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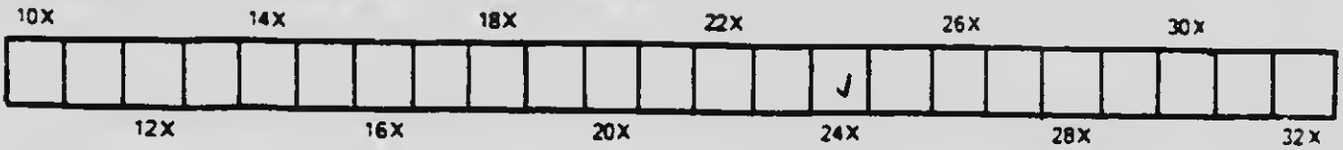

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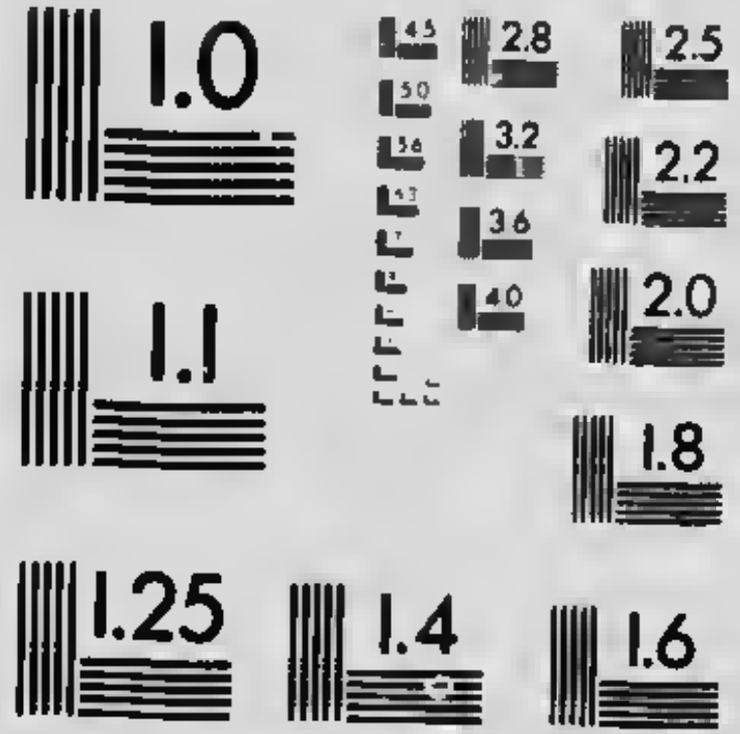

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Farm Poultry

M. A. JULL

Macdonald College
(McGILL UNIVERSITY)

1915

Macdonald College

Faculty of Agriculture, McGill University

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FARM POULTRY

BY

M. A. JULL, B.S.A.

Manager and Lecturer, Poultry Department

"All cookery rests on an egg. The egg is the Atlas that supports the world of gastronomy, the chef is the slave of the egg. What is the masterpiece of French cookery, the dish that outlives all other dishes, the thing that is found on His Majesty's table no less than upon the table of the bourgeoisie—the thing that is as French as a Frenchman, and which expresses the spirit of our people as no other food could express it?—the omelette. Could you make an omelette without breaking eggs? Then cast your mind's eye over this extraordinary Monsieur Egg and all his antics and evolutions. Now he permits himself to be boiled plain, and even like that, without frills, naked and in a state of nature, he is excellent. Now he consents to appear in all ways from poached to *perdu*, now he is the soul of a *vol-au-vent*, now of a sauce; not a pierrot fit to eat but stands by virtue of my lord the egg, and should all the hens in the world commit suicide, to-morrow every chef in France worthy of the name would fall on his spit, for fish is but a course in a dinner, whereas the egg is the ferment that holds all the castle of cookery together."—*Stoepoo'e*.

MACDONALD COLLEGE
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1915

CONTENTS

Farm Poultry

INTRODUCTION

EGGS AND DRESSED POULTRY are in constant and increasing demand by the consuming public of Quebec. This is partly due to improvement in the quality of the products marketed, which is largely responsible for an increased popularity of eggs. They are received with greater favor and are enjoyed with more relish than heretofore, and of course there is no substitute for such a unique commodity as eggs. An annual increase in the population of the Province is also responsible for an increased demand for eggs and poultry, which has been met to a certain extent by increased production within the Province. At the same time, increased production has not nearly kept pace with the increased demand, with the result that Quebec is importing eggs and poultry in large quantities. The farmers of Iowa, Missouri, Kansas and Ontario are supplying the people of Montreal, Quebec, Sherbrooke and other cities with many of their eggs. The farmers of Quebec thus lose a good share of the profits in their own market.

The farm flock has to supply the market requirements of the people in towns and cities. The farmer is a producer, while the town and city resident, who does not produce food for human consumption, is a consumer. The producer supplies his own needs as well as those of the consumer, and it is the business of the farmer to produce as economically as possible those products which are in greatest demand and are most profitably produced. The cost of living in farm homes would be reduced if more eggs and poultry were used on the table, since these products are produced more cheaply than other farm products. Indeed, it is difficult to realize that some farms are not producing enough eggs and poultry for their own use, and the number of poultry kept on the average farm is surprisingly small.

There are no exact statistics in regard to poultry and egg production in Quebec. Census figures are only estimated and no account is taken of the production of the flocks in towns and villages. By far the greatest production, however, comes from farms, since town flocks are comparatively few and are small in size. This fact is not only borne out by observation but also by the small number of poultry exhibitions held annually in the cities and towns of the Province. The statistics which are available are sufficient to establish general conclusions and clearly indicate the trend of development in the poultry industry.

The increase in the population of the Province, together with an increased consumption of eggs per capita of about four dozen per year

in 1911 over 1901, are factors which are responsible for the increased demand for eggs. During the ten years between 1901 and 1911 the consuming population of Quebec increased more rapidly than did the producing population, the census statistics showing that the urban population increased 8.6 per cent. more than the rural.

To furnish the demand for eggs and poultry due to the increase of city dwellers, the Province of Quebec imported quantities of eggs as shown hereunder:—

IMPORTS OF EGGS INTO QUEBEC

1913, 812,201 dozen at 19c. per dozen, value $156,740.00

1914, 1,103,118 dozen at 25c. per dozen, value $280,429.00

The value of exports of eggs and poultry from Quebec in 1914 amounted to $396 for eggs, $6,113 for live poultry, and $17,112 for dressed poultry, a total of $23,621.

The farmers of Quebec are favored with one of the best markets on the continent. The average annual wholesale price for eggs in Montreal is slightly higher than in Toronto or Winnipeg, whilst in these three cities the wholesale prices average higher than New York and Chicago markets. For the better quality of poultry produce Montreal offers, in many cases, better prices than any other market on the continent.

Quebec should be an exporter of poultry products instead of an importer, and notwithstanding an increased annual importation there has been a substantial increase in production. In 1901 there were 3,066,304 fowls on the farms of Quebec, and in 1911 there were 4,833,013. In 1911 the value of poultry on the farms amounted to $2,422,568; the egg products were valued at $3,812,838; live poultry at $662,343—a total of $6,897,749 for the poultry industry of Quebec in 1911. Appreciable advance has been made since 1911.

The number and value of poultry in Quebec is low compared with Canada as a whole. In 1911 the average number of fowls per farm in Canada was 44.5, while the average number of fowls per farm in Quebec was only 32.3. The number and quality of the stock can be increased considerably and would mean an increased production. In 1911 the average value, per family, of poultry for all Canada was $9.84, while in Quebec it was only $6.53.

The most reliable information places the average annual production per hen in Quebec at 50 eggs. This is abnormally low and can be raised to 100 eggs per hen with proper care and management. This increase would almost double the value of the industry, and would more than double the profits of the producers. It takes about 80 eggs to pay for a hen's keep for one year, so that many hens in Quebec are being kept at a loss. Another very significant fact is that over 50 per cent. of the eggs are produced in the months of March, April, May and June, and these are the least profitable months in which to produce eggs. More eggs should be produced between November and March, when prices are highest and profits are greatest.

A FARM INDUSTRY

Poultry-raising in Quebec is essentially a farm industry. An average-sized farm flock is easily managed and is not expensive to feed, because so many waste products are consumed. During a part of the year the laying hens and the growing stock can be kept on free range, thus greatly reducing the cost of feed. When given good attention poultry thrive well on the farm and give good returns. Any farm is improved by a good flock of chickens, and the returns secured compare favorably with other branches of farming.

The system of mixed farming carried on in Quebec is such that a large farm poultry industry should be developed. The dairy farmer has an available supply of skim-milk, which is one of the very best of poultry foods. The fruit-grower has his orchard, which makes an ideal run for the chickens, and the fowls destroy many insect pests. Where grain or other crops are produced there is a considerable amount of food left upon the fields, which is readily picked up by the chickens. Fowls are economizers, and the returns from the flock are distributed throughout the year.

Up to the present, however, there has been a general lack of appreciation of the value of a farm flock and of the importance of the poultry industry. There has been a great lack of interest in poultry breeding. There are too many mongrel flocks in the country to-day; in fact, there are comparatively few pure-bred flocks on the farms of the Province. The inferior quality of the stock is partly responsible for the low annual egg production. A pure-bred flock is more uniform than a flock of mongrels; it produces more uniform products, both in eggs and dressed poultry, and it also has greater breeding value.

One thing which is very apparent in the fowls of the country is their lack of vigor. There are few farmers who adopt any system of breeding, and as a rule no selection is practised; consequently there is very little improvement in egg production or in the finished appearance of the dressed birds. Lack of constitutional vigor is largely responsible. Rigorous selection should be practised every year, and the conservation of vigor should be the poultryman's standard in selection, which should proceed continually from the time the egg is laid until the birds are dressed for market or are sold for breeding or laying purposes. All cripples and weaklings should be killed, and diseased birds should be removed from the flock as soon as they appear to be affected.

The average farm flock should be replaced by a flock of well bred fowls, or be graded up by introducing improved blood from year to year. If the farmer wishes to secure pure-bred stock in one season, batching eggs, day-old chicks or breeding stock may be purchased. The last of these three methods is the most satisfactory. If the flock is to be graded up gradually by buying new male birds each year, then these should be secured from one breeder, or from the same line of breeding. It is a great mistake to change frequently from one strain to another.

THE BREEDS

The farmer desires a fowl which will not only be suited to his purpose but will also pay well. The breed which a farmer should keep will depend upon market requirements and the ruling price for eggs and poultry. Average prices for dressed poultry and eggs in the Province are good, and it will usually be found that those breeds which are good flesh producers, in addition to being good layers, are the most profitable. But there are vast differences among birds of the same breed; that is, there are good and poor birds in the one breed. One should aim to get a good strain of the breed chosen, as the breeding value of any strain is a very important factor.

From the farmer's standpoint there are three classes of chickens—the general utility class, the egg-laying class, and the meat-producing class. Each class is adapted for a special purpose. Taking into consideration the price of live and dressed poultry, it will usually be found that breeds belonging to the general utility class are most profitable in the hands of the average farmer.

GENERAL UTILITY CLASS

Plymouth Rock.—There are six varieties of this breed, the most important of which are the Barred, White and Buff. The Barred Plymouth Rock is the oldest and most popular of the six varieties. All varieties are noted for their qualities as general purpose fowls, being excellent flesh-producers and good layers. They have single combs, yellow legs and flesh, are hardy, and lay brown or tinted eggs.

The standard weights are: cock, 9½ lbs.; cockerel, 8 lbs.; hen, 7½ lbs., and pullet, 6 lbs.

Wyandotte.—There are several varieties of this breed, including the Silver, Golden, White, Buff, Black, Partridge, Silver Pencilled, and Columbian. The last variety is one of the newest, while the White is the most popular. The Wyandottes bear the same general characteristics as the Plymouth Rocks. They have rose combs and are of a different shape, being deeper and shorter in the body. They are sometimes used as broilers.

The standard weights are: cock, 8½ lbs.; cockerel, 7½ lbs.; hen, 6½ lbs., and pullet, 5½ lbs.

Rhode Island Red.—The only two varieties of this breed are the Single and Rose Comb, and they have no material differences except in combs. The Rhode Island Red is popular as a utility fowl. As with all American breeds, the Reds have yellow flesh and legs, and lay brown or tinted eggs.

The standard weights are: cock, 8½ lbs.; cockerel, 7½ lbs.; hen, 6½ lbs., and pullet, 5 lbs.

Fig. 1.—Barred Plymouth Rock cockerel

Fig. 2.—Single comb Rhode Island Red cockerel

Fig. 3.—White Wyandotte cockerel.

Fig. 4.—Black Orpington cockerel.

Orpington.—The most popular varieties of this breed are the Buff, White, and Black, the two former being bred more extensively than the latter. They have a white skin, are hardy, good layers, and flesh well for the market. There are single and rose-combed varieties. They lay brown or tinted eggs.

The standard weights are: cock, 10 lbs.; cockerel, 8½ lbs.; hen, 8 lbs., and pullet, 7 lbs.

Dorking, Sussex and Faverolles.—These breeds are bred to a certain extent in parts of the country. The Dorking and Sussex are English breeds and are noted for having flesh of superior quality, and in this particular resemble the Faverolles, a French breed.

EGG-LAYING CLASS

Leghorn.—This breed comprises a group of varieties characterized by great activity and sprightliness. The most popular varieties are the Single-comb White, Brown, and Buff, while the Rose-comb varieties are preferred in some parts. The Single comb White is the most numerous of all Leghorn varieties.

All Leghorns are essentially egg-laying breeds, the egg being white in color. They are non-sitters. The young cockerels make splendid broilers.

The standard weights are: cock, 5½ lbs. cockerel, 4½ lbs.; hen, 4 lbs., and pullet, 3½ lbs.

Minorca.—The Single-comb Black is the most popular variety. The Minorcas have many characteristics of the Leghorns, except that they are larger and lay heavier eggs.

The standard weights for the Single-comb Black Minorca are: cock, 9 lbs.; cockerel, 7½ lbs.; hen, 7½ lbs., and pullet, 6½ lbs.

Ancona.—The Ancona is practically a "Mottled Leghorn," and has the same commercial value as the Leghorn. It lays white eggs and is a non-sitter.

MEAT-PRODUCING CLASS

Brahma.—This is a hardy breed which is well adapted for flesh production, but which is not kept extensively. There are two varieties, the Light and the Dark, the former being the more popular. The Brahma has feathered legs, a disadvantage in commercial work, and at times it does not lay well.

The standard weights for the Light Brahma are: cock, 12 lbs.; cockerel, 10 lbs.; hen, 9½ lbs., and pullet, 8 lbs.

Langshan.—There are Black and White Langshans, though there are very few of the latter bred. They have the same commercial value as the Brahmas, but are not as popular. The black feathers on the legs place the Black variety at a disadvantage in dressing for market. They are generally poor layers.

The standard weights are: cock, 9½ lbs.; cockerel, 8 lbs.; hen, 7½ lbs., and pullet, 6½ lbs.

Cornish.—There are three varieties of this breed, the Dark, White, and White-laced Red. The first two are of most importance. It is an English breed and is noted for a well developed breast, which makes

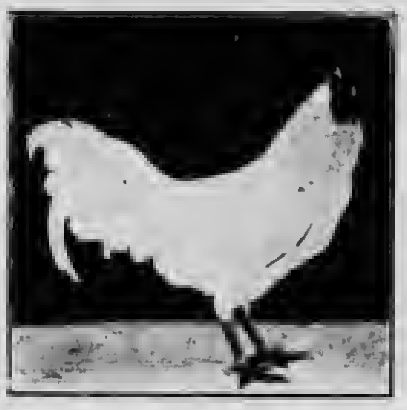


Fig. 5.—Single comb White Leghorn cockerel.

Fig. 6.—White Cornish pullet.

Fig. 7.—Light Brahma cockerel.

Fig. 8.—Single comb Brown Leghorn pullet.

it an excellent table bird. As a breed these fowls are hardy but poor layers, and most useful for improving the flesh production of other fowls.

The standard weights are: cock, 10 lbs.; cockerel, 8 lbs.; hen, 7½ lbs., and pullet, 6 lbs.

BREEDING FOR MEAT PRODUCTION

During recent years there has been a tendency to concentrate attention in poultry breeding on increased egg production exclusively. Little attention has been given to improvement of table quality in poultry, with the result that fleshing qualities in the general purpose breeds have been sacrificed. The quality of poultry sold on the market would suggest that much improvement is necessary to produce uniformity in the appearance and quality of dressed birds. Improvement can only be accomplished when a better class of stock is bred. In order to know how to produce a good table bird, the farmer should learn to judge, from the appearance and from handling the live bird, how it will dress. The main points to be noted in selecting stock to breed for roasters are: constitution, good size with fair length of body, plenty of flesh over the breast and back, a straight keel and back, and fair length in the leg, which should be well muscled. Through proper selection and mating, the table quality of poultry can be greatly improved without decreasing egg production. In many cases better methods of breeding for meat production will produce better layers.

A market bird must have type and vigor. If it has these it has the ability to put on flesh, otherwise it will be a poor feeder and a poor flesh-producer. A bird cannot flesh well if it is not bred well. The question of fleshing is not one entirely of feeding, though some believe that all chickens should fatten well if fed properly. There is a great difference in fleshing qualities, due to breeding, as has been very apparent in the fattening work at Macdonald College. Poorly bred birds will not fatten properly even when fed under the best of conditions.

In breeding for meat production care must be exercised in the selection of the male birds. Early maturity is desirable. The males should have plenty of vigor and good market type. They should have prominent breasts with good long keels; avoid the shallow-breasted bird and avoid the male with a very narrow body. The bird with a long keel will give a much better dressed appearance than a bird with a short keel.

The market demands a roaster weighing about five pounds, so that a chicken of good size must be produced. To get a chicken large enough in size care must be taken not to get them too long in the legs. Many farmers have difficulty in judging birds, as they select as breeders the largest cockerels, with long legs, with the result that they do not obtain a plump, well-dressed bird. Fowls with good long keels and moderately short legs should be selected.

Attention should also be given to the quality of flesh. This is important, particularly for a high-class market.

Fig. 9.—Showing a bird with a well shaped body and having plenty of vigor. He possesses the qualities of a profitable feeder.

Fig. 10.—Showing the bird in Fig. 9 after being fattened. Notice particularly the fleshing over the breast and keel and the plump thighs.

