Weeding Rake for Low Vines.**—SAVASTANO, L., in *R. Stazione sperimentale di Agrumicoltura e Frutticoltura, Acireale, Bollettino No. 34*, pp. 1-2. Acireale, April, 1918.

808—**A Hemp Harvester.**—*The Implement and Machinery Review*, Vol. XLIII, No. 516, p. 1291, 1 Fig. London, April 1, 1918.

810—**Moveable Pig-Houses.**—I. EDWARD, J. M. and DAVIDSON J. B., extracted from *Agricultural Experiment Station, Iowa State College of Agriculture and the Mechanical Arts, Bulletin* No. 152, Ames, *Iowa, U. S. A.*, published in *Missouri State Board of Agriculture Monthly Bulletin*, Vol. XIV, No. 5, pp. 54. Columbia, Missouri. May, 1916.—II. MACVEAN, J. D. and HUTTON, R. E., in *U. S. Dept. of Agriculture, Office of the Secretary, Circular* No. 102, pp. 8. Washington, February, 1918. (3 pp. in Institute Bulletin).

RURAL ECONOMICS.

811—**Important Factors in the Operation of Irrigated Farms in Utah, U. S. A.**—BROSSARD, E. B., in the *Utah Agricultural College Experiment Station Bulletin* No. 160, pp. 48, Logan, September, 1917. (2 pp. in Institute Bulletin).

812—**Cost of Harvesting Wheat by Different Methods in the United States.**—YERKES, A. P. and CHURCH, L.M. in *U. S. Dept. of Agric. Bulletin No. 627* pp. 1-24. Washington, D. C., February 13, 1918. (5 pp. in Institute Bulletin).

In the summary in the Institute Bulletin the subject is taken up under the following heads: interest and depreciation; repairs; auxiliary binder engines; cost of old methods *vs* new; stacking; harvesting by means of headers; combined harvesters.

813—**A Farm Accounting and Statistics Bureau for British Columbia, Canada.**—TWEDDLE, A. B. (Statistician), in *The Agricultural Journal of the Department of Agriculture of Victoria, B. C.*, Vol. 2, No. 10, pp. 197. Victoria, B. C., December, 1917.

AGRICULTURAL INDUSTRIES.

815—**The Balance of Some Constituents of the Sugar Beet During the Manufacture of Sugar.**—SAILLARD, EMILE, in *Comptes rendus des Seances de l'Academie des Sciences*, Vol. CLXVI, No. 17, pp. 697-699. Paris, April 29, 1918.

819—**The Pasteurization of Sour, Farm-skimmed Cream for Buttermaking.**—HUNZIKER, O. F., SPITZER, MILLS, H. C. and SWITZER, H. B., *in Purdue University, Agricultural Experiment Station, Bulletin* No. 208, Vol. XX, pp. 76, Lafayette, Ind., September, 1917. (3 pp. in Institute Bulletin).

The purpose of the experiments recorded in this bulletin was:—

1. To determine the effect of pasteurization of sour, farm separator cream on the flavour, keeping quality and market value of butter.

2. To study the effect of different processes of pasteurization on the bacterial count of cream and butter and on the flavour and keeping quality of butter.

3. To study the effect of pasteurization on the chemical properties of fresh and stored butter.

4. To determine the causes undertaking the changes of the flavour of raw and pasteurized cream butter in storage.

AGRICULTURAL ECONOMICS

THE ECONOMIC SITUATION IN ARGENTINA

In spite of bad harvests the economic situation of Argentina further improved in 1917. The considerable diminution in the exportable margin of cereals, due to the unsatisfactory harvest of the beginning of last year, was largely outweighed, on the one hand by very high selling prices and on the other by a larger export of the products of stock farming of which Europe stands in great need. The excess of exports over imports was therefore again more than $163,850,000. Money continued in consequence to flow into the country, and since the large producers lack occasion for expenditure, European products having become scarce and reaching Argentina with difficulty, available capital did not cease to accumulate, and the rate of interest lowered more and more on credit operations of all kinds and on the mortgage investments, which daily become rarer, in particular.

The situation will be exactly apprehended if the following figures are examined.

On 31 December 1914, that is to say at the outbreak of war, the amount of the deposits in the banks of Buenos Ayres was

$504.989,000; two years later, at the end of 1916, it was $602,280,000; on 31 December 1917 it was $787,694,000. The increase was therefore last year one of about $200,000,000. The prospects for the current year cause an accentuation of this position to be expected. The cereal harvest is extremely abundant, and transport to Europe has been facilitated by agreements with Great Britain and France; and therefore there is reason to believe that the improvement in the economic situation will be further intensified, and will moreover be generalized since the ships which come to fetch Argentine produce will bring European merchandise.

It is also permissible to suppose that this general improvement will have the effect of further developing the country's production since there will be less risk of a lack of markets.

ACQUISITION OF SMALL HOLDINGS BY MILITARY PENSIONERS IN FRANCE

A certain number of measures have been proposed in the Chamber of Deputies to allow the acquisition of rural small holdings by discharged and pensioned soldiers who have been wounded or have contracted diseases while in the army and by widows receiving pensions or having the right for life to indemnities. These proposed measures have been condensed into a single law which has been passed by the Chamber and the Senate and has had force since 9 April 1918.

