

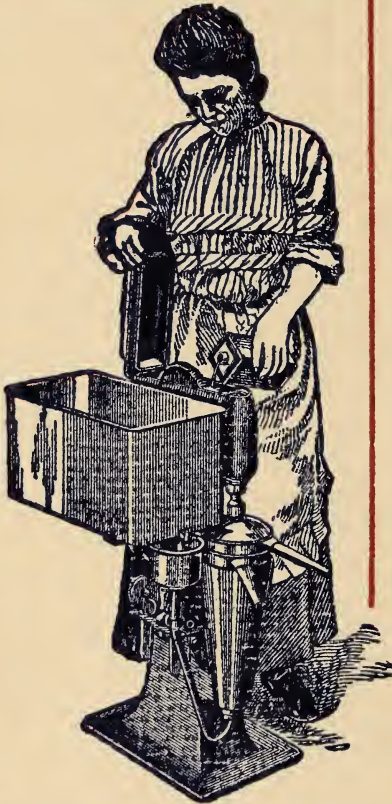
# THE AC REVIEW



APRIL  
1905

# WHY WATER DON'T RUN UP HILL

Some folks say gravity makes water flow down hill, which is just another way of saying its mighty up hill work for it to flow any other way.



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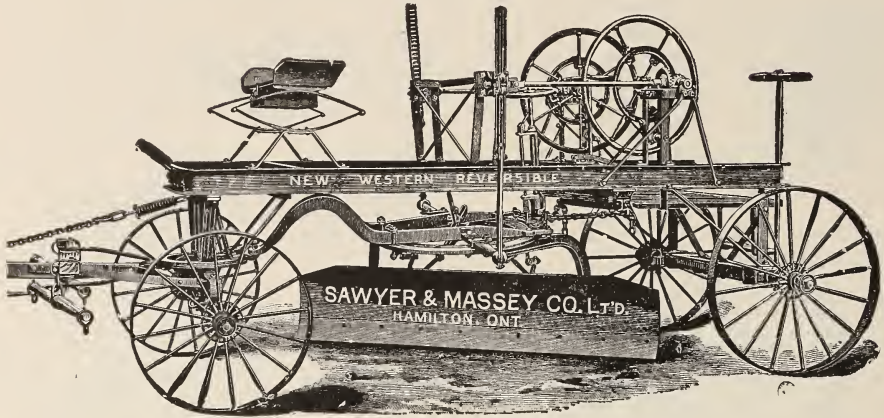


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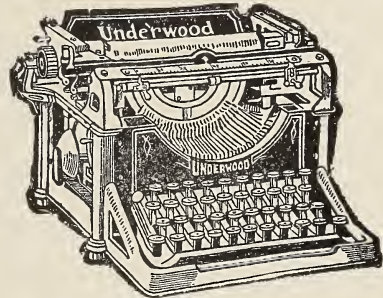
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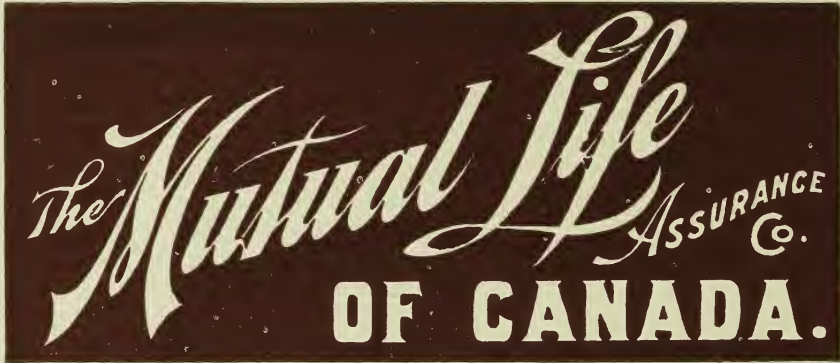
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<b>BARLEY</b>	- - -	<b>10,000,000</b>	<b>"</b>
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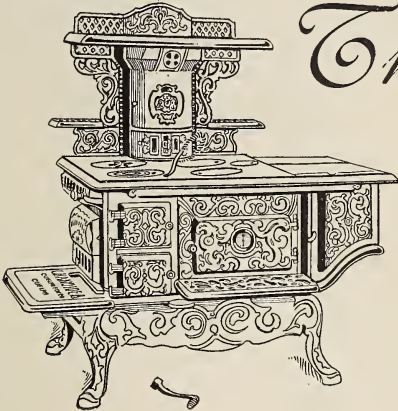
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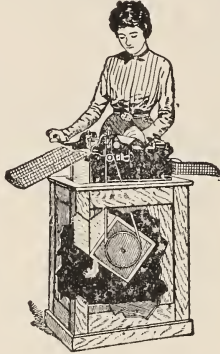
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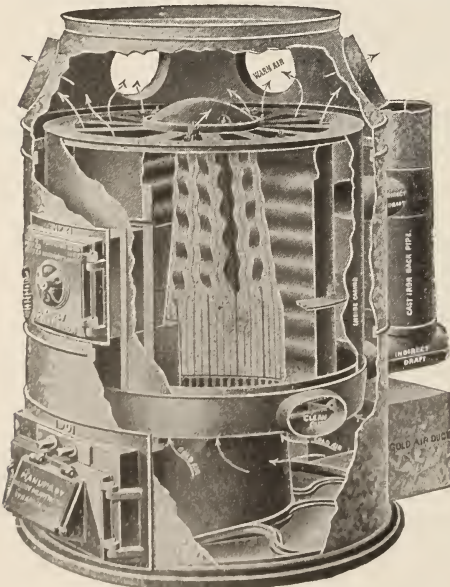
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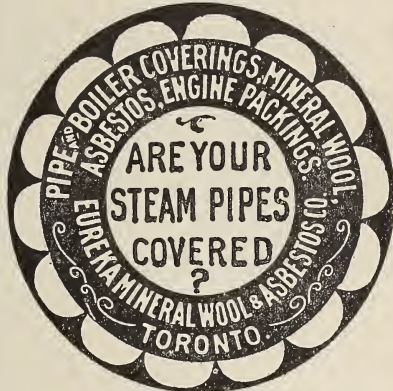
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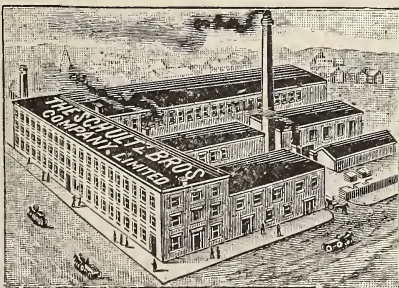
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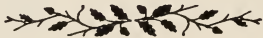


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# The O. A. C. Review

Published Monthly during the College Year  
by the Students of the Ontario Agricultural College, Guelph, Canada.

THE DIGNITY OF A CALLING IS ITS UTILITY.

Vol. XVII.

ONTARIO AGRICULTURAL COLLEGE,  
APRIL, 1905.

No. 7

## The Agricultural Societies of Ontario.

By H. B. COWAN, Provincial Superintendent.



FOR many years the agricultural societies of Ontario have been doing very poor work. This has been due to numerous causes. The Agriculture and Arts Act, under which they operate, was drafted many years ago. It contains weaknesses which have handicapped them and to which may be directly traced many of the serious defects that have crept into their work.

When our Provincial legislators passed the Agriculture and Arts Act, providing for distribution, under certain conditions, of \$800 annually to each of the electoral districts of the Province, they seem to have concluded that their responsibility was ended. From that time forward the societies were left to work out their future for themselves. This they have endeavored to do, but, owing to conditions over which they have had no control, their efforts, in many cases, have ended in complete failure, and for a number of years the condition of the societies as a whole has been growing steadily worse.

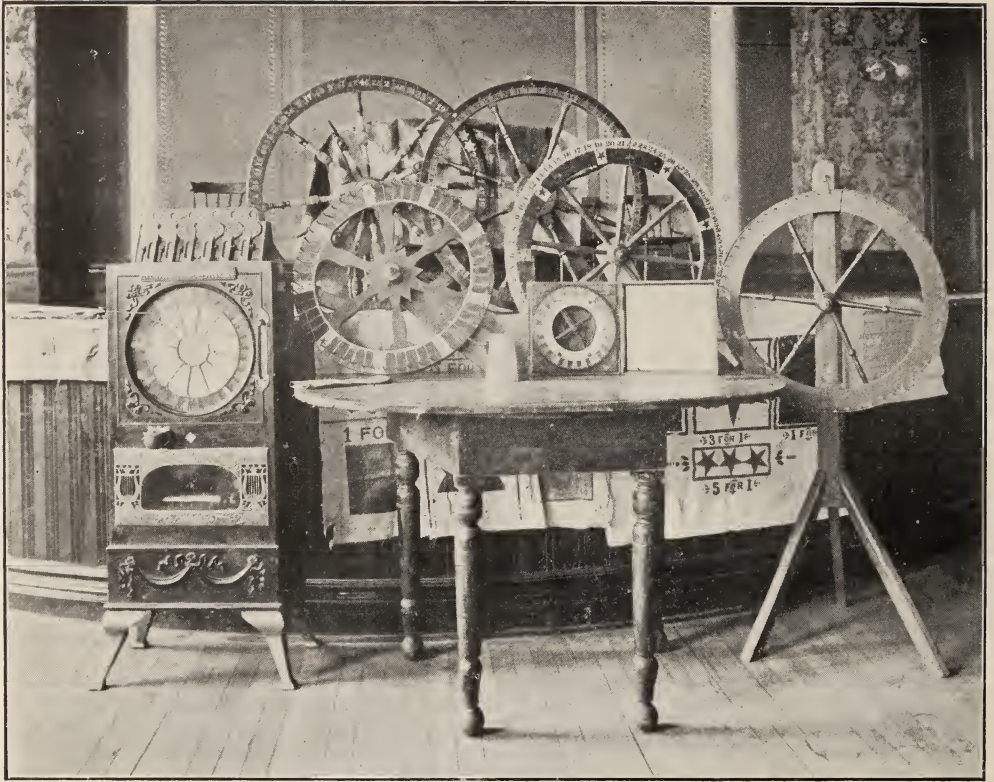
A careful investigation made last

year, of the work of the societies revealed the fact that the three most serious sources of weakness were:—

1. There were too many societies.
2. Fixed grants were given to societies and districts irrespective of the work they were doing.
3. A distinction was drawn in the Agriculture and Arts Act between district and township societies.

For the first few years after the Act was passed little cause for complaint was found. The number of societies was not large and the competition between them was slight. As time passed new societies sprung into existence. Every new society tends to weaken those already formed by diminishing their government grant, their exhibits and their gate receipts. This increase continued, until last year there were 488 agricultural and horticultural societies in Ontario. As there are ninety-eight ridings it means that there are practically five societies to every riding. In some districts the number greatly exceeds five.

It is this multiplicity of societies which has led in many instance, to the intro-



Collection of Gambling Outfits seized at our Fall Fairs.

duction of undesirable features at exhibitions. Where there are a large number of societies holding fall exhibitions within a few miles of each other, some of them, in order to draw the crowds, have been forced to engage special attractions. The commencement of the decline in the value of our fall fairs dates from the day when they first introduced these objectionable features. So far have certain of our societies wandered from the objects for which they were established that they are a disgrace, rather than a benefit, to the farmers of Ontario. Every year they expend two or three times as much money in purses for horse racing, and for special features such as women contortionists and balloon ascensions, as they do for agricultural purposes. At a considerable number of exhibitions last fall liquor was

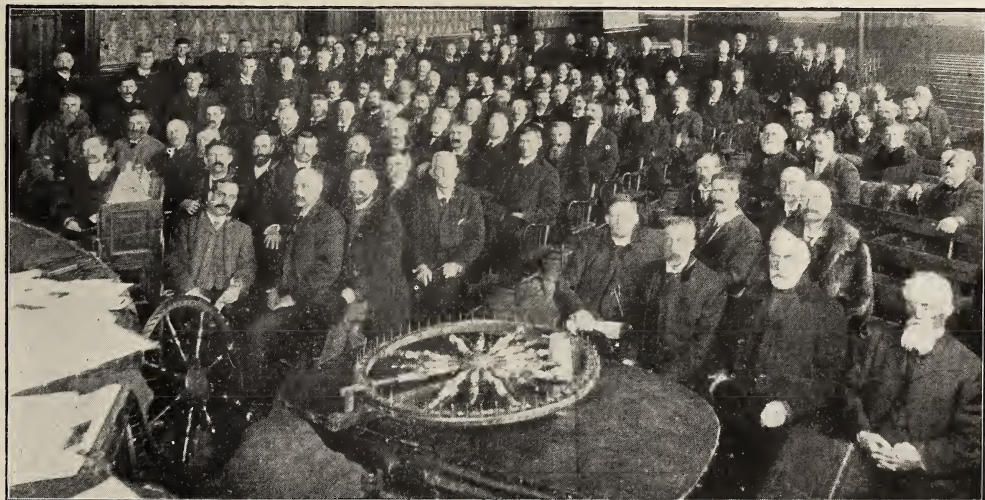
sold more or less openly, games of chance, although against the law, were main features and betting rings were by no means scarce. One of the Provincial detectives sent out, under the direction of the Department of Agriculture, estimated that in five counties there were 200 people making their living by fraud at exhibitions.

The multiplicity of fairs has so reduced the support of many societies that they are unable to offer good prizes or to erect buildings that will accommodate the exhibits satisfactorily. Eighty per cent. of the societies are without proper grounds and buildings. The majority of our exhibitions last only one day. The stock is rushed on and off the grounds, and is to be seen for such a short period that the exhibits are of little

educational value. So small are some societies that they are able to print their prize lists on the bills advertising their exhibitions. Over 150 societies notified the Department of Agriculture last year that they could not afford to engage expert judges in live stock, at a cost of five dollars per day for each judge. The greater number are unable to bear even the slight expense required for the introduction of educational features.

means by which societies will receive their government grants in proportion to the value of their work.

The creation of a distinction between district and township societies has become a great injustice to many of the township societies. Under the Act a district society cannot receive a government grant of less than \$380 a year and under certain circumstances may receive \$800. The most a township society can obtain



Delegates Representing 245 Agricultural Societies.

The second source of weakness, the giving of fixed grants to districts and to societies irrespective of the work they are doing, is a serious one. It has led to societies being established at many points where they were not needed and where their presence has had an injurious effect on other societies. As a result of this system the worst type of societies receive as much—and in some cases more—government money as the best societies. In 1903 several societies which received government grants of \$80 to \$100 gave over \$1000 each for agricultural purposes. A district society, with a grant of \$800, did not give any more. The Act does not provide a

is \$140 a year, while many receive only \$70 and even less. The township societies of Ontario in 1904 secured \$10,000 less in grants than the district societies but gave over \$25,000 more for agricultural purposes. In numerous cases township societies gave two and three times as much for agriculture as neighboring district societies which received much larger grants.

The bright side of the situation lies in the fact that the members of our agricultural societies are fully alive to these conditions and have taken steps which are certain, sooner or later, to lead to far-reaching improvements. At the annual convention of the Ontario Association of

Fairs and Exhibitions held in Toronto, last February, these matters were carefully discussed and two important decisions were reached. The Department of Agriculture was asked to revise the Agriculture and Arts Act in such a manner that the distinction between district and township societies will be abolished and societies receive their government grants in proportion to the amounts they expend for agricultural purposes. The convention, which was the largest in the history of the association, denounced in unmeasured terms the prevalence of games of chance at fall exhibitions and requested the Department to cut off the grants to societies which allow such features on their grounds. Representatives from the societies in the Eastern portion of the Province took the same stand at a convention held at Ottawa during the second week in March.

During 1905 the Agriculture and Arts Act will be thoroughly examined. The terms under which societies in the other Provinces of Canada and in other countries receive their government grants will be investigated. From the information thus gained an effort will be made to draft a new Agricultural Societies Act, or to revise the present Act, in such a manner that the societies of Ontario will be placed on a new and greatly improved basis.

The payment of the grants to societies in proportion to what they expend for agricultural purposes will have a beneficial effect. Societies which are ex-

pending excessive amounts for special attractions and neglecting their agricultural features will have their grants greatly reduced, while the grants to the best societies will be increased in proportion.

Many of the small societies which are of but little, if any, benefit, will receive such small grants that they will gradually die out. The change will result in the survival of the fittest.

Once our agricultural societies have been placed on a better basis they will have a bright future. Organization will be the next step in their improvement. It will be possible to arrange the societies in groups and to engage a competent man to devote his time to their interests. This is the system which has worked to such advantage in the improvement of the dairy industry. The societies in these groups will be able to introduce educational features at greatly reduced expense. Expert judges will be available for all departments instead of only for the live stock. Under such conditions our agricultural societies will be brought into closer touch with the agricultural college, live stock and other agricultural associations, and their value will be greatly increased. That these improvements may be brought about will require the united and best efforts of all who are interested in the advancement of agriculture. In this work the ex-students and students of the Agricultural College have it in their power to take a prominent part.



# Modern Seed Testing.

BY G. S. CLARK, B.S.A.



THE system of seed investigation and control now largely practiced was originated by Dr. F. Nobbe of Tharandt, Saxony, in the year 1869.

When Dr. Nobbe began the work, which ultimately became a model for the world, he found during the course of his researches, that, out of a number of samples sent for botanical examination, many of them were not of the kind represented and a large percent. of them contained dead seeds, weed seeds, and dangerous parasitic impurities.

The service rendered to farmers and to seed merchants by Dr. Nobbe led up to the establishment of seed testing stations in most of the European countries. Germany alone now maintains thirty-nine establishments for the testing of seeds; Sweden has eighteen; Norway, three; Finland, two; Denmark, one; France, one; and Switzerland, three. One of the most important of these stations is under the direction of Dr. Stebler, at Zurich, Switzerland. In Great Britain the work of seed testing has been conducted chiefly by the consulting botanists of various agricultural societies. A seed testing station has recently been started by Prof. J. S. Remington, Grange Over Sands, Lancashire, England. A seed laboratory was established by the Bureau of Plant Industry, U. S. Department of Agriculture, Washington, D. C., about twelve years ago. The equipment for modern seed testing was obtained in April, 1902, and a laboratory for the testing of seeds was established at Ottawa in

connection with the Seed Branch of the Department of Agriculture.

There are few matters, in connection with field agriculture, in any country that are of greater importance than the use of good seed, but notwithstanding its importance in Canada, a comparatively small proportion of farmers fully realize the difference in actual value to them, between a high class article and seed that is from poor stock, of low vitality and vital energy, or contains several species and large numbers of noxious impurities.

## QUALITY IN SEEDS.

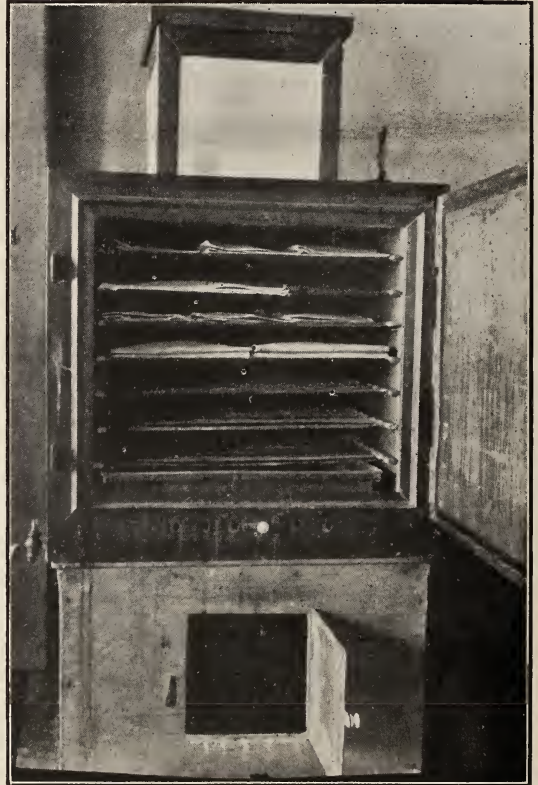
With most kinds of farm and garden seeds it is of first importance that the articles obtained for use be of the variety desired, and taken from stock that has had careful growing and continued selection for several preceding years. This quality is best appreciated by those who produce their own turnip seed by selecting each year, ideal specimens, for transplanting the succeeding spring, from which to obtain seed; or by those who have followed a careful system in the growing and selecting of seed corn or other cereal grains. This quality in seed, however, cannot be accurately determined in the Seed Laboratory. It is possible to discriminate between seed of mangels or beets that have been thus selected and seed of the Wild Beet from which they evolved, only by a growing test, which, under artificial conditions, requires about thirty days. The practice of making seedling tests is commonly

applied in modern methods of seed testing. There are species of Genus Brassica, the seeds of which can be identified only by the seedlings produced therefrom. The pursuit of such special work provides scope for useful service in determining whether seeds be true to kind. It is, however, quite certain that it does not lie within the power of the seed analyst to estimate the inherent qualities in seed known as vigour of growth and productiveness.

