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BRANCH OF THE LIVE STOCK COMMISSIONER
POULTRY DIVISION

F. W. HODSON,
Live Stock Commissioner

F. C. ELFORD,
Chief of Poultry Division

PROFITABLE POULTRY FARMING

(NEW EDITION)

BULLETIN No. 7

Published by direction of the Hon. SYDNEY A. FISHER, Minister of Agriculture, Ottawa, Ont.

MAY, 1905

OTTAWA, May 1, 1905.

To the Honourable
The Minister of Agriculture.

SIR,—I beg to transmit herewith a new edition of the bulletin, 'Profitable Poultry Farming,' by F. C. Elford, Chief of the Poultry Division, and to recommend that it be printed for distribution.

I have the honour to be, sir,
Your obedient servant,

F. W. HODSON,
Live Stock Commissioner.

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HATCHING, REARING AND MARKETING.

I. INCUBATION.

1. Advantages of an Incubator.—More birds can be hatched at once, thus lessening the time and cost required in looking after them, and there is less breakage of eggs An incubator requires less attention than several sitting hens. The chicks are free from vermin, and thus have a better chance of living. It permits of earlier hatches Hens instead of sitting should be kept laying.

2. Buying an Incubator.—In purchasing an incubator do not rely solely on the agent's recommendation. If possible, investigate for yourself. Never buy because it is cheap. Buy the best; it will prove to be the cheapest. There need be no difficulty in deciding; there are a number of good incubators on the market.

3. Getting Ready to Operate.—If you have purchased a new machine, follow as nearly as possible the instructions for operating sent by the manufacturers. If you have operated your incubator before, be sure it is perfectly clean. If you failed to attend to this when the hatching was finished last season, do so now. See that all the parts are in working order, wash the trays, &c., with hot water, into which a liberal amount of washing soda has been mixed. When thoroughly dry, run it several days to be sure the regulator is in perfect order.

4. Operating an Incubator.—The incubator should be placed in a well-ventilated room, preferably one unheated. The chicks developing in the eggs require an abundance of fresh air. A bright airy cellar or a well ventilated room having an even temperature are the most desirable places; a damp, close cellar will destroy the best hatching eggs. The ventilation should be so arranged that there will be outside air entering the room at all times, but without a direct draught blowing on the machine.

(*a*) *Turning the Eggs.*—The eggs should be placed in the machine in the morning. From the second till the nineteenth day, they should be removed from the incubator every 12 hours and turned. The position of the egg trays should be interchanged at each turning and the eggs in the middle of the egg chamber removed to the outside, so that any variation in the temperature of the chamber will be equally distributed among the eggs.

(*b*) *Temperature.*—If the thermometer is suspended in the machine on a level with the eggs, the incubator should be operated at a temperature of 102½° till the tenth day, and at 103° from the tenth day until the eggs commence to hatch, and during the hatching time at a temperature of 105° to 106°, as your directions read At this time it is imperative that the machine door is closed till the hatch is well over, or until the chicks that were first hatched are 24 hours old. It is of the utmost importance that the temperature and humidity of the egg chamber remain constant during the hatching. If the door of the machine is opened, the rapid evaporation cools and dries the air in the egg chamber at once, and many chicks just pipped stick to the shell and do not hatch.

(*c*) *Ventilation.*—Ventilation is required to supply fresh air to the embryos (chicks developing in the eggs) in the machine, and to remove the carbon dioxide or poisonous gas given off by them. With an incubator that forces warm fresh air through the egg chamber, more fresh air will be forced through the machine when it is operated in a cold room than in a warm room. The quantity of air forced through the machine in a cold room is usually sufficient to remove the carbon dioxide from the egg chamber, and little extra ventilation is required through the ordinary ventilators.

When the incubator is operated in a warm room, the amount of fresh air that is necessary to sustain the temperature of the machine is limited. In fact, the incubator lamp is often removed for several consecutive hours. Under these conditions supplementary ventilation should be supplied, or the vitality of the hatch will be lowered.

When the machine is running under warm, dry conditions, if the ventilators are open there will be too great an evaporation of the eggs. However, the ventilators of the machine should be opened and the undue evaporation of the eggs prevented by increasing the moisture of the outside air artificially.

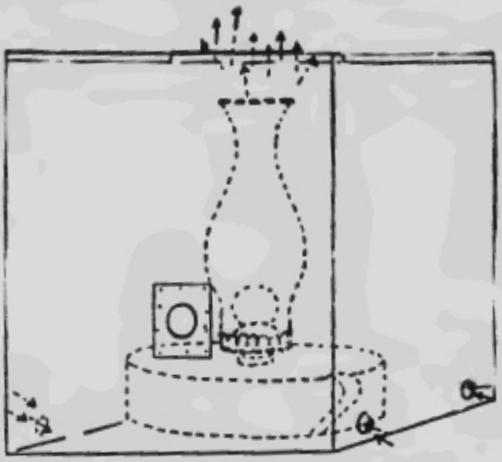


FIG. 1. Home-made Egg Tester.

5. Home-made Egg Tester.—All eggs that are undergoing incubation should be examined at least twice during the hatching period. Fig. 1 shows how an egg tester can be made that will give good results. One end should be removed from a wooden box of suitable size to place over a lamp. A large opening is made in the other end of the box to allow the fumes of the lamp to escape. This opening can be covered with a piece of tin having a hole punched in it. On the front of the box and on a level with the flame of the lamp a 3-inch hole is cut. Over this hole a piece of felt or heavy cloth is tacked. A small oval hole is cut in the felt against which the egg is pressed. Several 1-inch holes are required at the bottom of the box for ventilation.

In order to use the tester, it should be placed over a lamp in a dark room, and each egg pressed against the hole in the felt. The contents of the egg can be readily seen. Incubator eggs should be tested in a warm room, one tray at a time.

6. First Testing.—When testing dark-shelled eggs on the ninth day, the fertile eggs with live germs in them will have a dark spot (the germ) in the upper part of the egg with veins radiating from it (Fig. 2). These eggs are kept in the machine. Eggs that

FIG. 2.—A fertile egg at the first testing.

FIG. 3.—An imperfectly fertilized egg at the first testing. This egg is discarded.

are clear should be removed from the machine. They are infertile and will not hatch; also eggs having a red ring (Fig. 3); or eggs with a dark spot without blood vessels; or clouded eggs (Fig. 4).

7. Second Testing.—The eggs are again tested on the sixteenth day. At this stage of incubation a live chick darkens all the egg except the air cell (Fig. 5); if the egg is closely watched, a movement of the chick can often be detected.

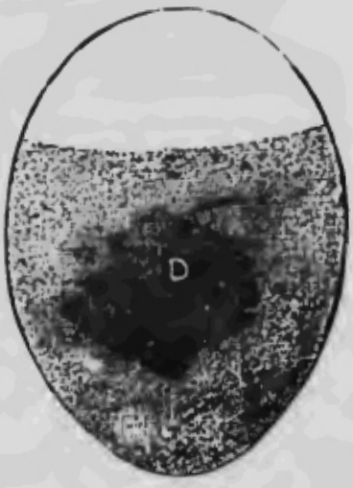


FIG. 4.—A stale or spoiled egg at the first testing. This egg is discarded.

FIG. 5.—The appearance of the egg at the second testing.

8. The Time for Hatching Chickens.—The most rapid growth is made by chickens that are hatched in the month of May. However, the date of hatching can extend to the middle of June. The date at which the chickens are hatched is not so important as is the consideration that they will mature rapidly after they are hatched.

9. Care Required by Eggs for Hatching.—Two important facts relative to the care of eggs for hatching are these. (1) If an egg is subjected to a temperature below freezing (32° F.) the germ is destroyed, and consequently the egg will not hatch. (2) Incubation is commenced by a hen sitting on an egg over night, and if such an egg is removed from the nest the next day, the germ dies, and the egg becomes putrid.

Eggs for hatching are best stored at a temperature of from 40° to 60° F. They should be placed in a basket in this cool room, covered with a cloth to prevent undue evaporation, and need not be turned. The more fresh the eggs are, the greater is the vitality of the germ, and the more chicks they will hatch; it is not advisable to use for hatching eggs over ten days old. In selecting the eggs, it is well to avoid extra-long, rough-shelled or sharp-pointed eggs, and to retain for hatching only the well-shaped, smooth-shelled eggs.

(*a*) *Resting Eggs after Transit.*—To ascertain if eggs should be rested after transit, the Maine Experiment Station had eggs shipped over several railroads and back again, covering 514 miles. The time of the journey, including stoppages, &c., was 36 hours. Upon their arrival, half of them were put immediately into the incubator and the other half rested for 24 hours and then put in. The summary of the results was that out of the 65 that had been rested 15 hatched, and of the 63 that were not rested, 22 hatched.

10. To Insure Fertile Eggs.—We cannot have a large percentage of fertile eggs from stock that is lacking in vigor. The conditions necessary to the fertilization of eggs are those which will insure good health to the poultry from which such eggs are

secured. A free range for breeding poultry is essential to healthy fertilization strong vigorous germination, for the reason that such range always develops a st muscular system in the fowls. Good wholesome food is also essential.

(*a*) *Time required to establish fertility.*—The following experiment was un taken by the Maine station to determine how soon after mating the eggs become s ciently fertile to produce chicks.

Of the 8 eggs laid by the pen the 2nd day after mating, 2 hatched chicks.
" 13 " " 3rd " 3 "
" 10 " " 6th " 3 "
" 10 " " 8th " 8 "
" 11 " " 10th " 4 "
" 10 " " 12th " 3 "

This list goes to show that eggs become fertile very soon after mating commenc

(*b*) *Continuance of fertility of hens' eggs after mating ceases.*—Table showi the number of eggs secured from the hens each day after the removal of the cocke the night of May 24, and the number of chicks hatched from them:—

No. of days after mating ceased.	Eggs laid.	Chicks hatched
1	11	4
3	11	4
6	12	4
10	10	2
11	12	4
13	8	3

II. THE BROODER.

There are good brooders on the market as well as good incubators. For the bene fit of those wishing to make their own, below will be found directions for making th brooder and colony house used by the Poultry Division at its stations.

A brooder is a necessary adjunct to the incubator and the same care must b taken in handling it to get the best results. Have it ready for some time before th chickens are to be put in it.