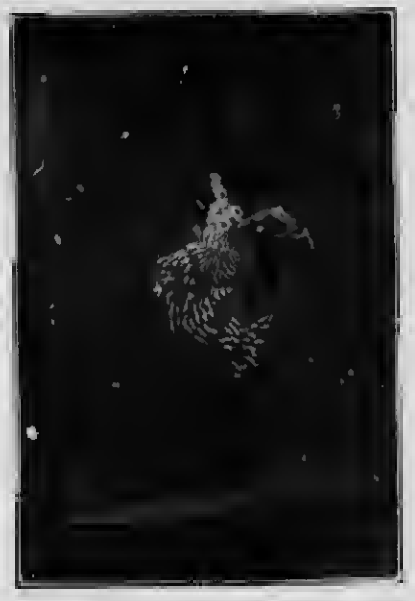


Fig. 11.—Showing a bird with a weak constitution and poor feeding qualities.

Fig. 12.—Showing the bird in Fig. 11 after being in the fattening crate for some time.

BREEDING FOR EGG PRODUCTION

Better methods of feeding, housing and general management will do much towards increasing egg production in all breeds. Some breeds will lay better than others, when handled in exactly the same manner, and certain strains of the same breed or variety will produce more eggs than other strains. We must not only breed from good strains, but we must also try to improve further the laying abilities of those strains.

A laying hen should have plenty of width and depth of body, with a long breastbone or keel. In egg production constitutional vigor is just as important as it is for meat production. Type and constitution alone, however, will not produce eggs. There are other factors of greater importance, and the ability of a hen to lay eggs depends upon her breeding.

The majority of eggs in the Province are produced in March, April, May and June; more eggs are produced at this time of the year than the market demands, and although the cost of production is low, they are worth less than at any other time. Consequently the profit on a dozen eggs laid in the spring months is lower than at any other time. What is desired is a hen that will not only lay 150 or more eggs in a year, but one that will lay well during the winter months, for winter producers are the most profitable.

The ability to lay eggs is inherited, and it requires careful and consistent selection to improve production. The heaviest yearly producers lay a good number of eggs between October and November, and these are the hens which should be selected as breeders. Spring production is of little value in determining the best producers. Heavy winter producers are the best breeders, providing they have good health and constitutional vigor.

The selection of heavy producing females may not improve the egg production of the subsequent flocks to any extent. It has been found that the male has a greater influence in transmitting the ability to lay a good number of eggs in the winter months than has the female. The hen transmits the ability to lay a normal number of eggs during the spring season, but she cannot transmit the ability to produce a large number of eggs in the winter season. This ability is transmitted by the male, and he should come from a heavy producing hen. The problem, then, is to select the heaviest winter producers and mate them with a male whose mother was known to have been a heavy winter layer. The selection of the male is very important, and it is only by using a male bred from a good winter layer that best results can be secured.

Nevertheless, good care must be exercised in the selection of the male breeders, for the mere fact that a hen laid 200 eggs in one year is not a guarantee that she will be a good breeder. Her eggs may run low in fertility, or they may hatch poorly. The problem of breeding for egg production is consequently quite difficult, for one must not only get an

outstanding male and breed this to females of high egg production, but these females should also produce eggs of good size and fertility.

Many farmers may not find it possible to use trap nests to find out the number of eggs laid by each hen in the flock. For those who can, however, it would be worth while, even if trap-nesting is done only from October to the last of February.

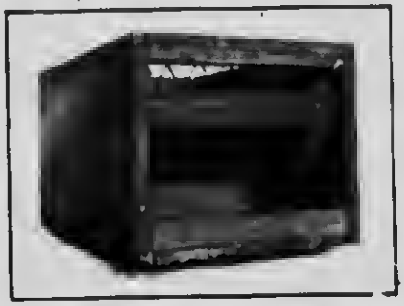


Fig. 13.—Trap-nest open.

Fig. 14.—Trap-nest closed.

A double compartment trap nest. The door is made in the shape of a cylinder and should be covered with finer wire mesh than is shown here. It is carefully balanced so that when the hen enters the second compartment of the nest her back touches the door and throws it off its balance and thus closes it. The hen must then remain in the nest until released.

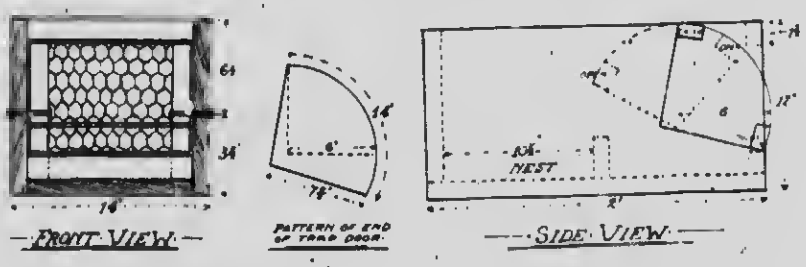


Fig. 15.—Trap-nest construction.

Fig. 16.—Trap-nest construction.

The following general principles can be applied by every poultryman. Breeding birds should be selected on the basis of constitutional vigor and vitality. Never breed from a bird which has been sick. If a bird is slightly affected at any time, place a leg band on it so that it may be identified and kept out of the breeding flock. The best layers are usually those which are active all the time; they are the first to be at work in the morning and the last to go to roost. Nearly all heavy laying hens are late in moulting. The more closely the flock is observed, the better able will one be to select the most desirable breeders.

INCUBATION

Eggs to be incubated should be selected with care. All eggs will not produce chicks. On the other hand, there are many fertile eggs which may produce chicks undesirable for rearing. The best of success, either in natural or artificial incubation, can only be expected with eggs which will hatch well and produce strong chicks. The successful renewal and

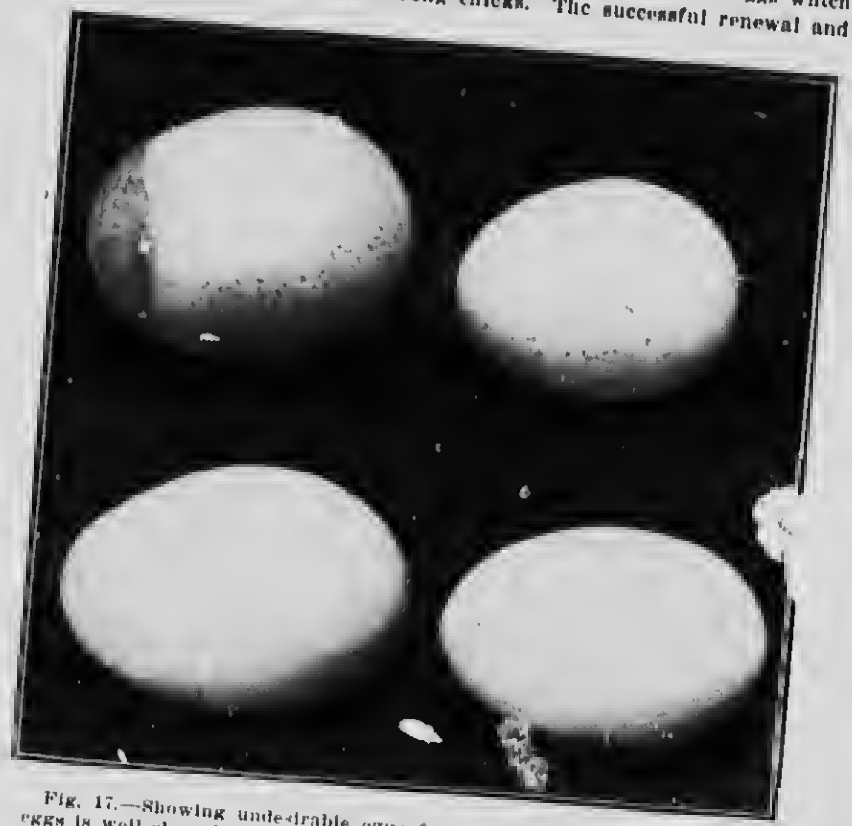


Fig. 17.—Showing undesirable eggs for incubation. Not one of these eggs is well shaped; some are too short and others are too long. Small eggs produce small chicks.

improvement of the flock is not wholly a problem of incubation. It is only one of many factors, and one which must be considered as a means to an end.

If the fertilization is weak, the most careful attention during the incubation of the eggs and the brooding of the chicks will not make up for the lack of vigor. Negligence in the management of the breeding stock and improper methods of breeding often result in poor hatches and weak chicks.

The vitality of future generations depends upon practices followed at present. The breeding stock is the foundation of the poultry industry. If farmers would use more care in the selection of their breeding stock and adopt improved methods of breeding, more satisfactory results would follow in the hatching of the chicks. In order to produce eggs most suitable for incubation, the flock should have an abundance of constitutional vigor, be well housed and fed, receive proper food, and be carefully managed at all times.

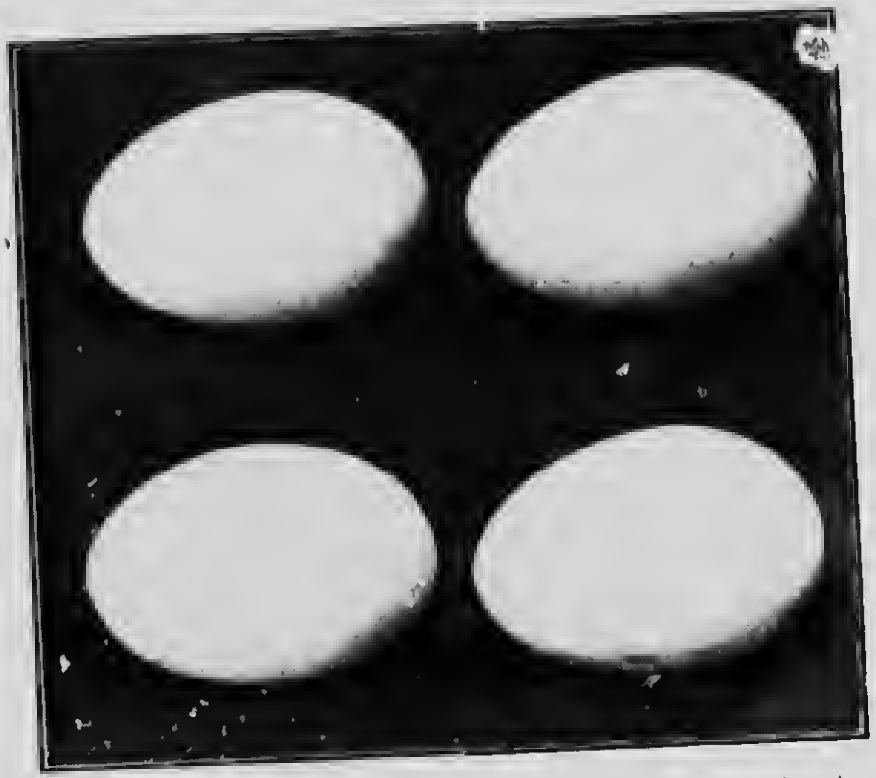


Fig. 18.—Showing desirable eggs for incubation. These eggs are of good size and good shape. Good chicks can be hatched only from good eggs.

THE SELECTION OF EGGS FOR INCUBATION

A careful selection should be made of the eggs laid by the breeding stock. Small eggs produce small chicks, and these should not be incubated. An egg uneven in shape is not suitable for incubation. Extremely long and very short, round eggs should be discarded.

However, an examination of the external appearance only is not sufficient. An egg may appear to be satisfactory, but, when the contents are examined, it may be found to be worthless for incubation.

Soms eggs may hsve cracked sheils. These may he detected hy the use of the tester or candler, such as ia used in testing eggs during incubation. Another method of detecting cracked sheils is to tap two eggs gently together, and if there is a slightly ringing sound the egga may be considered all right. If there is a duil aound, then ons of the eggs is cracked and should he avoided.

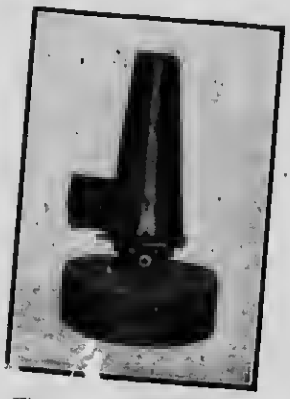


Fig. 19.—Showing an egg tester, used in testing or candling eggs. The egg is held in front of the opening in the short tube to the left, which is directly opposite the flame of the lamp. When the light from the flame is concentrated upon the egg its contents can be seen distinctly.

There may he some eggs with "broken yolka"; that is, where the vitelline membrane is broken snd the contents of the yolk are mixed with the aihumen. Such eggs could not hatch into chicks.

A "huttermilk" egg is one which, when candled, presents a coarsely spotted appearance. It has been found from experience that the majority of "huttermilk" eggs are infertile, and from those which are fertils weak chicks usually result.

The normal egg is one weighing shout two ounces, with a smooth surface, and oval in shape. The fresher ths egg the more suitable it is for incubation.

Eggs kept for hatching should not he exposed to either extremes heat or extrsme cold. The hest temperature in which to keep eggs for incubation is from 50° to 60° Fahrenheit. It is advisable to turn the eggs occaslonaily.

Farmers should test their eggs before putting them under a hen or in an incubator, and take out all eggs which are unlikely to produce good chicks.

It is not inferred, however, that infertile eggs msy be selected out of those to he incubated. There is no known method, except hy incubation, of determining whether an egg is fertile or infertile.

THE NATURAL METHOD OF INCUBATION

The numher of fowls kept on many farms is too smsli to warrant the use of an incuhator. On such places the chicks are hstched hy hens.

The ahility of the mother hen to hatch succeasfully and rear a healthy hrood of chicks is apparent whenever she steals away and in due time returns with her hrood, which she raises with little or no loss. Many people hsve hetter success in incuhating eggs under hens than in incubators. Under ordinsry conditions hen-hatched chicks are stronger than incubator-hstched chicks.

To raise chicks with hens it is necessary to have good hrooding hens, properly constructed nests, and to give careful attention during the incubation period.

The hen selected should have the hroody instinct well developed. She should he of medium size, large enough to cover well the required

number of eggs. The numher of eggs in a setting varies from eleven to fifteen, eleven in the early part of the season when the weather is cold, and fifteen later when the weather is warmer.

Breeds of the general purpose type, such as Plymouth Rocks, Rhode Island Reds, and Wyandottes are among the hest hrooders. Ths light hreeds, such as Leghorns and Anconas, are called non-sitters, and generally cannot he relied upon to hatch a setting of eggs.

The nest should he huilt carefully with fine soft hay, straw or leaves. It should he of such size and shaps that the hen will fil it nicely, affording complete protection for a singie layer of eggs. If the nest is deep the eggs may pile up and some hecome hroken. The nest should he placed in such a position that the hen will not have to fly or jump into it. A hox about eighteen inches square and ahout eight inches high makes a good nest. Place a sod of grass, turned upside down, in ths hottom of the hox and cover the sod with leaves or cut straw. The corners of the hox should he wsll filled, and the sod should he made slighily hollow in the centre. The moist earth tends to retard the drying up of the watery content of the egg nnd is conducive to a good hatch.

The room for the sitting hens should hs secluded, fairly light and cool. It will he found convenient and satisfactory to set a numher of hens, so that they can he cared for at the same time. Whsre a numher of hens are sitting in the same room it is wise to have the nests covered so that each hen will hs confined to her own nest. At feeding time the hens can he allowed to feed together, hut each hen should return to her own nest and ths door of the nest should be closed.

Place a dust hox in the room so that the hens can dust themselves.

The hest time to set a hen is after dark. Have the nest carefully prepared and, if convenient, place two or three infertile or nest eggs in the nest; then very carefully place the hen on the nest and do not disturh her for the first day. When she is sitting well the eggs may he placed under her.

At the time of sitting it is very necessary to dust the hen thoroughly with insect powder. Some hens may hecome so hadly infested with lice that they will leave their nests. To disinfect the hen, take her hy the feet, holding her head downwards, and sprinkle the powder well into her feathers, then ruh the powder around the joints. Dust the hen again in ten days, and a third time just hefore the eggs hatch.

The food should consist of hard grains, such as wheat, oats, corn, or a mixture of these. Where the hens are confined, green food should he given occasionally. Grit and clean water should he kept hefore them always.

At hatching time do not disturh the hen. Let her sit quietly after the nineteenth day, hut watch her closely to see that she does not leave ths nest with the first chick which she hatches. She should he allowed to remain on the nest for a few hours after all the chicks have hatched.

THE ARTIFICIAL METHOD OF INCUBATION

There are various types of incubators manufactured. The principle of supplying heat to the egg chamber is essentially the same in all makes. Minor differences are usually of little importance. There is, however, considerable difference in the quality of construction among the various makes of incubators. The standard makes will prove most satisfactory. There are many machines placed on the market which may hatch successfully for one or two seasons and then become practically worthless. Such have been constructed of cheap materials, have not been put together very well, and cannot be relied upon to give satisfaction season after season. It is wise to avoid inferior makes and to secure a durable and efficient machine.

Fig. 20.—Showing chicks with the incubator in which they were hatched.

The incubator should be given a good location. A cellar or a semi-basement about four feet below and about three feet above ground makes the best room for the incubator. The room should be well ventilated, but free from draughts. The floor of the room should be clean. The temperature should be fairly constant so that the heat of the incubator chamber will not be affected too much.

Success in incubation depends upon the method of operation, particularly during the first week. It is well, for amateurs especially, to follow closely the directions of the makers of the incubator. When experience is gained the manufacturers' directions may be varied to suit local conditions. The incubator should be started a few days before the eggs are to be placed in it, so that an even temperature may be maintained. The

heat regulator should he properly adjusted to make accurate record of any variations in temperature.

A temperature of 103° should be the registered temperature on a level with the tops of the eggs as they lie upon the trays.

An important factor which has to do with the maintaining of a uniform temperature is the flame. The lamp requires to he filled with oil every morning. The wick should he trimmed at the same time, in such a manner as to give a hroad, even flame, the corners of which are slightly rounded. When a new wick is to be used the rough edges should he hurned off hy holding the end of the wick in the flame of a lighted match. The proper method of trimming the wick is to ruh off the charred portion with the fingers and then light it. if an even flame does not show when the wick is turned up, remedy the defect and he very sure to round off the corners of the wick so that no smoking will result.

The lamp should be attended to after the eggs are turned and aired in t . morning.

During incubation the eggs require to be turned; the turning should hegin on the third and co1 tinue until ahout the eighteenth day. For all practical purposes, turning twice each day is sufficient. The best method is simply to "shuffle" the eggs; that is, remove a few eggs from the front of the tray as it rests on top of the incuhator, then roll the rest of the eggs forward, and place those taken off at the hack of the tray.

For good results the eggs must be given fresh air, and the circulation of the air through the incuhator chamber should he rapid enough to supply sufficient oxygen for the living embryo. Some incuhators are supplied with automatic ventilation. With those incuhators which are equipped with ventilating devices, the ventilators should he kept closed during the early period of the hatch and gradually opened as it proceeds.