#### PURITY TESTS.

Every sample received for test in the Seed Laboratory at Ottawa is marked with the laboratory test number and recorded on an index file, so that there may be no mistake in the identification of any sample. For a purity test a definite quantity is weighed out from a mixed bulk lot: the weight of the sample varies with the different kinds of seed. It is obvious that tests of relatively large quantities would give more accurate results, but in the practical working out of the principle of seed testing it becomes necessary to take into consideration the amount of work entailed. The minimum quantities that may be used in any case are fixed by a committee of experts appointed by the Association of American Agricultural Colleges and Experiment Stations. This Committee defines how samples shall be taken from bulk lots of commercial seeds, the methods in detail that are to be followed in conducting purity and germination tests and the information to be stated in the reports. Uniform regulations, essentially the same as those practised in all seed testing stations on the American Continent, prevail in several of the European countries. This becomes more especially advisable between countries that are closely con-

nected by commercial ties, in order that the work of any one seed testing station may be checked by that of another. The samples used for purity test in the seed laboratory are weighed on a Becker's balance, sensitive to one milligramme. The amounts used for most kinds are about eight thousand seeds. The weighed



Seed Girmenator used by Seed Department at Ottawa

sample is separated by the use of brass sieves and by hand, into three component parts:—

1. Pure seed,—seed of the kind being examined.
2. Inert matter, broken seeds, dirt, sand, sticks and chaff.
3. Foreign seed,—
  - (a) Seeds of useful or harmless plants.
  - (b) Weed seeds.

The percentage by weight of pure seeds, inert matter and foreign seeds is then calculated. Finally the kinds and proportion by number or by weight of foreign seeds are determined.

#### VITALITY TEST.

Seeds of all kinds of cultivated plants respond readily to the application of modern methods in determining their percentage of vitality. In the seed laboratory the substratum used and the temperature, moisture and air supply vary with different kinds of seed, the object being to obtain as rapidly as possible, results that may serve as a correct guide to the farmer or seed merchant. All germination tests are conducted in duplicate simultaneously under identical conditions.

With most agricultural seeds, the time required for a complete germination test is ten days: some of the finer grasses and root crop seeds are given a longer period. The regulations for seed testing stipulate that the report shall show the percentage of seeds which germinated in four days, as well as the final test. This gives a fair index to the vital energy possessed by the seed. Well matured, fresh seed—seed of strong vital energy—will practically all respond during a period of preliminary test.

Seeds of well matured cereal grains and clovers that have not been injured by damp or frost, are seldom deficient in percentage of germinable seeds. Glutinous wheats that have been badly frozen before maturity have been found to germinate from ninety-five to one hundred per cent., whereas a slight frost will destroy the germ of immature oats, barley or corn.

The form of germinating chamber used in European and American seed testing stations does not differ in any

essential point. The apartment for germination work in the laboratory at Ottawa is fitted with four standard seed germinators and one apparatus for conducting soil tests under green house conditions. This equipment enables the staff to conduct six hundred tests simultaneously. During the months of January and February of the current year, the space in these germinators was fully occupied with seeds being tested for Canadian seed merchants.

The standard seed germinator is made of twenty ounce corrugated copper, with the outer covering of heavy asbestos felt. The inside measurements of the germinating chamber are:—height, 20 inches; width, 20 inches; depth, 18 inches. A two-inch reservoir surrounds this chamber, with the exception of the door, between the inner and outer copper walls. The heating is affected by means of a gas flame, which is automatically controlled by a thermo-regulator.

#### CEREAL, ROOT CROP AND GARDEN VEGETABLE, AND GRASS AND CLOVER SEEDS.

It is not intended here to elaborate on the far reaching evils that follow the use of impure and non-vital seeds. The average farmer should be able to judge fairly accurately of the vitality and to recognize the impurities in cereal grains, but as a matter of fact, very few of them are able to do more than identify some of the weed seeds that are most plentiful on their farms or in the localities where they live. It is not a difficult matter to estimate the percentage of vital seeds in cereal grains that have been injured by damp or otherwise. Even the vital energy of seed corn can be closely calculated without making a germination test. It cannot be disputed that Canadian farmers are as intelligent as those in any

other country, but in making a comfortable living for themselves and their families, they are not, as are farmers in some countries, forced to make a full application of their intelligence in all matters pertaining to their welfare. Comparatively few farmers either test the seeds they use or make use of the machinery provided by their government to do the work for them.

The root crop and many kinds of garden vegetable seeds used in Canada are imported. They are grown in European countries, where labour is cheap and land is expensive. Unfortunately for the best interests of Canadian agriculture, competition among the importers of these seeds has been too largely confined to the matter of prices, without due attention being given to their inherent qualities. It is gratifying to note that during recent years some of our more progressive seed firms have adopted the course of putting selected stocks of root crop seeds on the market in sealed packages, with the hope of ultimately demonstrating their real worth when compared with the cheaper article that has not had the benefit of care and selection in their production.

The vitality of such seed is also important, perhaps of greater importance, than any other seed used on the farm. Of these seeds obtained for investigation, 10 per cent of the samples of beet and mangel contained, less than 60 per cent. of vital "balls" and of the garden vegetables, less than 40 per cent. of vital seeds. When seeds of low vitality are used without being tested, the farmer has no definite knowledge whether he, the weather or the soil is at fault, though he generally understands who has to bear the loss which, as a rule, tends to discourage him from

making an estimate of the amount of such loss.

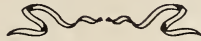
The Province of Ontario is a large producer and exporter of alsike and red clover seeds. The Toronto market virtually controls the world's prices for alsike seed. In addition to supplying her sister provinces, Ontario sends large quantities of a high class article to European markets, where in point of purity, Canadian grown seed has an enviable reputation. The plant from the Canadian grown red clover seed, however, differs in character and is not so well liked by the English, Scotch and German farmers as that from seed grown in Chili, New Zealand and France, or their homegrown article.

In obtaining their supplies of these seeds, European farmers are able to obtain from seedsmen a statement showing the percentage of purity, vitality and origin of growth with the seeds purchased. This guarantee system in connection with the sale of agricultural seeds in Europe is the outcome of the work done by seed testing stations and accounts for the demand from those countries for seeds of the best quality. To meet the demand from abroad for high-class seed, Canadian exporters have provided themselves with modern apparatus for recleaning grass and clover seeds. In the process of recleaning, from 75 to 90 per cent. of the bulk lots obtained from farmers is made sufficiently good for export. It is a regrettable fact that there has been a considerable demand among Canadian farmers for the cleanings taken from this export seed. These cleanings are not retailed by reliable seed houses. They reach the farmer through the medium of irresponsible local seed vendors, whose main business is of an entirely different character, and who are

no more able to judge as to the quality and value of the seeds than are the farmers who buy them.

In the light of the information obtained from recent investigations into the condition of the trade in agricultural seeds, it would seem clear that the natural and, to a great extent, the uncontrollable media by which weed seeds become disseminated, bring about minor difficulties when compared with the spread of weed seeds in grass, clover

and other seeds that enter into commerce. The far reaching evils connected therewith are already plainly evident in all except new districts. One of the most serious problems with which farmers in all parts of Canada have to contend is the cost for labour in fighting weed pests and far reaching evils brought about by sowing weed seeds—usually unwittingly on the part of farmers—are becoming too great for those who make their living primarily from the cultivation of land.



## Life's Mirror.



There are loyal hearts, there are spirits brave  
 There are souls that are pure and true ;  
 Then give to the world the best you have,  
 And the best shall come back to you.

Give love, and love to your heart will flow,  
 A strength in your utmost need ;  
 Have faith, and a score of hearts will show  
 Their faith in your word and deed.

For live is the mirror of king and slave,  
 'Tis just what your are and do ;  
 Then give to the world the best you have  
 And the best will come back to you.

# Geology and Agriculture.

BY PROFESSOR LOCHHEAD.



QUITE often we are asked : "Of what *use* is the study of Geology to agricultural students?" This question differs from the one which is but seldom asked : "Of what *good* is the study of geology &c?" The first savors of dollars and cents, the second demands an answer in terms of culture, mental training and power.

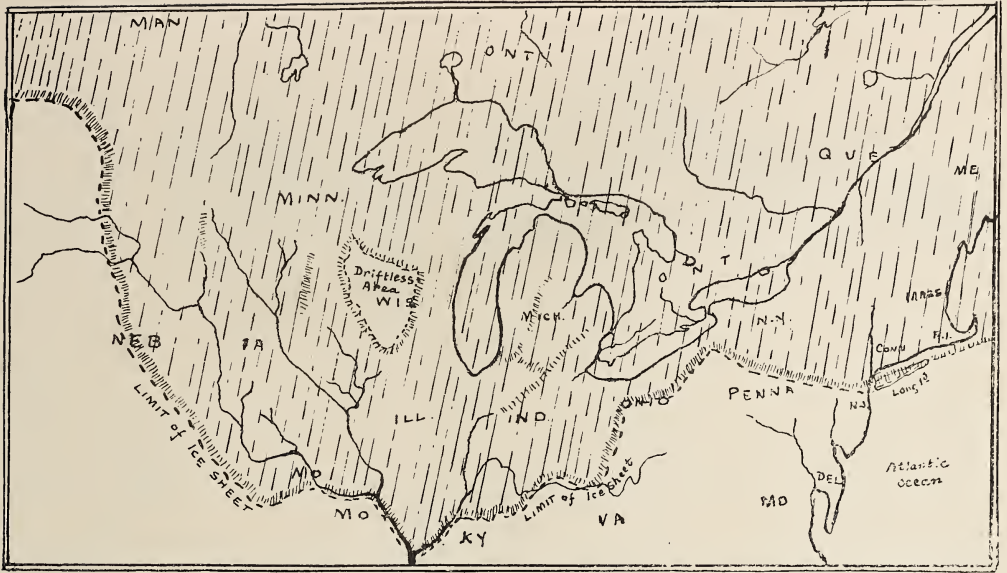
We may state in broad general terms that the student of agriculture should study the soil, the plant, and the animal. The plant is supported by the soil, and the animal by the plant, so that both directly and indirectly the soil is largely responsible for the support of both plant and animal. For this reason, then, it is clear that the agriculturist should make himself acquainted with the formation and properties of soils.

Now, soils are formed mainly by the breaking down of rocks by numerous agencies, and as there are many kinds of rock, so there will be many varieties of soils. In other words, the soil is determined by the kinds of rock from which it has been derived. From this point of view the origin of soils is a geological problem.

In Ontario, it happens that the soil problems are very complex through the operations of the great ice sheet which passed over the country during the Glacial Period. In many parts of the Province the soil is not the derivative of the under-lying rock, but is a mixed mass of many kinds of rocks and soils brought from some adjacent district.

The great ice sheet, perhaps a mile or more in thickness over Middle Ontario, moved slowly southward from its Labradorian collecting ground, gathering up and pushing ahead of it the residual soils that covered the rocks at the time. Other great changes occurred as a result of this forward movement of ice. Large valleys were made deeper, small valleys athwart the ice-front were filled up, and projecting masses of rock were rounded off.

Map I shows the most southerly advance of the ice-sheet, marked by a series of terminal moraines extending from Long Island to Nebraska. At that point the melting equalled the on-flow. After a time a change of climate occurred, followed by a melting back of the ice-front far into Ontario, and the immense mass of rock debris brought down by the glacier was left stranded along the line of retreat. Another change of climate took place, and was followed by a second advance of the ice mass. The stranded deposits of the first retreat were ploughed into and their contents rearranged. Again the ice melted back. There are evidences of four or five advances and retreats, but the final retreat was responsible for the surface features of the Province, such as we know them to-day. In some districts, noticeably the northern central counties of the peninsula, the surface is quite hilly on account of the deposition of large numbers of morainic masses composed usually of unsorted gravel, sand and clay. In other districts the surface is quite level, due some-



MAP I.

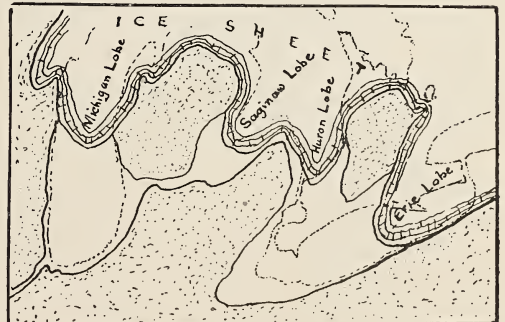
times to the absence of moraine dumps, and sometimes to peculiar conditions produced by the ice-mass in its retreat when large bodies of water were held between the ice-front and high land to the south. Map II. In such lakes the muddy particles settled as silt to the bottom, and when the waters finally drained away, large level areas of heavy clay land were left. Such lands may be seen along Lake Erie and in the Counties of Elgin, Kent, Essex and Lambton.

In some districts the soil covering the rock is very thin ; and is suitable only for pasturage. In our northern districts the hard rocks have been swept almost clear of the soil, so that it is unfit for agriculture. This land, however, is valuable as it furnishes great supplies of timber. The abundant lakes and streams of this region which render it possible to handle the timber cheaply, it should be remembered, are the effects of the glacial invasion.

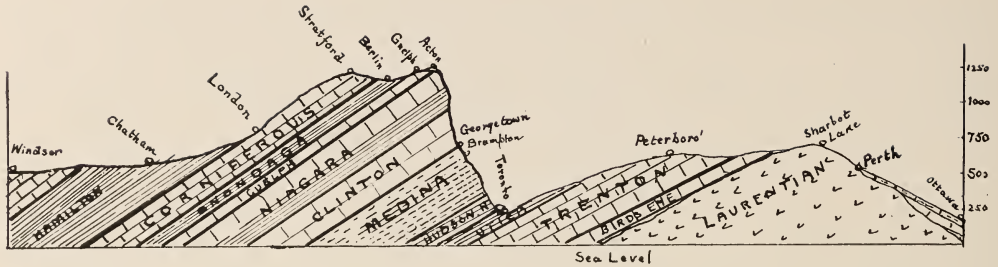
Moreover, the manufacturing industries associated with agriculture are

indebted to the glacial invasion for the unlimited water-power and the splendid water-transportation facilities placed at their disposal. The rise of such industries has reared large home markets for the products of the soil, and this in turn has been followed by a differentiation in agriculture, such as wheat-growing, fruit-growing, stock-raising, and truck-farming, for which different districts with their different styles are admirably adapted.

With a thorough knowledge of the closing period of the Glacial Epoch, we



MAP II.



HORIZONTAL SCALE - 1 INCH = 60 MILES

VERTICAL SCALE - 1 INCH = 1000 FEET

are able to explain the formation of the peculiar and complex soil-covering of Ontario. We can understand the origin of the peat and marl deposits, scattered through the Province; we have a better grasp of the problems of seepage water, springs and drainage; and we can see clearly why our soils are practically new soils, in which weathering has not yet produced much decay of the ground-up rock ingredients, and but slight leaching of the plant foods has taken place. Glacial soils like ours are not only a store-house of plant food but a manufactory of it also. Such soils differ very markedly in these respects from the residual soils of the south.

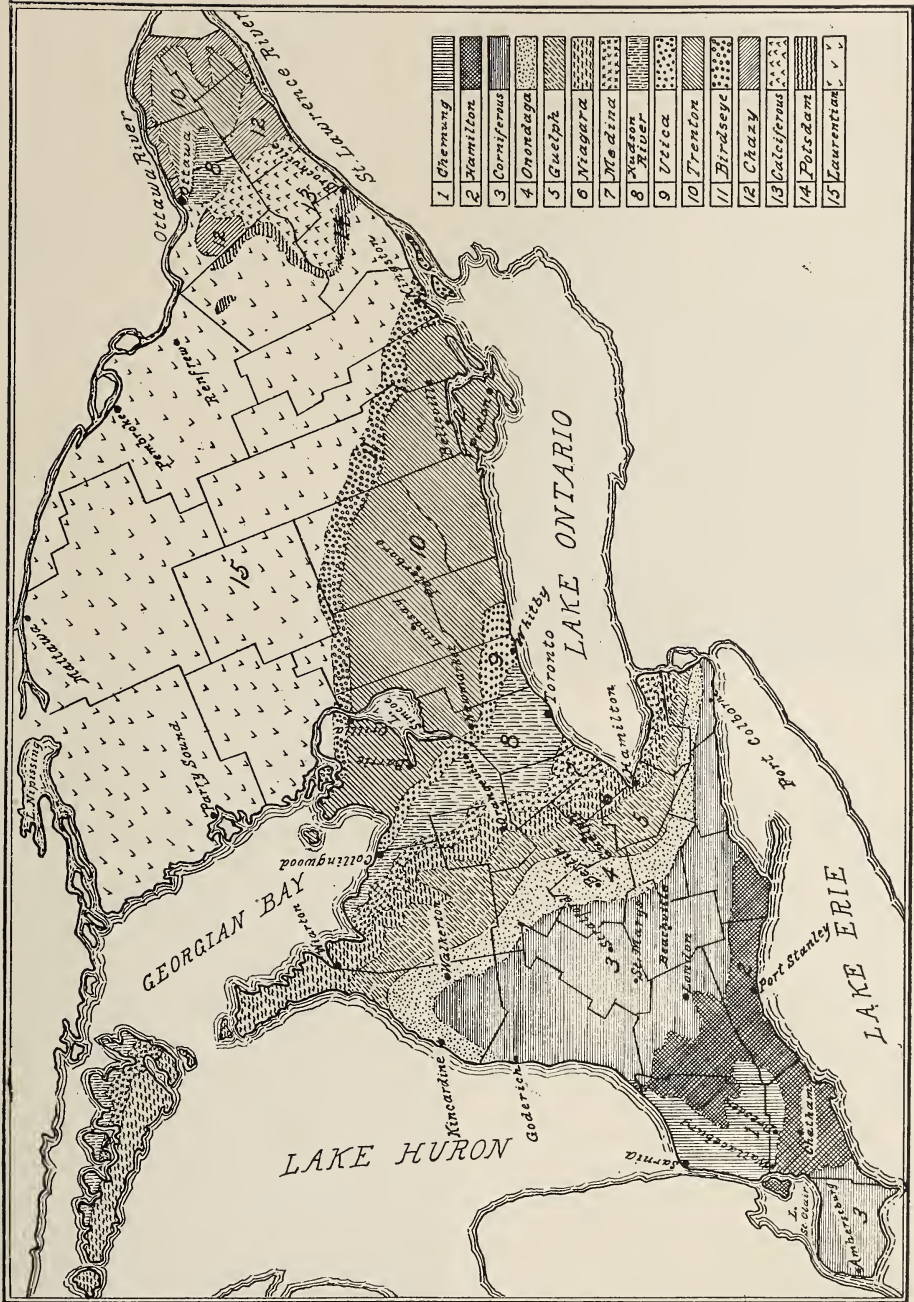
In a Province richly endowed with valuable mineral resources every student of agriculture should possess accurate information from a geological standpoint regarding those resources, so that he may be able to influence public opinion when their disposal is a question of public policy. Again, a knowledge of the rock formations that underlie the drift covering (maps III and IV) will help us to solve and to understand the problem of artesian water supply for our farms and villages. When we know the characters

of the underlying layers of rocks, their porosity, their thickness, and their *lie*, we can then act to better advantage when we come to deal with this problem of water-supply.

As a matter of fact the agricultural chemist, the soil physicist, and the biologist are all able to investigate more effectively and intelligently when they understand the fundamental facts of the geological formation of our country.

It is impossible for the student to get an intelligent grasp of the main essential geological facts in the classes in chemistry, physics, and pure biology, for the time is already more than occupied in the discussion of important matters in the domain of these special subjects. For this reason, therefore, geology should be studied as a separate science when the principles and their applications can receive adequate treatment. In this way only can the study of geology be made a means of culture and mental training, and at the same time can it give information to the agriculturist which will yield him better returns. The *good* as well as the *use* of the study will then be readily perceived.





GEOLOGIC MAP OF ONTARIO.