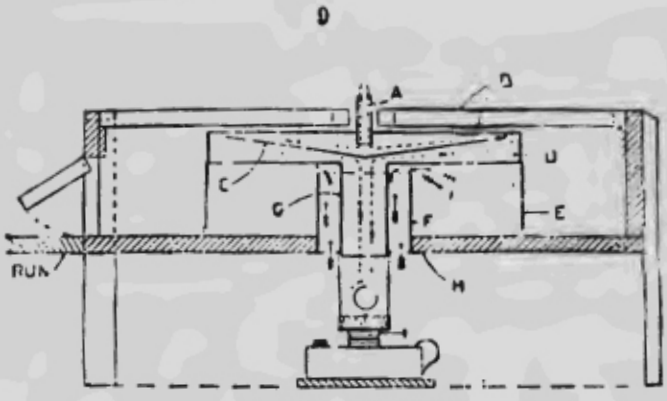
The brooder is a warm, ventilated box in which chickens can be reared without hen. The brooder (6) is warmed by means of a lamp; the fumes of the lamp are n permitted to enter the chick compartment. Warm fresh air continually flows int the brooder and ventilates it. The management of the brooder is simple. It shou be placed in the movable house (15-16) or in a vacant room or pen. It is not intend for outdoor use. The brooder can be satisfactorily constructed at home; the heate and lamp can be made by any tinsmith; the cost of the complete brooder is nomina

11.—Brooder Construction.—*Box.*—The box that forms the brooder is 34 inch square and 8 inches deep, inside measurement. It is made of ⅞-inch lumber planed o both sides. A 5 by 10 inch chick door should be sawed in one of the sides of the box the chick door should be hinged at the top.

The floor is ⅞-inch matched lumber. At centre of the floor a round hole (diamet 6½ inches) should be sawed. The heater is placed in this opening and rests on galvanized iron rim (inside diameter 5½ inches.)

Four legs, ⅞ by 2 inch, should be attached to the box; they should project 8½ inch below it.

The roof is a light wooden frame covered on both sides with heavy cotton. should fit inside the box level with the top, and be supported on ½-inch cleats. Th roof frame is 34 inches square and one inch deep, outside dimensions. There should b a 4-inch board across the middle of the frame. At the centre of this board a 2-inc hole is required for the upper smoke pipe of the heater.



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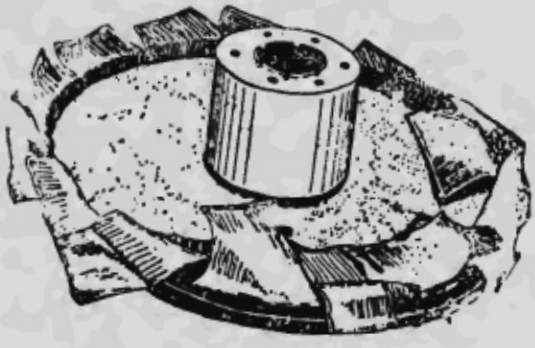
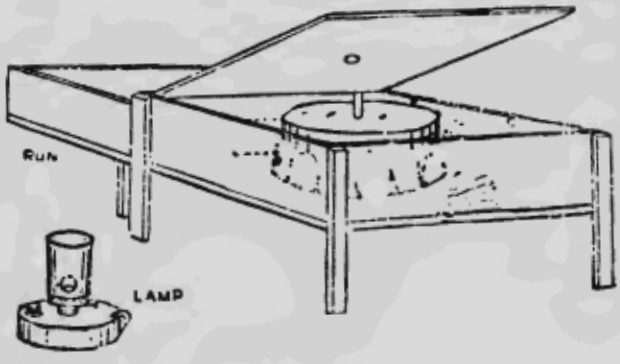


HEATER - VIEW FROM BELOW



GENERAL VIEW.

FIG. 6.—The indoor brooder.

A. Upper smoke pipe to carry off the fumes of the lamp B. Cotton-covered frame, or roof of brooder. C. Heat-reflector. D. Heating chamber. E. Two-ply flannel to form the warm hover for the chicks. F. Fresh air chamber. G. Lower smoke pipe. H. Galvanized iron rim on which the heater rests. I. Warm fresh air entering the hover.

Run.—The run is 2 feet by 3 feet. It should be hinged to the front of the brooder on a level with the brooder floor. A three section hinged frame 6 inches high should be placed around the outside of the run to confine the chicks for the first few days. The floor of the run can then be lowered to the ground, and will form a runway into the brooder.

Heater.—The heater is complete in itself and can be successfully operated in a box of any size. No separate hover is required, and the chicks are continually supplied with warmed fresh air. In cleaning the brooder if the heater and lamp are removed, and a pan is placed beneath the hole in the floor of the brooder, the litter can be caught and removed in the pan.

The heater is made of galvanized iron with the exception of the heat-reflector. This should be cut from bright tin. The dimensions of the different parts of the heater are as follows:—

Lower smoke pipe: diameter, 3 inches; length, 5½ inches.

Fresh air chamber: diameter, 6 inches; length, 5 inches. The fresh air chamber is attached to the smoke pipe at the bottom. In the floor of the fresh air chamber ½ inch holes should be punched for the ingress of fresh air. The fresh air chamber is open at the top.

Heating chamber: diameter, 20 inches; depth, 2 inches. A heat-reflector (inverted cone) is placed in the heating chamber. The diameter of the cone is 18 inches; depth, 1¼ inches. The upper edge of the cone is ¼ inch below the top of the heating chamber. The apex of the cone is ½ inch above the bottom of the heating chamber. The cone is riveted to the heating chamber by three clips at the top. The upper and lower surfaces of the heating chamber should be rigid; they can be stayed to the cone, or held by two wire nails driven through the chamber and soldered.

Upper smoke pipe: diameter, one inch; length, 4 inches. The upper smoke pipe should be soldered ½ inch inside the heating chamber.

To complete the heater two strips of flannel should be placed around the outside of the heating chamber and tied with a cord to it. The flannel strips should extend 4 inches below the heater. They reach to within one inch of the floor of the brooder, and form a warm hover for the chicks. The strips should be cut every 4 inches, and alternately, so as to prevent the escape of heat.

Lamp.—Dimensions: diameter of the oil fount, 7½ inches; depth, 2 inches; total height of lamp (including chimney), 8 inches. There should be a small handle on the oil fount, and a screw cap for filling with oil. A large size burner can be used, or a special water-cooled burner ;the burner screws into an ordinary lamp collar soldered to the oil fount. The iron chimney is about 5 inches high; the diameter of the top of the chimney is 2½ inches; the bottom diameter is 3 inches. A 1½ inch hole should be punched in the chimney and covered inside with mica in order to see the flame. The top of the chimney is placed over the lower smoke pipe.

Heat Circulation.—The fumes of the lamp enter the lower smoke pipe and ascend to the centre of the lower part of the heating chamber. The heat-reflector compels their circulating to the outer edge of the heating chamber. They then ascend to the upper part of the chamber, flow back to the centre of the heater, and are carried off by the upper smoke pipe. Fuel is saved by this forced circulation of the lamp fumes; the hover is warmer at the outside than towards the centre, so that crowding of the chicks is materially prevented.

Warmed fresh air is supplied to the hover by means of the fresh air chamber. Fresh air enters at the bottom of the chamber. It is warmed by contact with the hot smoke pipe, and flows into the hover below the heating chamber and above the heads of the chicks.

12. Situation of Brooder.—When the chicks commence hatching the brooder should be placed in position, and the brooder floor covered with one inch of earth and gravel. The brooder run should be raised and the run floor covered with earth and gravel also. The lamp should be lit, and the brooder warmed to 100°F. under the hover.

When the brooder is operated in the movable house (15), or in a warm bright pen, the floor of the pen should be dry earth and gravel; this soil should be covered with short straw or clover chaff. The chicks should be fed their dry food scattered through the chaff. As soon as the weather is suitable, the chicks should be allowed outside.

In rearing early chickens ,the brooder should be placed in a bright, artificially heated room. If an unoccupied room in a house is used, the floor should be first covered with building paper. Earth and chaff should cover the building paper.

13. Operation of Brooder.—The chicks should not be removed from the incubator until they are dry and strong, or until the chicks first hatched are 30 hours old. The chicks should be conveyed to the brooder in baskets covered with warm cloths. The brooder must be thoroughly warm (12) before the chicks are placed in it. Not more than 75 chicks should be housed in a brooder.

The first meal should consist of stale bread crumbs scattered on thin boards placed in the brooder run. When the chicks appear cold, they should be placed under the hover and the chick door closed. They should be again called for feeding in two hours: tapping with the finger on the feed boards will call them. They require to be confined in the hover for a day or two after hatching. When the chicks become strong and lively they should not be confined in the hover, but permitted to enjoy the run. After a few more days the run should be lowered and the chicks given the liberty of the pen.

The chicks should rest quietly in the brooder at night. When comfortable they will be found with their heads popping out from under the flannel. It is advisable to have the hover temperature too *warm* rather than too cold; if the hover is overheated, the chicks will secure a suitable temperature outside it. The operator should ascertain from the appearance of the chicks whether it is necessary to increase or decrease the temperature. When the chicks are huddling together and are crowding, additional heat is required. In warm weather when the chicks are a few weeks old the lamp can be extinguished during the day. The lamp should be filled with oil daily and the charred portion removed from the wick. The brooder should be cleaned out twice a week and fresh earth placed on the floor.

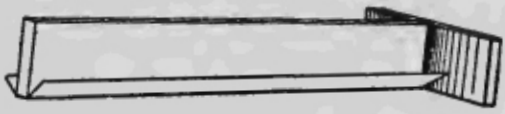


Fig. 7.—Feed Trough for Chicks.

14. Feeding Chickens.—The chicks should be fed a little several times a day. Soft sloppy mashes do not give as good results as the dry system, and they have a tendency to produce diarrhœa. The chick has a gizzard, and if mashes are fed this organ is idle, and finally causes trouble. The chick is also liable to over-eat, which results in indigestion.

Keep the chickens busy. Do not feed too much at once; a hungry chick is a healthy chick. If you do not use a mixed dry ration, change the feed slightly every meal. Hard boiled egg is good for chicks if fed in conjunction with other feed. Dry meals and grain, such as rolled oats, pinhead oatmeal, broken rice or millet seed, cracked wheat or cracked corn, scattered through the litter induce exercise, and, used judiciously in the different meals throughout the day, give good results. A johnny cake well baked may be used as a variety. Beef scrap and grit should be kept in hoppers constantly before them.