If the ventilation is too rapid the eggs will lose much moisture. Where the evaporation of the watery content of the egg is excess.v., moisture must he suppiled. it seems hest to supply moisture from the beginning. Some incuhators are equipped with moisture trays, while in others a shallow pan or dish may be filled with water and set in the bottom of the incuhator chamber.

A fertile egg will show signs o. .evelopment when incubated for a few hours. On the seventh day the germ has developed sufficiently to distinguish a fertile egg from an infertile one. An infertile egg shows no signs of development during incuhation.

To determine whether an egg is fertile or infertile, it is tested with the egg tester or candler. The condition of the egg may he seen when the egg is placed hetween the light of the tester and the eye.

Testing is done on the seventh and again on the fifteenth day. The first test is for the purpose of removing all infertile eggs and "hlood rings" (eggs in which the germ has died during the early part of incubation). The second test is to elimlnate from the incuhator all eggs whose embryos have died since the first test.

Fig. 21.—Showing an egg where the lining of the yolk (the vitelline membrane) is broken and the yolk is intermixed with the albumen. Such an egg cannot hatch into a chick.

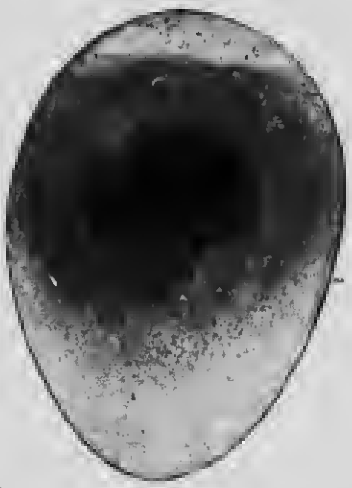


Fig. 22.—Showing an infertile egg. No development has taken place. Note the size of the air space in the large end of the egg.

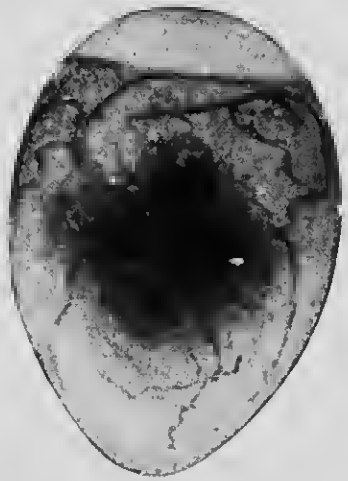


Fig. 23.—Showing a fertile egg on about the seventh day of incubation. The head and body features are quite well developed. Blood vessels extend into the albumen.

Fig. 24.—Showing the chick after twenty-one days of incubation.

While the chicks are hatching it is wise to keep the incubator chamber dark. This will tend to keep the chicks quiet, and they will not be inclined to crowd to the front of the incubator. The chicks should not be removed from the incubator until several hours after the last chick has hatched.

The flame of the lamp should be gradually lowered while the chicks are hatching, for they give off considerable body heat. If the chicks start to pant, open the door of the incubator a little to give ventilation. While the chicks are kept in the incubator, the temperature should be lowered gradually, as in this way the chicks are prepared for the brooder. It is advisable to keep the chicks on the egg tray until they are well dried.

Every incubator should be disinfected with a five per cent. solution of carbolic acid or a two per cent. solution of creolin before and after every hatch.

BROODING

Unless a chick is strong and active when taken from the incubator it should be killed. Usually the weak and puny chick is not worth saving; the majority of chicks which are weak at the time of hatching die before reaching maturity, and of those which survive comparatively few become profitable fowls.

There are few conditions so disastrous to chick rearing as overcrowding. As an individual, a healthy chick may be quite robust, but when placed with one hundred other chicks it may have a small chance to attain normal growth. The larger the number of chicks brooded together the smaller are the chances for any of them to grow properly and the greater the risk of loss of life. There is, of course, little danger of overcrowding when chicks are brooded with hens, but when brooded artificially there is a tendency to brood them in large numbers. Ordinarily the number of chicks to be brooded together should not exceed 50, but there are some exceptions to this, for with very careful management, particularly in regard to heat, about 150 can be brooded together.

THE NATURAL METHOD OF BROODING

The brooding of a limited number of chicks with hens is much easier than brooding them with artificial brooders. A good broody hen which has hatched her chicks successfully will usually take good care of her brood. The average hen will brood from ten to fifteen chicks quite successfully.

Where a number of hens hatch their chicks at the same time, the various broods may be divided among a portion of the hens and the balance may be placed in the laying-pen.

There are many who believe that they can get better and stronger chicks by using hens to do the hatching and raising, while there are some who can operate an incubator successfully but cannot raise the chicks in brooders. In such cases the chicks should be raised with hens. Take a sufficient number of hens to accommodate the chicks and set them three or four days before the hatch is expected. Give each hen two or three eggs from the incubator and let her hatch them, and when the incubator chicks are all hatched give her ten or fifteen chicks. The chicks should be placed under the hen at night, and in the morning she will take to them properly.

One of the first things that should be done is to make sure that the hen and chicks are entirely free from lice. Dust the hen thoroughly with insect powder.

During the first two or three weeks it is advisable to keep the hen confined in a coop. The little chicks should not be allowed too much freedom at first, nor should they be allowed out of the coop while the grass is damp with dew or rain.

Fig. 25.—A serviceable coop for raising chicks with hens. It is a combination hatching and brooding coop.

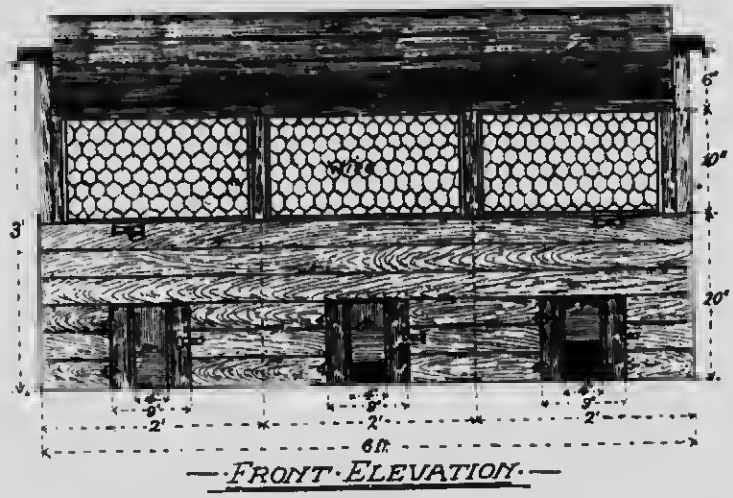


Fig. 26.—Combination hatching and brooding coop.

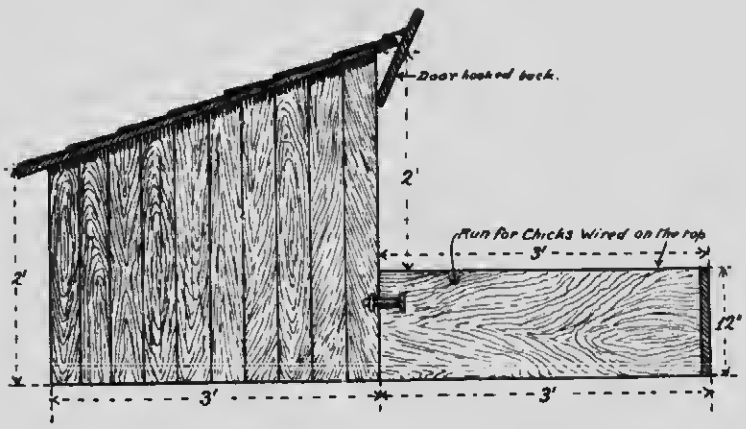


Fig. 27.—Combination hatching and brooding coop.

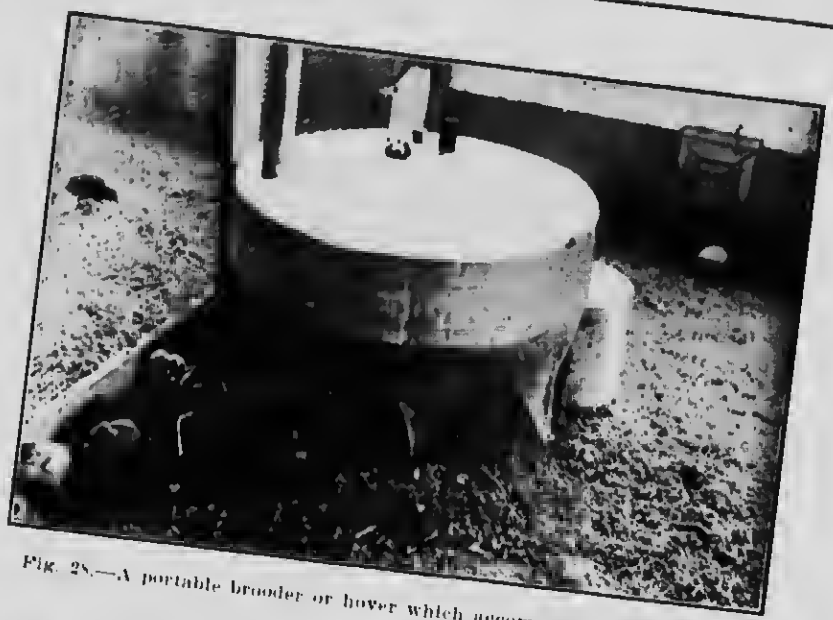


Fig. 28.—A portable brooder or hover which accommodates fifty chicks.

Fig. 29.—A stationary or room brooder.

It is advisable to make the coop as serviceable and economical as possible. Avoid making a lot of cheap coops which in a short time become useless. This is a common mistake on many farms.

The most serviceable coop is one which serves to brood the chicks and to house them during the growing season after the brooding period has ended.

Yards and fences are not necessary, except where a large number of chicks are being brooded at the same time. The coops may be placed in different parts of the orchard and fields, and in this way the chicks are given free range on clean soil. It is important to avoid keeping a large number of chicks on the same ground year after year. By keeping the soil sweet and clean the chicks can usually be kept in good health.

Fig. 30.—A permanent house adapted to the use of portable hovers.

THE ARTIFICIAL METHOD OF BROODING

Warmth is the first requirement of young chicks. When the chicks are placed in the brooder the temperature should be about 95°, and this should be lowered gradually from week to week, depending on the season. In the early season the chicks will require brooding at a higher temperature for a longer time than later on. Chicks that are hatched between the first of April and the middle of May (which is about the best time to hatch in Quebec) should be brooded for about six weeks.

It is better to keep the temperature a little on the cool side rather than too warm, for too high a temperature during the first two or three weeks often causes leg weakness.

The type of brooder which the farmer should use will depend upon the number of chicks he raises each year. Under certain conditions fire-

less brooders may give fair satisfaction, but they cannot be recommended for general use. Most farmers will find the portable brooders quite satisfactory for raising a few hundred chicks. Where a larger number is to be raised the stationary brooder may be used.

In many cases the brooders are placed in permanent houses, but if they can be placed in portable houses the chicks will do better. The portable houses can be moved from one field to another, or they can be

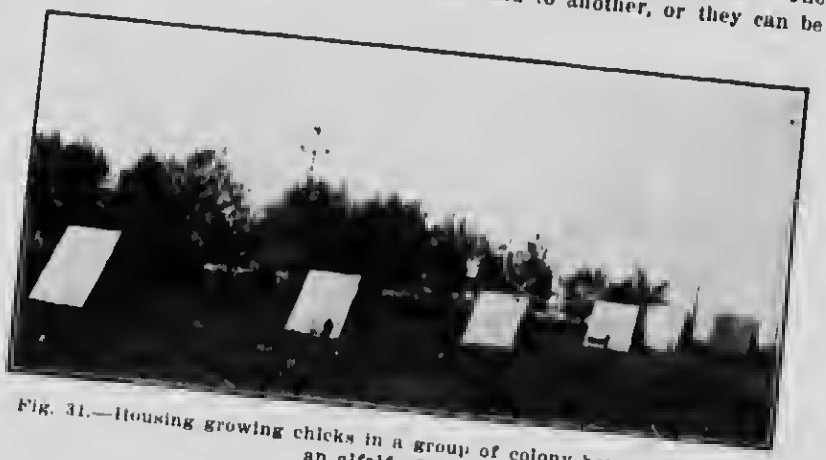


Fig. 31.—Housing growing chicks in a group of colony houses located in an alfalfa field.

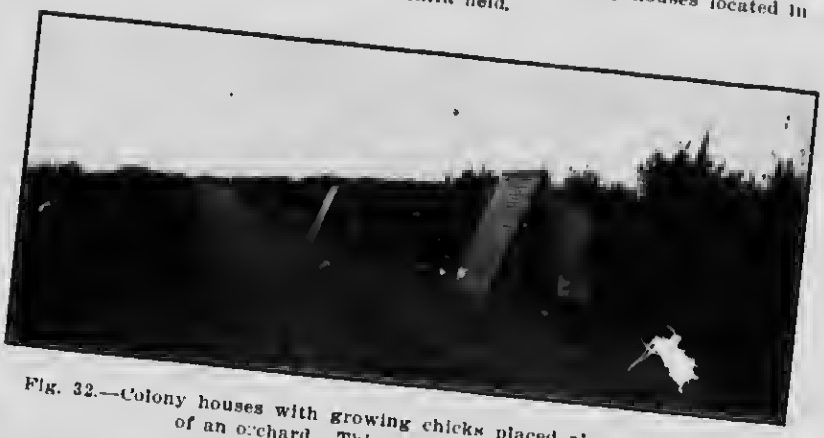


Fig. 32.—Colony houses with growing chicks placed along the headland of an orchard. This makes an ideal place.

located in different parts of the orchard each year. In this way the chicks are raised on fresh soil and will always grow faster. A cultivated field where a certain amount of green food is available is an almost ideal place for growing chicks. They require plenty of freedom, and overcrowding them on a small area of land will cause much trouble.

Give the chicks plenty of shade. On most farms the chicks have access to shade trees and buildings during hot weather, but on some farms chicks

Fig. 33.—Showing ground plan of colony house for growing stock.

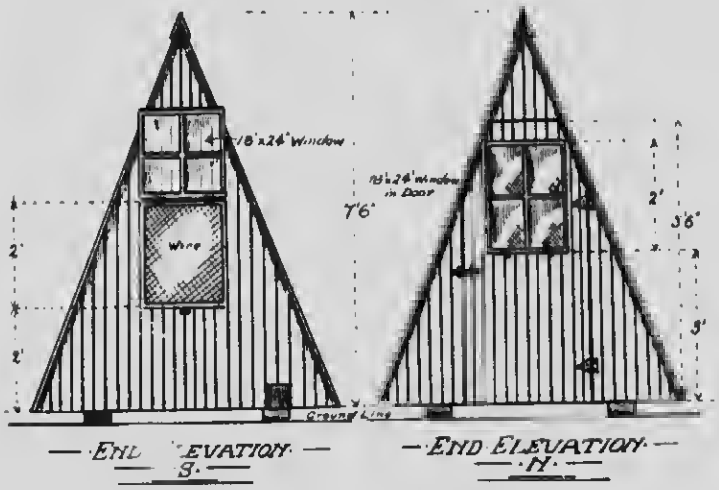


Fig. 34.—Showing construction of colony house. It is not advisable to use this house as a brooder house.

Fig. 35.—An excellent house for brooding and rearing chicks. It is convenient and serviceable.

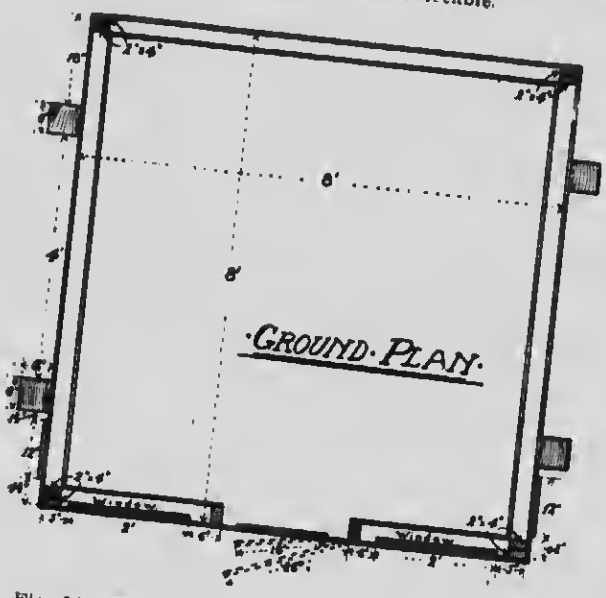


Fig. 36.—Showing ground plan of house in Fig. 35.

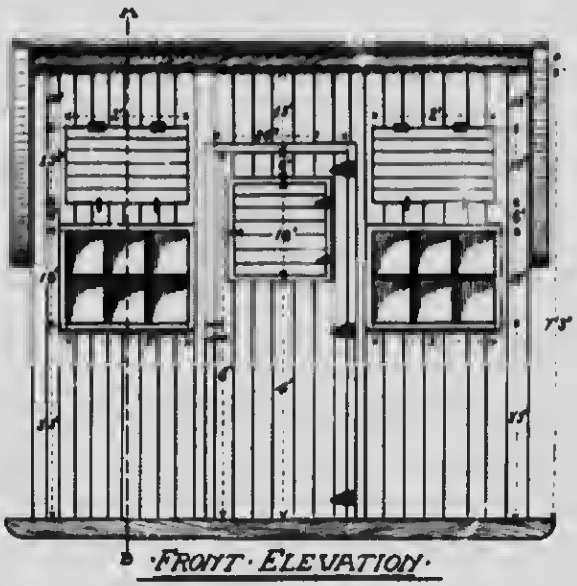


Fig. 37.—Showing front elevation of house in Fig. 35. The small ventilating door in this sketch is different from the door in the photograph and probably will tend to check any draught on the floor.

Fig. 38.—Showing side construction of house in Fig. 35.

are raised in small bare yards where they have not the slightest chance to do well.

All brooders and brooding quarters should be thoroughly and regularly disinfected.

Fig. 39.—An A-shaped house for brooding chicks and for housing the growing stock.