## Active Agriculturists.



**RICHARD GIBSON, Delaware.**

Richard Gibson first saw the light in England, where he was initiated into the mysteries of the herdsman's art. He comes of a family of stockmen, and one of the sights of the last International was the presence of three brothers in the ring competing for grand championship honors in the sheep classes—Richard with Shropshires, John with Lincolns, and William with Southdowns. The Belvoir Shropshires are noted for their sensational winnings at the great fat stock shows, and many a good Shorthorn has been given to the world from the same farm. Mr. Gibson is noted as a keen judge of stock, and an entertaining contributor to the press. The fact that Mr. Gibson was manager of the famous herd of Bates cattle which sold at fabulous prices at the New York Mills sale, speaks volumes as to his ability as a stockman.

**A. W. SMITH, Maple Lodge.**

The flock of Border Leicesters kept at Maple Lodge ranks as one of the very best on the continent, and a high-class herd of Shorthorns is also adding to the reputation of the farm. Such herds and flocks do not spring into existence by accident, but are the result of careful, scientific methods of breeding. The master of Maple Lodge is one of those clear-headed, progressive, public-spirited men, who are doing much towards establishing Canada's reputation for fine stock. In spite of his many home duties, Mr. Smith is a zealous worker in the various live stock associations in which he holds prominent positions. His sound judgment and progressive views render his services invaluable to the Associations.



# Agriculture.

## TILLAGE.

**N**OTWITHSTANDING the general familiarity of this subject of discussion, it still remains particularly suitable for consideration at this season, and is one whose importance is increasing rather than diminishing. Too often things familiar receive scant attention in the general fevered rush for something new and original, and often, too, men, probably farmers more especially, are slow to apply new methods which would give increased efficiency to old practices. This refers to even the important practice of cultivation.

This being an exceedingly broad subject, we cannot hope to deal with it by any means exhaustively, but we may touch on one or two important phases which have a very practical application. The objects to be attained are familiar to all who have worked the soil, and can readily be comprehended by those who have not. The first and most important consideration in spring is the preparation of a seed-bed, pulverized finely and thoroughly enough to ensure quick and even germination of the seed. Incidentally, air is admitted and the formation and liberation of plant food begins; the surface layer of the soil is warmed; excessive loss of moisture is prevented, and young weeds are destroyed. The thorough accomplishment of these objects is the aim of tillage, and, since it is obvious that the condition of the soil described conduces to the best results, it must be true that the thorough cultivation neces-

sary to accomplish the desideratum is most profitable.

The efficiency of the operation is of first importance, is a phase of the question upon which too much stress cannot be laid. Scarce and high-priced labor induces a tendency toward a lack of thoroughness. This tendency is often present as a result of carelessness, or inappreciation of the demands of the soil. Whatever the cause which induces it, failure to cultivate well cannot but lessen the profit from the crop. Clover seed, for instance, requires a very fine seed-bed. To save time, heavy land may be cultivated as the first operation of tillage in the spring. A stroke of the harrow previous to cultivating would have reduced the surface to a fine tilth, and the cultivator would merely have deepened the seed-bed without creating a lumpy condition. The fine seeds of clover and grass sown upon this coarse textured lumpy soil, largely fail to germinate, because conditions are obviously unfavorable. The same would be true of much of the seed grain. Insufficient cultivation by any implements used, as for example, the failure to stir hard spots on a heavy soil results disastrously to the success of crops. Qualification need be made, not so much to the kind of implement rationally used, as to the thoroughness of its use. The failure to first harrow land, however, is caused usually by a desire to get the work done quickly, regardless of the eminent desirability of

the finest tilth. It must be remembered that seed is to be sown, and that, if the preparation of the seed bed is not thorough enough to secure good germination, part of the seed is lost, part of the labor goes for nothing where a slight increase would have secured a full crop, the land is lying partially idle for the year and hence part the capital is paying no interest; and the expense of harvesting is relatively increased by having only a light crop to handle.

Related to the question of thorough cultivation is that of economical tillage. Very often the scarcity of labor unavoidably induces slipshod methods of cultivation, and in such cases a reduction of the amount of tilled land presents the only solution, for economic considerations show that insufficient tillage is unprofitable. But there are methods of meeting the difficulty instead of avoiding it. These require the investment of capital, which in the present stringency of the labor market may most profitably be devoted to the improvement of the farm and the purchase of labor-saving machinery. In regard to thoroughness and economy of cultivation, drainage would suggest itself as the first improvement. Heavy land is rendered more workable.

The areas which may be cultivated at once are increased and additional economy of energy is effected. The next step is the enlarging of the areas cultivated, by removing unnecessary cross fences and creating larger fields. This leads on to the use of larger implements, which is the object we have in view from the beginning. The solution to the labor problem, so far as cultivation is concerned, lies here. If the work formerly done by two men can now be performed by one, the most expensive item on the farm, manual labor, is reduced by half. That this is practicable needs no demonstration. Therefore, we return again to the question of thoroughness in cultivation, and find that it is both profitable and possible even in view of high-priced manual labor.

Thorough and yet economical methods of tillage are interdependent. We have seen that only careful cultivation is economical of soil, seed and labor. Labor may be economized by proper methods and implements, and efficiency increased. These two practical considerations will bear much thought and discussion. Both are important, overwhelmingly important, and application of these must be made in practice. Wisdom suggests it, the time demands it.



## Transportation and Competition.

**T**HERE are many substantial reasons for pronouncing Canadian freight rates excessive. Comparison with United States inland freight charges compels us to ask what causes the difference, a question which only the transportation companies can answer. A glance at such comparison will help to make the situation more striking. Tak-

ing wheat as the example, we find that it costs an average of .295 cents per pound to carry it from Winnipeg to Montreal in summer and St. John in winter. From Chicago to New York, transportation costs .0736 cents per pound. It is true that in the latter case the distance is rather less, but it is also noticeable that the charge is only one-

quarter that of the former. This example only illustrates a general principle which prevails in the fixing of the compared rates, in substantiation of which many other examples might be cited. The above example was taken from parallel routes. When, however, discrimination in favor of United States commodities occurs on lines common to both countries, Canadian producers have strong additional reason for protesting, because they have not a fair chance in competition on the produce markets of the world. And rates are not more favorable when the sea-board is reached. There is very much and very proper discussion of the inland rates mentioned, but the ocean rates receive less attention, though they are no less of a vital importance to our ability to place produce successfully on the British market in the face of strong competition. Taking wheat again, we find that from Canada to Great Britain the cost is approximately .65 cents per pound, from United States .03 cents per pound, the distance being slightly greater; from Argentine Republic it is .2 cents, the distance being several thousand miles greater; and from Australia it is .4 cents, the distance being also much greater. For meat from Canada, the cost is about .85 cents per pound, from United States .11 cents per pound, from Denmark .13 cents, and from Argentina 1 cent per pound, which last charge we must consider in relation to the distance of transportation. Butter shipped from Canada to Britain costs 2.6 cents per pound, from United States .19 cents, from Argentina .125 cents, and from Denmark .18 cents. Cheese sent from United States costs .16 cents, from Canada .196 cents per pound. United States apples are carried to Britain for 50 cents per barrel, and Canadian for 55 cents per barrel. With the exception

of Denmark, the ocean distance to the old country from Canadian ports is less than from those of the other countries named, and yet transportation charges are highest on Canadian exports.

How does this affect Canada's competitive ability? The products of her rivals are placed in the market at much lower cost, and the producers receiving a larger profit, are encouraged to increase their production. It will be asked, however, why Canada has succeeded in holding and improving her position under these conditions. It certainly cannot be attributed to favorable transportation facilities, and we must seek another reason, the only plausible one which we can find being greater productiveness of the soil and more diligent application of the farmer. This is substantiated by comparing average crop yields of the countries mentioned, taking wheat as representative. Average Canadian wheat yields range from 20 to 25 bushels per acre, United States from 13 to 14, Australian from 9 to 10 and Argentine yields the same. It is Canada's especial adaptability for wheat and dairy products, which enables her to compete successfully with her rivals in these lines of production, and at the same time withstand the disadvantage of heavy freight rates. There are not the same natural advantages for all lines of production, however, and a perusal of a table of agricultural exports, by showing what are the most important of these, shows also the extent of the natural advantages.

But the fact that the country possesses advantages which enable it to compete successfully in certain lines, at the same time bearing the imposition of heavy freight rates is no reason for the continuance of the imposition. The products of the land should belong to the owners, but excessive transportation

charges divert the profit from the producers to the carriers. Producers may receive sufficient for them to go on producing, but this does not make the distribution just, nor does it encourage production to its maximum. Beside those which can meet the competition and bear the freight rates, there may be other commodities which could be advantageously produced if freight rates were properly adjusted. Transportation companies show little wisdom in imposing all or a little more than the traffic will bear, and justice is left entirely out of consideration.

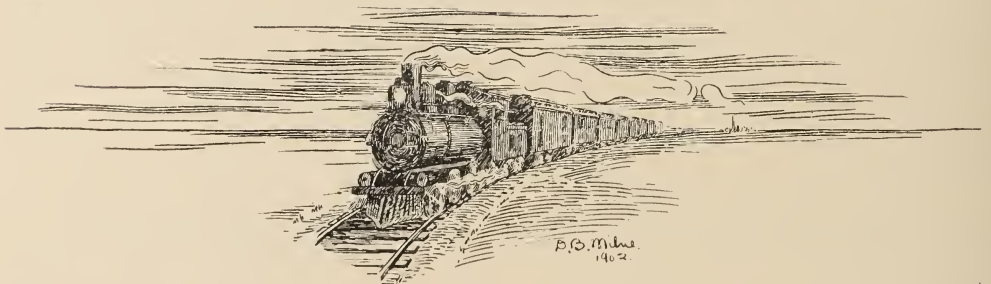
Demands for lower rates are met by objections which are valid within certain limits, for there are, of course, two sides to the question. The smaller amount of merchandise to be handled, and the long close season of navigation for some Canadian ports make the cheaper ocean rates from United States impossible for

Canada. Nevertheless we have compared the rates of other countries than United States, and when we find Australia and Argentina, both some thousands of miles farther from Great Britain than is Canada, and having no larger volume of merchandise to handle, enjoying cheaper rates in almost every case, we are justified in protesting against present Canadian ocean freight charges.

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### Live Stock.

We should like to draw the attention of intending purchasers of breeding stock to the live stock page in the advertising section. A number of the most prominent breeders give notice of their offerings, and those who intend buying will do well to correspond with these gentlemen.



# Horticulture.

## Windbreaks as a Protection.

**F**RUIT-GROWERS in all parts well know the destruction wrought by windstorms on the different trees in the fruit plantation. Wherever possible, the orchardist selects a site which is not exposed to the most severe storms. In many cases, however, such a desirable site is not available. Then the only resource is the establishing of a suitable windbreak. But it must not be taken for granted that fruit growers in general favor such protection as is afforded by the ordinary windbreak. It is true that most orchardists hold very decided opinions on the subject, but many are just as sure that the injurious effects are so numerous as to outweigh the beneficial results, as the majority are that windbreaks are practically essential to successful fruit growing. In fact they can cite instances of personal experience with orchards so protected and with others subject to the evil effects of the wild winds.

A careful study of the subject brings up many merits which are worthy of consideration. Horticultural authorities in all ages have recommended the planting of a windbreak or shelter belt. In sections where the forests have been destroyed, and the winds have free sweep, they are almost a necessity. To enumerate all the merits or advantages is unnecessary. It is well known that a sweeping wind causes excessive evaporation, and therefore a consequent drought, frequently when the trees are in greatest

need of moisture. This must be prevented in some way, and the windbreak seems to be the only feasible method. Again, the number of windfalls is lessened. The havoc wrought in breaking trees, or many of their limbs, is prevented. Operations such as pruning and picking may be carried on more quickly, and the work done much better. Snow and leaves are held on the orchard, there preventing root-killing, as well as increasing the moisture and fertility. In the spring the buds and blossoms are protected from the severe winds. These economic reasons are in themselves sufficient to show that windbreaks are very beneficial, but the fact that the fruit trees will be allowed to grow straight, behind an ornamental shelter belt is also worthy of consideration.

But the injurious effects are also worthy of mention. Orchardists all agree that nothing is more desirable than a free circulation of air, if first class fruit is to be produced. At certain times a cold atmosphere seems to settle in sheltered places and the absence of air circulation permits great damage by frost. Late spring frosts are especially injurious in such situations. Then the trees immediately adjoining the wind-break are generally less thrifty, and hence less productive, than those trees farther out in the orchard. Besides, the effects of insects and fungous diseases deserve mention. Such a shelter belt affords a suitable hibernating quarter for insects, and

a rallying place for serious fungus invasions. Modern spraying devices, however, practically remove this objection. It is the fruit grower's duty to give due consideration to the many merits and demerits and decide for himself.

Generally speaking, protection is needed only on those sides exposed to prevailing heavy wind-storms. The species of tree used in the wind-break

growth is most desirable. In the former case deciduous trees may suffice, but less space will be required if a row of evergreens is used along with some good deciduous species. Figure 1 shows a very desirable windbreak composed of one row of Norway spruce and three rows of hard maple. The trees are thirty feet apart in the row and the whole belt occupies a strip forty feet wide. Two rows of maple with spruce



Fig. 1.

will vary with different sections. To have best results, any tree must be growing under ideal conditions. Therefore, the more the departure from these ideal conditions of growth, the poorer shelter will be obtained. Nearly all trees have poor development when not grown in continuous forest, but there are several species which are well suited for making satisfactory protection as well as producing an ornamental effect.

For districts situated near bodies of water the belt need not be dense, while for inland sections a dense hedge-like

between forms an excellent shelter for most locations. For inland districts the Norway spruce alone is unsurpassed. Figure 2 represents a double row of this species nine feet apart in the row and the rows eight feet apart. In every case the trees of one row should alternate with those in the next. Lombardy poplar, elm, white spruce, and some of the pines have been used and proved quite serviceable. Red cedar forms a very good shelter but fruit growers object to its use because it is a desirable host in the life cycle of a fungus which attacks





Fig. 2.

the apple, commonly known as "apple rust" and "cedar apples."

It is urged by some that a row of some hardy variety of apples should be planted along the windy sides to serve as wind-break for the rest of the orchard. If this is not done it is claimed that no fruit trees should be planted within the influence of the shade and roots. This however can be at least partially overcome by planting the wind-break and the fruit trees at nearly the same time. Then the trees grow up together, and the roots of the trees comprising the shelter belt do not spread so widely toward those of the fruit trees to rob them of their food.

The majority of growers favor the planting of a suitable wind-break on such sites as will afford protection from the prevailing winds, and do not hesitate to pronounce it a paying investment. Those who see fit to oppose such planting could perhaps trace the points of objection to other sources. Taking everything into consideration the judicious planting of wind-breaks has proved to be a very great advantage wherever the plantation was in any way exposed to severe winds. A study of local conditions and then a selection of species according to those conditions seem to be the main factors in rendering the shelter belt beneficial or otherwise.



## Orchard Care and Cultivation.

**J**UDGING by the condition of many, if not most of the orchards in Ontario, we would think that cultivation was not necessary in them; we would think that it was only necessary to gather the fruit and the orchard would care for itself. But the best practice as well as science, has proven that good care and cultivation is as essential to

success in fruit-growing as it is to the other crops of the farm.

The cultivation for an orchard should commence a year or two before the orchard is set out. The plot of ground selected should be brought to a state of good tilth; noxious weeds should be eradicated; and it should be subsoiled, or better, tile-drained, if the subsoil is

at all compact in its nature. If a hoed crop is grown a season or two before we intend to set out the trees a good opportunity is given to kill the weeds and to find out the character of the soil in all parts of the field; we then have an opportunity to use special measures to put any bad spot into good condition. If grain crops only had been grown we would probably be unaware of the existence of such spots. Growing a crop of clover for one year puts the soil in good condition for setting out the trees.

A prime requisite in the soil for an orchard is that it be well drained. Fruit trees will not endure cold, wet feet for any length of time. To subsoil the plot the fall before the trees are set, serves a good purpose in loosening up the subsoil, thus forming a better reservoir for water and in causing the roots of the trees to strike deeper from the beginning. But the subsoil soon becomes compacted again and it is impracticable to repeat the operation of subsoiling in the orchard every three or four years as we do for other farm crops. On the other hand, if the plot be tile-drained the effect is practically permanent. Surplus water is carried away, the subsoil is loosened and as a consequence its water-holding power is increased. It will actually hold more water than it did before it was drained and it holds it in a form suitable to the requirements of the roots. The soil becomes more porous and is better aerated. The roots of the trees then find a deep, congenial soil in which to grow, and, if the surface cultivation is done correctly, an ever ready supply of moisture.

It is on this store of moisture in the soil that the trees depend for their supply. It is seldom that a summer rain is sufficient in quantity to reach the roots

of the trees. It behooves us therefore to conserve this moisture in the best possible manner. This is done by spring and summer cultivation. Hoed crops may be grown between the rows of trees for a few years after the trees are set, but a strip should be left along the rows which should be well cultivated and should be widened year by year as the trees grow. Cereals should never be grown in an orchard since they use the same elements that are required by the tree in its growth and they preclude cultivating.

The orchard should be plowed as early in the spring as the ground is fit; then it should be thoroughly cultivated with the spring tooth cultivator or harrow. It is important that the soil be put into a fine state of tilth as early as possible in the spring because the trees make practically all their growth in the spring and early summer. After this condition of fine tilth has been attained, it is only necessary to maintain a soil mulch, by cultivating every ten days or two weeks and after every rain. A light harrow is the best implement for this purpose.

It may be objected by some, that it is impossible to so cultivate their orchards because the branches hang too low. If the orchard is cultivated from the time it is set out and judiciously pruned every year this will not be a serious difficulty; besides there are machines on the market made especially for this purpose. The ground may be plowed towards the trees every spring and so long as it is not heaped up around the trees the summer's cultivation can be depended on to level it down again. An orchard in which the trees are so close and the limbs so low that it cannot be cultivated is not in good condition for producing first-class fruit. It offers insects and fungus diseases an excellent chance to thrive because it can-

not be thoroughly sprayed. Such an orchard should be thinned out as well as pruned.

After the normal period of active growth of the trees is over, it is no longer beneficial to continue the cultivation, in fact, it may be positively harmful by stimulating the growth too late in the season in consequence of which it does not ripen well before winter and may be winter-killed. We therefore cease cultivating the orchard about the last week in July and sow a cover crop. This cover crop uses up some of the moisture and the plant food which is being liberated in the soil, thus tending to check the undue growth of the trees. It also prevents these elements of fertility from being leached from the soil the following winter; it holds the snow and thus protects the roots from severe freezing and allows the melting snow and spring rains to enter the soil where it is held for the next season's growth.

In this system of cultivation the moisture of the soil is controlled by means of the cover crop in the fall and winter, and by maintaining an earth mulch during the growing season. The moisture conditions of the soil can be so well controlled in this way that a full crop of any description can be grown even though there be no rain during the summer, provided, of course, that there has been precipitation during the winter sufficient to saturate the soil.

The tilth of the soil is maintained by turning down the cover crop every spring and by the subsequent thorough cultivation. Humus is an essential element of good tilth and it is supplied by the cover crop after it has decayed. It loosens up heavy soils and binds light ones; and it also aids materially in holding moisture and plant food. It is

a common but mistaken notion among farmers that plants obtain their carbon from the humus in the soil. Plants can obtain all the carbon they require from the carbon-dioxide of the air. The thorough cultivation which follows the spring plowing is the chief factor in bringing the soil to a fine state of tilth. It also aerates the soil and warms it up, thus increasing bacterial action with the consequent release of plant food. The aeration of the soil is aided by the tile drains, also, and by the channels left by the decaying roots of the cover crop. When a rain occurs the water is enabled to enter the soil without resistance from the air since the air escapes through the tile. Thus a complete change of air in the soil is secured.

It is necessary to manure or fertilize an orchard to secure the highest returns but it is a waste of money and labor to throw manure or artificial fertilizers on a soil that is not cultivated and kept in a fine state of tilth. If legumes are used as the cover crop they will supply sufficient nitrogen for the trees, in most soils at least. Then if a liberal application of good hard-wood ashes is given every few years the trees should not suffer for lack of food on the average soil. I would say that cultivation was most important, then spraying, and then manuring.

The system of cultivation which has been outlined is the one generally recommended by the most advanced and successful fruit-growers, but there are some who maintain that, while this method gives good results, it is radically wrong. They say that nature never intended the soil to be left bare for so long a time and claim that the soil-bacteria thrive better where a crop is growing. They therefore seed down the orchard to grass

which they seldom or never plow up. This grass is cut two or three times a year, but is not removed nor are any animals allowed to pasture on it. This cut grass soon forms a very good mulch and it keeps the soil fairly porous beneath it. The roots of the trees, however, tend to come nearer the surface and run along just beneath the sod. It is because of this that plowing is not practiced since many of these roots would be cut off thereby.