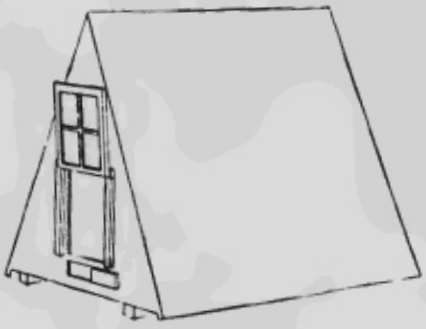
Let the young chick on the ground as soon as possible, and when a week old, if the weather is favourable, give free range.

Animal Food.—If the chicks cannot secure worms, bugs or similar insects, animal food (48) must be supplied them. Animal food is necessary for the rapid growth of chickens. When the chicks are fed a wide ration, or a ration that contains a large proportion of carbohydrates and fats they droop and die. A grain ration is not sufficient, there must be animal food included.

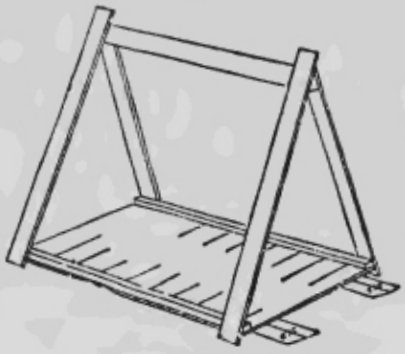
Water.—The chicks should have access to fresh water after they are one week old. At first a cup or tin can be filled with water and inverted over a saucer. A small piece of wood should be inserted under one edge of the cup to allow the water to escape. This

improvised water fountain will prevent the chicks becoming wet. Later the large wate fountains should be used.

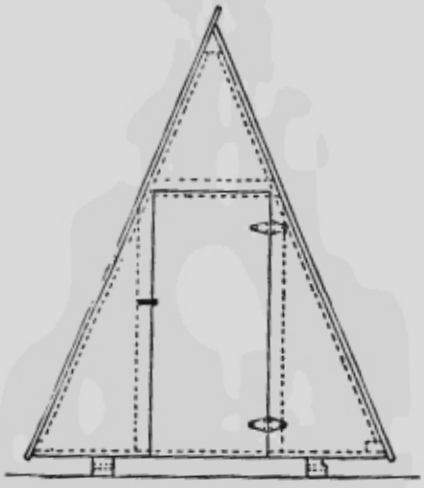
Grit.—Chicks at liberty should find sufficient grit to digest their food. Chick reared indoors require to have grit supplied them.



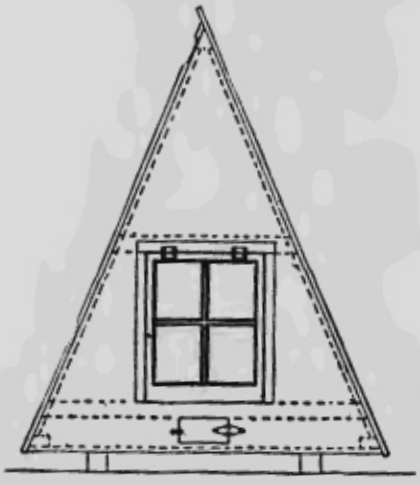
GENERAL VIEW



FRAME AND FLOOR.



REAR VIEW.



FRONT VIEW.

15. Housing Chickens.—*Movable Houses.*—Beside forming practical chicken houses, movable houses are used for housing other stock. The house described is in use at the Illustration Rearing Stations conducted by this department, and is quite satisfactory. In each house one brooder (6) is placed, and our men have found that the chickens require little attention in inclement weather; the house is bright and cheerful during the day and when the chicks cannot be allowed outside they scratch for grain among the litter on the floor.

The house will last for years and should prove a profitable investment. One house and brooder will rear 75 chickens to the market age. The brooder can be removed from the house when the chicks are a month or six weeks old and used for a later hatch.

16. Movable House Construction.—Two pieces of 4 by 4-inch cedar should be cut 10 feet long; both ends of the pieces should be bevelled, and either rings placed at the ends or 1-inch holes bored through the sills and a chain and clevis used for hauling. These sills are placed 3 feet apart and on them a 6 by 8 feet floor is nailed. The bevelled

ends of the sills should project 12 inches beyond the floor. The floor boards should be cut 6 feet long of ¾-inch matched lumber planed on one side. At each of the 8 feet sides of the floor a 2 by 4-inch scantling should be nailed. These two scantlings require to have their outer edges bevelled; they must be well secured to the floor.

The slanting sides should be covered with (1) dressed ¾-inch lumber with ¾ by 2-inch battens over the joints; or (2) matched siding; or (3) half-cut siding. The dressed and the matched siding should be laid vertically; the half-cut siding horizontally, and when used 4 pair of light rafters are required.

When the dressed or matched siding is used the boards should be cut 8 feet long. Two boards are fastened in position at each end of the house, and the triangular piece at the peak set in. The sides can then be boarded. The upper ends of the boards on one side of the house are bevelled; the ends of the boards on the other side are nailed on the face of the bevelled ends.

One inch inside each end of the house, four pieces ¾-inch thick and 3 inches wide are nailed the full length of the slanting sides. The end boards of the house are nailed to these pieces.

There is a hinged window, 2 feet 6 inches long and 2 feet wide, opening outwards, in the front end of the house; the bottom of the window is 10 inches from the floor. In the rear or north end of the house there is a door 2 feet wide and 4 feet 6 inches high. Above and below the window and on a level with the top of the door are 1½ by 3-inch cross pieces. Two 6-inch holes should be sawed in the front and rear ends of the house near the peak for ventilation. In the front of the house there should also be a small chick door.

III. THE CHICKEN TRADE.

17. Crate-fatted Chickens.—The business of crate-fattening chickens for market has made substantial progress in Canada during the last few years; it is a business that can be carried on with profit by almost any farmer. The work connected with the fattening of chickens is simple; the chickens gain in live weight from 1½ to 3 pounds each during the fattening, and they can be sold in Canada or Great Britain for a much higher price than lean chickens.

Reason for Increased Price.—Fatted chickens are sold for an increased price per pound, because they supply weight for weight three times as much edible meat as do lean chickens; all the flesh of the fatted chicken is of a superior quality to that of the lean chicken.

Market Requirements.—Fatted chickens when marketed in Canada or Great Britain should conform to the following market requirements:—

Breast.—The shape of the breast should be long and broad, so that when the chicken is dressed the breast will present a plump, meaty appearance. The breast meat is the most palatable part of the chicken. Large-framed chickens with prominent breast bones cannot be satisfactorily fatted.

Legs.—The legs of a fowl are largely composed of sinews, of which the meat is inferior, and this of course should form as small a proportion of the weight as is practicable. Feathers on the legs are an objection, also black or dark-coloured shanks and any development of the spur in male chickens.

Flesh.—The colour of the flesh of the chicken should be white, and the flesh should be of fine grain. The colour of the flesh is governed by the nature of the food consumed. To secure a white-coloured flesh, mashes should be fed of which ground oats and skim-milk are the main parts; if an excess of whole or ground Indian corn is fed, the chickens will have a yellow flesh. The flesh of an oat-fed chicken is of a superior quality to that of a corn-fed chicken.

Bone and Offal.—Smallness of bone ,and minimum quantity of offal are two important requirements. The head and comb should be of small size.

Weight.—The preferred plucked weight for fatted chickens is 4 pounds. Plump chickens of any weight up to 5 pounds each are more readily disposed of than large fatted chickens.

With reference to the dressed weight of chickens a report from a British produce merchant states:—

'The 3 to 5 pound bird is the right thing. I have noticed gigantic chickens, 7 and 8 pounds in weight; these birds approach nearly to the hen turkey in weight. The householders much prefer the latter bird (the hen turkey), when the conditions as to weight and size are on a par.'

18. Lean Chickens.—The market price received for a lean chicken allows a small profit to the farmer. As from 60 to 80 per cent of the live weight of the lean chicken is offal or waste matter, the lean chicken is generally an unprofitable chicken to purchase even at a low price per pound.

19. Early Chickens.—There is a growing demand in Canada for early chickens for broiling or roasting. The early chickens should be marketed either as broilers or roasters. The broilers should weigh from 1 to 1½ pounds each, and the roasters from 3 to 4 pounds each. High prices are generally paid for early chickens, and at present these trades will return a good income to farmers who supply them.

IV. SELECTION OF A SUITABLE BREED.

20. Pure Bred vs. Scrub Chickens.—When pure bred and scrub chickens were reared under similar conditions at the Illustration Poultry Stations conducted by this Department, pure bred chickens of the utility type made a more rapid and economical gain in live weight than did scrub chickens. In the crate-fattening of chickens the pure bred chickens made a greater gain in live weight than the scrubs; the cost of feed per pound of gain in live weight was less with the pure bred chickens. At the age of four months the pure bred chickens were fatted and ready for market; they were of uniform quality and appearance. At no age were the scrub chickens as saleable as the pure breds. For meeting the demands of the higher class local markets, or for exporting to Great Britain, scrub chickens are not satisfactory.

FIG. 10.—White Wyandottes.

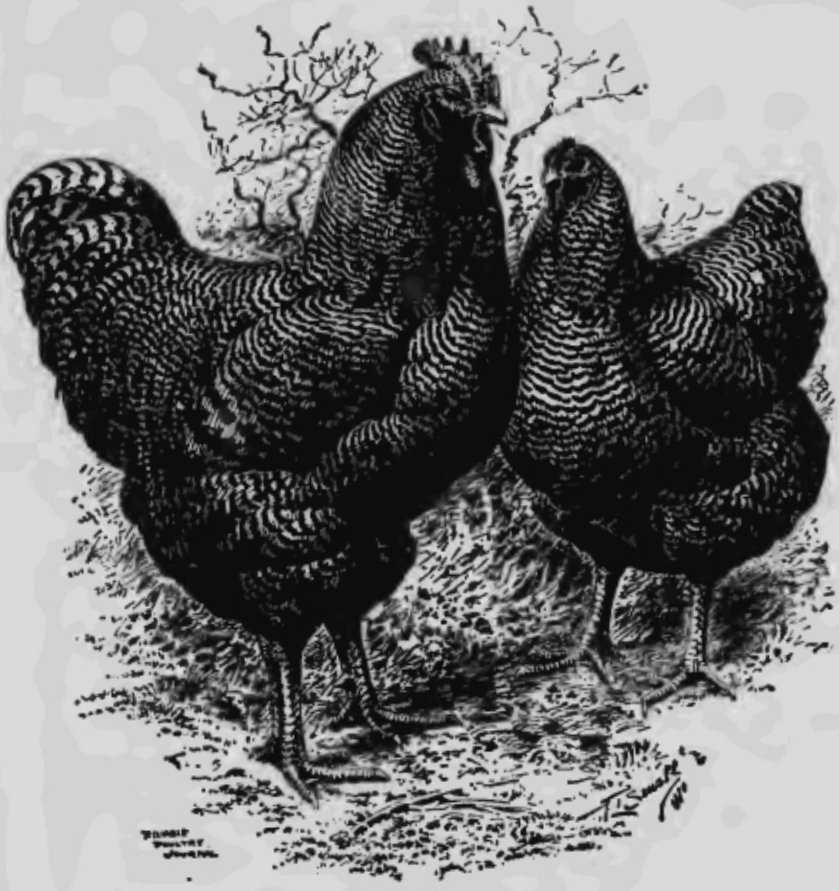


FIG. 3.—Barred Plymouth Rocks.