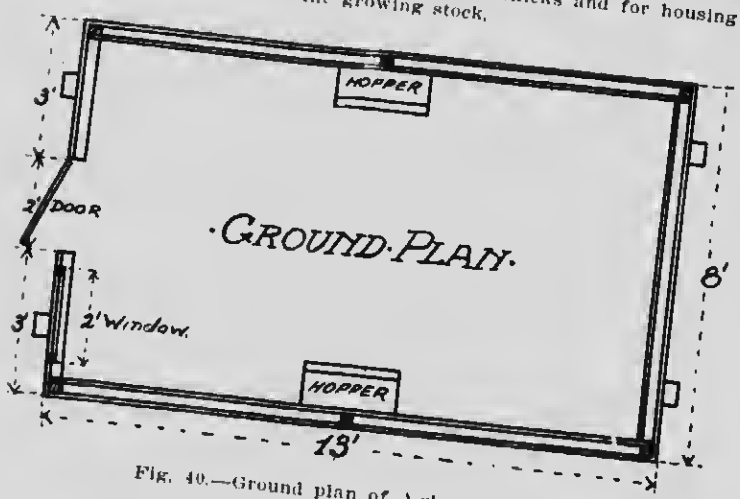


Fig. 40.—Ground plan of A-shaped house.

The houses in which the growing stock is kept should provide ample protection from the weather, and should be comfortable. The house should be well ventilated, so that the birds are supplied with fresh air at

all times. Never keep chickens in stuffy houses, as they are sure to become weak and of little value.

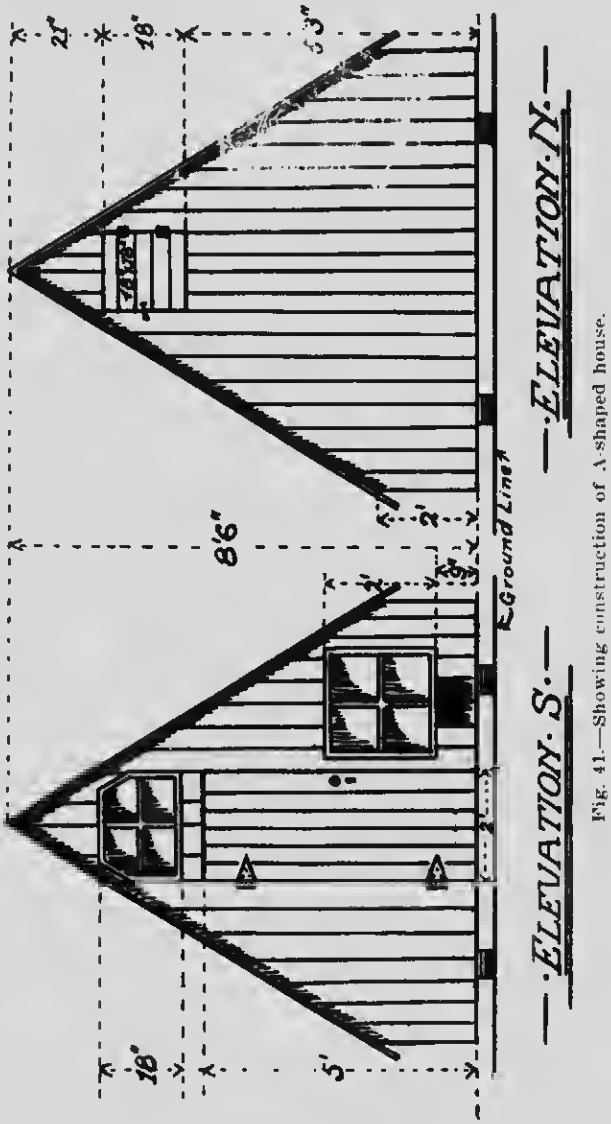


Fig. 41.—Showing construction of A-shaped house.

The houses should be economical and convenient. Rough or second-hand lumber from some old building can be utilized. It is best to have a number of colony or portable houses, which can be moved from place to place as the chicken range is changed from year to year. Each house

should be large enough to accommodate about fifty chicks without crowding. When the colony house is very small it is hard to ventilate and there is a tendency to overcrowd the chicks. With a fair-sized house there is the advantage of being able to brood the chicks with a portable brooder in the same house in which they are afterwards raised. A house six feet wide by eight feet long will accommodate fifty chicks in comfort. A house eight feet wide by twelve feet long will accommodate about sixty to seventy-five chicks, and can easily be moved by a team of horses. Ventilators or windows which can be opened should be placed in the ends of the house, but draughts across the floor or roosts should be avoided under all circumstances.

The houses are placed on skids or runners and should be placed at intervals about the range. In the early season they can be placed in the orchard, and then when the grass gets dry and tough the houses can be moved to the corn field or other places where the chicks will be able to obtain plenty of green food. If green food is not available, it should be supplied. For this purpose raise quick-growing succulent crops.

Keep the floor of the house well covered with good dry litter. It is wise to prevent the chicks from roosting when too young, as crooked keels often result. Roosts should not be placed in the colony house until the birds are about ten weeks old.

Throughout the growing period the houses should be thoroughly disinfected every week with a two to five per cent. solution of disinfectant. Above all have the houses well ventilated, keep them sweet and clean, and do not overcrowd the chicks.

FEEDING THE CHICKS

Do not feed the chicks until they are about thirty-six hours old. Indigestion and bowel trouble often result from careless feeding. A little grit, clean water and sour milk should be given first. The latter is one of the best poultry foods we have, and if given at all it should be given regularly. Sour milk seems to keep the digestive tract of the chick in good condition, and it does much to combat white diarrhœa.

We have found that a mixture of cracked wheat, cracked corn and oatmeal gives the best results. The oatmeal may be fed separately if desired, in which case it is fed twice daily, while the mixture of cracked wheat and corn is fed three times a day at the start. Little chicks should be fed a little at a time, and often. The grain should be fed in fine cut straw or other clean litter, as the chicks should be made to take plenty of exercise. Oatmeal is a fine food for growing birds and is relished by the chicks. If cracked wheat and cracked corn cannot be secured locally, a good brand of commercial chick food may be used.

Chicks with hens are fed in practically the same way as chicks with brooders. We have had good success in feeding a mixture of bread crumbs and boiled eggs, but this must be fed carefully. We have found from experience that chicks cannot handle large quantities of egg while very young, and grain feeding is safer. The mixture of bread crumbs and eggs may be fed after the chicks are about ten days old. Four parts by weight of bread to one of egg makes a good mixture.

During the first few weeks the chicks are fed five times a day, giving cracked grain three times and alternated with oatmeal twice, or the bread and egg mixture may be fed in place of one of the oatmeal feedings.

A liberal supply of green food is very necessary, when the chicks cannot get out much. Lettuce and sprouted oats are probably two of the best green foods for chicks. To sprout oats, take a quantity and soak in warm water for twenty-four hours, then spread the oats out about an inch thick on the floor of a fairly warm room, or place them in shallow boxes. Keep them moistened until the sprouts are about three or four inches long. The chicks are very fond of green food, and it does much to promote growth.

After the chicks are about one week old they require a little animal or meat food. Sour milk is excellent for this purpose, but beef scraps should be fed in addition. The beef scraps are usually given with ground grains, and at first the proportion of beef scraps to dry mash should be about 5 parts of the former to 95 parts by weight of the latter. When the chicks are six weeks old the proportion of beef scraps can be increased to 10 per cent. of the mash ration. A good mixture for dry mash is made up of wheat bran, 35 lbs.; oatmeal feed, 20 lbs.; cornmeal, 20 lbs.; middlings, 15 lbs.; beef scraps, 5 lbs., and finely ground charcoal, 2 lbs. This should be fed for the first few weeks, and later add 10 lbs. of beef scraps and use only 10 lbs. of middlings.

When the chickens are eight weeks old, three meals a day will be sufficient, particularly where a hopper of dry mash is kept before them. We have had good results by feeding a little moistened mash after the chicks are about a week old. The mash mixture given above is slightly moistened with water or sour milk, and is given once daily. This makes the chicks grow rapidly, but it must be fed in small quantities and slightly moistened.

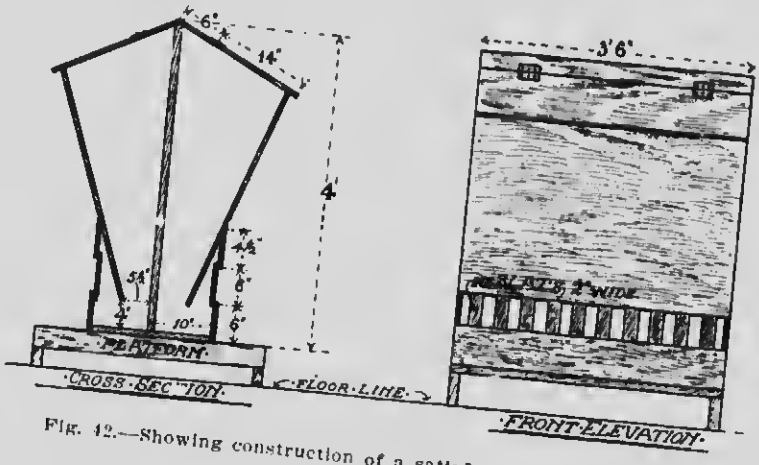


Fig. 42.—Showing construction of a satisfactory outdoor hopper.

The method of feeding chicks after they are taken from the pens or brooders is much the same as during the brooding period. The chicks must be given plenty of good food, consisting of a variety of grains and other materials. Where one hundred or more chickens are being raised, the time and labor required for feeding can be greatly reduced by placing a quantity of mash feed in self-feeding hoppers. Hopper feeding of mashes gives good results where the chicks have free range over cultivated fields. At least one feed a day, however, should be fed by hand. Whole wheat and cracked corn are used chiefly, and feeding these by hand once or twice daily will give better results than feeding them in hoppers. All chickens get a better chance when hand-fed, and sparrows are prevented from eating large quantities of the grain. On the other hand, the dry mash should be fed in hoppers which are placed near the houses. The following mash is good for growing stock:

Wheat bran	100 lbs.
Ground oats or oatmeal feed	50 lbs.
Cornmeal	50 lbs.
Middlings	50 lbs.
Beef-scraps	20 lbs.
	270 lbs.

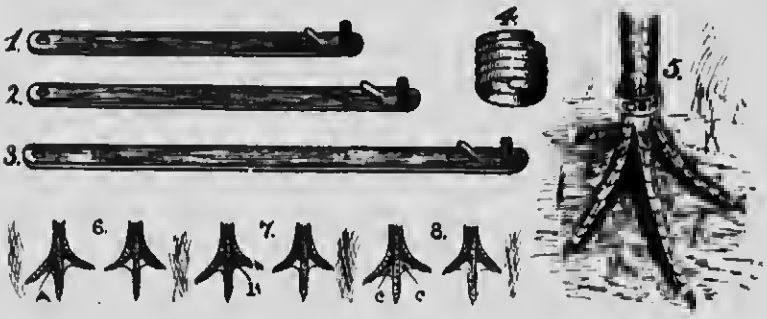


Fig. 43.—Showing methods of marking chicks. Nos. 1, 2 and 3 show different sizes of leg bands for different sizes of birds. No. 1 shows a colored celluloid leg band. Combinations of colored bands can be used in poultry breeding work. Also these bands can be used to distinguish fowls of various ages. No. 5 shows a numbered leg band on the leg of a fowl. These bands are used in breeding work. Nos. 6, 7 and 8 show three pairs of chicks' feet, illustrating the various ways in which the webs of the feet are punched. Pair No. 6 is punched in the outer right web at A. Pair No. 7 is punched in the inner right web at B, and pair No. 8 is punched in the outer and inner right webs at C. Poultry can also be marked very effectively by inserting a band in the wing. This method is permanent and is one of the most effective methods employed.

Fig. 44.—A labor-saving device, showing method of providing chicks with a continuous supply of fresh water. The barrel is fitted with a water valve which controls the flow of water. No. 1 is the pipe entering the barrel and fitted with a stop cock. No. 2 is water in the water cup. No. 3. When the water cup is full the weight is sufficient to close the stop cock in the pipe.

This mash can be moistened and fed once a day in troughs. The feed
ing of the moistened as well as the dry mash will induce quicker growth.

Chicks of different ages should not be raised together. The older ones
will crowd the younger, and poorly developed chickens will result. Raise
the growing stock of various ages in separate flocks, as it is only in this
way that a majority of good mature birds can be obtained.

Separation of the chicks according to sex is also necessary. The time
for separating varies according to the breed, cockerels of the egg-laying
class should be removed from the pullets when eight to twelve weeks old,
while cockerels of the general utility and meat-producing classes may run
with the pullets a little longer.

THE SUMMER CARE OF SURPLUS STOCK

All surplus chickens are usually sold as broilers, fryers, capons or roasters. Each class has its season of demand with corresponding market prices. The farmer, therefore, should study market requirements and conditions so that he may be able to dispose of his stock to good advantage.

There are comparatively few broilers sold in the markets of the Province, and the broiler trade has been developing somewhat slowly. The supply of good quality broilers has been limited, and this has had a tendency to retard the demand.

Broiler raising as a specialized business can be carried on successfully by comparatively few people. Those in close proximity to the better markets of the cities, and those who can get good prices at the various summer resorts in the Province, sometimes make good profits in raising broilers. Otherwise, the average farmer will find roaster production more profitable.

In order to make the largest profits in raising broilers, an early maturing strain of fowls must be used. The Leghorns and other light breeds mature faster than do general utility and meat breeds and are thus better suited for the production of squab and medium broilers. On the other hand, good strains of some of the general utility breeds, such as the White Wyandotte, are quite suitable for the production of large broilers. All white feathered birds look better when dressed than do those with dark feathers.

Chickens intended for broilers are reared with the rest of the chickens until a short time before they are marketed. Under proper management the chickens will grow rapidly. When they weigh about one pound each they should be put into small yards or pens, though care should be taken to avoid overcrowding. Where a large number of broilers are being fattened, they may be put in fattening crates. At this age they will tend to grow more than to fatten, but a little fattening food while in confinement will produce more meat and the quality will be improved. The first feed given after they are confined should be their growing ration while on range. This should be gradually changed to a more fattening ration. A good ration consists of equal parts oatmeal feed, cornmeal and ground buckwheat, to which has been added ten per cent. of beef scraps; that is, the ration would contain:

Oatmeal feed	30 lbs.
Cornmeal	30 lbs.
Ground buckwheat	30 lbs.
Beef scraps	10 lbs.
	100 lbs.

These ground grains should be thoroughly mixed and then moistened with sour milk. The wet mash is fed in troughs twice each day, giving

Fig. 45.—A good colony house located in an ideal place for growing stock.

Fig. 46.—A flock of S. C. White Leghorn cockerels. They will average about two pounds each live weight and make fine broilers.

the broilers all they will eat at each feeding. If sour skim-milk is not available, water may be used. Low grade flour or wheat middlings may be substituted for the ground buckwheat.

A fryer is a chicken somewhat older than a large broiler and weighing usually from two and one-half to three and one-half pounds dressed. It has more meat in proportion to the total body weight than a broiler and is suitable for frying. There is very little demand for fryers in this country. Their summer treatment is much the same as for broilers.

The great bulk of surplus stock is sold as roasters, and this is the staple trade for farmers. A roaster is a matured chicken from above five to twelve months old, which, when properly fattened and finished, weighs from four and one-half to six pounds dressed.

The general utility breeds, such as the Plymouth Rocks, Rhode Island Reds and Wyandottes, are very suitable for the production of roasters. If large roasters are desired the Light Brahma could be used. With good care and plenty of food, Brahma chickens will attain great size, though as a rule they will not mature as quickly as the general utility breeds.

Chickens intended for roasters are reared with the rest of the chickens until the fall of the year, giving proper consideration to the separation of the chicks according to age and sex. If White Leghorns or similar breeds are being kept it will doubtless be more profitable to dispose of all surplus cockerels and pullets as broilers rather than to keep them for roasters, since egg-laying breeds do not fatten well. The majority of farmers, however, are keeping a general utility breed, and it is wise to keep all surplus stock to fatten when matured.

THE SUMMER CARE OF PULLETS

During the early part of the growing season, the pullets which are to be kept for laying purposes are reared with the rest of the chickens of the flock and receive the same attention. As the season advances, the cockerels and undesirable pullets are selected from time to time to be sold as broilers, or later to be fattened as roasters; the pullets intended for laying are kept by themselves. They must be given proper treatment to ensure their being in good laying condition at the proper time.

Pullets should be ready to lay about the middle of October or the first of November. The majority of the general utility breeds, Plymouth Rocks, Wyandottes, and Rhode Island Reds, do not begin to lay before they are six months old, so that they should be hatched before the first of June. Birds of the egg-laying type may be hatched up to the middle of June, as they mature more rapidly than other breeds and consequently begin laying earlier.

The growth of the pullets to maturity should proceed without interruption, because a check to growth at any stage retards laying at maturity. Influences which are unfavorable to the development of the body will also be unfavorable to the proper development of the reproductive organs, upon which successful egg-production depends. Free range on clean soil, with plenty of green food and shade, are essentials for good growth. The method of feeding the pullets should be the same as the method outlined under rearing.

Avoid disturbances to the flock. The growing pullets should be kept in the same place and under the same conditions as far as possible. If the pullets are moved several times during the growing season it will undoubtedly retard normal growth and egg-laying at maturity. They should receive regular treatment and careful handling at all times, for young pullets are very sensitive to strange objects and conditions.

In the fall of the year the pullets are moved from their summer to their winter quarters. This is necessary because the pullets should be raised on free range and on different parts of the farm each succeeding year. In order that the pullets may lay by the first of November they should be in their winter laying quarters by about the middle of September. They will then have a good chance to settle down and become acquainted with their new conditions. The moving of the birds should be done as quietly as possible.

Every care should be taken to select the best pullets for the laying pen; they should be well matured and in good, thriving condition. A diseased or an unthrifty bird should never be placed in the laying flock. Every effort should be made to keep up the constitutional vigor and vitality of the layers, if good egg production is to be secured.

HOUSING THE LAYING STOCK

One of the things upon which profitable egg production depends is a good, comfortable house. The more eggs laid during the winter months, the larger are the profits from the farm flock, but in Quebec the difficult question is to make the hens lay during the cold months of the year. On some farms the hens are allowed to roost in a draughty shed, and on other farms the hens are kept in the horse or cow stable. There are on many farms, however, poultry-houses that are often too small, poorly ventilated and with damp floors. Poor housing conditions are often responsible for a low winter production from a good flock.

It cannot be said that any particular type of poultry-house is the best; local conditions determine to a large extent the exact type which will give good results. At the same time, there are general principles which apply in all cases.

A poultry-house should be comfortable, light, dry, and with a good supply of fresh air, but free from draughts. It may be necessary to provide curtains in front of the house, and perhaps occasionally in front of the roosts on very cold nights. One should not be too dependent upon the use of curtains and they should be made more or less stationary features. Use a cheap grade of cotton for curtains, for it is as satisfactory as the more expensive grades.

Houses with open fronts or cotton fronts have proved quite satisfactory, even in the most severe weather, for egg production is good and the fowls keep in a thriving and vigorous condition. Chicks hatched from stock kept in [illegible] or cool houses are usually much stronger and thriftier than chicks [illegible] from stock kept in warmer houses. A house which is open on the south side must be well built on the other three sides in order to make it draught-proof.