If this method of orchard management is followed it will be necessary to supply some nitrogen to the soil as well as potash and phosphoric acid, because sufficient legumes would not be grown to supply it. The sod would form a breeding place for insects and fungi, also,

which would necessitate more care in the spraying.

This method would do very well, on steep hillsides and rocky places where cultivation could not be practiced, and may possibly be the means of turning such places into fruitful orchards instead of barren wastes.

It would also be suitable in humid sections where no summer drouths occur, but in the average sections of Ontario the great growth of grass would pump out the moisture to the detriment of the trees, and as Bailey says—"If one were to sink a well under the tree and were to erect a windmill and pump, he could not so completely deprive the tree of moisture."

J. E.



# Experimental.

## Experiments with Swine.

### Blood Meal and Tankage as Compared with Skim-Milk for Hogs.

**I**N a previous issue an account was given of a series of experiments conducted to determine the value of Blood Meal and Tankage as supplementary foods to an ordinary meal ration for hogs. These foods are by-products from the slaughter houses, but, as yet, not manufactured by our Canadian firms in a sufficiently palatable form to be used as foods for animals. At present blood-meal and tankage made in Canada are being sold to firms across the line to be used as fertilizers. The importance of retaining and feeding these by-products on our own farms, rather than allowing them to go out of the country, is apparent to any one who realizes the importance of maintaining and increasing the fertility of our Canadian farms.

The tankage and blood-meal used in this experiment was supplied by Swift & Co., of Chicago, and, although supplied free by that firm, on account of being used for experimental purposes, would have cost us for blood-meal \$55 per ton, and for tankage \$33 per ton. No doubt Canadian firms could supply these foods at a cheaper rate, but the calculations in the table on following page are made upon a basis of the above prices.

In this experiment there were eight groups of pigs, four in each group, averaging in weight from 21 to 40 pounds. All were fed the same meal ration, consisting at first of pure middlings, but

with a gradually increasing amount of barley and some oats, until at the last the ration consisted of about three parts barley, one part oats and one part middlings. In addition, supplementary foods were added to nearly all the groups. The following shows the ration for each group:

- Group 1—Blood-meal and meal. Proportion, 1 : 9.
- Group 2—Blood-meal and meal. Proportion, 1 : 14.
- Group 3—Tankage and meal. Proportion, 1 : 9.
- Group 4—Tankage and meal. Proportion, 1 : 15.
- Group 5—Skim-milk and meal. Proportion, 2 : 1.
- Group 6—Meal alone.
- Group 7—Blood-meal, milk and meal. Proportion, 1 : 15 : 15.
- Group 8—Tankage, milk and meal. Proportion, 1 : 15 : 13.

The experiment was commenced on June 27th and completed on November 23rd. This was rather a longer feeding period than last year's, due in part to the character of the pigs themselves, but also because they were not fed quite as heavily as those of the previous year. It is a significant fact that the slightly lighter feeding, although it required a longer period, proved somewhat more economical of grain and other foods.

The blood-meal or tankage or milk were mixed with the regular meal ration and moistened to a thick paste. The

pigs were fed just about as much as they would eat up clean twice each day. Water *ad libitum* was supplied in the troughs afterwards. In addition, the pigs were fed at noon a very small amount per pen of grass or clover, or green oats or rape or soy beans and latterly roots, all of which were conveniently near the piggery. In the statement made below no account is taken of this, but, at the same time, we have found that even a very little green food fed regularly, as above described, is a most beneficial food for pigs.

The table presented below gives the gains, the food consumed, and the cost of producing the gains. In estimating the latter, meal is valued at \$18 per ton, blood-meal at \$55 per ton, tankage at \$33 per ton, and skim-milk at 10 cents per hundred.

the figures quoted in this table represent about rightly the comparative value of these supplemental foods.

2. The pigs fed on meal alone made very satisfactory results, but not as large gains as those in the other groups, and had they been finished to the same degree, for example, as groups 7 and 8, would have cost considerably higher than the figures stated here.

3. Allowing for rate as well as for cost of gain, the groups of pigs are rated as follows:—Group 5 receiving skim-milk and meal, and group 8 receiving tankage, skim-milk and meal, best and about equal; next in order are group 7, group 4, group 6, group 3, group 2, group 1.

4. By reference to the table it will be seen that blood-meal, mainly on account of its extra cost, proved the least satis-

GROUP	Gain lbs.	FOOD CONSUMED.	FOOD CONSUMED For 100 pounds gain.	Cost of 100 lbs gain
1. Blood M. and meal heavy blood m. ration	501	Meal 1757 lbs ; blood-m. 194 lbs.	Meal 351 lbs.; blood-meal 39 lbs.	\$4 23
2. Blood M. and meal light blood m. ration	461	Meal 1710 lbs ; blood-m. 123 lbs.	Meal 371 lbs.; blood-meal 27 lbs.	4 08
3. Tankage and meal heavy tankage ration	501	Meal 1851 lbs.; tankage 199 lbs.	Meal 369 lbs.; tankage 40 lbs.	3 98
4. Tankage and meal light tankage ration	498	Meal 1720 lbs.; tankage 114 lbs.	Meal 345 lbs.; tankage 23 lbs.	3 48
5. Skim-milk and meal	568	M. 1888 lbs.; milk 3,236 lbs	Meal 332 lbs.; milk 639 lbs	3 63
6. Meal alone	481	Meal 1980 lbs.	Meal 412 lbs.	3 70
7. Blood-meal, milk and meal	562	Meal 1862 lbs.; blood-m. 120 lbs.; milk 1871 lbs	Meal 330 lbs.; blood-m. 22 lbs.; skim-milk 333 lbs.	3 92
8. Tankage, meal and milk	597	Meal 1744 lbs.; tankage 126 lbs.; skim-milk 1942 lbs.	Meal 293 lbs.; tankage 21 lbs.; skim-milk 325 lbs.	3 66

#### NOTES ON ABOVE TABLE.

1. In comparison with last year's experiment, the results are not so much in favor of blood-meal and tankage; but, summarizing the conditions, we consider

factory of these supplemental foods. Tankage proved much more satisfactory and, while not quite equal to skim-milk, yet, when fed in small quantities along with a small quantity of skim-milk, gave about the best results.

5. Judging from this, we would say that tankage would prove itself an excellent food to add to a ration for pigs, when only a limited amount of skim-milk was available, which is often the case on the average farm.

6. In both cases where tankage and blood-meal were fed in different proportions, the smaller proportion proved more satisfactory. This is about what we would expect in considering the nature of the main meal ration, viz., middlings, barley and oats. Had the ration consisted of a large amount of corn, it is very likely that the larger amount of these bye-products would have proved more satisfactory.

7. Averaging up these results by comparing the gains and rate of gain made when meal alone was fed with those made when supplemental foods were fed, we may, roughly, indicate the figures a farmer could afford to pay for these foods for the purpose of pig feeding:—skim-milk 15 cents per hundred; blood-meal \$30 per ton, and tankage \$30 per ton.

#### PIGS ON PASTURE.

During the same period that the above pigs were fed inside, we fed pigs outside, in order to compare the economy of pasture feeding with that of pen feeding. Those who have kept in touch with our former experiments in the pasture feeding of pigs, will remember that we have invariably reported this method to have cost us more than pen feeding. Hence, this year, we selected the growthiest pigs of the lot to be turned out on pasture in order to see just how favorable results we could get.

The pigs were divided into two groups of 12 each. Lot one received as a meal ration just what they would eat up clean. Lot two received about two-thirds as much meal as lot one, and had to depend somewhat more on pasture for sustenance, although, it must be added, they did not seem to eat much more green feed than the heavy-feed lot.

The crops used for pasturing were, first, clover, and, latterly, rape. In order to economize the pasture as much as possible, we hurdled off only a small part of a field at first, and gradually moved the hurdles back so that the pigs had fresh pasture about every week. The pigs found shelter in movable houses.

The pigs were turned out on June 22nd, at which time they averaged in weight about 50 lbs. They ran for five weeks on clover, and for ten weeks on rape. In all, the pigs used about an acre of pasturage. On October 7th they were brought inside and fed for seven weeks more, receiving during this period roots to take the place of the succulent pasture food. During the latter period, both groups received all the meal they would eat.

The following table shows the gains and pounds of meal consumed up to the end of the time the pigs were on pasture, and the total gains and total meal consumed, and the cost of this, from beginning to end of experiment. In estimating this cost, meal is charged at \$18 per ton, and no account is taken of the cost of pasturage, but this is discussed in Note No. 2.

GROUP.	Gain June 22 to Oct. 7	Meal Consumed.	Meal for 100 lbs. gain.	Total gain June 22 to Nov. 23	Total Meal.	Meal for 100 lbs. gain.	Cost of Meal for 100 lbs. gain.
Heavy feed	928 lbs.	3907 lbs.	421 lbs.	1334 lbs.	6919 lbs.	517 lbs.	\$4 65
Light feed	861 lbs.	3041 lbs.	421 lbs.	1339 lbs.	5969 lbs.	445 lbs.	4 00

## NOTES.

1. It cost more to finish these pigs than the ones in the former experiment.

2. The pasturage and roots allowed the whole 24 pigs was worth about \$20, and, if this were taken into consideration, the cost of 100 lbs. gain would have been increased about 60 cents in each case.

3. As compared with this, the green feed given to the pigs inside did not cost more than one-third as much, so that, had this item been taken into calculation, the results would have been still more in favor of the inside pigs.

4. In former years the results have been even more decidedly in favor of inside pigs, but, as stated above, we made every effort this year to give the outside lot the best chance, and feel sure that at least, so far as young pigs are concerned, feeding inside, under the conditions prevailing at Guelph, is more economical than feeding outside.

5. In looking over the table, the reader will notice the increased amount of grain required for 100 lbs. gain during the last stage as compared with the former stage. This is an illustration of a principle well known to feeders of all kinds of stock, viz., that the cost of gain increases with the age of the animal.

6. The importance of carefully husbanding the grain fed to pigs on pasture is strongly emphasized in this experiment. At the time the pigs went inside the light feed ones were considerably thinner than the heavy ones, but they had developed just as big frames, and went ahead more rapidly during the last stages of feeding, at which time they, too were fed a full ration.

## SOY BEANS VS. RAPE AS GREEN FEED FOR PIGS.

By way of variety in green feed we

grew a small plot of soy beans and, in order to determine their value, fed two groups of pigs of six each on the same meal and milk ration, but one lot soy beans and the other lot rape or green feed. The pigs averaged about 70 lbs. each at the beginning of the experiment August 18th, and were fed for 5 weeks, eating about four lbs. each of soy beans per day, and about five and a half lbs. each of rape per day. The following statement shows the feed consumed and the gains made by each group :

Group 1—Fed rape ; gain, 145 lbs. ; feed consumed, 502 lbs. meal, 1004 lbs. milk, 1381 lbs. rape.

Group 2—Fed soy beans ; gain, 159 lbs. ; feed consumed, 502 lbs. meal, 1004 lbs. milk, 983 lbs. soy beans.

## NOTES.

1. It is evident that the soy beans are a richer food than rape, a lesser quantity producing a greater gain.

2. On the other hand, rape is a heavier yielder per acre than soy beans, the yields of fresh cut forage in this case being : Rape 22 tons per acre, and soy beans 15 tons per acre.

3. From this it is evident that, for purposes of feeding green forage to pigs in pens, a given amount of land might be equally profitably sown with either soy beans or rape.

4. When, however, it is desired to pasture pigs on one or the other crop, rape will stand the tramping, etc., much better and is the more profitable crop.

5. We commenced feeding the soy beans when they were in blossom and they kept wonderfully green for about five weeks after this.

6. For particulars with regard to soy beans see report of the Experimentalist.



# The O. A. C. Review

## Editorial Staff.

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R. S. HAMER, '07	-	Editor.
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## Business Managers.

H. H. LEDREW, '05	J. B. FAIRBAIRN, '07
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## Subscription Rates.

Annual subscription—Students, \$1.00; ex-Students, 50 cents. Single copies, 15 cents.  
Advertising Rates on application.

## Editorial.

In all countries and in all ages, individuals have varied widely in tastes and predilections as they have in character and appearance. These widely diversified likes and dislikes find expression in choice of vocation, to some extent, but are more strongly displayed in the individuals avocation when he seeks diversion from the daily round of business worries. Some indulge in sport, some in reading, and others in what are popularly termed hobbies. Many of these hobbies are doubtless of little practical benefit but there are others which are instructive, pleasing and capable of developing the aesthetic emotions.

In a college, especially in one such as ours, where students of all nations, ages and degrees of education are enrolled, hobbies are numerous, but very few are general. It is noticeable, however, that amateur photography is a recreation,

which is common to perhaps twenty-five per cent. of our students, and were conditions favorable, it would be indulged in to a still greater extent.

Though an expensive pastime, the results are usually a lasting source of gratification and are in themselves a sufficient compensation. Many amateurs, however, contrive to make their work profitable financially as well.

To give the lover of cameras, films, hypo-baths, developers, etc., a fair chance, all that is needed is a dark room for the use of students only. There are numerous "sites" for such a room in unused corners of our many buildings and the cost of equipment would be trifling.

What is to prevent the various owners of valuable and practically unused cameras from forming an Amateur Photographers Association and petitioning for a dark room? The many opportunities for catching pretty views and

obtaining valuable souvenirs could then be taken advantage of and collections could be carried away to form a much prized, illustrated supplement to a graduation diploma.



The close of the spring term and the commencement in September are always important periods with our various college associations.

#### **Elect Good**

**Men.** It is then that officers and committees are chosen for the next year, and upon the choice of the students depends the success of each society, association, or journal, as the case may be.

The men are usually elected by ballot, at a mass-meeting of the students, and are of course supposed to be the very best men available for their respective positions. This implies that every candidate has been nominated by a man who understands the requirements of the case. It also implies that every voter knows what sort of man each position demands and that he is familiar with the qualifications of the various candidates for each position.

But is this always the case? One has only to be present at such a meeting to realize that a majority of the voters are voting carelessly, on personal grounds or upon blind impulse. Too often men who have made themselves popular in one sphere are nominated by their admirers, for a position of an entirely

different character. Too many are put up because they are "good fellows" generally, executive ability being a minor consideration. When the vote is taken, only a few take the trouble to think how they should vote and still fewer know why they vote as they do.

What, then, are the remedies? In the first place the old Executive should always be watching for prospective ability, their experience being the surest guide as to the man best qualified. They should see that these men are nominated by influential students capable of giving a little "spiel" on their candidates special fitness. A chance should be given to publicly discuss the merits of the candidates. Substantial reasons why each man was chosen would then have to be given instead of personal caprice and all would be able to vote intelligently.

Further, a week should elapse between nominations and elections to give an opportunity for consideration. At the final meeting, those who have the interest of the college at heart should make it a point to be present and poll their vote.

In the past, our executives have, as a rule, been efficient, but when we consider how they have usually been appointed, this is a matter of surprise rather than congratulation. Only when more intelligence and system are introduced into our election methods will an enthusiastic, enterprising and energetic executive be guaranteed.

## Our Alumni.

**I**T is common belief that our best Canadian college graduates receive their recognition across the border. This is not an unmixed evil if we can retain enough of the brightest to man our national institutions, and such is the policy followed by the O. A. C. H. S. Arkell, B. S. A. '04, M. A., has this winter returned from the south to take the position of Associate Professor of Agriculture here. No person could come better qualified.

Heredity, inclination, and training have combined to make him a factor in agricultural education. Belonging to a family of leading stockmen and raised on a well appointed farm, he has the inborn and inbred natural experience. A graduate of Woodstock College, and a man who led his year throughout the Arts course at McMaster, he had, when he came to the O. A. C, a perfect foundation for the agricultural degree. While preparing for this he held the position of Demon-

strator in Physics, and so is not altogether new to the staff.

After securing the degree of B.S.A. he joined the staff of the University of Columbus, Ohio, as Associate Professor of Agriculture, and has the honor of having trained the team which won at the last International Judging Contest. With this to his credit, his experience in other educational institutions, and his natural ability H. S. Arkell represents the type of man who should be chosen to strengthen any college.



In this issue we are pleased to be able to furnish a cut of the first student who entered Dominion politics, Dr. J. G. Rutherford, Chief Veterinary Inspector,

Ottawa. He first entered public life in 1892, when he was elected member for Lakeside, in the Manitoba Legislature, by a large majority. He at once became one of the forces in the Liberal party in Manitoba, and was again elected at the general election in January, 1896,



H. S. Arkell, B. S. A., M. A.

resigning shortly afterward to contest the Dominion constituency of Macdonald. He was nominally defeated in this election, but the seat was voided because of corrupt practices, and Dr. Rutherford was again returned in a subsequent bye-election and sat in the Dominion House until 1900.

He entered this college in 1875 taking the first prize for his year in Practical Agriculture. After leaving here he spent a year on the Bow Park farm at Brantford. He entered the Ontario Veterinary College, Toronto, from which he graduated in 1879, carrying off the gold medal. He first opened an office at Woodstock, but in a few years moved to Portage La Prairie, where he worked up an extensive

practice and earned for himself the reputation of being one of the most skilful and best informed veterinarians in Canada. As a speaker Dr. Rutherford has also gained high repute, having a vein of very caustic sarcasm relieved by an easy flow of real wit and humor. At present he is Chief Veterinary Inspector for the Dominion with headquarters at Ottawa.

A glance over this career is indeed very encouraging to the students, who are graduating from this institution at a later day. No doubt the knowledge and

experience gained at the O. A. C. have aided in no small measure to ensure Dr. Rutherford's success in life.



W. H. Gunn, B. S. A., '04, is devoting his energies to Montreal cold storage. Such has been his success that he has been given charge of a plant in Ottawa.



L. S. Klinck, B. S. A., has resigned his position as instructor in farm crops and will complete his study of soil fertility and agricultural chemistry, at Ames, Iowa. He hopes to be able to finish this work by July, at which time he will be granted his master degree.

Mr. Klinck graduated with high honors from this college in the spring of 1903. Immediately

after graduation the agricultural men across the line recognized in him a man of ability, and lost no time in securing his services. Since then he has given ample proof of his capabilities, therefore we feel confident in predicting an exceedingly bright future for Mr. Klinck. We must congratulate our American neighbors in securing the cream of the men from this institution. However there is a consoling feature that they are unable to keep our men very long. Another evidence of this is shown by the fact that Mr. Klinck intends to



Dr. J. G. Rutherford.

return to Canada some time in the near future.



T. H. Sharp, B. S. A. '03, is managing a banana estate in Jamaica. He states that they hope to grow two hundred and fifty acres of bananas next year, and also feed about fifty head of beef on the by-products of the fruit. This will be a profitable addition to the fruit industry and shows the progress of farm economics.



W. Bailey entered the college in 1884, taking the two year's course, after which he returned to his home at Shooter's Hill, Mount Olivet, Jamaica. He has lately come to Canada and purchased a farm about four miles west of Guelph.



A. B. Cutting, B. S. A. '04, is still in the Argentine managing a fruit farm for Mr. Panelo. According to a recent letter he is seriously contemplating returning to Canada. Al. is evidently out of his element in the sunny South.



L. H. Newman, B. S. A., '03, is at present engaged with the Dominion Department of Agriculture, representing the Seed Grower's Association of Ontario. During the months of December and January he took a course in Seed Judging at Ames, Iowa. Until quite recently he has been on Farmer's Institute work in the Western part of Ontario. Next month Mr. Newman and Mr. Broderick of Nova Scotia will conduct a seed judging course of a few days duration at Charlottetown, Prince Edward Island.



W. A. Elmes and wife paid the College a visit on March 31st. After finishing the associate course in '91, Mr.

Elmes went west to take up missionary work. However, western life proved too lonely for him, so he returned this winter, bought a farm, and entered into partnership with two people, his brother and one other. On the 29th of March Mr. Elmes was united in the holy bonds of matrimony. He and his brother, who attended the college in '92, will start farming at Princeton, Ontario, this spring.



Mr. A. C. Johnston, a student of '95-'96 has been conducting the practical side of the "Science of the Soil" very successfully on the old homestead near Winchester, Ont. He is infected with the Western fever and hopes to soon stake a claim "in the boundless plain."



W. R. Dewar, B.S.A., '04, writes a very interesting experience from Bloemfontein South Africa, dated Feb. 15, 1905.

While visiting a small mining town in Orange River Colony he accidentally came across a man who once attended the O. A. C. They both got on the same train and although strangers to one another they soon struck up a conversation. Mr. Dewar's newly made acquaintance was low set and dark, with quite a broken accent. On inquiring, Mr. Dewar found that he was from Canada, and after a great deal of inquiry he found that he had been at the O. A. C.