21. Utility Type of Fowl.—For poultry farming the utility type of breeding fowl should be selected. This type of fowl can be had in the popular breeds, Plymouth Rocks, Wyandottes and Buff Orpingtons, or, if preferred, in a medium size fancier's breed. It is possible to buy Plymouth Rocks or Wyandottes that are not satisfactory for poultry farming on account of their great size, heavy bone, length of leg, or narrowness of body. For this reason it is of primary importance that the farmer has a definite conception of the proper type of fowl to select for his flock. The breed of poultry from which utility type breeding fowls are selected is of secondary importance.

Utility type fowls should conform to the following standard:—

Mature Weight.—Cock, 7 to 8½ lbs.; hen, 5½ to 7 lbs.

Shape of Body.—Broad, blocky and of medium length.

Breast.—Carried well forward, full and broad, of medium depth. Breast bone, long, straight, not deep or pointed at the front.

Legs.—Set well apart, short, stout, white or yellow in colour, without leg or foot-feathering.

Head.—Medium in size. Large combs and wattles are not desirable.

Plumage and Flesh.—Close-feathered fowls are preferable. The colour of plumage and flesh is not important. They must possess, besides the compact blocky appearance a good strong constitution.

FIG. 11.—Buff Orpingtons.

V. FATTENING CHICKENS IN CRATES.

17. The Fattening Crates.—The fattening crates in use at the Illustration Stations are 6 feet long, 16 inches wide and 20 inches high, inside measurement. Each crate is divided by two tight wooden partitions into three compartments, and each compartment holds four chickens. The frame pieces are two inches wide and ⅞ inch thick. This frame (Fig. 12) is covered with slats. The slats are placed lengthwise on three sides—bottom, back and top—and up and down in front. The slats for the bottom are ⅞ inch wide and ⅝ inch thick; the back, top, and front slats are the same width, but only ½ inch thick. The spaces between the slats in front are two inches wide to enable the chickens to feed from the trough. The bottom slats are put on 1½ inches apart, and the slat nearest the back of the crate is 2½ inches from the corner piece. The bottom slats are placed upon the top of the bottom cross pieces of the frame, to prevent the chickens' feet being bruised when the crate is placed on the ground. The top slats are 2 inches apart and the back slats 1½ inch. The top slats are cut above each partition, and six strips 2 inches wide are nailed under them. The three doors so formed are hinged to the rear corner piece.

FIG. 12.—The frame of the fattening crate.

The crates are placed on stands 16 inches from the ground. The droppings from the chickens are received on sand or other absorbent material. A light 'V' trough 2½ inches inside, is placed in front of each crate, and is carried on two brackets nailed to the ends of the crate. The bottom of the trough is 4 inches above the floor, and the upper inside edge is 2 inches from the crate.

23. Situation of Crates.—In *warm* weather the crates should be placed outdoors in a sheltered position.

In *unsettled* weather it is advisable to construct a rough board shelter above the crates so as to shed the rain; or the fattening should be carried on inside a shed or barn.

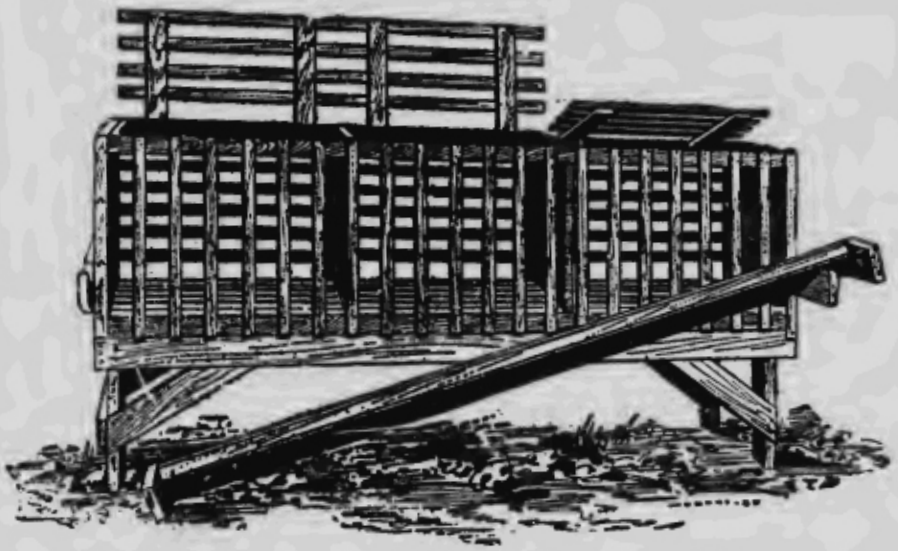


FIG. 13.—The fattening crate.

During *cold* weather the crates should be placed in a warm building. Abundant ventilation is required at all times.

In order to have the chickens plump and well fitted for the market when they are at the most profitable age, they should be placed in the fattening crates when they are three to four months old. It is not meant by this that chickens cannot be fatted profitably when they are more than four months old. Suitable market chickens of any age will show gains in the crates. In selecting chickens for fattening, those should be fatted that are of medium size, and are of a broad square shape, with short, straight legs set well apart and above all with a good strong constitution.

24. Equipment for Fattening.—In fattening chickens for market, it is advisable to use the fattening crates described in this bulletin (17). If only a small number of chickens are to be fatted, packing boxes of suitable dimensions can be adapted for the purpose. The open top of the box should become the bottom of the crate, and one side should be removed for the front. Laths should be nailed up and down the front, and also lengthways of the crate to form the floor. The laths are placed the same distance apart as recommended in the construction of the fattening crate (17). A board should be loosened in the top of the crate to remove the chickens, and a feed trough arranged in front. A shaping board and shipping boxes are also required.

25. Cost of Feed and Gain in Weight.—'Taking the results from five lots at four of the Fattening Stations where the men managed the work best and had good chickens of large breeds, I find that 365 chickens in five lots gained on the average

2.35 pounds each; and the average cost for food consumed was 5.27 cents per po of increase in live weight. That shows a great increase, nearly two and a half pou per chicken, and the cost for food was five and a half cents cents per pound of incr in live weight.' The ground grain was valued at $1.20 per 100 pounds and the sk milk at 15 cents per 100 pounds.)

26. Fattening Rations.—A satisfactory fattening ration is one that is palat and that will produce a white-coloured flesh. Ground oats, finely ground or with coarser hulls sifted out, should form the basis of all the grain mixtures. Ground c fed in excess will result in a yellow-coloured flesh of inferior quality; ground pease part a hardness to the flesh that is not desirable. Ground oats, ground buckwh ground barley, and low grade flour are the most suitable meals for fattening.

Satisfactory Meal Mixtures:—

(1) Ground oats (coarse hulls removed).
(2) Siftings from rolled oats (no hulling dust should be included).
(3) Two parts ground oats, two parts ground buckwheat, one part ground co
(4) Equal parts ground oats, ground barley, and ground buckwheat.
(5) Two parts ground barley, two parts low grade flour, one part wheat bran.

The ground meal should be mixed to a thin porridge with thick sour skim-milk buttermilk. On the average, 10 pounds of meal require from 15 to 17 pounds of so skim-milk. A small quantity of salt should be added to the mash.

When sufficient skim-milk or buttermilk cannot be obtained for mixing the mash a quantity of animal and raw vegetable food should be added to the fattening ratio

27. Duration of the Fattening.—The chickens should remain in the fatteni crates for a period not exceeding 24 days. Some chicks will fatten more readily tha others. These should be picked out a week before finished and during this last wee it is well to feed a little beef tallow, shaved into their trough along with the mas about one pound tallow to 50 or 60 chickens per day.

28. Killing the Lice.—Before the chickens are placed in the crates they should b well dusted with sulphur to kill the lice. They should be again sulphured thr days before they are killed.

29. The First Week.—It is necessary to feed the chickens lightly the first wee they are in the crates. A small quantity of the fattening food should be spread alon the troughs, and as this is eaten more food is added, but not as much as the chicken would consume. The food should be given three times a day, and after feeding th troughs should be cleaned and turned over. The chickens should receive fresh wat twice a day, and grit two or three times during the week.

30. Balance of the Time.—The chickens should be given twice a day as much fo as they will eat. Half an hour after feeding the feed troughs should be cleaned an turned over. Water and grit should also be supplied as in the first week.

31. Feather-plucking.—Chickens that are fattening in crates sometimes pluck th feathers from one another. This habit is caused by an irritation at the roots of th feathers, and which results from either over-heated blood or parasites.

The remedy is to remove the chickens that are affected; to feed the others mor skim-milk in their mashes, or to add animal food and vegetable food to the fatteni ration.

If the trouble is caused by parasites, the mites can be found amongst the whi powdery matter at the base of the quill. A sulphur and lard ointment should be applie to the affected parts.

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[1] 'Fattening of Chickens,' Evidence of 1901, by Prof. Jas. W. Robertson.

VI. PREPARING CHICKENS FOR MARKET.

12. Starving.—The chickens should be starved 24 hours before killing. This will prevent food remaining in the crop and intestines, which would decompose and spoil the flavour of the birds. Several hours after the last feed allow the chickens what water they wish to drink. They should then have a complete fast until they are killed.

13. Killing.—(*a*) For chickens going into immediate consumption on the local market it will be found most convenient to kill by dislocating the neck. With the left hand hold the chicken's legs and wings in one firm grasp. Place the first finger of the right hand on the right side of the neck, and the remaining fingers on the left side. Grasp the head in the hollow of the hand, with the fork of the fingers behind the head where it joins the neck. The back of the chicken being upwards, hold the legs against the left hip, and the head near the right thigh or knee. Bend the head backwards as far as possible, and at the same time stretch the neck, when it is dislocated immediately; pull the head about 1½ inches from the neck. Hold the wings firmly after killing, and allow the chicken's head to hang down, so that the blood can collect in the neck; the head is attached to the body simply by the skin of the neck.