The location of the house should be dry. If the ground is wet or damp it should be well drained. This may be done by putting in a tile drain or an open ditch. The yards should be drained so that they will be dry most of the time. Damp ground is cold and it soon becomes sour and unhealthy. Chickens grow best on a sandy or gravelly loam. Both of these types of soil are usually easily drained and may be kept in a nice sweet condition.

Houses that face the south secure the largest amount of exposure to the sun's rays, which the fowls enjoy. A slightly eastern exposure is to be preferred to a western exposure unless the prevailing winds are from the east. At Macdonald College the poultry-houses face due south, and we find this very satisfactory.

A safe working rule is to allow about four to six square feet floor space per bird. The lighter breeds, Leghorns and Anconas, are more active than the general utility breeds, Plymouth Rocks and Wyandottes,

and they will stand slightly more crowding. It is a good plan, however, to give the birds as much room as possible, keeping in mind the cost of construction per bird.

Small flocks usually pay better than large ones. A flock of twenty-five birds will usually lay more eggs per bird than a flock of one hundred. It will cost more, however, to construct four houses for four flocks of twenty-five birds each than one house for one hundred birds, and it will take more labor to care for the four flocks. The larger egg production secured from the smaller flocks would doubtless more than offset the extra cost of labor. Then, again, a flock of one hundred birds can be divided into four flocks in one large house.

Damp air in the poultry-house is fatal to egg production. It is much better to have a cold dry house than a warm damp one. Hoar-frost on the walls of a house is the result of warm, moist air coming in contact with the cold walls. If the foul air is gradually mixed with fresh air, no rime will occur.

An earth floor is frequently satisfactory where the soil is light in texture and well drained. Otherwise a board or cement floor is better, and preferably the latter, as it is more durable and sanitary.

The nearer square a house is—other things being equal—the less lumber it will require. A long narrow house is colder than a short deep one, because it has a larger area of exposed surface and it is more inclined to be draughty.

The shape of the roof influences the cost of construction. The steeper the pitch the greater the cost of building, particularly with a shed-roof house as compared with a gable or combination-roof house. On the other hand, the steeper the pitch the longer it will last. Most roofs are one-fourth pitch, while shingle roofs should be one-third pitch.

A poultry-house should be of simple construction, and the fewer permanent fixtures there are the better. The feeding hoppers, dusting boxes and nests should be movable in order to make the house easy to clean.

The roosts should be made low down, particularly for the heavier breeds. Leghorns require about eight inches of perch room, Plymouth Rocks nine, and Brahmas ten. The roosts may be made of two by four inch scantling or of two by two inch pieces, with the corners slightly rounded.

When a dropping-board is used it should be made low down to admit of easy cleaning. For one roost, the dropping-board should be twenty inches wide, and for two roosts the boards should be three feet wide. It should be made of matched lumber and should be well constructed, especially where nests are located under the dropping-board. We do not use dropping-boards at all and we find that we save much labor.

Nests are made about twelve by fifteen inches, and they should be dark, as this tends to prevent egg eating.

Hemlock or yellow pine is frequently used in the construction of poultry-houses.

THE COLONY HOUSE

We have tried different styles of poultry-houses and have found most of them satisfactory, though adapted for different purposes. The colony house is especially adapted for a small flock and is very suitable for those who keep a few chickens on a town lot. The house in use at Macdonald College is eight by twelve feet and will accommodate twenty-five hens. It is movable, and when used on the farm may be drawn near the barn for winter use and into the orchard or field for summer. The gable of this house is filled with straw, which tends to keep it thoroughly dry at all times.

The lumber necessary for the colony house is:

324 feet 1 in. × 4 in. × 12 feet, planed, tongue and grooved.
2 pieces 4 in. × 4 in. × 13 feet.
96 feet 1 in. × 6 in. × 12 feet.
4 pieces 2 in. × 4 in. × 12 feet.
17 pieces 2 in. × 4 in. × 6 feet 3 in.
16 pieces 2 in. × 4 in. × 8 feet.
36 feet 1 in. 2 in. × 1 in.
12 pieces 2 in. × 1 in. × 6 feet.
15 pieces 1 in. × 5 in. × 12 feet.
18 feet 1 in. 1 in. × 2 in. window slide.
108 feet flooring 12 feet long.
150 feet spruce 5 × 10 in. wide, 13 feet 1 in.
1 piece 2 in. × 4 in. × 12 feet.
2 pieces 4 in. × 6 in. × 13 feet (runners).

THE 100-HEN HOUSE

We have been using at Macdonald College two houses which are especially adapted for farmers' use, and they have given good satisfaction. They are both open front houses, curtains being used in cold weather. There is practically no difference between them except that the "Tolman" house is a little more comfortable on extremely cold days. It is a low built house, and is a little more sheltered than the "Macdonald" house. On the other hand, the "Macdonald" house is lighter, and is more comfortable in mild and warm weather.

In using curtains in these houses we try to make it as simple a matter as possible. The houses are left open as much as possible, and we use more curtain as the weather gets more severe. In the front of the "Tolman" house there are five sections, and it is very rarely that all of the sections will be covered with cotton. In the late fall, when the first cold weather comes, we put cotton over each section at the ends of the house, leaving the three centre sections open. When colder weather sets in, we put cotton over two more sections, leaving the centre one open entirely, unless it drops to 20° below zero.

We have made an improvement in the "Macdonald" house by placing a frame of shutters over the opening in front. The shutters are each two inches wide and they overlap one another about one inch. This makes the house a little darker, but it serves to break any possible draught into the house and it keeps out all rain and snow. The cotton curtain is used beneath the shutters in very cold weather only.

These houses have given good results and can be recommended for general use. They are convenient and inexpensive but they have one objection which should be mentioned. We have had difficulty in keeping both houses thoroughly dry during the coldest weather.

The lumber, etc., for the "Macdonald" house:

8 pieces 4 in. × 6 in. × 10 feet, for sills.
10 pieces 2 in. × 4 in. × 10 feet, for plates.
20 pieces 2 in. × 4 in. × 10 feet, for studding.
6 pieces 2 in. × 4 in. × 12 feet, for studding.
11 pieces 2 in. × 4 in. × 10 feet, for rafters.
11 pieces 2 in. × 4 in. × 12 feet, for rafters.
10 pieces 2 in. × 4 in. × 12 feet, for roosts.
720 feet for boarding the two ends and the back.
1,500 feet tongue and grooved, for roofing, for the front and for double boarding the two ends and the back.
5 rolls roofing paper.
14 barrels cement—where foundation and floor are made of concrete. Foundation, 1:3:5; floor, 1:2½:5.

The lumber necessary for the "Tolman" house is:

6 pieces 2 in. × 4 in. × 14 feet, for sills.
12 pieces 2 in. × 4 in. × 14 feet, for studding, girts, etc.
24 pieces 2 in. × 6 in. × 12 feet, for rafters and ridge tree.
10 pieces 2 in. × 4 in. × 12 feet, for roosts.
600 feet for sheathing, nests, etc.
250 feet for boarding ends and sides.
250 feet tongue and grooved, as a second boarding for ends and back.
7 pieces 1 in. × 4 in. × 14 feet pine dressed, one side cornice.
8 pieces 1 in. × 8 in. × 14 feet pine dressed.
5 rolls roofing paper.
14 barrels cement—where foundation and floor are made of concrete. Foundation, 1:3:5; floor, 1:2½:5.

THE CONTINUOUS HOUSE

There are many farmers who are keeping more than 100 hens and in some cases a continuous house can be used to good advantage. The house which we are using will accommodate 225 to 300 birds and is built on the same principle as the colony house. It is twenty feet wide by sixty feet long and is divided into three equal sections. The interior arrangement is practically the same as for the "Macdonald" and "Tolman" houses. The upper half of each window is provided with a cotton frame for fresh air supply. The straw in the gable keeps the house thoroughly dry at all times. It is one of the most satisfactory houses we have used, though a little more expensive than the 100-hen houses.

The lumber, etc., for the continuous house:

66 pieces 2 in. × 4 in. × 10 feet, for studding and plates.
16 pieces 2 in. × 4 in. × 14 feet for roosts.
62 pieces 2 in. × 6 in. × 12 feet, for rafters.
5,680 board feet for single boarding front, double boarding ends and back, partitions, roofing and nesting material.
15 rolls roofing paper.
40 barrels cement—where foundation and floor are made of concrete. Foundation, 1:3:5; floor, 1: 2½:5.

Fig. 47.—Colony house.

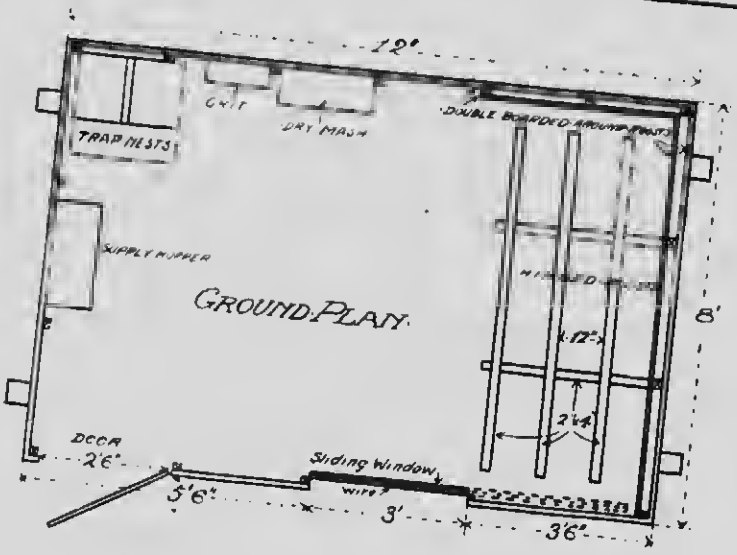


Fig. 48.—Showing ground plan of colony house.

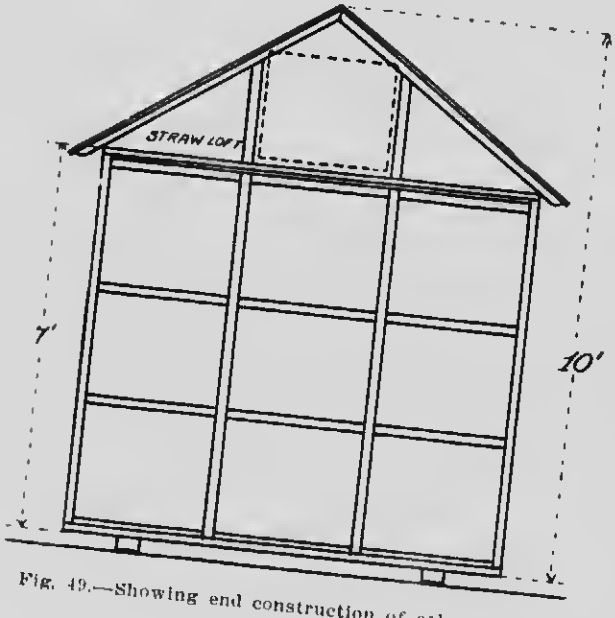


Fig. 49.—Showing end construction of colony house.

Fig. 50.—Colony houses located in an alfalfa field.

Fig. 51.—The "Macdonald" house.

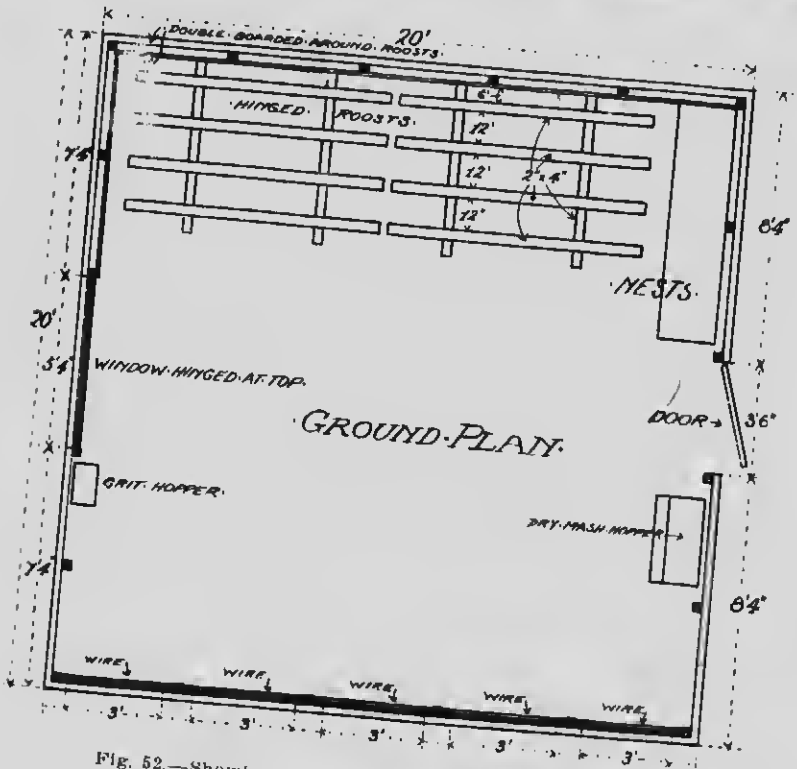


Fig. 52.—Showing ground plan of "Macdonald" house.

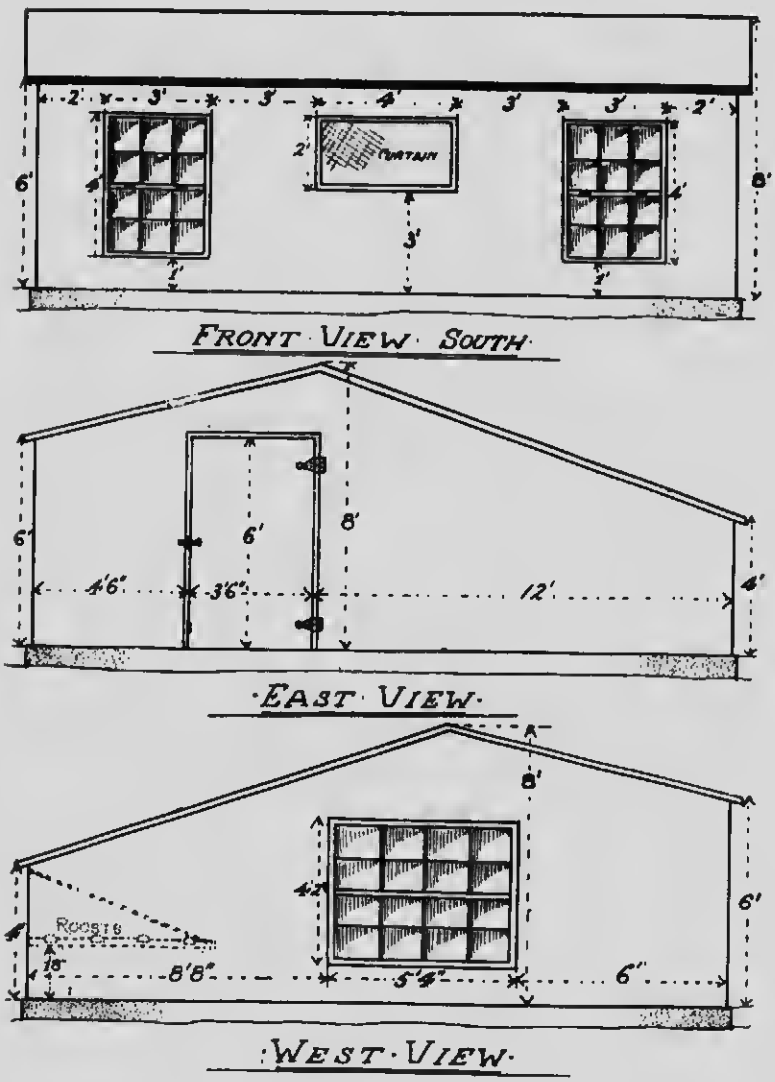


Fig. 53.—Showing construction of "Macdonald" house.

Fig. 54.—The "Tolman" house.

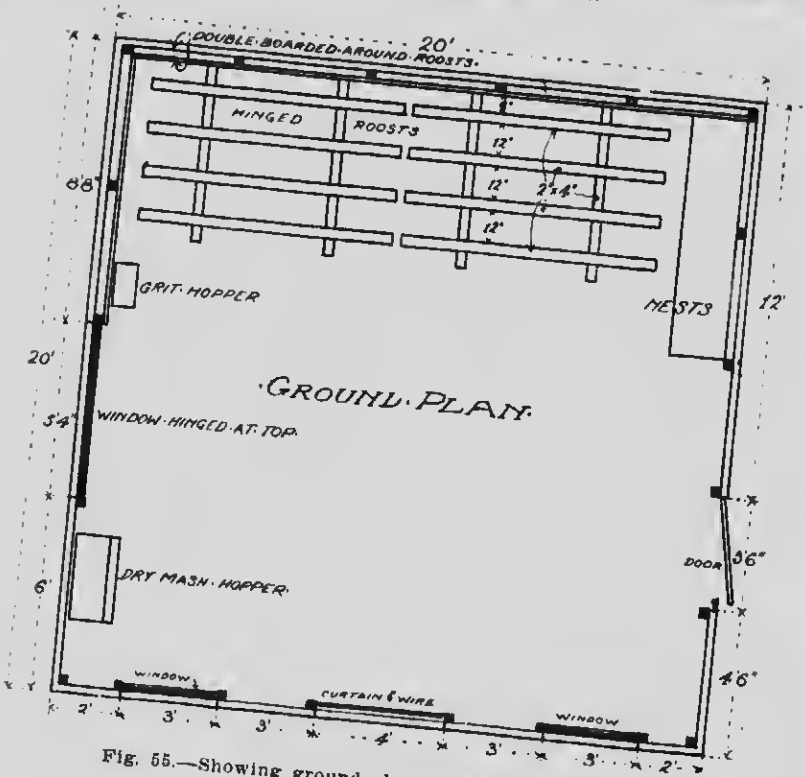


Fig. 55.—Showing ground plan of "Tolman" house.