According to the first article of this law the societies and companies affording credit on real estate and agricultural credit may make individual loans, secured by mortgages: (1) to ex-soldiers and ex-sailors who are in receipt of invalids' pensions from the State for wounds or infirmities incurred during the present war; (2) to widows in receipt of life pensions or indemnities paid because their husbands have died in consequence of wounds received or illnesses contracted after 2 August, 1914; (3) to those having the right to life indemnities or pensions in consequence of personal injuries caused by events of the war.

These loans aim at facilitating the acquisition, the organization, the transformation and the reconstitution of small rural holdings which are of less value—exclusively of costs and of insurance premiums—than 10,000 francs, whatever may be the area farmed. The term for repayment of these loans may be as much as twenty-five years so long as this does not make the borrower more than sixty years old when he repays his last instalment. According to article 2, the rate of interest charged on these loans is one per cent. Every borrower must when the mortgage loan is finally conceded to him make a single-premium contract with the *Caisse nationale d'assurance* to provide for the case of his death, thus securing the payment of any annual instalments which may remain unpaid at the time of his death. The amount of the premium may, together with the cost of insurance, go to increase the sum lent on mortgage.

According to article 3, if the payment of an annual instalment of repayment be delayed, the society or company which has made the loan may cause one fifth of this instalment to be paid to itself out of the pension due to the borrower concerned, but the sum thus appropriated out of the pension must not exceed the half of that due nor reduce the unappropriated part of the pension to less than 360 francs. This clause will be inserted in the borrowing contract and will justify any assignment which may be made in accordance with it.

By the terms of article 4, societies and companies affording credit on real estate and agricultural credit receive the funds needed for these loans in the form of advances not bearing interest, repayable in annual instalments within a maximum period of twenty-six years, and deducted from that part of the general endowment of agricultural credit which is reserved for individual long-term credit.

Article 6 contains an opportune provision encouraging large families. The annual instalments which a borrower must repay to a lending society will be diminished by 50 centimes per 100 francs borrowed for each legitimate child born to him after he has contracted the loan. This sum will be annually paid by the State.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the May number of the International Review of Agricultural Economics. Persons interested in any of the articles in this list may obtain the original bulletin on application to the Institute Branch, so long as the supply for distribution is not exhausted.

AGRICULTURAL STATISTICS

THE CROPS OF ENGLAND AND WALES

	Crops	Estimated Total Produce		Acreage	
		1918	1917	1918	1917
		Bushels	Bushels	Acres	Acres
England and Wales	Wheat	84,272,000	57,320,000	2,556,706	1,918,485
	Barley	50,708,000	46,125,000	1,501,413	1,459,796
	Oats	128,181,000	97,146,000	2,779,429	2,258,909
	Mixed grain	4,965,000	.....	139,077	.....
	Beans	7,117,000	3,498,000	242,097	203,399
	Peas	3,516,000	2,214,000	127,857	102,962
		Tons	Tons		
	Seeds Hay (1)	2,098,000	2,404,000	1,446,504	1,681,899
	Meadow Hay (2)	4,687,000	5,155,000	4,298,498	4,794,213

(1) Hay from clover, sainfoin, and grasses under rotation.
(2) Hay from permanent grass.

BROOMHALL'S FOREIGN CROP SUMMARY, NOVEMBER 10, 1918

Italy.—Unsettled weather has retarded preparations for the new crops. Efforts will be made to secure sufficient tonnage to transport the necessary artificial manures for the new crops. Situation as regards supplies is considered fairly satisfactory.

France.—Ploughing and sowing has been hindered lately, owing to the heavy rains, but nevertheless fair progress has been made in these operations. Transportation difficulties, especially a shortage of railway cars, continue to hamper the distribution of supplies and there are many complaints of the dealys in forwarding seed grain. The liberation of the land of Northern France from enemy occupation will eventually result in large areas of arable land being available for cropping.

Denmark.—Wheat, barley and rye were harvested in good condition, but rains have partially damaged oats and hindered field work.

Spain.—Beneficial rains have been experienced recently and it is believed there will be larger deliveries of native wheat. The official fixed price for wheat, it is claimed, will be maintained, and if growers do not offer their grain voluntarily the authorities have power to requisition it.

United Kingdom.—Autumn cultivation is progressing. Threshing of the wheat and oats harvested some time ago is giving satisfactory results, but the later crops in some cases appear to be badly damaged. A long period of fine weather is needed so that farmers can proceed with their ploughing and sowing. Recent soaking rains have served to damage some grain left in the fields.

Japan.—Probable yields this year have been estimated as follows: Wheat, about 31,000,000 bushels compared with 35,000,000 bushels in 1917 and a normal yield of 34,000,000 bushels; rye at 39,000,000 bushels against 42,000,000 bushels last year and an average yield of 41,000,000 bushels.

LIVE STOCK STATISTICS

ENGLAND AND WALES

Classification	June, 1918.	June, 1917.
Horses	1,375,830	1,372,820
Cattle	6,200,490	6,227,150
Sheep	16,475,180	17,169,860
Pigs	1,697,070	1,918,540
	Morocco 1916-17	Morocco 1915-16
Horses	107,573	96,544
Cattle	1,030,045	855,921
Sheep	4,289,822	4,050,888
Goats	1,266,383	1,226,182
Pigs	51,298	29,116

NEW ZEALAND

The number of sheep in New Zealand on April 30th, 1918, was 26,354,594, compared with 25,270,386 on the same date in 1917.

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