When questioned as to his origin, he said, "Oh, I am French, but born in Canada, away up there where it is cold" and disclosed his name as Hiltos. He then told of being at a place "Where they taught a fellow how to farm; where you get eight cents an hour for working and five if you don't work. You had to get up early to milk the cows and feed the pigs, phe-e-w it was cold!"

Mr Dewar then asked the name of the place. "Oh a farm for experiments; what do you call it?" Then he pictured with his hands a big square building, and the head master was a big tall man with sharp eyes, "Phe-e-e-w they would look right through you." Mr Dewar then suggested the name of Guelph. "Guelph! Guelph! that's it." He then told how he came to the college in 1891, but the atmosphere did not quite suit him, so after a little over a year's time he refused to do some work and was expelled. Shortly after he went to South Africa and is travelling for The Cycle Trade Company.

Although Mr. Dewar is in far off South Africa his interest in the O. A. C. is still keen. This is plainly manifested in a recent letter received by one of the college boys in which he states, that if there is a subscription started among the ex-students for the purpose of raising money to build a rink, he will contribute one hundred dollars.



Mr. W. Patterson, '96, is engaged in the lumber business in British Columbia. He recently visited Ottawa with a deputation, interviewing the Cabinet and Railway Commission regarding lumber legislation for that Province.



B. M. Eftyhites, B. S. A., '04 is managing a large type-writer concern at 203 Security Building, Chicago.



J. Chisholm, '05, a practical associate, has invaded the realm of American Agricultural Colleges. He is managing the 300 acre State Farm, of the Agricultural

College at Columbus, Ohio. His work here created so favorable an impression that he has lately been placed in charge of the corn-judging competition in Ohio.



Maurice S. Middleton, who took the associate course with the '06 class, is now at his home, Vernon, B. C., putting into practice what knowledge of fruit farming he gained while at college, and during a summer's hard work under that genial taskmaster, William Squirrel. He speaks in glowing terms of the fruit growing possibilities of that district and mentions that many ranchers have divided their lands into lots suitable for fruit growers, and are selling them at very high prices. During the winter months, M. S., who is naturally fond of all social functions, is having a real good time, and is playing hockey as a more strenuous pastime.



We have recently received a letter from one of the boys who roamed these halls with the year of '96.

It will interest the classmates of Mr. A. C. Wilson, to hear that he is amongst the progressive list of O. A. C. ex-students.

Since leaving the college he has abandoned the subject which had heretofore interested him, and now we find him connected with one of the large railway concerns across the border, with headquarters at Aurora, Ill.

Besides holding this important position, Mr. Wilson is President of the Yeomen of America, a fraternal organization which is flourishing in United States at present.

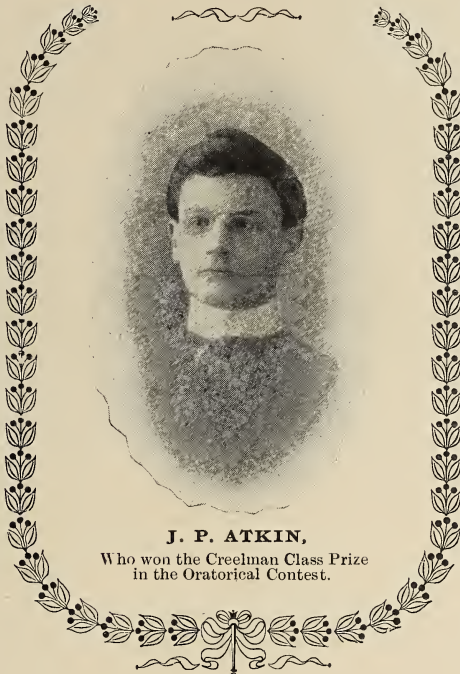
## College Life.

**J**UDGING by the number and quality of the entertainments that have taken place in our spacious Gymnasium during this winter, we had ample opportunity to show our literary and oratorical ability, and judging by the size of the audiences, we feel sure the efforts of the performers have been enthusiastically appreciated and enjoyed. The Public Speaking Contest, held on the evening of Saturday, March 28th, was a program of exceptional merit, and elicited the highest praise. In the contest were six speakers: "Libraries for the People," — J. A. Clark: "How Canada became a Nation," — M. Greenshields; "Contra Militarism," — H. G. Bell; "Patriotism," — D. M. Rose; "Anglo-Saxon Unity," — J. Bracken; "National Morality," — G. G. White. In judging the speeches, the judges, Rev. P. C. L. Harris, W. E. Buckingham and M. MacCormick, took into consideration the same points as in the Oratorical, but giving a little more emphasis to matter—that is, the speeches were considered as addresses rather than orations. The quality of the speeches, however, proved that we have good

material for next year's oratorical. The subjects treated were of a national character, and were well handled and presented. Mr. G. G. White, though the last speaker, held the attention of his audience with an excellent speech and won his laurels with credit. The judges placing was as follows — 1st, G. G. White; 2nd, M. Greenshields; 3rd, D. M. Rose; 4th, J. Bracken.

The first musical selection, a mandolin duet by Mr. G. C. Goulding and Mr. Chas. Kelly was appreciated. The other numbers consisted of illustrated songs, cleverly presented, and showing much talent on the part of the students taking part. These songs were "You and I, and I and You," by Miss Hilda Fuller; "The Bloom is on the Rye," by Miss Davis and Mr. Mills; "Robin Adair," by Miss Muriel Hoodless; "Even Bravest Hearts May Swell," by Miss Fleming and Mr. de Coriolis.

The second part of the programme, which was enjoyed every moment to the brilliant finish, consisted of a pantomime with the following characters:



**J. P. ATKIN,**  
Who won the Creelman Class Prize  
in the Oratorical Contest.



G. G. WHITE,  
Winner of the Public Speaking Contest.

The Bachelor in Search of a Wife.  
Professor Harrison.

“There was once a bachelor who lived  
by himself,  
And all the bread and cheese he got he  
put upon the shelf,  
The rats and the mice they led him such  
a life,  
He was forced to go to London to get  
him a wife.”

Matrimonial Agent.  
Miss Mary Pattullo.

Miss Kent—Strong Minded Woman.  
Miss Culham—Widow.  
Miss Wanzer—Golf Girl.  
Miss McFarlane—Tidy Girl.  
Miss Watt—School Girl.  
Miss Haywood—The Rejected One.  
Miss Eaton—Athletic Girl.  
Miss Johnson—Learned Girl.  
Miss Bickle—Bashful Girl.  
Miss Brown—Society Girl.  
Miss Beatty—Artistic Girl.  
Miss Cameron—The Winning Girl.

The stage was made to represent a cosy comfortable room in the home of our genial matrimonial agent. The doughty old bachelor, though his household troubles were many, seemed to find his difficulties increased when the choosing of a wife became the problem. The tears of the widow, the wisp of the tidy girl, the fists of the athletic girl, and the paint brushes of the artist covered him with confusion and other things, until the arrival of the winsome winner, who with her belongings was loaded in a wheelbarrow and triumphantly trundled home, amid the congratulations of her less fortunate sisters.

We trust that these other young ladies, if they have not already done so, will soon find more congenial companions.

The acting and the costuming in the pantomime were well executed and reflect credit on the performers. “God Save the King” brought the programme to a close.

Saturday evening of the following week, The Maple Leaf Literary Society held an open meeting to which were invited the students and their friends from the city. A large audience graced the program. No pains were spared in making the Hall attractive, the stage particularly being startlingly pretty with spruce, bunting, flags, and a profusion of callas, palms, and other plants from the conservatory.

Mr. G. M. Frier, President of the Society, was in the chair and efficiently carried out his duties.

#### THE PROGRAMME.

##### Part I.

Address—Professor J. B. Reynolds.

Violin Solo—D. Stewart.

Reading—“Cuban Tea”

—Miss Irene Glendenning.

Solo—“King of the Mighty Deep”

—J. Buchanan.



Guitar Solo—"The Old Kentucky Home"

—Prof. Chas. Kelly.

Duet—"Only for Thee"

—Miss Hunt, Mr. Reiner.

Reading—"Domestic Mutual Improvement"

—J. Strachan

#### Part II.

Songs—Prof. Chas. Kelly.

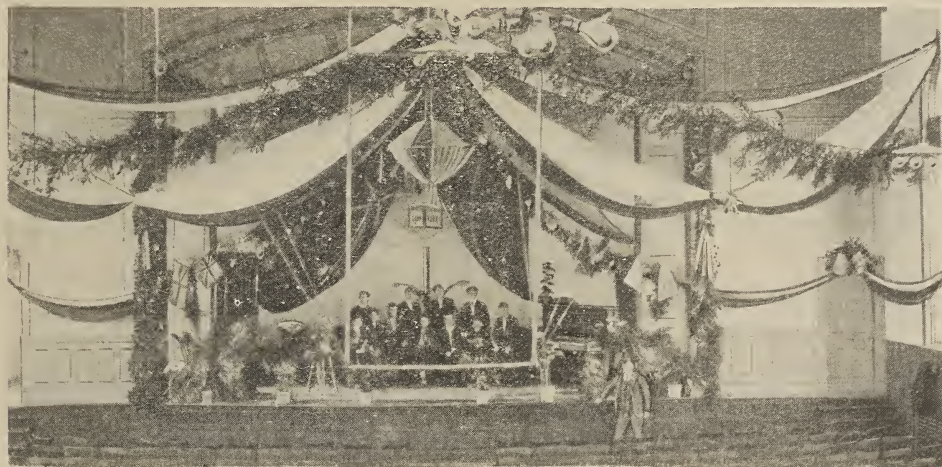
Harmonia Trio—Medley of Popular Airs

—Messrs. Leach, Davidson, and Hare.

Banjo Solo—G. C. Goulding.

ties, and convictions are necessary features. He emphasized the importance of young Canadians preparing themselves for the task of solving the social, industrial and commercial problems of our country.

Miss Glendenning is a charming young Toronto elocutionist, and her numbers on the program were warmly greeted. The musical numbers were supplied by



The Gymnasium as Decorated by the Freshman.

Solo—"Cherette"—Miss Hunt.

Violin Solo—D. Stewart.

Solo—"Creole Love Song"

—Mr. Reiner.

Reading—"Twa Coorters"

—Miss Glendenning

Quartette—"In the Shade of the Apple Tree"

—Maple Leaf Quartette.  
National Anthem.

The program was a long one but every number was excellent and encores were the order of the evening.

Professor Reynolds in his address discussed the various qualities essential to good public speaking, a topic of especial interest to the students. The desire, he said, to become a good public speaker is a laudable one but personal worth, quali-

Guelph's leading singers, and some of the college talent. The first year are to be congratulated on their efforts and on the success of the evening.

The Dairy School closed on March 24th, and on the evening of the 23rd the instructors gave their annual At Home in the Dairy Building. About one hundred guests participated in this pleasing event. Games of various kinds, music and an abundance of dainty refreshments filled both the hours and the guests with pleasure. During the evening Professor Dean was called to the platform and on behalf of the Dairy Class, Mr. Agin presented him with a Morris Rocker. Professor Dean grace-



As in a Mirror.

fully acknowledged the token of esteem.

The last of a series of lectures on popular subjects was delivered by Dr. Clark, Provincial Forester, on Saturday evening, April 1st. A large number of the students and many from the city gathered in Massey Hall and listened to an interesting practical address on "The Forest as a National Resource," a subject of interest not only to the farmer, but one which is becoming of increasing importance to the people of Canada.

In introducing the speaker, President Creelman said he was glad, after having had Professors from other Universities, to introduce a graduate of our own college, a man who was filling one of the most important positions in the Province.

The lecturer outlined the subject, emphasizing the value and the effects of forests, the causes of deforestation, and the means of restoration. The talk was made exceptionally clear by means of an

excellent series of views from photographs of actual conditions.

Literary Society meetings, social functions, and feeds, have had their place; but all our time has not been spent in fun and frivolity. Lectures morning and afternoon, a little recreation during the day, study hour at night, and chapel Sunday afternoons have followed week after week. We hope we have learned something, that we have gathered a few ideas in the noble art of agriculture. Some of us at least will, in a few days, be leaving the halls to move out and find our places in the world; and it behooves us, not only to use these ideas but to profit by the inspiration we have acquired to dig more deeply into the sciences of our vocation, and, remembering that "The Dignity of a Calling is Its Utility" endeavor to raise and maintain our profession on the level it deserves.

# Macdonald Notes.

## THE SONNET.

**O**F all the forms through which poetry has found expression there is none more curious and interesting than the sonnet. Judged superficially, it is an artificial form of expression, restricted in its compass, arbitrary in its structure, and limited in its themes. From this judgment it is a natural inference that the sonnet may have been the fashion of an hour merely, the product of an artificial period, to be cast aside when saner and more original methods should prevail. But such is not the case. On the contrary, the sonnet originated over six hundred years ago, has enjoyed almost continuous popularity during that long period, and has never been used with greater effect than in the era now closing—the Victorian. Further than that, the poets who have made it their instrument have not been, as one might expect, mere imitators and poetasters, jugglers in verse, lacking in originality and creative power. Strange to say, that literary period known specifically as the Artificial School,—the period inaugurated by Dryden and coming to its climax in Pope, shunned this form of expression. So far as I can find out, not a sonnet was written in England between John Milton and Thomas Gray. Rather, poets of the very highest originality found this instrument eminently adapted to their purposes, and there is no finer body of poetry to be found anywhere, if we consider pure quality apart from mere mass, than the sonnets of Shakespeare, Milton, and Wordsworth.

Its use by writers of such genius indicates that in spite of its restricted and apparently arbitrary form, it possesses some apt and harmonious quality, some inevitable fitness that recommends it. Such being the case, it may seem worth while briefly to examine the structure and the character of the sonnet, and to exhibit a few specimens of this remarkable form of verse. It arose in Italy about the middle of the thirteenth century, and was brought to its complete form, the form that has ever since been the accepted one, by Petrarch (1304-1374). It was adopted in England first by Wyatt and Surrey in the sixteenth century. Variations in the form have been introduced by English writers, so that there exists three distinct types: 1. The Petrarchan; 2. The Shakespearian; 3. The Miltonic.

All sonnets contain fourteen ten-syllabled lines. The three types above mentioned differ in the subdivision of the fourteen lines in respect of rhyme-arrangement and of theme. Following is a typical Petrarchan form, one by Wordsworth:

Milton! thou shouldst be living at this hour:  
 England hath need of thee: she is a fen  
 Of stagnant waters: altar, sword, and pen,  
 Fireside, the heroic wealth of hall and bower,  
 Have forfeited their ancient English dower  
 Of inward happiness. We are selfish men;  
 Oh! raise up, return to us again;  
 And give us manners, virtue, freedom, power.

Thy soul was like a Star, and dwelt apart:  
 Thou hadst a voice whose sound was like the  
 sea:

Pure as the naked heavens, majestic, free,  
 So didst thou travel on life's common way,  
 In cheerful godliness; and yet thy heart  
 The lowliest duties on herself did lay.



The Macdonald Dairy Maids.

Here the theme is Milton. The motive, or circumstance that suggests the theme is the degenerate condition of England; this circumstance is dealt with in the first eight lines. The application, the theme itself, is rounded off in the remaining six lines of the poem. There is thus a natural pause, or break, in the structure of the poem, imposed by the subdivision of the theme. As to the structure, the first eight lines constitute what is called the *octave*, which, in its typical form, has a definite scheme of rhymes, as follows: the first, fourth, fifth, and eighth terminals constitute one rhyme-sound, and the second, third, sixth and seventh terminals the other. There are thus only two rhyme-sounds in the octave. The remaining six lines of the sonnet are known as the *sestet*, which also has a definite arrangement of rhymes of its own, generally consisting of three sounds: the first and fifth terminals of the *sestet*, the second and third, and the fourth and sixth, furnishing the three rhymes.

While there is considerable variation, among sonnets of this type, in the scheme of rhymes, the essential features consist

of a marked pause at the end of the octave, the motive of the theme being treated in the octave and the application in the *sestet*, and a limited number of rhymes, generally two and never more than three in the octave, and generally three, but sometimes only two, in the *sestet*. The Petrarchan sonnet never concludes with a couplet, that is, two lines rhyming in succession.

The Shakespearian sonnet, so called not because Shakespeare originated it, but because he, the foremost writer of his age, made such noble use of it, differs from the Petrarchan by the division of the fourteen lines into three quatrains and a concluding couplet, the division being marked both by the scheme of rhymes and by the pauses and divisions in sense. One of the finest sonnets of this type is the following by Michael Drayton, a contemporary of Shakespeare:

“Since there’s no help, come let us kiss and part,—

Nay I have done, you get no more of me;  
 And I am glad, yes, glad with all my heart,  
 That thus so cleanly I myself can free;  
 Shake hands for ever, cancel all our vows,  
 And when we meet at any time again,  
 Be it not seen in either of our brows  
 That we one jot of former love retain.  
 Now at the last gasp of Love’s latest breath,



### Nature Study.

When, his pulse failing, Passion speechless lies,  
When Faith is kneeling by his bed of death,  
And Innocence is closing up his eyes,—  
Now if thou wouldst, when all have given him  
over,  
From death to life thou mightest him yet re-  
cover!"

Here we may note a brief pause at the end of the fourth, eighth, and twelfth lines, while the final couplet as it were clinches the argument by a swift concluding stroke. The rhyme-sounds, corresponding to the pauses, are: 1 and 3, 2 and 4; 5 and 7, 6 and 8; 9 and 11, 10 and 12; 13 and 14.

The Miltonic sonnet is a variation of the Petrarchan form. The scheme of rhymes is much the same as in the latter, but instead of the natural pause, at the end of the octave, the Miltonic sonnet carries the thought through in unbroken continuity. It makes use of the Petrarchan structure, but obliterates the pauses. Milton's "Avenge, O Lord, thy slaughtered saints," is a true specimen of this style:

"Avenge, O Lord, thy slaughtered saints,  
whose bones  
Lie scattered on the Alpine mountains cold;  
Even them who kept Thy truth so pure of old,

When all our fathers worshipped stocks and  
stones,  
Forget not: in Thy book record their groans  
Who were Thy sheep, and in their ancient fold  
Slain by the bloody Piemontese, that rolled  
Mother with infant down the rocks. Their  
moans  
The vales redoubled to the hills, and they  
To heaven. Their martyred blood and ashes  
sow  
O'er all the Italian fields, where still doth sway  
The triple Tyrant; that from these may grow  
A hundredfold, who, having learnt Thy way,  
Early may fly the Babylonian woe."

Besides the restrictions imposed by these somewhat formal moulds, the sonnet is further restricted in its theme and general character. It deals with a single specific thought, complete in itself. Further, that thought is elevated, is of elemental simplicity and of universal interest; the feeling is impassioned but restrained; and frequently impetuous. The language is simple, concise, condensed, dignified, in keeping with the theme; and is frequently noble and majestic. The conclusion is convincing and impressive, whether in the terset or in the couplet.

Wonder again arises that so many great poets have found freedom in this narrow

compass, "This scanty plot of ground," for the expression of their noblest thoughts, their loftiest aspirations. Wordsworth effectually replies to this wonder in his "Scorn not the Sonnet." A comparison of the merits of the different writers of sonnets is here impossible, except to say, that if the best ten sonnets were to be selected, all from one writer, the choice would likely fall upon Wordsworth's. Blanco White wrote one immortal sonnet, "Night and Death," and, curious to relate, he not only eclipsed himself, but seems to have exhausted himself in this one supreme effort, for he wrote no more.

"Mysterious Night! when our first parent knew  
Thee from report divine, and heard thy name,  
Did he not tremble for this lovely frame,  
This glorious canopy of light and blue,  
Yet 'neath a curtain of translucent dew,  
Bathed in the rays of the great setting flame,  
Hesperus with the host of heaven came,  
And lo! creation widened in man's view.  
Who could have thought such darkness lay  
concealed  
Within thy beams, O Sun! or who could find,  
Whilst fly and leaf and insect stood revealed,  
That to such countless orbs thou mad'st us  
blind?  
Why do we then shun Death with anxious strife?  
If Light can thus deceive, wherefore not Life?"

Leigh Hunt says of this sonnet:—  
"Supreme, perhaps, above all in any language; nor can we ponder it too deeply, or with too hopeful a reverence." Our own Lampman has written many sonnets of considerable excellence, the best of which is perhaps, the one entitled "Outlook."