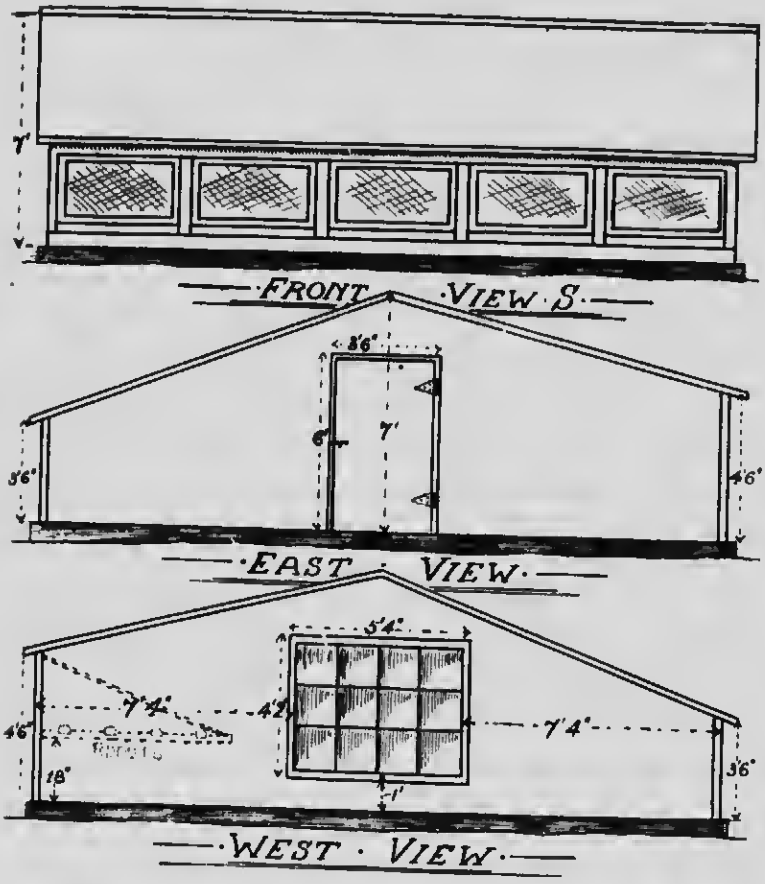
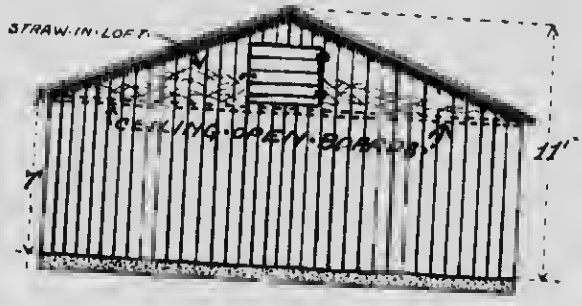


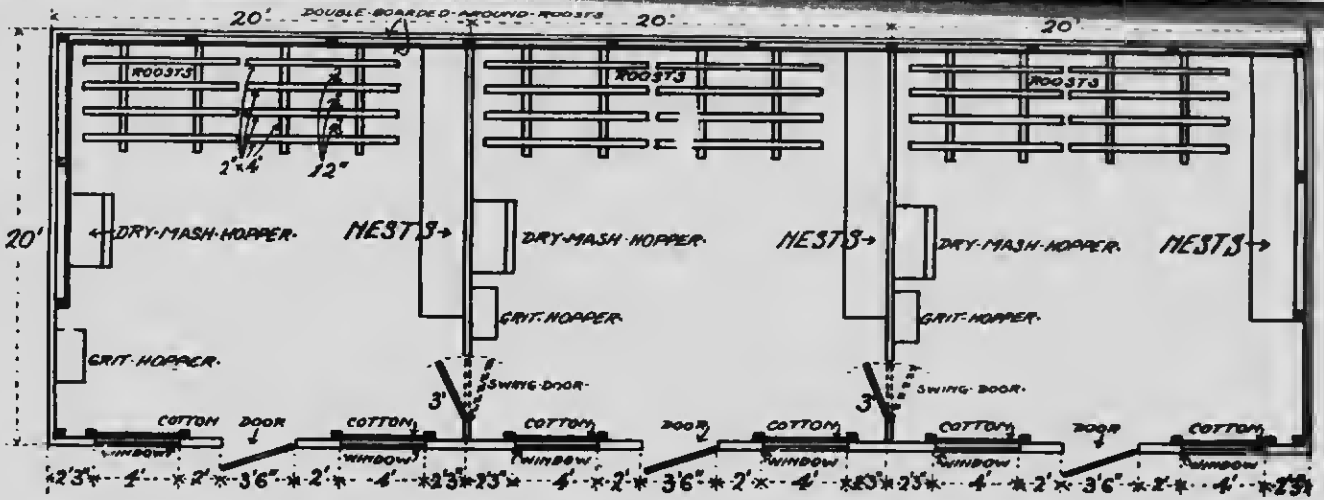
Fig. 56.—Showing construction of "Tolman" house.

Fig. 57.—The continuous house.



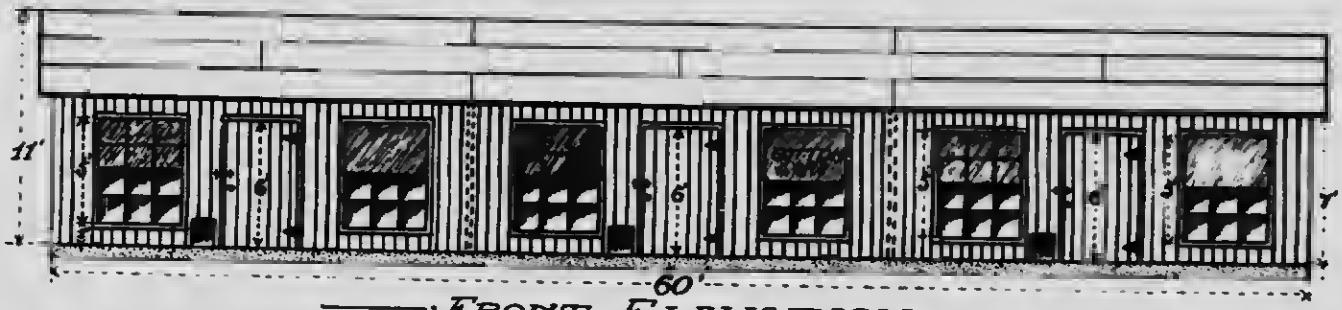
END ELEVATION.

Fig. 58.—Showing end construction of continuous house.



GROUND PLAN

Fig. 59.—Showing ground plan of continuous house.



FRONT ELEVATION

Fig. 60.—Showing front construction of continuous house. The plans given here are improved on the actual plans of house shown in Fig. 60. These plans call for more windows, giving more light and more air.

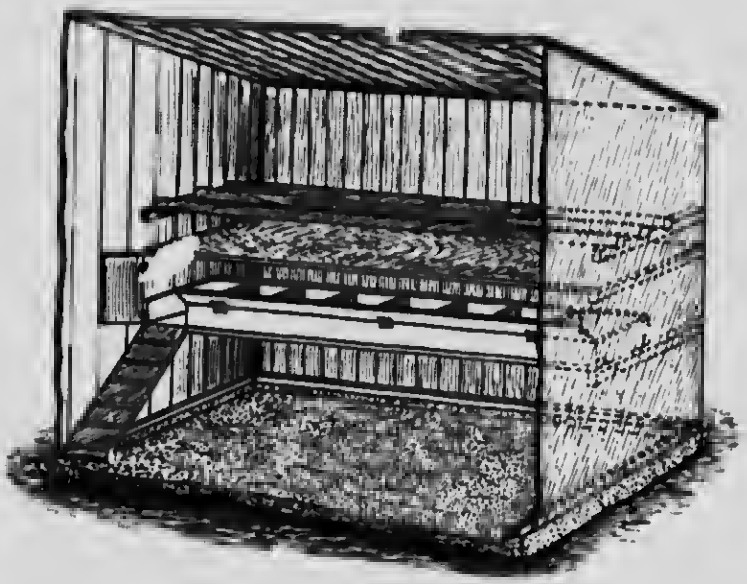


Fig. 61.—Showing construction of dropping board and nests, which are so arranged that nests are convenient for collecting the eggs, and are also raised off the floor, giving all the floor space for scratching purposes. The dropping board should be well made of matched lumber.

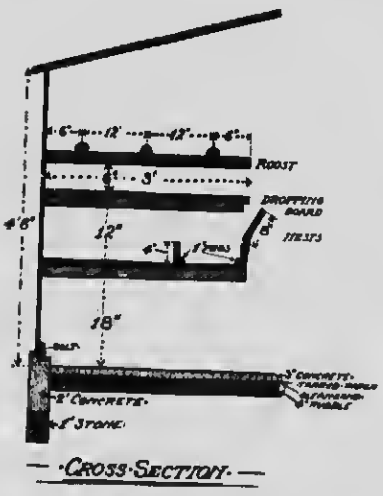


Fig. 62.—Showing construction of dropping board and nests.

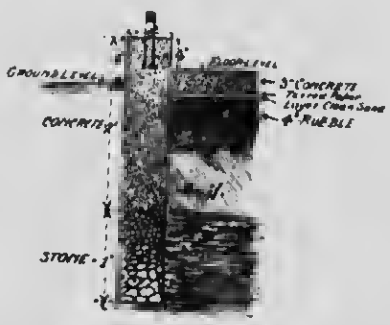


Fig. 63.—Showin, construction of foundation wall and floor for poultry houses.

FEEDING THE LAYING STOCK

Good sound stock is absolutely necessary for winter egg production. Every bird in the flock should be healthy, vigorous, and in prime condition when put into the laying pen in the fall of the year. Diseased birds or birds low in vitality should not be kept, as they are a source of loss.

Usually a bird lays the largest number of eggs in her first laying year, so that pullets are more profitable than older birds. On the other hand, it is wise for every farmer to keep a few yearlings on hand to be used as breeders. The largest part of the flock should consist of pullets and these should be well matured. Undeveloped and immature pullets are very prevalent in many farmers' flocks during October and November. If a bird is to lay well throughout the winter months she should start laying about the first of November just as cold weather is approaching. All pullets should be well matured by about the middle of September and they should be put into their laying pen about the middle of the month in order that they may be accustomed to their new place and changed conditions by the first of November. Unless the birds are fully matured, eggs cannot be expected in any number before the first of the year. Well matured pullets of good health and vitality should be the first consideration in building up a laying stock.

Best results are obtained if the yearlings and pullets are kept separate. This, however, is not often practicable on the average farm. A flock of one hundred birds would be composed of about twenty-five yearlings and about seventy-five pullets, the yearlings being kept primarily for breeding purposes in the spring of the year, while the pullets would be maintained for winter egg production. Naturally the pullets will be fed rather heavily to secure a large egg production, but such heavy feeding is not desirable in the case of the yearlings, as it affects the fertility of the eggs during the breeding season.

Among the pure breeds the most profitable for the average farmer are the Plymouth Rocks, the Rhode Island Reds, the Wyandottes, and the Orpingtons. There are a few other breeds of equal value, but for all practical purposes any one of the above breeds will meet the farmer's needs. Legborns, Minorcas, Anconas and Campines are smaller birds, and are especially noted for egg production in mild weather. The general purpose breeds are among the best winter layers in our Province, and since they also produce good table birds they are being bred in greater numbers than the lighter breeds.

Maximum egg production is largely controlled by the method of feeding as well as by the nature of the foods given. One of the prime factors in feeding is to compel the birds to take plenty of exercise. The litter in the house should be eight or ten inches deep, and the grain should be scattered in this whenever it is fed. It is a good practice to stir up the litter frequently with a fork. This will prevent the straw, or what-

ever is used for litter, from becoming packed down solid, and will also compel the birds to scratch for the grain.

The diet of the hen may be simple, but it should be wholesome. The hen must be given plenty of food and as much variety as possible. All foods serve various purposes in the production of eggs. Part of the food a hen receives furnishes energy to carry on the various functions of the body; part furnishes energy to keep the body warm; another part serves to build up the tissues and organs and keep them in repair; still another part supplies material for egg production. The amount of food over and above the maintenance ration constitutes the egg-producing ration. For this purpose those foods must be given which are known to be good egg-producers.

Most of the food given to laying hens consists of whole and ground grains. Wheat, corn, oats and buckwheat are the whole grains which are chiefly used.

In this country wheat is used to a greater extent than any other poultry food. There are many different grades, and while a good grade is desirable, some of the shrunken wheat is quite valuable. If it is not musty in flavor and not too badly shrunken, it may be practically as good as the better grades of milling wheat.

Corn is an excellent food, particularly for winter feeding. It tends to keep the laying stock in good condition during the cold weather, and it could be used much more freely than it is at present. In many cases it is more economical to feed corn than wheat.

Oats, when of good quality, make a good food. On the other hand, oats of poor quality are quite objectionable, since they have a high percentage of hull. They can be fed in various forms, but they are best relished when rolled out flat. In this form we call them whole-rolled or bruised oats, and we have been surprised to find what large quantities the birds will consume.

Buckwheat is used to some extent, especially in those sections where it is grown extensively. It makes an excellent fattening food, but should not be used too freely in feeding the laying stock. It can be used with wheat and corn to give variety.

The practice at Macdonald College is to feed a whole grain ration of two parts wheat, two parts corn and one part oats or buckwheat, during the winter months. If the corn is cracked it will give the hens more exercise than when fed whole. This grain mixture is scattered in the litter morning and evening, and the litter is kept in such a condition that considerable scratching is necessary. Enough grain is fed in the morning to keep the hens busy for several hours. In the evening they are given practically all the grain they will pick up before going to roost. There are many poultrymen who are not able to feed their flock the proper amount of grain from time to time. On the other hand, there are some poultrymen who believe in feeding a definite quantity of grain at each feeding. It is far better to feed the birds the amount they need from time to time, and as they will eat more at one feeding than another, it

is practically impossible to state definitely any specific amount which the flock should be given for each feeding. A very simple way of finding out whether the birds are being fed properly or not is to brush away some of the litter, then blow the chaff and dust away, and if corn or wheat can be seen on the bare spot of the floor, the hens are being fed too heavily. They should be made to clean everything up before being fed again.

Whole grain alone is not sufficient, since the birds must balance the ration with ground grains, to which can be added certain concentrated foods. The ground grains are chiefly wheat bran, crushed oats, cornmeal and middlings. To these ground grains may be added linseed meal, gluten meal, beef scraps or fish scraps. These are concentrated foods and supply the fowls with protein, which is largely lacking in the whole and ground grains. Considerable protein is necessary for the manufacture of eggs.

It is not necessary to use all of the materials mentioned in preparing a mash. At the same time the larger the variety the better the fowls like the mash and the better it serves its purpose. A good mash mixture is composed of the following: wheat bran, 200 lbs.; crushed oats, 120 lbs.; cornmeal, 100 lbs.; middlings, 100 lbs.; beef scraps, 60 lbs., and charcoal, 20 lbs. This makes a mash which is quite palatable and which the birds relish. In place of crushed oats it may be well to use oatmeal feed, which is a by-product of the oatmeal industry and contains practically no hulls.

This mash may be fed in two ways: as a wet mash or as a dry mash. The wet mash consists of ground grains thoroughly mixed and moistened with water or sour milk. The mash is fed in V-shaped troughs at definite times. The object in wet mash feeding is really to stimulate maximum egg production.

The troughs should be kept strictly clean, and it is wise not to overfeed with wet mash. Just give the birds as much as they will clean up in a few minutes. The best time to feed a wet mash is about noon or shortly after. When wet mash is fed, table scraps, potatoes and other waste products can be mixed with it to good advantage.

If the ground grains are fed in the form of a dry mash, labor is saved. The ground grains are thoroughly mixed, and placed in a self-feeding hopper from which the birds can help themselves at any time. This is a very satisfactory method, as it saves much labor, particularly where there is a large flock, and is not so apt to be abused. The principal factor is to have a hopper so constructed that none of the mash will be wasted. Excellent results have been obtained in feeding whole rolled oats from the hopper instead of a dry mash. The oats are relished and the birds do very well on them. Whenever these oats can be secured, it simplifies the feeding problem very much.

Beef scraps have been suggested as a form of animal food. In some localities ground green bone can be obtained at a reasonable price. Where such is the case the quantity of beef scrap in the mash ration may be greatly reduced. Care should be exercised in feeding ground green bone,

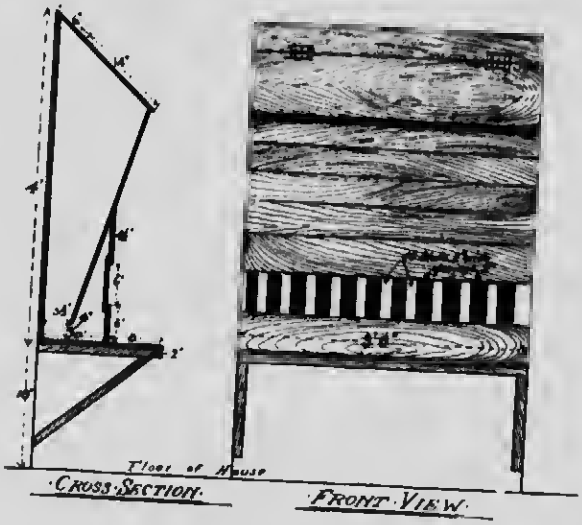


Fig. 64.—An excellent indoor feed hopper which holds a quantity of dry mash and still prevents waste.

Fig. 65.—Convenient coop for breaking broody hens.

Fig. 66.—A good hook for catching fowls.

as one-half ounces per bird per day is heavy feeding. The green bone should always he in the very best condition. Sour milk is also an excellent animal food; it is one of tbe best poultry foods we have, and should be used more extensively. It is low in cost, and in addition to being a valuable egg producer it tends to keep the hens in good health. One of the most profitable ways in which sour milk may he used is in feeding it to laying hens.

While the birds are confined during the winter months some form of green food is absolutely necessary for best results. Give the birds mangels, turnips, or sprouted oats. Alfalfa or clover hay, if well cured, may be fed. Mangels are cheap and are easily grown, and the birds will consume large quantities of them. Sprouted oats also make an excellent form of green food. The method of sprouting is simple. Take the quantity of oats desired, soak them in lukewarm water for twenty-four hours, then spread them out on the floor of a fairly warm room, or place them in flat boxes so that the oats will spread out in a layer about one inch thick. Keep them moistened and stir them to prevent moulding. When they start to sprout do not disturb them, and when the sprouts are about three inches long the oats may be given to the birds. Some form of green food should be supplied the birds every day. In feeding mangels it is a good practice to drive a spike in the wall about sixteen inches above the floor, on which the mangels can be placed.

Oyster shells and grit should he kept before the birds at all times. Grit seems to aid digestion, nd oyster shells supply the fowls with material from which they make egg shells. The egg shell is largely composed of lime, which is secured from oyster shells.

Clean water is also necessary. It is very important to see that the birds are never without water, for an insufficient supply often causes a serious decrease in egg production. Where sour milk is available it should he used, and it will largely take the place of water. It should be given in a thick condition.