(*b*) Chicks that are to be exported or put into cold storage must be killed by sticking in the mouth. Cut the large arteries at the sides of the neck, just below the ears. This can be done by introducing the knife into the throat and giving a couple of quick motions up and down. When bleeding freely drive the blade at an angle with the bird's bill into the back part of the roof of the mouth. Be sure the blade is through the bony structure and has entered the brain, then give a quick half-turn to the knife. This causes paralysis which loosens the feathers, making them much easier to pluck. Allow the bird to hang by its feet until plucked.

FIG. 14.—The chicken as it is held preparatory to killing.

34. Plucking.—(a) When the neck is dislocated dry plucking should be co
menced as soon as the chicken's neck is dislocated:—

Directions for Plucking.—While still holding the chicken in the left hand, extr
the tail feathers and the quill feathers of the wing. Allow the chicken's head to ha
down, and commence plucking the feathers on the back and wings; then pluck
breast and lower part of the neck, and work back on the body to the tail, and turn
the bird over again, finish the back and wings.

Leave the feathers on the neck for 3 inches from the head. Leave, also, a ring
feathers around the legs at the hock joints, and the small feathers on the outside jo
of each wing.

Clean pluck the rest of the chicken. Remove all pinfeathers, and make the chick
as attractive as possible. Use care in plucking so as not to tear the skin. If a tear
made have the flesh brought together with white thread.

(*b*) *Plucking the chick that is bled.*—As the bird is hanging on a level with t
operator's chest, grasp the wing between the thumb and first two fingers of the le
hand, holding the neck between the third and little finger. This gives the operat
control of the bird.

Remove the large wing feathers with the right hand and also the stiff feathe
at the shoulder joints. Remove tail feathers with one quick twisting motion. Pa
the right hand rapidly down the back, from rump to neck, removing the feathers wi
thumb and forefinger. Shift the bird then to the right hand and use the left hand i
picking the soft feathers from the breast.

If the sticking has been done properly, the feathers will all come out easily an
without danger of tearing. The bird is again held in the left hand while the feathe
are quickly stripped, the neck wing and hock feather are left the same as in (*a*).

35. Shaping.—Chickens fattened for market should be properly shaped. This giv
them a compact, plump appearance, and the returns received for shaped chickens a
greater than when they are shipped in a rough, unprepared condition.

The shaper (Fig.15) is made by nailing two ¾ inch planed boards together at righ
angles, so as to form a trough of 6 inches, inside measurement. This trough can
made 6 feet long and nailed in a frame (Fig. 16), or 12 feet long with ends on it, an
placed on the top of two barrels; the trough should lean slightly backwards.

FIG. 15.—The position of the chicken in the shaper, with a brick on top to shape it.

Directions for Shaping.—As soon as the chicken is plucked, place its legs alongside its breast; then with its breast downward, force the chicken down into the angle of the shaper. Cover the chicken with paper and place a brick on top to shape it, also one against it to hold it in position. Continue this same process as the other chickens are

FIG. 16.—A number of chickens in a shaping frame.

plucked, placing each chicken in the shaper close to the last, and moving the lower brick along to hold the row in position. Allow the chickens to remain in the shaper for at least six hours.

36. Packing.—After being *thoroughly* cooled, ' kens should be packed into the shipping cases. The chickens *must* be cooled an .. the kins before packing. Unless the chickens are artificially cooled, they shou. . be packed into the cases until 20 hours after killing.

The Shipping Case.—Each case holds one layer of 12 chickens. The cases are made of basswood or spruce, and the corners are lock-jointed. The different sizes are as follows.

Number.	Inside Measurement in Inches.	Thickness of wood.	
		Sides.	Ends.
0	19⅛ x 15 1/16 x 4	7/16	5/16
1	21½ x 16 x 4 7/16	7/16	5/16
2	23 1/16 x 16⅝ x 4 7/16	7/16	5/16
3	24⅛ x 17 5/16 x 4⅝	7/16	5/16
4	26½ x 18 x 5½	7/16	5/16

Case No. 0 is for 12 chickens weighing (plucked) from 2½ to 3 lbs. each.
" No. 1 " " " 3 to 3½ "
" No. 2 " " " 3½ to 4 "
" No. 3 " " " 4 to 4½ "
" No. 4 " " " 4½ to 5½ "

FIG. 17.—The shipping case—The first row of chickens packed and two chickens in the second row.

On one end of the shipping case should be stencilled the name and address of the shipper, the word *Canadian*, the number of chickens, and the space for their net weight.

As the bottom of the case is removed for packing the chickens, the stencil marks will be upside down until the case is closed and turned over to its correct position. Care must therefore be taken that the stencilling is placed correctly to ensure that the case will be opened properly on the market.

Directions for Packing.—The chickens should be graded in size, and each chicken packed into the proper size shipping case. Small chickens should not be packed in a large case. The case should be lined with parchment paper[1] before the chickens are placed in it.

FIG. 18.—The shipping case—The appearance of the chickens when the case is opened.

[1] Six sheets of light-weight parchment or butter paper are required; two sheets 18 by 26 inches, two sheets 10 by 26 inches, and two sheets 10 by 18 inches.

The parchment paper should be neatly tucked around the case, and before the cover is nailed down, the upper (18 by 26 inch) sheet of parchment paper should be placed in a 25 per cent solution of formalin. This will prevent the development of mould.

The box of chickens should be weighed and the net weight stencilled or plainly marked. Fractions of a pound should not be given.

The chickens are packed with their breasts up (Fig. 17), but the case is so made that it opens with the chickens' backs up (Fig. 18). The heads of the first row (6) of chickens are placed straight out on the bottom of the box, and the backs of the row of chickens packed last are placed against them. The heads of the row of chickens packed last may be arranged in the centre of the case.

VII. MARKETING CHICKENS.

37. The Equivalent Market Prices of Chickens.—The following table shows the results of an experiment conducted by this Department of Agriculture at the Glenfinnan, P.E.I., Illustration Chicken Fattening Station to ascertain the loss in weight of fatted chickens (1) when starved 36 hours and ready to kill; (2) when killed by dislocating or breaking the neck, dry-plucked and cooled 20 hours; (3) when drawn and prepared for roasting.

In order to secure an accurate live weight of the chickens before the experiment was commenced, the chickens were weighed two hours after their last feed and this weight is given in the first column:—

Loss in Weight of Twelve Fatted Chickens.

Number of Chicken.	Live weight.		When starved 36 hours.		When killed, plucked and cooled 20 hours.		When drawn and prepared for roasting.	
	Lbs.	oz.	Lbs.	oz.	Lbs.	oz.	Lbs.	oz.
1	5	8	4	12	4	7	2	15
2	4	12	4		3	13	2	6
3	5	7	4	12	4	7	3	
4	6	3	5	7	5	2	3	8
5	4	12	4		3	12	2	8
6	5	8	4	13	4	8	3	2
7	5	3	4	8	4	3	2	14
8	5	10	4	14	4	8	2	15
9	6	3	5	5	5	1	3	7
10	5		4	3	3	13	2	7
11	6	8	5	14	5	8	3	12
12	5	14	5	3	4	14....	3	6
Totals	66	08	57	11	54	0	36	4

Results of the Experiment.—(1) As a result of the 36 hours starving there was an average loss of three-quarters of a pound in the live weight of each chicken. (2) There was a loss in weight of five ounces due to the killing, plucking and cooling of the chicken. This small loss would represent the weight of the feathers; there is no appreciable loss in weight owing to the 20 hours cooling.

Combined Results of (1) and (2).—The total loss in weight of the chickens when they were prepared for market by starving 36 hours, by having their necks broken, dry-plucked and not bled or drawn, averaged one pound or 20 per cent from the live weight. In many Canadian cities and on the smaller markets where the improved quality of undrawn fatted chickens is recognized, a plucked chicken is more readily bought than one that has been drawn. A chicken that is not drawn until required for the oven,

is more juicy in flesh than one that has been drawn as soon as killed and exposed to atmosphere.

(3) In order to complete this experiment and to ascertain the loss in weight w chickens are prepared for the oven, the twelve chickens were drawn, and their he legs and outer joints of the wings were removed. There was an average loss in wei of one pound and one-half on each chicken, or 33⅓ per cent; 54 per cent of the weight of the chicken was the drawn weight.

(4) To ascertain the prices per pound at which the chickens could have been s by drawn weight, plucked weight or live weight, and realize the same amount of mon the chickens were sold in a regular way on the Charlottetown, P.E.I. market. T selling price was $5.95, and the price per pound was 16½ cts. This price per pound v for *drawn* chickens. If the chickens had been sold for 11 cts. a pound after killi plucking and cooling, or by *plucked* weight, they would have realized $5.95 also. if the chickens had been sold for 9 cts. a pound *live* weight, they would have realiz $5.95. So that in this experiment a selling price per pound of 9 cts. live weight equ led 11 cts. plucked weight and equalled 16½ cts. drawn weight. These figures a equivalent to the weights of the chickens. A value has not been placed on the ti necessary to kill, pluck or draw the chickens.

By estimating equivalent values for the different selling prices the following tab has been calculated:—

Equal Prices in Cents per Pound for Selling Fatted Chickens by Live Weight, Pluck Weight or Drawn Weight.

Live weight..	6	7	8	9	10	11	12	13	cts. per poun
Plucked weight..	7.4	8.6	9.9	11	12.4	13.6	14.8	16	cts. per poun
Drawn weight..	11	12.8	14.7	16.5	18.4	20	22	23.8	cts. per poun

38. Home Markets.—At present the local demand for properly fatted chickens unsupplied. Dealers in the small towns are asking for them, while the large deale and exporters must have them as their customers demand a fat chicken.

This Division receives inquiries almost every day before and throughout the fee ing season, asking where fat chickens can be purchased.

Mr. Henry Gatehouse, Montreal, one of the largest handlers of dressed poultry in a letter says: 'Our customers are much pleased with the birds and are anxious t get more; they always bring a higher price. If the farmer will only give a little tim to extra feeding he will find it very profitable. The price will be increased 5 cent per pound in almost every case.'

Mr. Gatehouse, in writing to the manager of one of the stations, says: 'I a highly pleased with your shipments of chickens this season. I can find no fault what ever with them. I hope your neighbours will take advantage of your work so that can buy a larger quantity of the same stock.'