"Not to be conquered by these headlong days,  
But to stand free: to keep the mind at brood  
On life's deep meaning, nature's altitude  
Of loveliness, and time's mysterious ways;

At every thought and deed to clear the haze  
Out of our eyes, considering only this,  
What man, what life, what love, what beauty  
is,  
This is to live and win the final praise,  
Though strife, ill fortune and harsh human need  
Beat down the soul, at moments blind and  
dumb  
With agony; yet, patience—there shall come  
Many great voices from life's outer sea,  
Hours of strange triumph, and, when few men  
heed,  
Murmurs and glimpses of eternity."

Though the space at my disposal does not permit of many illustrations of this noble form of verse, I cannot refrain from quoting Wordsworth's undying lines contained in his concluding address to the River Duddon:

"I thought of Thee, my partner and my guide,  
As being past away.—Vain sympathies!  
For, backward, Duddon! as I cast my eyes,  
I see what was, and will abide;  
Still glides the Stream, and shall for ever glide;  
The form remains, the Function never dies;  
While we, the brave the mighty, and the wise,  
We men, who in our morn of youth defied  
The elements, must vanish;—be it so!  
Enough, if something from our hands have  
power  
To live, and act, and serve the future hour;  
And if, as toward the silent tomb we go,  
Through love, through hope, and faith's  
transcendent dower,  
We feel that we are greater than we know."

People in this busy rushing age, who are crowded by and absorbed in material achievement, and yet who wish not to surrender entirely to mundane influences, cannot do better than cultivate familiarity with English sonnet poetry. There are two small collections of sonnets I may mention, one entitled "Sonnets of this Century," edited by William Sharp, and the other entitled "English Sonnets," edited by Mr. Quiller-Couch,

J. B. REYNOLDS.

## Athletics in our Colleges and Universities.

ANY one who is in touch with college life and alive to the spirit of the times cannot help but realize that there is, among some of the best classes of our people, a deep seated yet vague horror of sports in general and football in particular. Many of our best level headed men hesitate to send their sons to college lest they should return home with blunted moral instinct, and if not with disfigured limbs, at least with weakened heart and vital organs as a result of over-training. Even the presidents of some of our largest universities are condemning some of our leading games especially football, for both its moral and physical effects on the students of those institutions. We all admit the desirability of athletics in every centre of population, and the great necessity of sports at our educational institutions. We are free to admit that athletics have an important part to play in the training of young men, that the ideals of those who encourage them are pure, and that to abolish sports from schools would be calamitous. Yet we can not shut our eyes to the fact that those who criticize and condemn have many and good reasons for doing so, and that serious evils have crept into our modern games, and that all true friends of athletics must seek to rectify and eliminate those evils if they wish to preserve college sport from the bane of public opinion.

The primary object of athletics is to develop a fine body which will be able to stand the strain of a man's life work, and to provide an outlet for energies which might appear in more mischievous forms. This is accomplished by the use of games, which in themselves are calculated to stimulate interest and excitement. Interest in those games is further kept up by contests between different institutions, and the rivalry thus set up will be intensified as our educational institutions become larger and more numerous. Now it must be remembered

that this rivalry exists among bodies of young men full of life and energy, young men of intelligence and resource who are at times perhaps unthinking and careless of future results. The young men of one institution are opposed by the young men of another institution, who are just as clever and just as resourceful as themselves, and the battle royal between those two opposing forces taxes the energies of the students to the utmost limit. No matter to what extremes one student body may go in order to attain success their opponents must go one better. What a field for the expenditure of a young man's energies! What a temptation to sacrifice everything else for the sake of victory. The tendency of ambitious and high spirited young men is to place a high value on victory, in fact to seek to obtain it at any cost. In this they are warmly encouraged by their circle of friends and by all who are interested in their college sports, and the temptation is very strong to carry their schemes to such an extreme as to involve the welfare of our educational institutions.

Perhaps the strongest case against athletics is directed against football and dwells chiefly upon its moral effects. In the mass plays in football it is quite easy to violate the rules of the game without being detected, and the temptation to do this at the expense of a principle is very strong. The mass plays also afford many opportunities of injuring an opponent when thus concealed from observation, and in the excitement of the moment the temptation to do this when it helps to win the game is practically irresistible. Then too, it is generally the most skilful players and cleverest athletes who are injured, the less skilful in their desire to win seek to compensate for their lack of skill by rough play or by causing injury to a more skilful opponent in order to decrease his efficiency. Thus the tendency is to cultivate a habit of holding fine points of honor and principle sub-



Ring out the Old ; Ring in the New.

servient to the all important question of victory.

I am quite aware of the fact that many will not agree with me here and will consider that those dangers are trivial and that such reasoning places too much importance on trifles and fine points of distinction! Yet every principle works down to very fine points of distinction and every principle depends for its strength and its purity on the faithful, persistent observance of trifling matters. Great results from little causes spring and the principle at stake in this particular case has been violated to such an extent that so eminent a college authority as President Elliott of Harvard condemns football, chiefly for its moral influence.

Dr. Elliott says that the ethics of football are the ethics of war. General Sherman said that war is hell of which state the ethics are a minus quantity, so that Dr. Elliott's statement is only a conservative variation of the charge that football brutalizes its participants. The solution of this important question *re* the reform or abolition of football at centres of learning will be a test of the stamina of our educational administrators, and not of our college and university administration only but also of our national civilization. If we have become

a people which values success at any cost, and places all questions of morals subservient to the all important question of 'getting there,' then college football will go on as it is played now and violations of the rules will be winked at when they help to win the game.

As we have seen that many of the evils connected with athletics are due to the fact that sports are at present not directed nor controlled by any permanent or responsible body, it would seem to be a logical remedy for those evils, to have athletics under the direct control of a competent man, who would be held responsible for the welfare of the individual student and the student body as a whole in his department. This may seem like too much interference on the part of the staff in student affairs and I admit there is a good deal to commend such an objection, especially in a small institution but it must be remembered that our small institutions will grow and it is much easier to introduce an innovation while the institution is comparatively small. Besides, the principle at stake is the same whether the institution be large or small and all will admit that a remedy is more effective in the early stages of the disease than when it has progressed almost beyond control.



## Locals.

Household Economics.—If it costs a freshman \$12.00 per month for board, and a senior is fined 50 cents for coming in when supper is half over, how much would it cost a sophomore to board out?

Morewood rose to the occasion and Rose trimmed more wood in Freshman Horticulture.

On Sophomore Dairying Kennedy showed the whey and Greenshields was salted down.

Twigg was a little shaky and Willows up in the air on Sophomore Horticulture, but Porter carried the day.

There will be race to the finish for first place between Hare, Winslow, Row, Walker, and Dan Patch but the betting is that Dan will eclipse famous records and finish about 1.01.

On the Apiculture Wright couldn't write right, Murray couldn't get a "starter," and Arkell thinks that though he couldn't get a super he got a "sup." all right.

Mills, while trying the Practical Engine, worked under high pressure, went up the flue and finished below the water line.

On Horse Judging "Mac" Cutting set the pace, but Reeves Palmer also ran.

Bunting was up against it in the Sheep Judging.

Broderick had to feel his way in the Cattle Ring.

MacVannel says he went through the English Poetry whooping.

Baker was up a tree in Botany.

White was a little under the weather during the Meteorology.

Smith struck rock bottom in Geology.



"At the Dairy."

C. P. Clark is crowing and Hamer has a feather in his cap as a result of their efforts in Poultry.

Jacobs felt too big to say much about the poor little bacteria.

Fairbairn was seedy and green when it came to passing in Practical Botany.

Scottie was seen buying a cake of soap before the exams. He was probably preparing to slip through.

Craig is inclined to think that he suffered a freeze-out in the Cold Storage examination.

Klinck is of the opinion that he was stalled when it came to writing an account of the life of Stahl in the chemistry ordeal.

K. G. MacKay wished that somebody could put a flea in his ear when he saw the Entomology paper.

Seen on the bulletin board recently:—An absentee slip, bearing the following inscription, A. J. MacKay: "Love not sleep lest thou come to poverty," and the following subscription: Fined \$1.00.

Hart—"What does Dr. Clark, Ph. D. stand for?" "Doctor of the Phoresty Department."

In the spring a young man's fancy,  
Lightly turns to thoughts of sport,  
And the girl he used to go with  
He no longer cares to court.

The students were much disappointed with "The Bonnie Briar Bush." The new Nature Study Class had gone down early and picked all the briars.

Prof. Day—What do we mean by a non-conductor?

Broderick—The motor man.

Tennis—A game in which the participants enjoy a racket on the side and raise the deuce over a net, while the volleys drive them from side to side, and love scores as often as it is mentioned.

A student of the Sophomore year conducted a little experiment in "saddle-grafting" the other day, by appropriat-

(Continued on Page xx, advertising)

## Rode 7,000 Miles on One Pair of Tires



MR. JAMES THOMAS DEWEY is Canada's champion steady bicycle rider. He is a collector for one of the big telegraph companies in Toronto, and he rides a wheel all the year round making collections over a wide district. His record is 12,000 miles a year. Mr. Dewey's bicycle is fitted with Dunlop Detachable Tires, a single pair of which have carried him over 7,000 miles of good, bad and indifferent roads. Dunlop bicycle tires are famous as the kind that may be attached, detached and repaired when necessary by the two hands, unaided by any form of tool. Every pair is guaranteed for a year.

**THE DUNLOP TIRE COMPANY, Limited**

204 ST. JOHN  
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**Toronto**

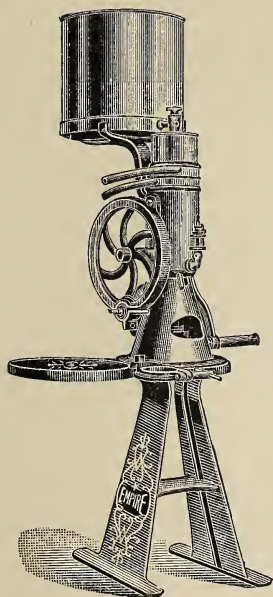
MONTREAL  
WINNIPEG

— THE —

# EMPIRE

## CREAM SEPARATORS

Though not the oldest is the most popular Separator in the world to-day Why? Simply because it is doing better work and giving greater satisfaction than any other can.



It will pay you —————  
 ————— To get the Best

Send for our free books on the  
 “Empire Way”  
 of dairying. They will give you  
 information that is worth to you  
 \$10.00 per year for every cow  
 you own.

Empire Cream Separator Co., of Canada, Limited.

28 Wellington Street West

Toronto, Ontario

# Carnefac

## Gives Quick and Permanent

# Results

West L'Ardoise, Cape Breton, Jan. 27th, 1905.

To the Carnefac Stock Food Co.:

Dear Sirs—Enclose please find balance due on "1 Pail" Carnefac, which duly arrived here on Dec. 24th, 1904. Must say that Carnefac has proven very satisfactory. As a matter of fact, do not think I shall ever be without it again. I have recommended it and you shall certainly hear from me when this pail is empty.

Yours truly,

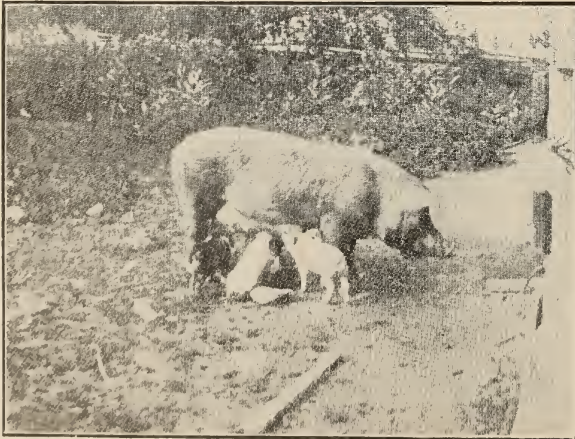
(Signed) JEFFREY MAUBOURQUETTE.

**T**HE above is but a sample of letters we receive every day from farmers who have had 25 lbs of Carnefac on trial. A few points in these are worthy of especial notice, namely, the short-time use, the small quantity, the trifling cost, and the satisfactory results. If any of these points concern you in the feeding of your stock a few weeks use of Carnefac will satisfy you that it does all claimed for it. We would particularly invite you to try it, if you have any stock seriously out of condition.

# The Carnefac Stock Food Co.

## WINNIPEG

## TORONTO



### IMPROVE YOUR STOCK and SAVE HAY and OATS by using International Stock Food

THIS FOOD. "THREE FEEDS FOR ONE CENT," is a purely vegetable, medicinal preparation, composed of nature's remedies such as roots, herbs, barks, seeds, etc. It is entirely harmless, even if taken into the human system, and is fed to stock in small quantities in addition to the regular grain ration in order to promote digestion and a-d assimilation.

## FREE

A \$3,000 Stock Book and  
Colored Lithograph of Dan Patch  
1.56 1-1.

We will pay you \$10 if Book and Lithograph are not as described.

The cover of the Stock Book is a beautiful live stock picture printed in six brilliant colors. Book is 9 1/2 inches long by 6 1/2 inches wide. It cost us over \$3,000 to produce the engravings. It contains an up-to-date veterinary department, which will save any farmer or stockman hundreds

of dollars, as it treats of the ordinary diseases to which stock are subject, and tells how to cure them. The large colored lithograph of Dan Patch is 2 feet 4 1/4 inches long by 9 inches wide, printed in six colors. It shows the International Stock Company's model barn in the background, and is worthy of a place in any home.

Write to us to-day and answer the following questions:

1st—Name this paper.

2nd—How much stock have you?

Capital Paid in  
\$2,000,000

## International Stock Food Co.

Toronto, Canada.

Largest Stock Food  
Company in the World

# London Fence



## THOR, (Greek God of Thunder and Friend of Man.) To the Farmers of Canada.

These coiled steel strands of famous "London" Wire, Secured to end posts anchored firm as earth herself, And tightened independently, do perfectly to hill or dale conform. These are the girders. In their great strength and resilience Doth mostly lie the endurance of the fence. In this no chances take, but purchase only "London" spring steel wire—coiled, not kinked, (warranted by the makers.) These strands or girders, each to each, so solidly secured by this machine, With tough steel wire automatically prepared or spooled, Thereby produce a barrier so perfect that well do ye exclaim, "Eureka!" "This London Fence Machine no equal hath on this broad earth, "That doth in speed or perfect product bear comparison."

## London Fence Machine Co LONDON AND CLEVELAND. LIMITED.

Western Agents—A. E. Hinds & Co., 602 Main St., Winnipeg, Quebec and East. Ont.—PHELPS & SMITH, 60 McGill, Montreal. Maritime Agent—J. W. BOUTLIER, Summerside, P. E. I. 203

ing the horse of the Duke for a few minutes' ride. The "graft" was all right and so was the "stock," and it was not necessary to apply the "bud." The "sport" grew rapidly until the horse ran away. The rider tried the "heading back" method without success, as he had only a farm bridle on. In spite of his efforts the horse "branched" over the fence into the next field, "planting" his worthy "scion" in the mud so that he closely resembled an ordinary "sucker." A long walk over a field, covered with a fertilizer, was the "fruit" of the experiment, and it was amply proven that soft mud "yields" well.

A long list of misspelled words was recently posted on the bulletin board, headed *misspelled* words. Our worthy professor likes to be in good company.

We are anxious to know whether Esmond or Whyte has the winning *Card*.

A miss is as good as her smile.

Spinster—An ember from which the sparks have flown.

Actual examples of first-year innocence:—A drupe is when an animal is too heavy for the branch on which it is on. Then we may say that it drupes *down*.

There are different kinds of buds as fruit buds, flower buds, potato buds, turnips, etc.

McKinnon—I don't know enough about engine to set a paper I could pass on.

It has been said that fellows who know all about acidity, lactometers, tests, &c., need not think they are the whole cheese.

Two readers of jokes in funny papers were recently heard to converse as follows while boarding the car:

"Shall we take the car or will it take us?"

"We had better not take this car; too many cars have been missed around here lately."

"That would not be fare, would it?"

"Perhaps, but it sounded like Fair's voice."

Prof. Day:—We hear a great deal of the straight Scotch blood in pedigrees, but we must remember that in many animals we often find too much "Straight Scotch."

"Probably cows of this kind would be a little "whiskey" in fly time.

Prof. Hutt (in *Landscape Gardening*): In the case of the college grounds, the easiest and most natural approach seems to follow the present drive.

Voice—The more natural approach is via the Macdonald grounds.

Duncan is afraid he was starred in the *Meteorology*.

Baker's goose was cooked in the *Poultry*.

It kept Mills grinding to beat Miller.

#### AN EDITOR'S EPITAPH.

Here lies an editor,  
Smith, if you will;  
In mercy, kind Providence,  
Let him lie still.

He lied for his living, so  
He lived while he lied;  
When he could not lie longer  
He lied down and died.

*Continued on page xxiv, advertising.*

# MELOTTE

## CREAM SEPARATORS

### EASY TO TURN

Owing to the suspension of the bowl from a spindle turning on ball bearings and to the admirable arrangement of the gearing, whereby the entire weight is thrown on the lower bearings, which all turn in oil, the "MELOTTE" is probably easier to turn than any other Separator in the world.

So easily does the Machine run that it has been found necessary to introduce a brake, which is now a feature of all "MELOTTE" Cream Separators, and of no others.



### EASY TO CLEAN

In the manufacture of the "MELOTTE" special care has been given to this matter. The simple skimming device here illustrated can be cleaned with facility, whilst the thickly-enamelled surface of the bowl casing in sizes 1 to 5, is specially provided as being the easiest possible surface to clean.

The "MELOTTE" has no long tubes or complicated devices of any kind to be cleaned. The bowl itself is self-emptying, and every part is easily accessible.

Melotte Self-Balancing  
Self-Emptying Bowl

### AND DURABLE

The durability of the "MELOTTE" is shown by the fact that we have never yet had occasion to replace a single worn bearing, notwithstanding that these Machines have been on sale throughout Ontario, Quebec, and the Lower Provinces for the last seven years.

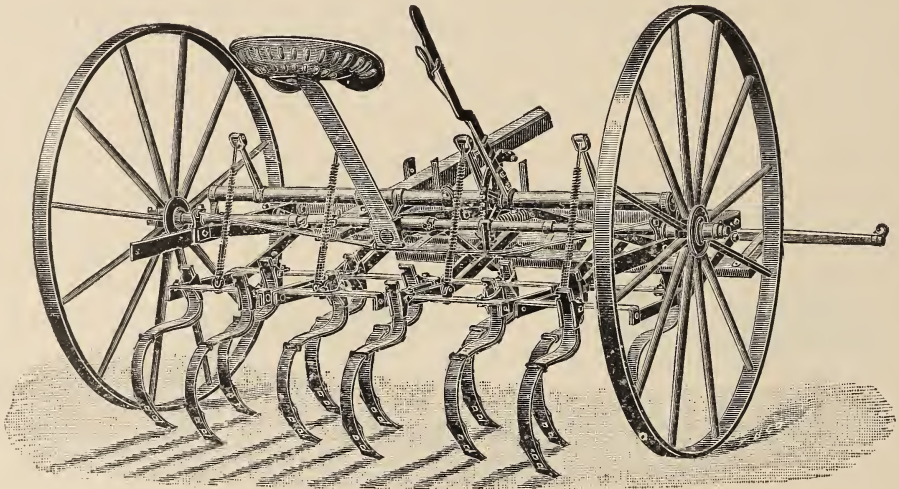
**R. A. LISTER & CO., Limited**  
**MONTREAL**

# The Frost & Wood Co., Limited

Have built for 1905, a line of

## Seeding and Cultivating Machinery

That will increase the production on your farm, and at the same time lighten your work.



Champion 12 Tooth Cultivator

This Cultivator may be equipped with grain and grass seed boxes and be used as a broadcast seeder.

The teeth are of steel; the proper size and shape to do the best work. They are arranged in sections and will adapt themselves to any condition of land.

**FROST & WOOD HOE DRILLS, SEEDERS, CULTIVATORS and HARROWS** always satisfy the prosperous farmer; they are good machines. There's a reason for it—See our Catalogue.

*THE*  
**Frost & Wood Company**  
*LIMITED.*

HEAD OFFICE AND WORKS

SMITH'S FALLS, ONT.

Winnipeg, Toronto, Montreal, Quebec, St. John, Truro, Charlottetown.