Finally, it should be borne in mind always that apart from the kind and quality of foods given, the method of feeding has much to do with egg production. The laying hen must be kept as busy as possible. It is the busy hen that lays best. Exercise means eggs.

FEEDING THE FATTENING STOCK

A roaster of the highest quality is one which is young, full grown, plump and well finished. Such a one will roast better than one that has more bones than flesh. A chicken is "ripe" as a choice roaster for only a short time. After a pullet has commenced to lay eggs, her flesh is not of the same quality as it was before she laid an egg. When the spurs of a cockerel begin to harden the flesh begins to get tougher. A good roaster must always be plump and fat; that is, it must be well finished where the fat and lean meat are well interminxed in good proportions. A well finished and good appearing chicken will look well on the table, while the unfinished chicken lacks flavor, and when prepared for eating may present anything but an appetizing appearance.

The majority of farmers in Quebec take but little trouble in properly preparing their poultry for market. The consumers, or the general public, are so accustomed to purchasing dressed poultry of poor quality that they usually do not recognize the difference between a poor roaster and a well finished one. If the poultry is well fattened, properly killed and dressed, there are few kinds of meat so wholesome and with so much flavor.

A thin bird is not attractive when dressed and is not appetizing when roasted. The flesh appears shrunken and the bones are prominent. When roasted, the meat is dry and tough.

A plump, well finished chicken has a rich flavor and an abundance of tender meat of good quality.

The fattening of poultry, then, is a finishing process. The object in fattening is to prepare in the best possible way poultry flesh for human consumption.

There is always a demand for dressed poultry. Poorly fattened birds, however, bring low prices, and sometimes no profits are made in selling them. Plump birds are in the greatest demand at highest prices, and birds of high quality always yield the largest profits. Fattening, then, means heavier birds and higher prices. There is usually five cents or more a pound difference in price between thin and plump poultry.

Best results are obtained by feeding all fattening birds on soft mashes. The gain in weight is greater and the quality of the flesh is superior when wet mashes are used than when the chickens are fed whole grain. The ground grains used to make up the mashes are usually oatmeal feed, finely ground buckwheat and cornmeal. Low grade flour and middlings may also be used.

A good fattening ration is composed of equal parts oatmeal feed, finely ground buckwheat and cornmeal. The proportion of oatmeal feed may be increased, for it is one of the best fattening foods we have. It is a by-product of the oatmeal factory and is much cheaper than oatmeal itself. The actual price of each grain will determine its value as a fattening

food. In some cases large profits will be made by feeding a ration largely composed of oatmeal, and at other times, depending upon prices, a varied ration may be more profitable.

Fig. 67.—Fattening house with fattening crate in foreground.

Fig. 68.—Interior of fattening house, showing arrangements of crates.

These ground grains should be mixed thoroughly, and the mixture moistened with sour skim-milk. Milk is an excellent food for fattening chickens. It tends to develop the tissues and improves the quality of the meat. The proportion of milk to the mash mixture is about two pounds

of milk to one pound of mash by weight. Best results are secured when the food is mixed twelve hours previous to feeding. Give the birds grit once a week during the fattening period.

There are two methods of fattening poultry for the market. The method usually employed on the farm is the pen method, where the birds are confined in a pen or box stall. The other method is crate fattening, and is usually more profitable.

The stock which is to be fattened will consist of cockerels and probably a few pullets which are not suitable for laying or breeding purposes. Whether they are to be pen-fattened or crate-fattened, they should be starved for twenty-four hours. This cleans out the digestive system of the birds and puts them in good shape for the special feeding during the fattening period.

In pen-fattening all the stock is crowded into a small pen so that the birds will be kept quiet and cannot exercise much. If the room is slightly

Fig. 69.—A fattening crate.

dark all the better, as the birds will not be restless. They are kept there for about three weeks, being fed two or three times daily. If fed properly they will put on flesh quite rapidly.

Great care should be taken not to feed the birds too much during the first week of the fattening period. Feed very lightly. Give the birds just sufficient wet mash to make them clean it all up and be just a little hungry for more. For the second week feed a little more heavily, and for the third week feed all they can possibly eat.

Where only a few chickens are to be fattened, the pen-fattening method can be employed with good profit.

Where a large number of birds are to be fattened the most economical method is to feed them in crates or batteries. The birds will make larger gains and the quality of the meat should be superior to that of pen-fattened birds. Poultry buyers nearly all prefer crate-fattened birds.

A good crate can be made of laths, with a few light boards for the ends and partitions. The crate should be 6 feet 6 inches long, 20 inches high, and 16 inches wide. The top, back and bottom are made of laths running lengthwise. The laths on the top and back should be about 1½ inches apart. The laths in front run up and down and are placed about 2 inches apart, so that the birds may eat from the V-shaped trough in

Fig. 70.—A fattening battery.

front of the crate. The laths on the bottom are usually placed ¾ inches apart. Care should be taken to have the back slat on the bottom at least ¾ to 1 inch from the back, so that the droppings may pass through and not accumulate.

A V-shaped trough, 2 inches deep and 2½ inches wide at the top, is placed on brackets in front of the crate. It is raised about 2 inches above the bottom of the crate.

The crate, when finished, should stand on legs about 2½ or 3 feet high.

Use the same precautions in feeding birds in crates as when fattening in the pen. Feed lightly at first, then heavily towards the end of the three weeks. It is very important to keep the birds with keen appetites.

The fattening crates should be placed in a cool, comfortable place, and where the birds will not be disturbed. The birds should he dusted with powder to rid them of lice and mites, otherwise they will not fatten profitably.

Ordinarily a chicken will gain about one pound in weight after three weeks of careful feeding.

When the birds are ready to be killed they should he starved from twelve to twenty-four hours. Tbis will clean out the crop and intestines of all food and the birds will keep longer and will he of hetter quality. While they are heing starved they should be given water to drink, which will wash food particles out of the digestive tract. This is a very important matter—starve before killing.

There are two methods of killing poultry for the market, either of whieh may he used. The common practice among farmers is to chop off the head. This method is not a good one where fowle are intended for market. It should he abolished and hetter methode ehould he adopted.

Dislocating the neck is a simple and effective way of killing. The neck is simply hroken or dislocated. The legs and wings are grasped in the left hand and the bird is held head downwards. The head of the hird ie grasped between the thumb and forefinger of the right hand. By putting pressure on the right hand the neck of the hird is etretched, and at the same time the head is hent straight hack. When the neck is stretched practically as far as it will go, a quick jerk backwards on the head breaks the neck close to the skull. The hird hleeds freely, the blood collecting in the neck. This method is simple, easy to perform, and clean. For ordinary commercial purposes where the hirds are to be consumed shortly after being killed, dislocation of the neek is quite satisfactory.

Where the hirds are to be kept for some time hefore consumption, the stickling and bleeding method should be used, since the neck is usually the first part of the hird to become discolored when kept for a long time.

The hleeding of a fowl affects its keeping qualities and appearance. The carcass will have a much better and cleaner appearance when well bled. The best method of killing poultry is by "sticking." The hirde are bled in the roof of the mouth. In this operation, when the fowls are to be dry picked, the birds are cut to bleed and are also stuck through the brain to paralyze tlie feather muscles.

The blood vessels run down eaeh side of the neek and just at the base of the chicken's skull they are joined, and this is where they should be severed. It requires practice to locate the proper place to cut, and many pickers sever each artery separately by running the knife along the throat past the junction. Care should be taken to avoid closing the arteries after they have been severed. Pressure of the thumh on one side of the base of the skull and of the forefinger on the other side at the same

place results in the chicken's mouth opening and remaining open while the operator makes the cut to bleed. When held in this way there is nothing to constrict the blood vessels. Hook a small can into the beak to catch the blood.

After the bird has been bled it should be brained in order to make the feathers come off easily.

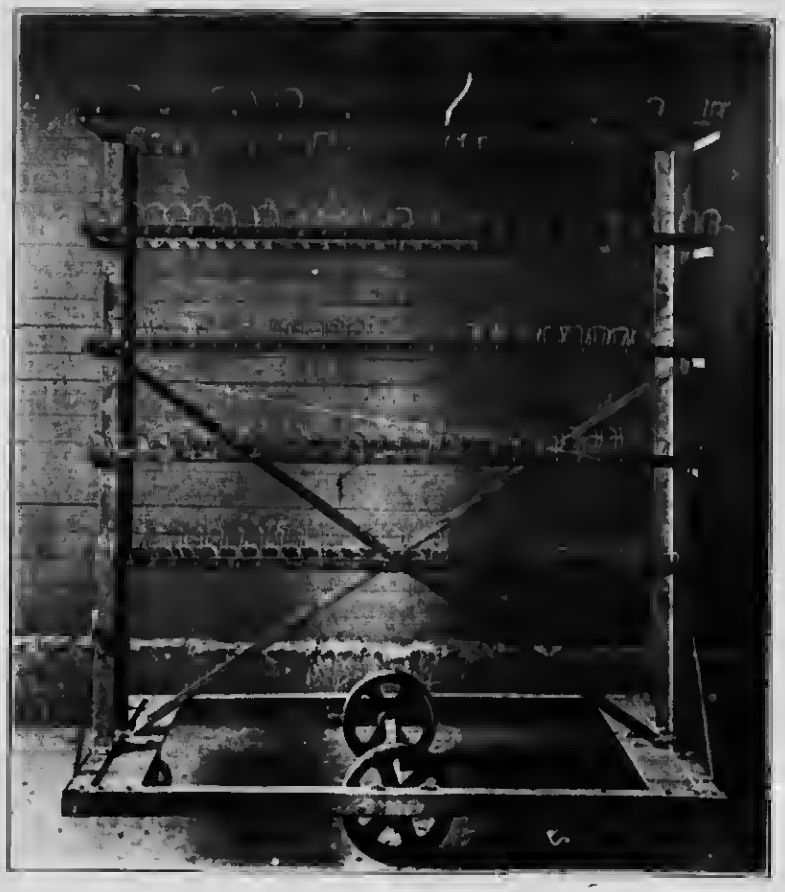


Fig. 71.—A cooling rack for the cooling of dressed poultry before packing.

The usual method is to run a knife about half way down the roof of the chicken's mouth and thrust it up until the knife reaches the top of the skull. The point of the knife should then be moved backward and forward a little so that enough brain may be destroyed to paralyze the bird. It takes good practice for anyone to acquire the knack of sticking so that the feathers will loosen and be easily removed. A poor "stick" will set the feathers, and the bird will be difficult to pluck, and will most

likely result in torn skin. It is understood, of course, that for killing in this way the fowl is held head down, or suspended from the ceiling by a cord.

Instead of piercing the brain through the mouth, it may be pierced under the eye. When one becomes practiced in sticking birds, this method is probably more effective.

The blade of the knife should be about two inches long and one-quarter inch wide, and should be of a heavy piece of steel. The back of the blade should be about one eighth of an inch thick. It should be ground to a sharp point, with a straight cutting edge, the slope for the point being taken from the back rather than from the front edge.

As soon as the bird has been killed the feathers should be plucked. They come out much easier while the bird is still warm. The birds are plucked dry; dry plucking is more satisfactory, as it gives a better result than scalding.

Many pluckers suspend the bird by a cord from the ceiling or roof of the room. The bird hangs at about the height of the shoulder, and plucking is an easy matter. The tail feathers should be pulled first, then the large wing feathers, followed by the feathers on the breast, sides, legs, abdomen, hips, back and neck.

Birds which have been scalded are usually not finished satisfactorily and do not appear well on the market.

In dry picking, roasters are picked clean except for a few feathers around the neck at the base of the head. Capons should be dressed in capon style, that is, the feathers are left on the upper part of the neck, on the upper part of the last two joints of the wing, on the thigh about two or three inches from the joint, and on the back about three inches from the tail, including the main tail feathers.

After the bird is dressed, the feet and head should be washed, using a stiff brush, and the vent should be well squeezed to remove any dung. If this is not done the chicken will probably develop a green butt.

If any food remains in the crop after the bird is dressed, an opening should be made at the extreme side and just above the wing or shoulder joint, and the food taken out.

It is absolutely necessary that the animal heat be allowed to pass out of a dressed bird as soon as possible after it is killed. The numerous bacteria that are always present begin to develop very rapidly as soon as the bird is dead, unless it is cooled. Cold retards the development of bacteria; when the temperature of the bird is near freezing the development is very slow, and when frozen it is practically suspended. A dressed bird, however, should not be placed at once where the temperature is too low, for in that case the bird will not cool properly. If the bird is placed immediately in too cold a temperature, the heat is held within long enough to give the putrefactive bacteria a chance to develop to a sufficient extent to give the bird an offensive flavor when cooked. The birds should be cooled for about twelve hours in a temperature of about 30 to 35 degrees before being packed.

EGGS

The average farm flock produces a limited number of eggs some of which are used in the farm home, but the majority are sold for cash or traded at the country store for other goods. The average farmer thinks of his eggs as a by-product and fails to realize that they enter into the daily food of a nation, being considered a necessity by both the poor and rich.

Eggs differ considerably in size, but otherwise are a very uniform product. Eggs of good size, weighing at least two ounces each or 1½ lb. to the dozen, are worth more than smaller eggs. Eggs are being bought according to size and quality. The quality is affected at different seasons

Fig. 72.—A uniform basket of eggs, graded as to size and color, clean and sound in shell.

of the year. Eggs produced during the spring months are probably of higher quality than those produced at any other time of the year. On many farms during the winter months the birds get little or no green food and are allowed to scratch in the manure pile, with the result that the eggs have not the flavor or quality that they have when produced under more sanitary conditions.

The flavor of the egg is influenced by feeding. This is easily determined by taking a pen of birds which are confined in a small yard with no access to green food, feeding them with onions or geranium leaves, and then tasting the eggs. In each case they will have the flavor of onions or geranium leaves.

The edible portion of the egg when laid is in a natural package ready for immediate consumption. Many people believe that the shell of an egg protects the contents from infection and from the influence of weather conditions. But the shell is porous, which is very necessary in incubation.

Eggs were originally produced by hens for the purpose of reproduction rather than as an article of food for human consumption. The shell is porous in order to allow the interchange of gases while the chick is hatching, as the chick requires carbon-dioxide and throws off oxygen. The chick must have fresh air in order to develop. If the contents of an egg under a sitting hen are smeared over the rest of the eggs in the nest practically no chicks will hatch. They become suffocated, because the pores of the shell were closed when the eggs were smeared.

On the other hand, if there is dirt on the shell of the egg that egg will not keep nearly as well as a clean egg. Almost invariably there are numerous bacteria in the dirt on the shell, and these bacteria readily penetrate the shell and cause the egg to rot or become mouldy. There are many eggs produced on the farm which become so badly infected that they become completely unfit for food. On the other hand, it is not advisable to wash eggs for market. When an egg is washed the pores

Fig. 73.—A basket of eggs as collected. There is a lack of uniformity and some of the eggs are very dirty.

of the shell are opened and the egg loses its water content very rapidly. About 65 per cent. of the egg is water and in a high temperature the water evaporates through the shell. An excellent illustration of this may be observed in artificial incubation. Examine a new-laid egg and note how small is the air cell at the large end of the egg. Then take an egg which has been in the incubator for ten or twelve days, place it before the candler and note how large the air cell is. The older an egg becomes the more water it loses and the larger the air cell grows. Eggs kept in the ordinary farm kitchen will lose rapidly in weight through evaporation.

There are many farmers and egg dealers who do not realize that eggs absorb odors very quickly. If eggs are placed in a room where coal oil is kept they will become tainted with a coal oil flavor. If they are stored in a damp room they often become musty. They absorb odors very quickly, as one can soon learn by putting a number of new-laid eggs in a packing case which has damp and musty-smelling fillers. If the eggs

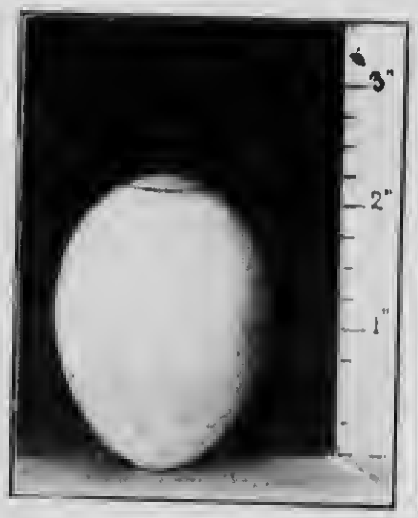


Fig. 74.—Showing the natural size of the air space in a fresh egg, with the depth marked

Fig. 75.—Showing an enlarged air space in a stale egg, marked on the outside of the shell to indicate depth.

Fig. 76.—An X-ray photograph showing size of air space in a fresh egg.

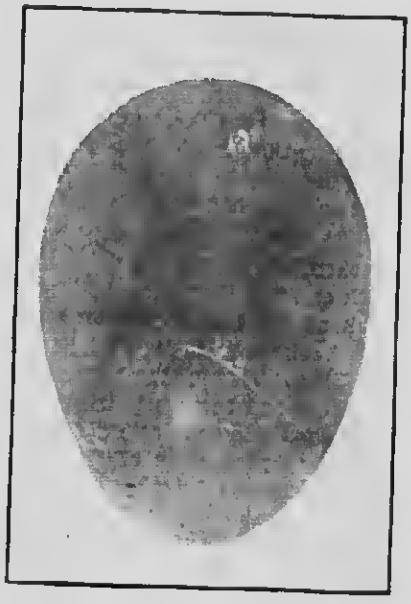


Fig. 77.—An X-ray photograph showing enlarged air space in a stale egg.

are kept in the case for two or three weeks and then removed, they will have a musty flavor, having absorbed the odors from the musty fillers in the case.

There are many eggs spoiled by incubation, particularly during warm weather. Frequently a nest full of eggs is found in some secluded place. The hen may have been sitting on the eggs for two or three days, but nevertheless they are all taken and placed in a basket or case along with the other eggs and sent to market. A number of the eggs from the hidden nest were doubtless partially incubated. If they had been examined before leaving the farm they would have shown chick development and the farmer would have realized that they should not be sold for food. A fertile egg will start to hatch if placed in a temperature of 80 or 90 degrees. If broody hens are left in the nest for a day or two many of the eggs laid in the nest where the broody hens sit from day to day will be partially incubated before they are gathered. This is especially true when eggs are not collected once a day and where the collection is very irregular. In many cases ordinary summer temperature will spoil fertile eggs. In some cases the nests in the poultry-house become very warm, and during hot weather these eggs may actually start to hatch. The remedy for this is to collect the eggs twice a day, especially during warm weather.