Messrs. Westage & Lewis, Montreal, also large dealers say: 'We are pleased t give expression to our appreciation of the good work the government has done throug your department, in the great improvement in the chickens produced through th country. Three or four years ago we were obliged to take chickens that were stunte and ill-bred, badly and insufficiently fed, killed with crops and stomachs full of fee and most of them spolit in getting off the feathers, either by being scalded or the ski badly torn. We have had hundreds of pounds of chickens sent to us quite unfit for foo never having been bled at all and shipped in dirty barrels or boxes, without paper keep them clean. We were really ashamed to offer even the best stock we could get t our customers. During the last two or three years, in addition to the chickens w have purchased from the department, we have received a great many small consig ments from the farmers from all parts of the country, and most of these direct shi ments from the farms have been well bred, mostly Plymouth Rocks, well fed and good size before getting too old. They have been fasted before being killed, proper bled and plucked, and shipped to us in a clean and creditable condition. We canno

account for the change, except it be through the efforts of the government to instruct and direct the farmers in raising and handling their chickens. We are now able to get enough of this kind and quality of stock, to so cut the price of any that have been improperly fed or prepared for market, that farmers must feel the necessity of improving or going out of the chicken business.'

39. Export Marketing.—The chickens can be shipped to Great Britain as soon as they are fatted in the fall, or they can be held in cold storage and forwarded between February and May of the following year. The shipment should go forward by refrigerator car or express to the port, and should be placed in the cold storage chamber of the steamer. It is advisable for several neighbouring farmers to fatten their chickens at one time, or have one farmer fatten for all, so that a large number of chickens can be shipped together. The price per pound realized in Great Britain is from 12 to 16 cents, plucked weight.

A. W. Grindley, agent at Liverpool for the Canadian Department of Agriculture, writes as follows concerning the poultry industry:—

'Medium-sized birds, well set up and fleshy, but young, always sell well, and there is a limited demand for large heavy birds; but there is always a glut of undersized, crooked or short breasted, scraggy-looking birds. It is good policy therefore to ship choice birds only, keeping the poorer grades for home markets. All poultry should be graded; that is, birds of the same weight should be packed together. All poultry should be thoroughly cooled before being packed.'

'Care must be taken not to cool too quickly; if warm poultry is placed in a refrigerator at a low temperature (below 28 degrees) it quickly becomes chilled and frozen on the outside, the remaining heat can not escape and is finally driven into the bones, which become dark coloured, and as soon as the birds are thawed out they become putrid next the bone. Nearly always, when poultry is discharged at British ports in a damaged or partially damaged condition, the exporters blame poor transportation facilities, while as a matter of fact, the damage has often been done before the poultry left the exporter's hands. Too much attention therefore can not be paid to the proper cooling of poultry before it is packed. Ship regular supplies over as long a period as possible; it is a mistake to ship heavily for the Christmas markets as there is nearly always a glut at that season. Poultry should be frozen hard before being shipped. The ideal method is 'chilling,' which means a uniform temperature of about 28 degrees, but under present conditions of transportation that uniform temperature can not be maintained throughout; while we have a very good system of refrigeration in Canada and across the ocean, the damage is sustained after poultry is landed in Great Britain, where the shipment may be exposed to a high temperature for several days while being taken in railway cars from seaport to destination. It is during this period that damage is done to chilled poultry, which, if frozen hard, would have been placed in cold storage again before being injured.

'Shipments from the United States and Russia are frozen hard and give general satisfaction provided the poultry is properly defrosted, which means taking about three or four days to gradually thaw the birds.

'Many Canadian exporters ship produce not only to towns in the same district but to different firms in the same town, with the result that the buyers play one against the other and very often get the goods at much less than their real value, the loss having to be sustained by the Canadian exporter.

'Large American concerns which have made a close study of exporting food products to Great Britain, choose reliable firms to handle their produce, giving each a district in which they have the sole agency, these districts being of such size that they do not compete against each other. This policy appears to give general satisfaction.'

'The mistake is still made of consigning poultry, especially turkeys at Christmas time, to firms that are not in the poultry trade, who either turn the consignment over to a poultry dealer to sell and deduct two commissions from the returns, or else have the birds sold at public auction, often at a sacrifice in price. The better plan is to ship to a poultry dealer who controls cold storage. The shipment can then be held back

in the event of glutted markets, and in case of warm weather, forced sales would not be necessary.'

'In order to show the demand in Great Britain for poultry, the value of poultry and game imported into the United Kingdom for the year ending December 31, 1903, amounted to a total of $5,846,997.96, while the value of poultry exported from Canada to Great Britain for the year ending June 30, 1903, amounted to a total of only $139,099, the chief supplies last year being imported from Russia, Belgium and France.'

Egg Markets, (by George F. Johnson, Government Statistician, from Dominion Poultry Keeper).

The home market with a production of 84,000,000 dozens, is short of eggs.

In 1902, we exported 12,000,000 dozens and had, say, 72,000,000 dozens for home consumption. We needed quite a lot to put under hens and into incubators. We have probably an annual home consumption of 68,000,000 dozens; say 12 dozens, making allowance for addled eggs, per head of the population. That looks large, but it is not one egg in two days for each person, and then consider how many eggs are used in household cooking, confectionery shops, bakeries, and other businesses, arts and sciences.

The British Isle imported last year 198,500,000 dozens, Russia sending 68,000,000, Denmark 38,000,000, Germany 31,000,000, Belgium 23,000,000, France 16,000,000 and Canada 7,333,000 dozens. We sent fewer dozens last year than in the preceding year, though while the average price of the 198,500,000 dozens was 16 1-5 cents per dozen, Canada's eggs had a value of 19 cents.

We are being beaten by the Russian hens, which are contributing more and more to the wants of the British consumer. Shall we let the Russian hen continue to carry off one-third of this business, valued at $32,000,000 or $33,000,000 yearly, while we send but one-twenty-eighth—Russia one dozen in every three, Canada one dozen in every twenty-eight? The Russian hen does not produce as good an egg as the Canadian hen.

VIII. SOME STATION WORK IN 1904.

40. Record of Fattening Results Carried on at the Bowmanville (Ont.) Station.

Number of Chicks.	Weight of Chicks.	Cost of Chicks.	Cost of Meal Fed.	Cost of Milk Fed.	Total Cost of Chicks.	Number of Lbs. Gain.	Dressed Weight.	Amount Received at 13c.	Profit over Cost.
	Lbs.	$ cts.	$ cts.	$ cts.	$ cts.			$ cts.	$ cts.
36	111	7 77	1 30	0 70	9 77	48	146	18 98	9 21
48	164	11 48	1 60	0 85	13 93	76	194	25 22	11 29
48	165	11 55	2 10	1 10	14 75	80	194	25 22	10 47
48	146	10 22	1 96	1 00	13 18	64	173	22 49	9 31
60	195	13 65	2 10	0 87	16 62	105	220	28 60	11 98
60	185	12 95	1 70	0 70	15 35	83	210	27 30	11 95
62	200	14 00	1 80	0 87	16 67	58	205	26 65	9 96
72	166	11 62	3 75	1 25		80	231	30 03	13 41
424	1,332	93 24	16 31	7 34	116 89	594	1,573	204 49	87 60

The above statement does not show the actual profit, as most of the birds were sold for 15 cents, but as 13 cents f.o.b. was offered for all the output of the Division, it is taken as the price.

These chicks were a good type, pure-bred Barred Rocks and Buff Orpingtons. The feed was mostly oat chop finely ground and buttermilk. Similar results may be obtained by any person having the proper chickens and fed judiciously on a palatable ration.

IX. THE EGG TRADE.

41. Fresh Eggs.—Eggs to be palatable should be eaten in a strictly fresh condition; therefore they should reach the consumer without unnecessary delay. This requires (1) that the eggs be collected regularly every day and stored in a cool room (temp. 40° to 50° F.) until a sufficient number are on hand to deliver to a dealer; (2) that the dealer forward the eggs to the merchant at least once a week; and (3) that the merchant should protect the eggs from deterioration while in his possession.

Some farmers are so situated that they can establish a city trade in fresh eggs throughout the year. Strictly fresh eggs shipped from the farm to the city merchant weekly, are usually bought at a premium of several cents a dozen.

For all farmers a most profitable branch of the business is the trade in fresh winter eggs. Every winter there is a great demand for new-laid eggs; the supply of new-laid eggs is limited, and high prices per dozen are paid. Exporting firms buy great quantities of eggs during the spring and summer months.

Market Requirements.—There is a growing preference on the home markets for brown-shelled eggs. The shells of the eggs should be wiped clean if necessary, and the eggs graded in size. For shipment to the merchant the eggs should be packed into cases holding 12 dozens or 30 dozens each.

42. Egg Preservation.—While no process of preservation will retain the fine flavour of a newly laid egg, so that later it can honestly be sold as such, yet for culinary purposes when the supply of new-laid eggs is limited, preserved eggs meet the demand.

The eggs are placed in the preservative during the spring and summer. None but fresh eggs should be packed[1]; stale or cracked eggs are not only bad in themselves, but they will affect those packed with them. The eggs must be fairly clean as eggs that require washing are poor 'packers.'

Eggs can be preserved in lime-water, or placed in cold storage.

Lime-water Preservation.—The lime-water is prepared by adding one pound of new lime to 4 gallons of water. The mixture should be well stirred and the liquid portion, which is 'saturated lime-water,' poured into a crock or water-tight barrel; the vessel containing the lime-water should be placed in a cool room.

As exposure to the air tends to weaken the preservative, the vessel should be covered with a piece of burlap upon which a paste of lime is spread.

The eggs can be placed in the preservative every day; they should be packed closely in the vessel, but no part of any egg should be above the surface of the liquid. Afterwards the eggs should be examined occasionally, and if necessary fresh lime-water added to keep the eggs always covered.

Lime and Salt.—To each pailful of water, add two pints of fresh slacked lime and one pint of common salt, mix well. Fill a barrel half full with this fluid, put your eggs in it any time after June.

Cold Storage.—Eggs should be held in cold storage at a temperature near 32° F. The air of the room should be dry and pure. Unless the egg cases have projecting pieces that prevent close stacking, laths should be placed between the cases to allow the

[1] Eggs that are purchased for preservation should be examined with the egg tester and the cloudy or stale eggs removed.

necessary circulation of air. The pores of the egg shell should not be coated with any preservative, nor should the eggs be washed. The egg cases and fillers must be thoroughly dry before using. Beyond the fillers no packing of any kind should be used in the cases.