# LOVE'S ATHLETIC SUPPLIES

**Discount to  
Students**

**Write for  
Catalogue**

## Hockey Sticks

Mohawk	\$4.50 Doz
Mic-Mac	\$4.50 Doz
Spalding	\$4.50 Doz

## Skates

Lunn's, per pair	\$4.50
Regal, per pair	\$3.60
Mic-Mac, per pair,	\$2.70

**Goal**  
Sticks

**Sweaters  
Stockings, Etc.**



**HARRY H. LOVE & CO.**  
189 Yonge Street, Toronto

## Keleher & Hendley's Tailor Store



The Charm  
of  
Refinement

To the discriminating people the  
elegance and charm of good clothes  
is always apparent. Our hand-  
some suits and overcoats are dis-  
tinctive in design and finish giving  
to the wearer that quiet air of  
refinement.    :-    :-    :-

# Golden Fleece

First Year Publications :

- Canadian Dairying, by Kerr.
- Russell it, My Boy, by Moody and Hayes.
- The Waters of Life, by Cameron and MacDonald.
- Domestic Service, by Stirling.
- The Lost (H)air, by Frier.
- The Commutation of Student Labor, by Curran.
- Tales of a Wayside Inn, by Skinner and Russell.
- Over the Bridge at Midnight, by Hodson.
- A Mid-winter Night's Dream, by Lawrence and Bowes.

The geology paper kame to Mulloy very gneiss, but he was at fault, felt tuff, wasn't altogether in a true vein, and there were many unconformities in his answers.

Examiner—"Define a 'Drupe' fruit."  
 A. B. Smith—"One that is too heavy for branch. It is said to 'Droop.'"

Carpenter was in an unhappy frame of mind in the Freshmen Manual Training, and although the questions were plain he cut loose and got through by a close shave.

A. B. Klugh was recently seen trying to open the cases in the museum with the "Key to the Birds of our Parks."

H. B. Smith made the bold declaration that with a glass, and this same key, he would be able to run down the swiftest bird.

A Macdonald girl says that the "books in the running brooks" that Shakespeare speaks about are nothing but volumes of water.

# The Traders Bank of Canada.

Assets Twenty Millions, (\$20,000,000.00.)

IT IS THE FARMERS' BANK.

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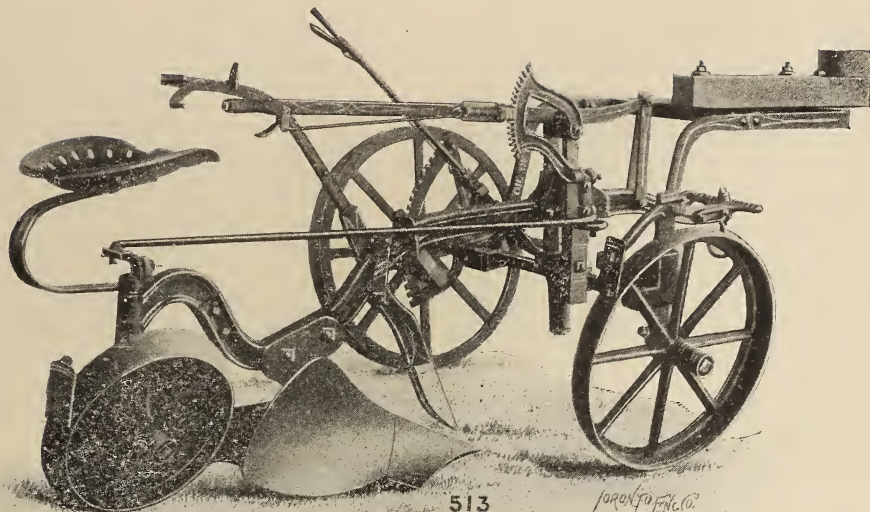
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A. F. H. JONES    1/8    1/8    1/8    1/8    1/8    MANAGER

' THERE  
ARE  
NO  
PLOWS  
LIKE  
FLEURY'S'

This is  
said by  
hundreds  
of  
Plowmen



**"GOOD-LUCK" SINGLE SULKY PLOW**

This cut shows our "Good-Luck" Single Sulky Plow which we furnish with wide bottom 21A., or with narrow bottom 13A. This plow is the result of long experience in making Sulky Plows and combines EVERY CONVENIENCE for handling easily with VERY LIGHT DRAFT and most PERFECT WORK. Where these plows came into competition with others in the fall of 1904 they drove others out of the field.

**Fleury Plows Lead wherever introduced**

**Walking Plows. Gangs, large and small. Sulky Plows.**

**LETTERS—From West and East,**

"I have had no other field trial with the P— Sulky Plow in Chatham township and have sold your plow. The P— C. W. Peters, Dresden, Oct., 7th, 1904.

"I have some good plowmen operating your Sulky Plow and they claim it is ahead of any other Sulky Plow they ever used. It has beaten the — and the P— Sulky Plow here by letting a good plowman take them all to the field and test them. He has taken a FLEURY Sulky Plow."

**J. Fleury's Sons, Aurora, Ontario, Canada**

**MEDALS AND DIPLOMAS, WORLD'S FAIRS, CHICAGO AND PARIS**

**Education Department Calendar for 1905.**

**JUNE:**

1. Public and Separate School Boards to appoint representatives on the High School Entrance Board of Examiners.

By-law to alter School boundaries—last day of passing.

9. University Commencement.
13. Senior Matriculation Examination in Arts, Toronto University, begins.
16. Provincial Normal Schools close.
28. High School Entrance Examinations begins.
30. High, Public and Separate Schools, close.

District Certificate, Junior and Senior Teachers' and University Matriculation Examinations, and Commercial Specialist Examination, begin.

Protestant Separate School Trustees to transmit to County Inspectors names and attendance during the last preceding six months.

Trustees' Reports to Truant Officers due.

**JULY:**

1. DOMINION DAY.  
Last day for establishing new High Schools by County Councils.  
Legislative grant payable to Treasurers.  
Trustees to report to Inspectors regarding Continuation classes.
11. Inspectors' Reports on Continuation classes, due.

**AUGUST:**

1. Inspectors' Report on School premises, due.  
Notice by Trustees to Municipal Councils respecting indigent children, due.

**EXAMINATION PAPERS**

Circulars giving list of Departmental Examination Papers, with prices, free on application.  
Single copies, 25c. Five copies, \$1.00. One dozen copies, \$2.00. Trade supplied

Address:

**THE CARSWELL COMPANY, LIMITED,**  
30 Adelaide St. E., Toronto.

## Most People Have No Idea

of the size of our establishment. Call in some time and let us show YOU  
through Visitors are Always Welcome.

# John M. Bond & Co.

CONCLUSIVELY

“ THE ”

Hardware Store

of

**Guelph and Wellington County**

We

Have

The

Largest Premises

4 Stories and Cellars

Largest Staff of Clerks

And Most Important of All

Largest Stock for You

To Choose From

# John M. Bond & Co.

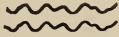
GUELPH

## Wholesale & Retail

## Two of a Kind



The Ontario Agricultural College is the best of its kind in the world.



The Clothes made here are in keeping with the College.



The Best, only, is good enough for the boys of the O. A. C.

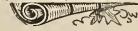
## J. A. Scott

MAKER OF MEN'S CLOTHES

**26 Wyndham Street  
GUELPH**

## FOSTER & FOSTER

### Dentists



Office and Surgery: Corner Wyndham and Macdonnell Sts., over Dominion Bank.  
Residence, "Sunset," Paisley Street.

**Telephone, 14**

## We Lead

Them all in Oil, Gas, Coal and Wood Heaters, Graniteware, Tinware and Sheet Metal Goods of every description.



## H. Occomore & Co.

Stoves, Tinware and House Furnishings, Etc. Etc.  
**86 Upper Wyndham St.  
GUELPH**

## The Authorized College Pin



Adopted March 30th, 1903, by Joint Committee of Students and Faculty elected by O. A. C. A. A. Design Registered at Department of Agriculture, Sept. 17th, 1903.

For sale at

**Pringle's Jewellery Store**  
Sterling Gilt, Price 50c.

## J. A. McCrea

### Invites You

To inspect his beautiful display of China, fancy Art Ware, and Cut Glass on the second floor. It is one of the sights of Guelph and as such should not be missed. We consider it a pleasure to show our goods and do not ask you to buy. We supply the O. A. C. and Macdonald Hall with groceries and can deliver anything you might require. Fresh Oysters, Oranges and Chocolates are our specialties.

### Noted Tea Store

### and China Palace

## J. A. McCrea

'PHONE 48

Lower Wyndham St. - GUELPH

## 2nd Year O.A.C. Group of

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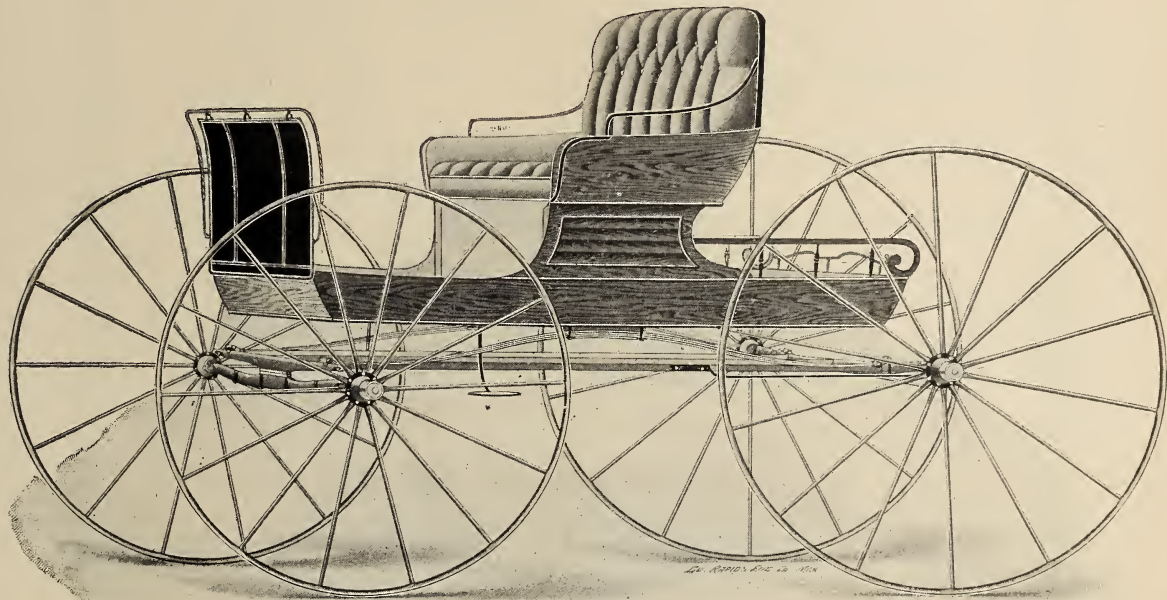
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Your Hats, Shirts, Collars, Ties, Sox, and all  
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Guaranteed. One Price. Goods marked in  
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GOODS**E. R. Bollert & Co.**LADIES'  
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Fine Ordered Clothing at Moderate Prices.

Fit-the form, Ready-to-wear Clothing, very good and very cheap.

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Increase in membership.....	14,123
Membership December 31st, 1903.....	219,492
Increase in accumulated funds during the year.....	1,234,236.97
Total accumulated fund December 31st, 1903.....	7,453,308.14
Total benefits paid to December 31st, 1903.....	16,290,991.78
Total accumulated funds February 1st, 1904.....	7,518,852.09

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THE REVIEW is the production of this office

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these things is to be without a great share of all that goes to make home on the farm what it should be, the most pleasant place on earth. Besides, the reading and thinking farmer of to-day is the one who fills the highest place in the profession of agriculture. The man who reads the best methods by his fireside is the one who goes out and makes a success in his fields.

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## Farmer's Advocate and Home Magazine

There must be many intelligent farmers in your vicinity who would appreciate our paper. Why not secure some of our valuable premiums by sending us the subscriptions of these people? Premium lists may be had by applying to our office at London, Ontario.

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**Send For a FREE Sample Copy.**

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It will keep them in touch with important matters pertaining to their Alma Mater, will furnish them with full information concerning the Ontario Winter Fair; will give them the news of the Royal City, and the Farm and Live Stock News of the District.

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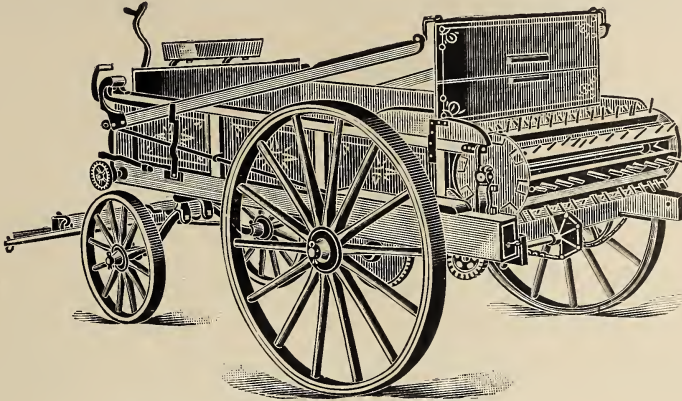
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Massey-Harris 20th Century Manure Spreader

"The man who makes two blades of grass grow where one grew before, is a public Benefactor."—EMERSON.

**MASSEY-HARRIS MANURE SPREADERS ARE WITHOUT A DOUBT THE FINEST MANURE DISTRIBUTERS ON THE FARMS OF CANADA. THEY PUT YOUR FARM AT DOUBLE ITS VALUE IN CROP PRODUCTIONS. MAKE YOUR FERTILIZER DOUBLE THE VALUE TO THE SOIL. THEY ARE THE ONLY TIGHT-BOX SPREADERS, SPREAD EVENLY FROM STARTING POINT, DO NOT CLOG AND BREAK THE BEATER. SIMPLEST, SUREST AND LIGHTEST DRAFT.**

One man and team with a Massey-Harris Manure Spreader will do more work than four men and four horses with two ordinary Manure Wagons, and do it better.

## Massey-Harris Co., Limited

**Toronto**

**Brantford**

**Stratford**

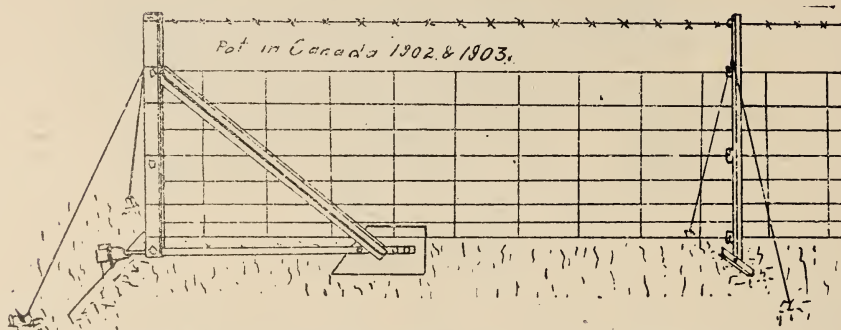
**Farm Implements  
For All Kinds of  
Good Farming**

# PORTABLE FENCE

Manufactured only by

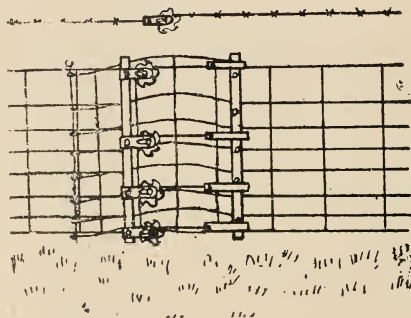
## The Canadian Portable Fence Co. Ltd.

TORONTO, CANADA



SHOWING END and INTERMEDIATE POSTS of PORTABLE FENCE

**STRETCHER ALWAYS  
IN PLACE IN MIDDLE  
OF FENCE, READY  
AT ANY TIME TO  
TIGHTEN OR SLACK  
OFF YOUR FENCE**



PORTABLE FENCE STRETCHER

**STRETCHER CAN  
BE ADJUSTED TO ANY  
LENGTH OF FENCE  
CONNECTORS SUP-  
PLIED TO SIMPLIFY  
COUPLING UP  
SECTIONS**

Did you read the article on FENCING in February O. A. C. REVIEW? (p.289). OUR PORTABLE FENCE meets the requirements of the case and meets the requirements of the farmers of Canada, because:—

1. It is PERFECTLY PORTABLE; No Post-holes to dig.
2. No Staples to Drive; WEB HELD in place by HOOKS.
3. No Waste Headlands; No Permanent Fences between standing crops.
4. Quickly SET UP AND TAKEN DOWN.

**It will pay you to find out more about it**

Please mention the O. A. C. Review when answering advertisements.

# MADE IN CANADA

## FARMING WITH

# DEERING MACHINES

MAKES FARMING WORTH WHILE

BINDERS, HEADERS, HEADER-BINDERS, REAPERS, MOWERS, RAKES, TEDDERS,  
BINDER TWINE, CORN BINDERS, HUSKERS AND SHREDDERS,  
KNIFE GRINDERS, HARROWS, DRILLS, CULTIVATORS,  
SEEDERS AND FARM WAGONS.

Canadian Farmers Unhesitatingly Endorse

## DEERING

HARVESTING MACHINES, TILLAGE AND SEEDING IMPLEMENTS.

INTERNATIONAL HARVESTER COMPANY OF AMERICA

CHICAGO, U.S.A.

CANADIAN BRANCHES

Montreal, P. Q.  
Ottawa, Can.

Toronto, Ont.  
Winnipeg, Man.

Regina, N. W. T.  
St. John, N. B.

Calgary, N. W. T.  
London, Ont.

Made in Canada

North - East - South - West

# McCormick

STANDS FOR PERFECTION IN

## HARVESTING MACHINES

## TILLAGE AND SEEDING IMPLEMENTS

BINDERS, MOWERS, REAPERS, HEADERS, HEADER-BINDERS, RAKES,  
TEDDERS, CORN BINDERS, HUSKERS AND SHREDDERS, BINDER  
TWINE, KNIFE GRINDERS, HARROWS, DRILLS, CULTIVATORS, SEEDERS  
AND

## FARM WAGONS

INTERNATIONAL HARVESTER COMPANY OF AMERICA

CHICAGO, U.S.A.

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Montreal, P. Q.  
Ottawa, Can.

Toronto, Ont.  
Winnipeg, Man.

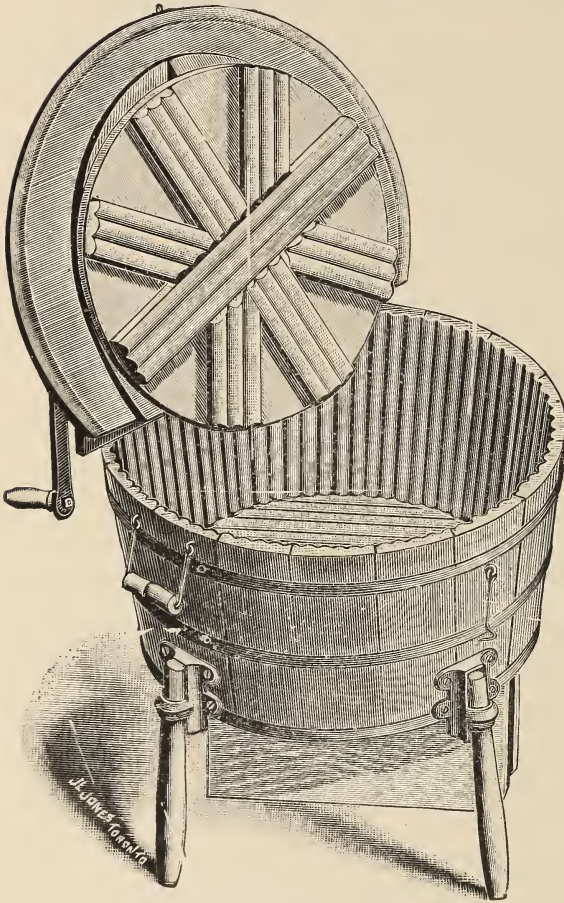
Calgary N. W. T.  
London, Ont.

Regina, N. W. T.  
St. John, N. B.

Please mention the O. A. C. Review when answering advertisements.

“STEPHENSON”

# Washing Machine.



No. 2 with Wringer Attachment.

The most easily operated washer in the market.

A boon to the family.

Reduces labor, and saves time.

The machine will wash from 75 to 100 napkins in about five minutes, and about 40 to 50 towels in the same time.

From 4 to 6 sheets, or 8 to 10 sheets can be washed in the machine at once.

You can wash QUILTS or BLANKETS as easily as small articles, and wash them perfectly clean.