43. Export Eggs.—The following information concerning the requirements of the British egg market is from the report of the late Dominion Commissioner of Agriculture:—

'The grade of egg which is in good demand in Great Britain is one weighing 15 pounds per great hundred, that is 15 pounds per 10 dozens, which is equal to two ounces per egg or 1½ pounds per dozen. A small quantity imported into Great Britain from France go as high as 17 pounds per great hundred. For every half pound which eggs weigh less than 15 pounds per great hundred the value is lessened by about one cent per dozen.

'Eggs should be graded as to size. A higher value will be obtained for a given quantity of eggs graded into three sizes—large, medium and small,—than if they were sent with the sizes mixed promiscuously. Eggs of a brown shade of colour are preferred.

'The preferred size of egg case for export is a wooden case holding thirty dozen eggs, paper-filled—that is having pasteboard frames with a separate space for each egg. These cases, holding thirty dozen each, measure about 28 inches long, 12¾ inches wide, and 13 inches high, outside dimensions.

'For the safe carriage of the eggs, it is important that they should not be stored in a warehouse, on the cars, or on board the steamship, in proximity to any cargo from which they would acquire a flavour. The carrying of eggs with a cargo of apples has been known to impart to them a flavour which impaired their value.

'They should be carried on the cars and on the steamship at a temperature of from 38° to 42° F. When cases containing eggs are removed from the cold storage chambers they should not be opened at once in an atmosphere where the temperature is warm. They should be left for two days unopened, so that the eggs may become gradually warmed to the temperature of the room where they have been deposited. Otherwise a condensation of moisture from the atmosphere will appear on the shell, and give them the appearance of sweating. This so-called 'sweating' is not an exudation through the shell of the egg, and can be entirely prevented in the manner indicated.'

Eggs that are placed in cold storage from April till July are shipped to Great Britain for the September and October trades. Eggs that go into cold storage in the fall are exported during the winter months. Cold storage eggs are sold in Great Britain as 'Canadian fresh eggs,' and the prices last year ranged from 7s. 6d. to 8s. 6d. per long hundred (120) eggs) during September and October, and from 7s. 9d. to 8s. 6d. per long hundred during November and December.

Pickled eggs should be exported to Great Britain so as to reach there during November and December. The eggs that were sold in November and December last year realized from 7s. 6d. to 8s. 2d. per long hundred.

A report from a Liverpool, England, provision merchant, states:—

'There is undoubtedly a growing inclination among consumers to give a preference to Canadian eggs for winter trade, and the shipments to the United Kingdom may be very largely increased without injuring consumption, provided always in the first place that the quality is maintained up to last year's standard; and secondly (a most important one for Canadian shippers), that the price is not prohibitive.'

X. THE FLOCK.

44. Grading up a Flock.—(1) *By Hatching Pure Bred Eggs.*—In April or May several sittings of eggs from pure bred utility type fowls should be bought; 25 or 30 chickens should be reared. The cockerels should be fatted in the fall and disposed of, and the pure bred pullets retained for the following year's breeding pen. By this means a farmer can stock his farm with pure bred poultry in two years.

(2) *By Introducing Pure Bred Cockerels.*—When the flock of poultry is large and has unlimited range, a utility type cockerel should be secured for every 15 hens. The other male birds of the flock should be disposed of; also the hens over two and a-half years old and any fowls not in an active or healthy condition. It is preferable, however, to obtain the eggs for hatching from a breeding pen of a pure bred male and 10 of the best hens of the flock (46), rather than from all the layers indiscriminately.

(3) *By Buying Pure Bred Chickens.*—A pure bred utility cockerel and 10 pullets should be bought in the fall and should constitute the next year's breeding pen.

In buying eggs for hatching or pure bred fowls for poultry farming, a preference should be given to flocks of poultry that have been bred for winter laying.

45. Profits from the Chickens.—(1) *Cockerels.*—The cockerels should be sold in the early fall. Unless they are housed in the fields and require little attention or extra feed, the most profitable age for marketing is four months. After this age the cost of feed per pound of gain in live weight of the cockerels rapidly increases. When cockerels are kept on the farm until they are six or seven months old the profits are materially reduced.

(2) *Pullets.*—The winter production of eggs is the most valuable asset of the pullets. Early winter laying demands *liberal* feeding, which includes in addition to the grain, waste meat or animal food, and vegetable food. The pullets should be comfortably and permanently housed in the fall: transferring mature pullets to a strange pen defers egg-production.

46. Pullets more Profitable Egg-producers than Hens.—At the agricultural experiment station at Utah, United States, experiments showed that the profit from young hens or pullets was about *five times greater* than that of the old hens. Not only did the old hens lay considerably fewer eggs, but the eggs were worth less per dozen. This is accounted for by the fact that the pullets laid a larger proportion of their eggs in early winter, when the price was good. The old hens were three to four years old. The results of this experiment have been accomplished with fowls kept in confinement. During the winter months, a period of between three and four months, they were not outside of the building.

With many poultrymen and farmers the idea is prevalent that if a hen lays but few eggs the first year she is more likely to do well the second year. Whenever experiments have been carried on the results go to prove that hens that yield 100 eggs or less the first year are very light layers the second. On the other hand, those that produce 130 to 200 and more eggs the first year also yield very satisfactory the second.

The results of a number of experiments carried on in Maine showed that 10 pullets in egg production equalled 17 year-olds or 24 two-year olds.

Selection of Breeding Specimens.—The farmer should select from the flock of pullets the 10 best winter layers. A regular leg band or a piece of wire should be placed around the leg of each of the 10 pullets. The next winter the 10 pullets (which are now yearling hens) should be separated from the laying hens and kept in good health and medium flesh. They are not fed for winter laying. In February or March they are mated with a suitable cockerel, their rations are increased and they are brought into laying at the time their eggs are required for hatching. Male birds used for breeding purposes should not be allowed with the female except during the breeding season.

(a) *To Promote Moulting.*—The earlier birds are out of their moult and in full plumage the sooner they will begin to lay in the autumn. The pullets usually begin to lay as soon as they are completely plumed and become adult fowls. It is worth while, therefore, to encourage moulting in every way, giving them exercise, insect food, meat in their rations, with ground bone or oyster shell and sound grain. Sunflower seeds, or linseed meal in their food, promote moulting. A teaspoonful of fine salt in the soft foods given daily to a flock of twenty hens should be allowed. Fowls

do not depend upon this for the salt which their bodies and feathers contain, for either the material itself or the elements of which it is composed exists to a greater or less extent in almost all the food they eat. What we do by giving them the salt is simply to increase the supply.

XI. FEEDS FOR POULTRY.

47. Food Composition.—Five compounds are found in the foods of poultry, viz., water, protein, fat, carbohydrates and ash.

Water.—All foodstuffs, no matter how dry they may seem, contain a considerable amount of water. In grains and dried meat the water averages 10 per cent of the material, in raw meats 50 per cent, while in some vegetables it amounts to 90 per cent.

Protein.—The protein of food is characterized by containing nitrogen. The terms *nitrogenous matter* and the *albumenoids* are frequently used to designate this group. The function of the protein is to build up and repair the working organs and parts of the body, and to supply material for the production of eggs, feathers, &c. No other food constituent can do this.

Fats and Carbohydrates.—Since the carbohydrates and fats serve nearly the same purpose in the animal economy, they may be grouped together. Experiments have shown that fat is about 2¼ times more effective as a food than are the carbohydrates. Fat in the food may either be stored in the body as fat, or burned to produce heat and energy. Carbohydrates constitute a large part of vegetable foods. In the animal body they are converted into fat or used (burned) to produce heat and energy.

Ash.—The ash of the food is the source of the mineral matter of the animal body, and as such is of importance. Ordinary feeding stuffs, however, do not contain sufficient lime for shell-formation, and an extra supply of this material is required.

48. Animal Food.—The term animal food is used to denote a number of highly nitrogenous substances fed to poultry. The most important are waste meat, ground raw bones, dried blood, fresh fish and skim-milk.

To obtain the best results in egg-production from confined laying or breeding stock, some form of animal food should be supplied every day. The following table* shows the average composition of one pound of eggs and one pound of meat. The analysis of the eggs and sirloin steak represent the eggs and steak as they are purchased. The refuse matter in the case of eggs would be shell-material and for the steak, bone or other inedible matter:—

—	Refuse.	Water.	Protein.	Fat.	Carbo-hydrates.	Ash.
Brown shelled eggs	10·9	64·8	11·9	11·2	....	·7
White shelled eggs	10·7	65·6	11·8	10·8	....	·6
Sirloin steak	12·8	54·0	16·5	16·1	....	·9

It is noted that the eggs and meat contain similar proportions of the different nutrients—protein and fat. However, in an equal weight of meat and eggs there is less water in the meat, so that three-quarters of a pound of lean meat equals in nutritive value one pound of eggs. Another fact brought out by the table is that in both eggs and meat there are no carbohydrates.

A large amount of animal food should be fed fowls during the moulting season; for the reason that the growing feathers require the nitrogenous matter that meat supplies most readily and cheaply.

*Bulletin 128, U.S. Department of Agriculture.

Waste Meat may consist of meat scraps, beef heads or livers, and can be fed either raw or boiled; if cooked, the water in which the meats are boiled should be fed in the mash, and the boiled portion of the meat either cut up and fed to the hens, or tied in the pen.

Ground Raw Bones require the use of a special bone cutter for grinding. The bones are finely cut so the fowls can eat them, and form a nutritive food that is relished.

Dried Blood is a most concentrated animal food; it should be fed in the mash in the proportion of one pound of blood to 16 pounds of meal. At the Illustration Chicken Rearing Stations conducted by this Department last year the confined chickens were fed dried blood in their mashes until they were two months old, and made rapid development. If fed in this way to laying hens, it would supply the necessary protein.

Fresh Fish.—Inquiries have been received from the Maritime Provinces respecting the feeding value of fresh fish for poultry. For breeding fowls it would be satisfactory, but for pullets that were producing table eggs the tendency would be towards the fish flavour in the eggs.

Skim-milk, preferably well-soured, or buttermilk, have high feeding values for every class of poultry. In the rearing and fattening of chickens their value cannot be overestimated. In fact, in the crate-fattening of chickens no satisfactory substitute has as yet been discovered. Skim-milk or buttermilk should be employed, whenever they can be obtained at a reasonable price, for mixing with mashes fed to laying hens.