**Agents Wanted Everywhere.**

For Particulars Address :

# Taylor-Forbes Co.,

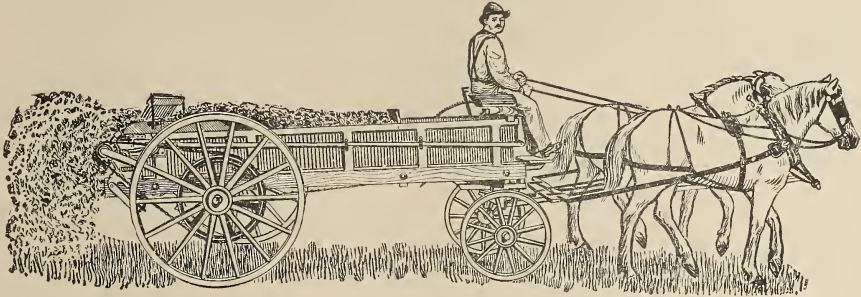
Limited

GUELPH, - CANADA

Please mention the O. A. C. Review when answering advertisements

# 'Success' Manure Spreader

Pays for itself in one year by Saving in Labor  
and Manure and the increased crops produced.



A "SUCCESS" MANURE SPREADER will economise labor more than any other farm implement.

It will make the manure go two or three times as far as when spread by hand, and every acre spread will produce from 10 to 15 per cent. more crop.

After the first year the results secured are all profit.

You can sit still and the machine and team will do the work.

With a "SUCCESS" you can spread a load in five minutes.

The spreading is even to the end of the load.

Our beaterchain driving device gives us the easiest running and strongest machine on the market.

A Manure Spreader is a necessity on every farm. Investigate the situation and buy now.

**Write for Booklet, "Worth its Weight in Gold."**

Manufactured by

## THE PARIS PLOW COMPANY, LIMITED

PARIS

ONTARIO

Western Agents - THE STEWART NELSON CO., Limited, Winnipeg, Man.

Agents for Quebec and Maritime Provinces -

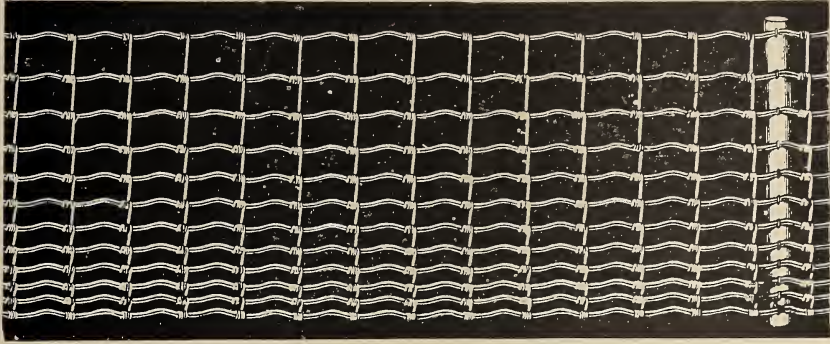
**The FROST & WOOD Co., Ltd.**

Montreal, Quebec, St. John and Truro.





# Cyclone Spring Steel Fence



For eight years we have been continually engaged in the manufacture of wire fencing and fence building machinery. In presenting for your consideration **CYCLONE SPRING STEEL FENCE** our foremost idea has been to make fence, with full provision for the changes of heat and cold, having the lateral wires made of high carbon Bessemer steel and the cross wires of the best annealed wire on the market, drawn especially for us. Every piece of fence we put out will be perfect in workmanship and material.

We also manufacture a full line of **LAWN FENCES**.

**Write for Catalogue. Agents Wanted in every District.**

**Cyclone Woven Wire Fence Company**

**Dundas and Dufferin Sts., Toronto, Ont.**

8,000 Canadian Agriculturists co-operatively United

**GRAND SUCCESS FROM START TO FINISH**

*Farmers' Binder Twine Co.*  
**LIMITED**  
*Brantford.*

Opposition of every kind helplessly helpless against such an aggregation.

The Kingdom of Denmark's mighty success at home, and with its products in the great markets of the world, is allowed to hinge wholly on true co-operation, properly operated.

**Joseph Stratford, General Manager**

Please mention the O. A. C. Review when answering advertisements



# LADDERS!

**Pruning** comes in March and April.

**Painting** and Repairing April and May.

**Hay Fork** work June and July

**Fruit Picking**  
August to November

**Storm Sash** April and November.

**Fire Protection** January to December.

For all these you need a good ladder. The qualities of a good ladder are: *First*—Safety  
*Second*—Handiness

The Waggoner Extension Ladder combines these qualities better than any other. There are lower priced ladders, but no other so really cheap. Our steel safety lock and our steel wire reinforcement enable us to combine strength and lightness in the highest degree.

Send for free descriptive circulars, prices, etc. When writing ask about our CLOTHES LINE REEL for the yard. The women want it—so do the men.

The Waggoner Ladder Co., Ltd  
London, Ont.



## We Pay Special Attention

To the making of Suits, Overcoats and Trousers for O. A. C. Students.

Our stock is always new and up-to-date. We buy only the best material and employ only the most skilled workmen.

Our prices are such that you can save money on every garment we make for you.

**R. J. Stewart**

The Little Tailor Store

Quebec St., opposite Knox Church

WALTER E. BUCKINGHAM, B.A., LL.B.

Barrister Solicitor

Notary, Conveyancer, Etc.

Douglas Street, Guelph

Office Phone 175

Residence Phone 404

## MAXWELL'S

### FAVOURITE CHURN

#### LIST.

No.	HOLDS	CHURN
0	6 gal.	1/2 to 3 gal.
1	10 "	1 to 5 "
2	15 "	2 to 7 "
3	20 "	3 to 9 "
4	26 "	4 to 12 "
5	30 "	6 to 14 "
6	60 "	8 to 20 "



Patent Foot and Lever Drive

Patent Steel Roller Bearings

Improved Steel Frame

Bearings Bolted No Screws Used

Easy to Operate

Superior in workmanship and finish

If not sold by your dealer, write direct to

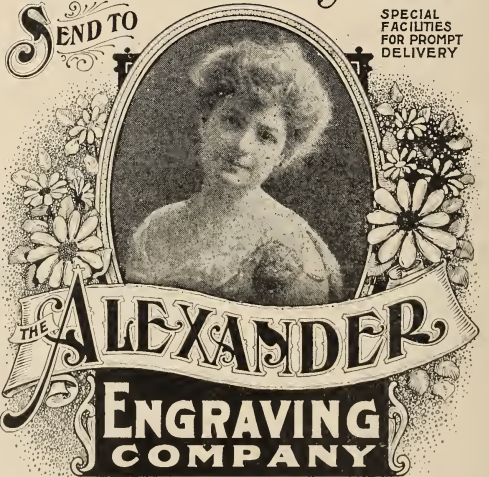
**David Maxwell & Sons**

St. Mary's, Ontario, Canada.

## WHEN YOU ARE IN NEED OF CUTS IN HALF-TONE, ZINC & WOOD.

SEND TO

SPECIAL FACILITIES FOR PROMPT DELIVERY



16 ADELAIDE ST WEST

**TORONTO**

DESIGNERS.  
ILLUSTRATORS.  
COMMERCIAL PHOTOGRAPHERS.

# The Goldie & McCulloch Co.

Limited.

**Galt**

**Ontario**

**Canada**

**Extensive Builders of**

Wheelock Engines, Corliss Engines, Ideal High Speed Engines, Gas and Gasoline Engines, Boilers, Pumps, Water Wheels, Flour Mill Machinery, Oatmeal Mill Machinery, Gyrotors, Emery Choppers, Wood Working Machinery, Shingle Machinery Heading and Stave Machinery, Wood Rim Split Pulleys, Iron Pulleys, Shafting, Hangers, Friction Clutch Couplings, Friction Clutch Pulleys, Safes, Vaults and Vault Doors.



Should you be interested in any of the above we shall be pleased to furnish you Catalogues, Etc., if you will write us.

## Reliability

Has been our motto in everything we sell whether for the

**Garden, Field, Farm, or Dairy**

Farm Seed Catalogue, Field Root Grains, Fodder Plants, Etc.

Flower and Vegetable Seed Catalogue, giving full particulars of the best Seeds for the Garden.

Market Gardeners' Catalogue, for the use of those who are raising Vegetables and Flowers for Market.

Bee Supply Catalogue, for Bee-Keepers.

Poultry, Dairy and Creamery Supply Catalogue, for Poultry Keepers, Cheese and Butter Factories and Home Dairies.

Wheat Catalogue, issued in the Fall.

Flowering Bulb Catalogue, also issued in the Fall.

We will be pleased to send any of these Catalogues to interested parties.

**Darch & Hunter**

"Seedsmen to the Canadian People."

**London**

**Canada**

**Founded 1863**

**Waterloo, Ontario.**

# The Waterloo Mutual Fire Insurance COMPANY

## 42ND FINANCIAL STATEMENT

RECEIPTS.		EXPENDITURE.	
Balance brought forward.....	\$212,433 35	Losses.....	\$160,829 67
Premiums.....	220,217 66	All other Expenses.....	89,869 38
Interest, Rent and Re-Insurance...	26,262 68	Balance.....	208,214 64
	<hr/>		<hr/>
	\$458,913 69		\$458,913 69
ASSETS		LIABILITIES, ETC.	
Real Estate.....	\$ 17,475 72	Unadjusted Losses.....	\$ 5,284 38
Bonds, Mortgages and Cash.....	178,121 12	Re-Insurance Fund.....	111,882 37
Other Assets.....	16,040 58	BALANCE.....	94,470 67
	<hr/>		<hr/>
	\$211,637 42		\$211,637 42
Cash Balance over all Liabilities...\$		94,470 67	
Unassessed Premium Notes.....		249,049 92	
Total of Assets.....		460,687 34	

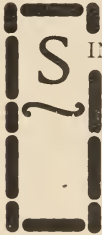
Audited and found correct

(Signed) J. M. SCULLY, F. C. A. }  
 (Signed) BENJ. DEVITT } Auditors.

WATERLOO, January 21st, 1905.

FRANK HAIGHT,                      GEORGE RANDALL, President.                      T. L. ARMSTRONG }  
 Manager.                      Wm. SNIDER, Vice-President.                      R. THOMAS ORR } Inspectors.

## Chas. A. Cyphers' Announcement.



SINCE my withdrawal from the Presidency and General Managership of the Cyphers Incubator Co., a year ago, my "Model Incubators and Brooders" have become as well known as the "Cyphers," my older invention. That the newer invention, the "Model," has been doing better work than the older has also become well known.

The progressive poultryman needs the best, and will have it at any cost, but, at the same time does not like to pay a premium over that which another has to pay who is situated perhaps only across a river.

To place my Canadian customers on an equal footing with their brother poultrymen across the border, avoiding the duty and giving them the machines at the same price at which they are sold in the States, I have decided to manufacture in Canada. I have made arrangements with MR. C. J. DANIELS, of Toronto, to take charge of the manufacture, and the Canadian branch will be entirely under his management. Mr. Daniels is too well known to Canadian Poultrymen to need any commendation from me. I place the Canadian business in his care with full confidence in his integrity and ability, and the assurance that my Canadian customers will receive courteous and honorable treatment at his hands.

CHAS. A. CYPHERS

Manufacturer,

**BUFFALO, N. Y.**

**TORONTO, CANADA**

Please address all Canadian business communications in the future to

**C. J. DANIELS, 196-200 RIVER ST., TORONTO, CANADA**

Please mention the O. A. C. Review when answering advertisements.

## HON. JOHN DRYDEN SAYS

"We have been permitted to use at Maple Shade during the last year, your disinfectant known as ZENOLEUM. I am glad to say that we found it all that you represent. It is an admirable mixture for the purpose for which it is intended, and may be put to so many uses on a stock farm that no advanced stockman should undertake to carry on his business without keeping a supply constantly on hand. As a destroyer of vermin on cattle and as a general disinfectant, I cannot recommend it too strongly."

### Zenoleum for all Stock Raisers

**ZENOLEUM** is the stockman's standard remedy. It prevents cholera, destroys all disease germs, kills lice, cures mange, purges the stomach and removes intestinal worms. It gives a clear healthy skin and a wholesome, vigorous body.

Zenoleum is absolutely non-poisonous, non-irritating, non-inflammable and non-explosive. It is perfectly safe for use. It is absolutely certain in results.

**Don't wait for trouble. Head it off. Use Zenoleum.  
Order to-day and take no chances.**

<b>Prices of ZENOLEUM</b>	}	8 ounce tin, making	6 gallons of fluid, \$	25
		1 quart tin, "	25	" " " 50
		½ gallon tin, "	50	" " " 90
		1 " " "	100	" " " 1 50
		2 " " "	200	" " " 3 00
<b>Duty Paid</b>	}	3 " " "	300	" " " 4 50
		5 " " "	500	" " " 6 25

Special rates on larger quantities. Freight paid on orders of one gallon or more

Send for free famous Zenoleum Booklets, "Piggies' Troubles," "Veterinary Adviser" and "Chicken Chat."

**Zenner Disinfectant Co., BRAMPTON, ONT.  
DETROIT, MICH.**

Avoid Disappointment

Buy Bruce's Seeds

### Bruce's Re-Cleaned Farm Seeds

Farmers all over the Dominion are awakening to the fact that it pays to buy the very best seeds that can be procured, and our long connection with the best growers in the seed-producing districts gives us exceptional advantages in securing the best samples offered, while our cleaning facilities are unequalled. The large annual increase in our trade with the farmers of the Dominion is an evidence of the superiority of our stocks and of the personal attention we give to the interests of our patrons. Our first grades of Clovers and Timothy are in all cases export seed.

We offer as follows for early orders, subject to being unsold:

#### Clover Seeds

#### Grass Seeds

	Per bushel 60 lbs
Alsike, 1st Grade.....	\$ 8 00
do 2nd Grade.....	7 50
do 3rd Grade.....	7 00
do and Timothy.....	3 50
Crimson, 1st Grade.....	6 00
Lucerne, 1st Grade.....	8 00
do 2nd Grade.....	7 75
Red, 1st Grade.....	9 50
do 2nd Grade.....	9 30
Mammoth, 1st Grade.....	9 50
do 2nd Grade.....	9 00
White, 1st Grade.....	13 20
do 2nd Grade.....	10 80
Yellow, 1st Grade.....	6 50

	Per bushel, 14 lbs
Blue Grass, Canadian Fancy.....	\$ 1 10
do Kentucky, Fancy.....	1 75
Bromus Inermis, Fancy.....	2 00
Meadow fescue, Fancy.....	1 75
Orchard Grass, Fancy.....	2 25
Red Top, Fancy.....	1 75
do Common.....	1 25
Lawn Grass, Bruce's.....	2 80

	Per bushel, 48 lbs
Hungarian.....	\$ 1 00
Millet, German.....	1 25
do Common.....	1 00
Timothy, 1st Grade.....	2 25
do 2nd Grade.....	2 00

Prices of Seed Grains, Feeding Stuffs and Poultry Supplies on Application

Remit 20 Cents Each for Two-bushel Cotton Bags

Our Beautifully Illustrated Catalogue of Seeds and Supplies—88 pages—mailed free to all applicants.

**LITTLE GIANT GEARED HAND SEED SOWER**

The best Seeder offered; gives universal satisfaction; \$1.75 each; smaller size, \$1.50 each.

**John A. Bruce & Co.**

SEED MERCHANTS

HAMILTON, CANADA

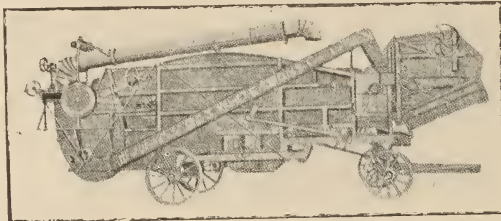
Established over half a Century.

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# THREE WINNERS

## OUR FIRST QUALITY LINE

DOES TWO DAYS WORK IN ONE.



SAVES WORK, Time and Money for the men folk.

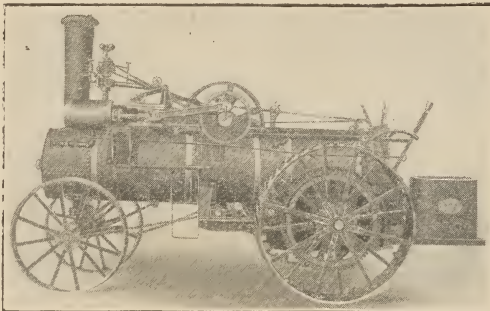
SAVES WORK, Time and worry for the women folk.

### THE WHITE CHALLENGER

With Cutting Box Attachment, Wind Stacker and Feeder.

**FIVE SIZES**

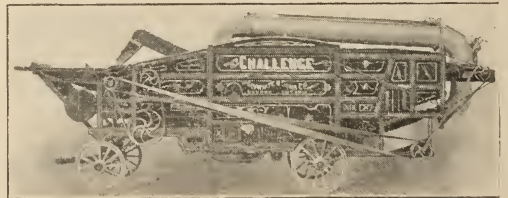
- 14 H. P.
- 17 H. P.
- 20 H. P.
- 24 H. P.
- 26 H. P.



HOW DOES THIS ONE SUIT YOU?

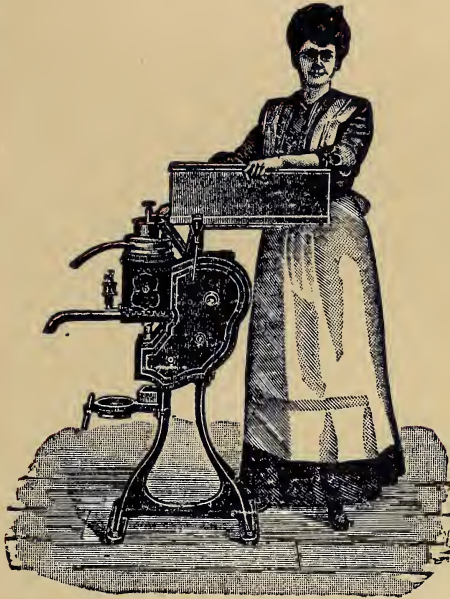
### THE WHITE TRACTION ENGINES.

HAS OUR 1905 CIRCULAR REACHED YOU?  
FULL OF GOOD THINGS.



The WHITE CHALLENGER with Wind Stacker.

**THE GEORGE WHITE & SONS CO. LIMITED**  
LONDON, ONTARIO.



# A Sure Money Maker On the Farm



When you buy a Cream Separator you cheat yourself if you don't get the machine that saves the most money for you. Cream repairs and oil all represent money. The

## U. S. Cream Separator

holds the world's record for clean skimming. It will save you cream every day which any other separator would lose in the skim-milk.

Its substantial and simple construction insures extreme durability. It has no joints to work loose, no ratchet pin to break off, no exposed gears to be injured. With moderate care a U. S. will wear for years without repairs.

The working parts are so adjusted that they require little oil and waste none.

You can't make your cows pay as they should without a U. S. Cream Separator. Don't delay any longer, write for a free illustrated catalogue to-day.

**VERMONT FARM MACHINE CO.**  
**BELLOWS FALLS, VT.**

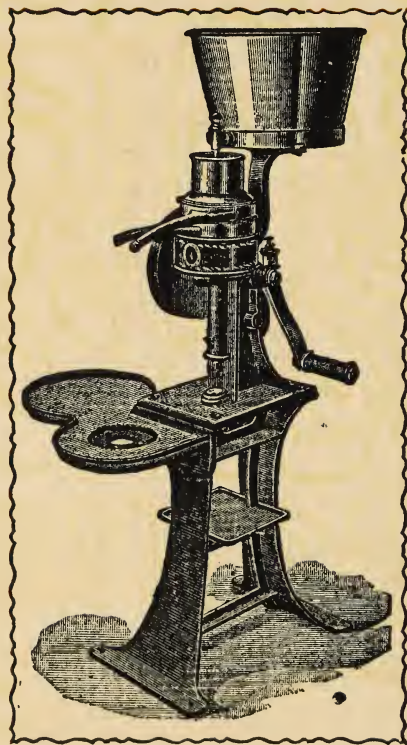


Warehouses at Chicago, Minneapolis, Omaha, La Crosse,  
Wis., Sioux City, Ia., Kansas City, Mo., Salt Lake City,  
Utah, San Francisco, Cal., Portland, Ore., Buffalo,  
N.Y., Portland, Me., Montreal and Sherbrooke,  
Que., Hamilton, Ont. Address all letters to  
Bellows Falls, Vermont.

# De Laval Cream Separators

Are enough better than the best  
of the others to make it  
Business to get the

## DE LAVAL



## Grand Prize Winner

**The De Laval Separator Co.**

77 YORK ST., TORONTO  
WINNIPEG MONTREAL