49. Grains.—The cost of the different cereals in the locality should determine what varieties of grain are to be fed to the fowls. When feeding fowls that are confined or at liberty, animal food should supply the greater part of the protein or nitrogenous portion of the ration. In that case, the grains are required more for maintaining the heat of the fowl's body, and it would not be profitable to purchase expensive grains for this use. Poultry will thrive better on a variety of foodstuffs than they will on a single food of the same nutritive value. It is preferable to feed a number of grains, both ground for the mash and for feeding whole in the litter, rather than to limit the selection to one or two sorts. The palatability of the mash is another consideration; ground buckwheat, ground corn and ground oats are the grains that are most preferred.

In the crate-fattening of chickens the most important factor is that the food produces a white, fine-grained flesh, so that in fattening chickens the suitable grains are limited in number.

50. Vegetables and Green Food.—The value of vegetable foods such as clover, mangel-wurtzels, turnips or cabbages is attributed to the succulency and also to their bulky nature. The amount of digestible nutrients in them is comparatively small. The roots may be cut in half and stuck on nails driven in the wall near the ground. The clover is best used as litter. Cut clover often causes crop-impaction.

51. Lime.—Laying hens require lime for the formataion of egg-shells: it can be fed in the form of egg-shells, broken oyster shells or broken plaster. If the egg-shells that accumulate during the spring and summer are dried in the oven and stored, they can be fed with advantage to the winter layers. Laying hens that are eating their eggs, began by picking at the shell to secure the lime. If a flock of egg-eating fowls is given an over-abundance of fresh eggs-shells, this habit may be discontinued.

52. Grit.—All classes of poultry masticate their food by a grinding process in the gizzard. The gizzard is lined with a tough membrane or skin, and will not be injured by a hard or sharp grinding material. In fact, the more hard and insoluble the grit is, the longer it will perform work. Lake shore or river gravel can be utilized, but small sharp broken stones or coarse coal ashes are preferable; broken crockery or granite are also suitable. Sharp grits are manufactured in different sizes for poultry and chickens.

53. Water.—Plenty of water is indispensable to the health of poultry, and it should be pure and fresh. Laying hens especially require an abundant supply of fresh water on account of the great percentage of water in eggs (64 to 65 per cent). A galvanized iron drinking fountain placed upon a small shelf where it will not become filled with litter, is the most satisfactory water arrangement.

54. Advantages of Good Treatment.—A greater amount of food is required by poultry to sustain their vital force in cold weather than in warm weather. Every assistance that is given laying fowls in the winter months, by making them comfortable at night, warming the mashes, or the water, simply reduces the amount of food required for sustenance, and therefore, the cost of egg-production.

55. Winter Feeding.—In the morning each fowl should receive a small handful of the smaller grains, such as wheat, buckwheat or barley, well distributed through the litter: this feed of grain will compel exercise. In the middle of the day a warm mash of ground grain and sour skim-milk or water is sometimes given. It is well to mix this mash to a crumbly condition, and allow the fowls what they will consume quickly. Some advocate feeding it dry. If table scraps can be added to the mash, it will be improved. At night each fowl should receive a large handful of whole grain, preferably corn, oats or barley, scattered through the floor litter.

Vegetable food should be before the fowls at all times. Animal food is required daily and except the blood meal, can be fed in unlimited quantities, also grit and lime.

56. Summer Feeding.—When breeding fowls have unlimited range, the feed can be greatly reduced. The small grains should be scattered through the litter in the morning, and the mash fed in the afternoon. Meat and vegetables are only necessary when the supply of natural food is limited.

Breeding fowls, that are confined in pens during the summer, should be fed whole grain (the smaller grains mentioned above) scattered through the litter, animal food and vegetables. The mash should not be fed. The fowls should be compelled to exercise, and kept in medium flesh.

XII.—TRAP NESTS.

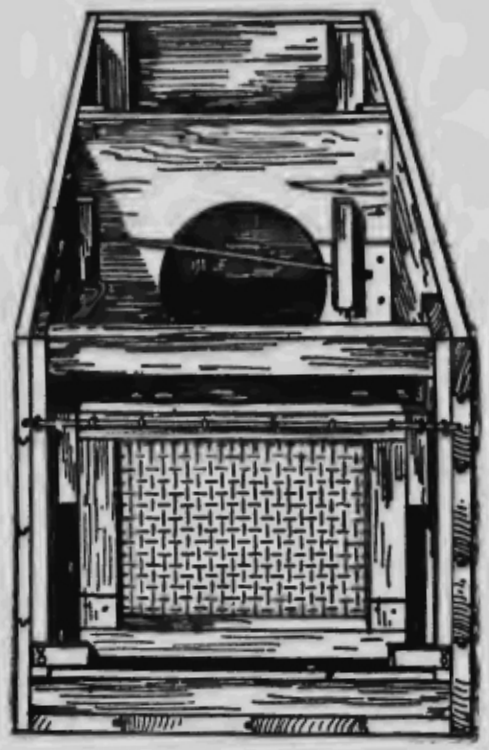
One essential feature in poultry keeping to-day is that the individual bird comprising the flock should make a profit. While there are birds that lay 200 eggs and upwards a year, there are many others which do not lay 50, and very often there seems to be no difference in appearance. By the use of the trap nest one can find which hen or hens lay the eggs, and by setting eggs produced by such birds the profits from the flock may be greatly increased.

Trap nests are simple and easy of construction. The two plans herein contained are giving good satisfaction at the poultry stations. Persons who wish to construct trap nests after either plan and who desire fuller instructions may obtain a model by applying to the Chief of the Poultry Division, Ottawa, and enclosing $2. This amount will be refunded when the model is returned. The Poultry Division will pay postage or express on the model both ways.

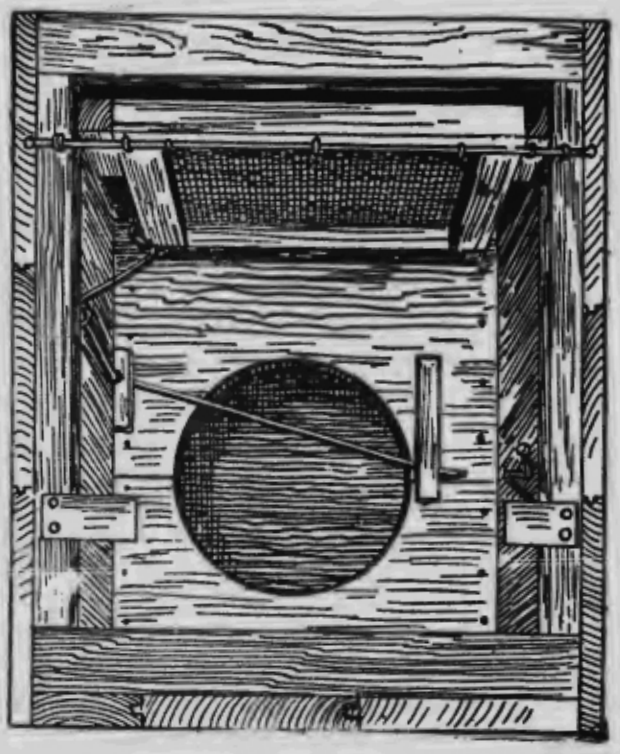
To the person who considers extra attention given to poultry a burden, the use of the trap nests is of no value; but to those who are willing to give the necessary care and attention in order to increase the profits, the trap nest is worth the extra labor entailed.

The cuts opposite represent the Maine trap nests, which is used with satisfaction at a number of the poultry stations. It is very simple, inexpensive, easy to attend and certain in its action.

It is a box-like structure without front end or cover, 28 inches long, 13 inches wide and 16 inches deep, inside measure. A division board with a circular opening 7½ inches in diameter is placed across the box, 12 inches from the rear end and 15 inches



Front and Top View.

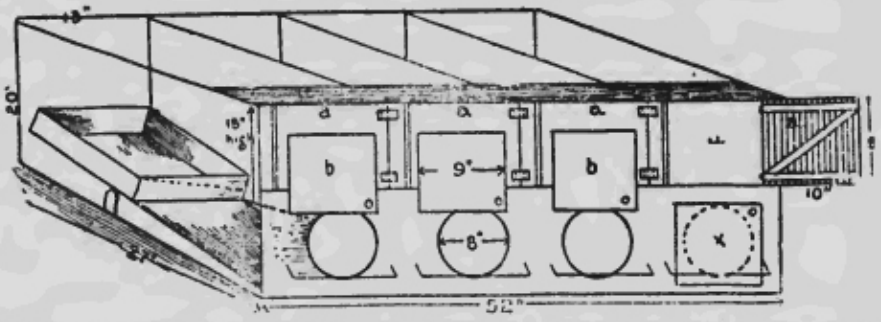


Front View.

from the front end. The rear section is the nest proper. Instead of a close made door at the entrance, a light frame of 1 by 1½ inch stuff is covered with wire netting of one inch mesh. The door is 10 inches wide by 10 inches high, and does not fill the entire entrance, a space of two inches being left at the bottom and one inch at the top, with a good margin at each side, to avoid friction. It is hinged at the top and opens up in the box. The hinges are placed on the front of the door rather than at the centre or rear, the better to secure complete closing action. The trap consists of one piece of stiff wire about three-sixteenths of an inch in diameter and 22 inches long. This piece of wire is shaped so that a section of it, 11 inches long, rests directly across the circular opening in the division board and is held in place by two clamps, one on either side of the circular opening. The clamps fit loosely and the slots are long enough to allow the wire to work up and down about three inches, without m friction. The next section of wire is eight inches long, and it is bent so that it is at right angles with the 11 inch section. It passes along the side of the box 11 inches above the floor, back toward the entrance door, and is fastened strongly to the wall by staples, but yet loosely enough so that the wire can roll easily. The remaining section of the wire, which is three inches long, is bent toward the centre of the box, with an upward inclination, so that it supports the door when it is open and rests upon it. The end of the wire is turned over smoothly, forming a notch into which the door may slip when opened.

As the hen passes in under the open door and then through the circular opening to the nest, she raises herself so that her keel may pass over the lower part of the division board, and her back presses against the horizontal wire, as she passes it, and lifts it enough, so that the end supporting the door slides from under it, and the door swings down and p sses a wire spring, near the bottom of the box, at the entrance, which locks it and prevents the hen from escaping and others from entering.

In the trap nest used at the Bowmanville station, the hen enters the round opening and when on the nest her weight bears the nest down, which pulls the wire from under the trap door (*b*), allowing it to fall as shown; see (*x*). The door (*a*) is opened to release the hen. This nest can be built singly or in sections as desired. In balancing the nest the nails or sockets should be about 11 inches from the back end so as to allow the nest to tip forward when set. The length of the wire can be regulated when the nest is built.



View of four individual nests built in one section. Design of A. W. Foley, Bowmanville, On