One of the most important things for farmers to do is to produce infertile eggs. These cannot possibly start to hatch under any conditions of temperature. Under ordinary conditions they have better keeping qualities than fertile eggs, and in warm weather the majority of eggs marketed cannot be guaranteed as first-class unless they are infertile. Infertile eggs are absolutely essential if highest prices are to be expected. This means that no male birds should be kept with the females except during the breeding season. All mature male birds should be sold or killed as soon as the hatching season is over. It is largely because of the presence of the male birds in the laying flock during warm weather that so many bad eggs are produced on the farm.

The conditions under which eggs are kept on many farms before being marketed do not usually enhance the selling value. Eggs do not improve with age, and though of the highest quality when produced on the farm, their quality rapidly deteriorates.

A relatively small proportion of farm eggs reaches the market in good condition. This is largely because of the low quality of farm eggs when produced and because it takes too long for eggs to reach the consumer. This results in the waste of an enormous sum of money, for many of the eggs are thrown away, others which are unfit for food, are used for dressing feather and for various chemical purposes. The great problem is to improve the quality of eggs produced on the farm and to get the eggs to market in the best condition possible in the least time.

It is when the great bulk of eggs produced on the farms enter the regular trade channels that the greatest changes occur in regard to quality. The first responsibility for the low quality of market eggs, however, rests upon the farmer. It has been pointed out that the method

of collecting eggs on the farm, and the manner of holding and marketing those eggs, do not tend to improve the eggs in quality. Usually the farmer gathers his eggs once a day or perhaps two or three times a week at irregular intervals. Stolen nests also supply considerable numbers of bad eggs which are afterwards marketed along with the good ones. As the eggs are collected they are usually stored in the pantry or kitchen, or perhaps in a damp cellar, and often many of the eggs are stale before they are taken to market. There is no regularity in marketing; the eggs may be taken to the country grocery store once a week or perhaps once in two weeks, and the same applies to selling eggs in public markets.

Fig. 78.—Showing growth of mould in an egg.

Fig. 79.—An X-ray photograph showing extent of mouldy growth in an egg.

In the spring, when egg production is heaviest, the farmer usually thinks he is too busy to deliver his eggs, with the result that during the warm weather shrinkage and incubation proceed rapidly. Even the manner in which eggs are taken from the farm to the market will affect the quality; a farmer may often be seen with a case of eggs in an open rig where the eggs are exposed to a very high temperature. In consequence many eggs, which perhaps were fresh at the time of leaving the farm, are not fresh when they reach the market three or five miles distant.

When the eggs are received at the country grocery store or by the egg dealer they are held under varying conditions. No manner of holding the eggs or shipping them to the distributing markets can possibly improve the quality, but such conditions as exist in the trade to-day

usually cause a further deterioration in quality. There are too many egg dealers and commission men who are careless in the manner of handling eggs received from the farms. The improvement of trade conditions, however, is a matter over which the farmer has little or no control, and while certain existing conditions need to be greatly improved to give the farm egg a better chance of reaching the consumer in good condition, still the principal problem for us to consider is the improvement in the quality of eggs as produced on the farm.

The condition and quality of eggs can be detected by inspecting and candling. By inspecting the eggs the farmer can detect all dirty eggs and those which are slightly or badly cracked. Also the eggs can be graded according to size, and this is advisable in shipping to a good market. Eggs with dirty shells constitute one of the most objectionable factors in the egg industry. Such eggs may be fresh, but the dirt on the shells lowers the price considerably. They do not store well and, therefore, all dirty eggs should be used at home as far as possible.

Eggs which are very slightly cracked are known in the trade as "hair splits." Those which are more seriously cracked but whose contents do not leak through the shell are known as "checks," and those eggs where the shell is so badly broken that the contents leak out are known as "leakers." "Mashed" eggs are those which are completely broken and which often spoil other eggs. Cracked shells are often the result of thin shells or poor packing. In shipping eggs to market the farmer should use substantial egg cases and strong fillers. This will greatly help to overcome the enormous breakage in eggs in transit, which at present is causing such heavy losses to the industry. Second-hand cases and fillers should not be used.

The candling of eggs enables one to detect the condition and quality of the white and yolk. Eggs are candled by placing them one at a time before a bright light where the light is focused entirely on the egg. The apparatus for candling usually consists of a bright light in a small compartment which is darkened on all sides, having a hole on one side against which the egg is placed. A fresh egg, when placed before the light, will be semi-transparent and the white and yolk will nearly fill the shell. There is a small air cell about the size of a five-cent piece and the yolk is barely visible. It should be pale yellow in color and both yolk and white should show a strong body and good consistency. The freshness, as well as the age of an egg, can only be determined by candling. The older the egg, the larger the air space becomes. The white of the egg loses its firm, thick, viscous condition and becomes more watery. The yolk becomes darker in color and sometimes changes its position. The air space becomes larger, due to the evaporation of water within the egg through the shell. The size of the air space is a good indication of the age.

The longer an egg is kept before being consumed the more it changes in condition and quality, according to the manner in which it has been stored. The candling of commercial eggs has revealed many different kinds of bad eggs. Those which show an enlarged air space and where

the yolk has become dark in color and the white has become watery are known as "stale" eggs. There are too many of them produced on the farm.

It has been pointed out previously that many eggs produced on the farm start to hatch before they are marketed. In some of these eggs the hatching process is arrested when the eggs are collected and "blood rings" are the result. In such eggs the developing embryos have died and the blood has collected in a ring in each egg. When a broody hen is allowed to sit on eggs for a few days chick development becomes very distinct; such eggs, of course, are totally unfit for food.

Another class comprises eggs whose yolk adheres to the shell. These are called "spot rots" and show the yolks very dark in color and stuck to the shell. Sometimes in commercial eggs the yolks will become par-

Fig. 80.—A carton for one dozen eggs, which should be of the highest quality. An attractive carton with a good sounding name upon it will not recompense for the lack of quality in the eggs in the carton.

tially mixed with the whites, making them objectionable for boiling purposes.

"Musty" eggs have a very strong penetrating odor and are detected most readily by the sense of smell. "Mouldy" eggs are produced by eggs being laid in wet nests or in stolen nests or by holding eggs in damp cellars. They show dense black areas of various sizes inside the shell when candled. "White rots" are the advanced forms of partially decomposed eggs, while "black rots" receive their name from the black appearance which they present before the candler.

The majority of the eggs described above would be eliminated from the markets if better methods of production and marketing were undertaken. As soon as the farmers produce eggs of better quality then trade conditions will improve, prices will advance, and profits will be larger.

The farmer loses money through the poor quality of a large number of the eggs produced, through loss in transportation charges on bad eggs,

and through the necessity of candling eggs commercially. The farmer really has to pay for the price of candling, for, although this is done by the egg dealers, the farmer pays for it indirectly through a lower price for his product. The farmers also suffer losses due to curtailed consumption through the marketing of doubtful eggs, which cuts down the demand and lowers the price.

The majority of these undesirable factors will be greatly overcome as soon as the farmer produces the best possible grade of eggs. He is being encouraged in this matter to a certain extent through improved methods of buying on the part of egg dealers. A number of firms in Montreal and Quebec are buying eggs on the quality-payment basis. They first started by buying eggs on the loss-off system where no price was paid for bad eggs. This method has been changed for the quality-payment basis whereby eggs are paid for according to quality. When the dealer

Fig. 81.—The commercial egg case, showing method of packing a thirty-dozen egg case. The excelsior should be spread evenly over the top and bottom of the case.

receives a quantity of eggs they are candled and graded according to condition and quality, the highest grade commanding top prices, and prices for the other grades of eggs varying. This method of purchasing eggs should induce the farmers to produce a better class of eggs, since largest profits are made on the best grades.

A simple set of practical rules has been suggested for the marketing of eggs from the farm, and, if these rules were followed by farmers, much trouble which the trade has had to contend with would be avoided. The farmers are strongly advised to keep the hens in comfortable, sanitary houses and give them clean nests at all times. Eggs should be gathered regularly twice daily in warm weather and once daily at other times of the year. The eggs should be stored in a cool, dry room at a temperature not higher than 60 degrees. Eggs should be marketed at least once a week, and every precaution should be taken to keep the eggs out of the sunlight as much as possible. All mature male birds should be killed or

sold as soon as the hatching season is over, and they should be kept out of the laying flock except during the breeding season.

A movement which will do n great deal to improve tbe egg industry in Canada has been the recent adoption by the Canadian Produce Association of a standard basis for classes and grades of eggs.

Fig. 82.—Showing method of packing thirty one dozen cartons in an egg case. This method is used in shipping to a private customer.

CLASSES AND GRADES

CLASSES.	GRADES.
Fresh Gathered	Specials.
	Extras.
	No. 1's.
	No. 2's.
Storage	Extras.
	No. 1's.
	No. 2's.
Cracked and Dirties	No. 1's.
	No 2's.

Allowance for deterioration in transit, 10 per cent.; i.e., eggs should grade at point of delivery 90 per cent. of grade named at point of shipment.

Definitions of Grades

Specials.—Eggs of uniform size, weighing over 24 ozs. to the dozen, or over 45 lbs. net to the 30 doz. case, absolutely clean, strong and sound in shell, air cell small, not over 3-16 of an inch in depth (measured from top of cell to outer rim), white of egg to be firm and clear and yolk dimly visible, free from blood clots.

Extras.—Eggs of good size, weighing at least 24 ozs. to the dozen, or 45 lbs. net to the 30 doz. case, clean, sound in shell, air cell less than ⅜ inch in depth (measured from top of cell to outer rim), white of egg to be firm and yolk only slightly visible.

No. 1's.—Eggs weighing at least 23 ozs. to the dozen, or 43 lbs. net to the 30 doz. case, clear, sound in shell, air cell less than ½ inch in depth (measured from top of cell to outer rim), white of egg to be reasonably firm, yolk may be quite visible but mobile, not stuck to the shell or seriously out of place, air cell not necessarily stationary.

No. 2's.—Eggs clean, sound in shell, may contain weak, watery eggs, and eggs with heavy yolks, and all other eggs sound in shell and fit for food.

PRESERVING EGGS

During the fall and winter months of the year there is a scarcity of fresh eggs. The yearling stock usually passes through the moulting period in the late summer and the pullets, which have been raised during the season, do not begin to lay until late in the fall or early in winter. To make up for the shortage of eggs at this time it is advisable to preserve a quantity of spring eggs. April and May eggs are produced cheaply and cost little to preserve, and even on the farm it will pay to use these preserved eggs in place of new-laid fall eggs which command a good price.

In preserving it is essential to use fresh eggs only, and it has been found that April and May eggs are best for this purpose.

Eggs may be preserved by the lime-water method or by the water-glass method, both of which have been found satisfactory.

In the lime-water method good results have been obtained by using one pound of lime to five gallons of water. Slake the pound of lime in a small quantity of water and then stir this milk of lime into the five gallons of water. After the mixture has been kept stirred for a few hours it is allowed to settle and the liquid above the lime is called lime-water. This is drawn off and is poured over the eggs, which have been carefully placed in a crock or other water-tight vessel. The eggs must be completely immersed at all times and the top of the crock or container should be covered. Instead of a cover a layer of sweet oil may be poured on the top of the solution of lime-water. Should there be any precipitation of the lime the lime-water should be drawn off and replaced with a fresh supply.

In preserving eggs with water-glass practically the same method of procedure is adopted as with lime-water. Boil nine quarts of clean water and allow it to cool, then add one quart of water-glass (sodium silicate). This solution is poured over the eggs, which are placed in crocks or glazed jars, and the top layer of eggs should be immersed for a depth of two inches at least. A layer of melted paraffin poured over the top of the solution will exclude the air.

POULTRY

In the marketing of poultry the farmer should take into consideration prices for live and dressed poultry as well as prices at different seasons of the year. Poultry may be shipped either live or dressed, according to prevailing prices at the time of shipment. Where a good customer can be secured, it will certainly pay the average farmer to kill and dress his own stock. It is an open question, however, whether the general run of the stock throughout the country should be sold alive or dressed. Birds sold alive are collected by the poultry dealers and when finished can be graded uniformly in regard to size and quality. The average farmer produces such a comparatively small number of birds that in some cases there may be no particular advantage in killing and dressing.

It is very important, however, that every farmer should fatten his birds before marketing them, whether they are sold alive or dressed. Under present conditions poultry buyers are purchasing unfattened stock from the farmers and are fattening them in feeding stations, and are thus securing the profits which the farmers should be making.

In shipping poultry alive it is extremely important to crate the fowls in good substantial crates, which provide plenty of air. The shipping crate should have sides, ends and tops slatted. The top slats should not be more than 1½ inches apart. The crate should be between 12 and 16 inches high, not more than 30 inches wide and not more than 48 inches long.

As far as possible birds should be shipped so that they will arrive at their destination in as good condition as possible. If they are packed too closely or in crates which do not provide plenty of air many dead and sick birds will be the result.

If farmers were to ship their poultry collectively they would realize better prices and larger profits. Each farmer should fatten his own birds, and a number of farmers in the district can ship together, thus making a larger number of birds in one shipment and allowing of grading according to size and quality. Better methods of selling and shipping live poultry should receive careful attention in the Province of Quebec.

Where conditions will allow, it is more profitable to kill and dress the fattened birds on the farm. Comparatively little experience is necessary to fatten, kill and dress market poultry properly. The quality of the stock is greatly enhanced and, at certain seasons of the year, prices for dressed poultry are considerably in advance of prices for live poultry.

The essential feature in marketing dressed poultry is to produce the highest quality possible. Within the last few years the price of well fattened poultry has advanced to a far greater extent than the price for poorly fattened stock. For certain grades of dressed poultry the price has advanced 50 per cent. in the last five years, while the price for all

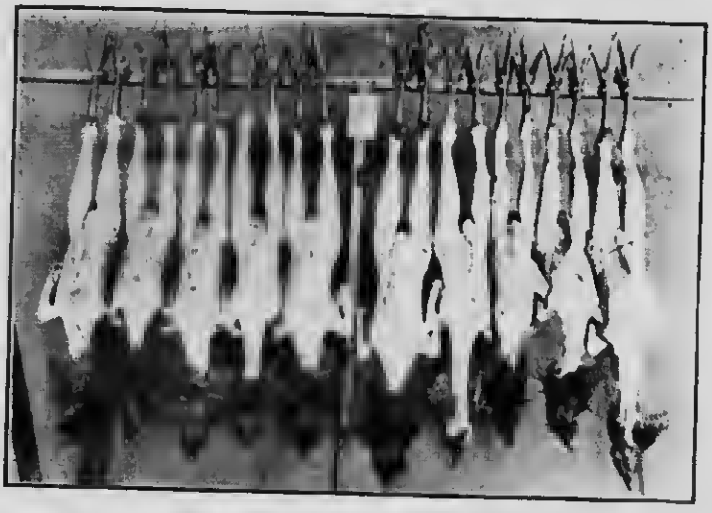


Fig. 83.—Barred Plymouth Rocks as roasters.

Fig. 84.—Rhode Island Reds and White Wyandottes as roasters.

grades of inferior stock has increased very slightly. Each succeeding year finds greater difficulty in disposing of poorly fattened birds. The essential requirements in marketing dressed birds include a good breed, freedom from torn flesh and clean picking. The head and the feet should be absolutely clean and the vent should be free from dung. The heads of all classes of dressed birds should be wrapped, using either 30 lb. parchment paper or grease-proof imitation parchment.

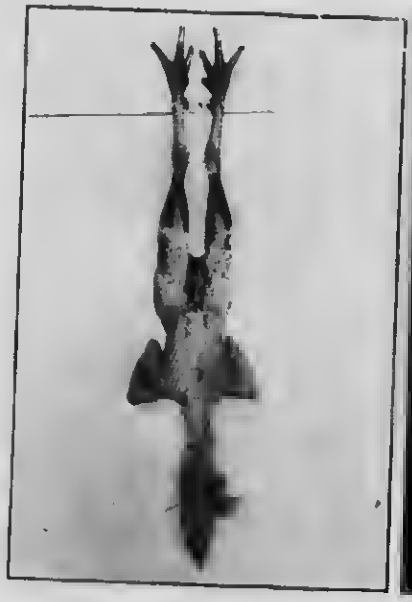


Fig. 85.—Showing the bad effects of scalding poultry.

Fig. 86.—A dressed bird with a crooked keel and a crop full of food, both of which are objectionable.

In some parts of Quebec dressed poultry is drawn before being sent to market. This is a very bad practice and should be discontinued, since drawn birds spoil much more quickly than do undrawn birds.

The buying of dressed birds by poultry dealers needs to be placed on a much better basis. Poultry dealers in Montreal, for instance, have no standard set of rules covering the classes and grades of poultry purchased. The adoption by the trade of such standard rules would greatly improve the present condition. The following classes and grades would be of great value, not only to the trade, but also to the producer and the consumer.

CLASSES AND GRADES

CLASSES.	GRADES.
Broilers	Squab—under 1½ lbs. Medium—1½ to 2 lbs. Large—2 to 2½ lbs.
Fryers	3 lbs.
Roasters	Small—under 4 lbs. Medium—4 to 5 lbs. Large—over 5 lbs.
Fowls	Small—under 4½ lbs. Large—over 4½ lbs.
Roosters	4 to 6 lbs.
Capons	6 to 10 lbs.
Stags	3 to 5 lbs.

Broilers are the lightest class of chickens marketed. Squab-broilers are usually from 6 to 9 weeks old, and medium and large broilers are a few weeks older. They are all considered a delicacy in high-class dining-rooms and restaurants of the large cities. Where the demand is good, they always command a fair price. Fryers are slightly older than broilers and weigh about 3 lbs. There is practically no demand for them at present. Roasters are mature chickens from about 5 to 12 months old and which, when properly fattened and dressed, usually weigh from 4½ to 6 lbs. They are graded as small, medium and large, the greatest demand being for the medium size. Fowls include all hens over one year old. These are best suited for boiling. Roosters are male birds over one year old, and in the better class of markets they are sold separately. Capons are unsexed male chickens which have the advantage over cockerels of increased size and superior flavor of flesh. The demand for them in Montreal is not very great, but the price is usually good. Stags are those chickens which have a hard meated appearance or are dark or bluish in color.

In packing poultry for the market great care should be taken to have the birds of about the same size and as well finished as possible. The packing should be neat and clean and boxes should be used suitable for the size of birds to be shipped. If the poultry is to be marketed immediately pine boxes can be used to good advantage. If the poultry is not going to a private customer, but is going to a poultry dealer where it will probably be stored for some time, whitewood or cotton-wood boxes should be used.

Suitable dimensions for various boxes for different grades of poultry are given below:—

16 × 15 × 3½ inside.—This is the standard broiler box and will hold twelve broilers, twenty-four pounds and under per dozen.

Fig. 87.—This dressed poultry was bought on the market, and it shows the quality of products often marketed.

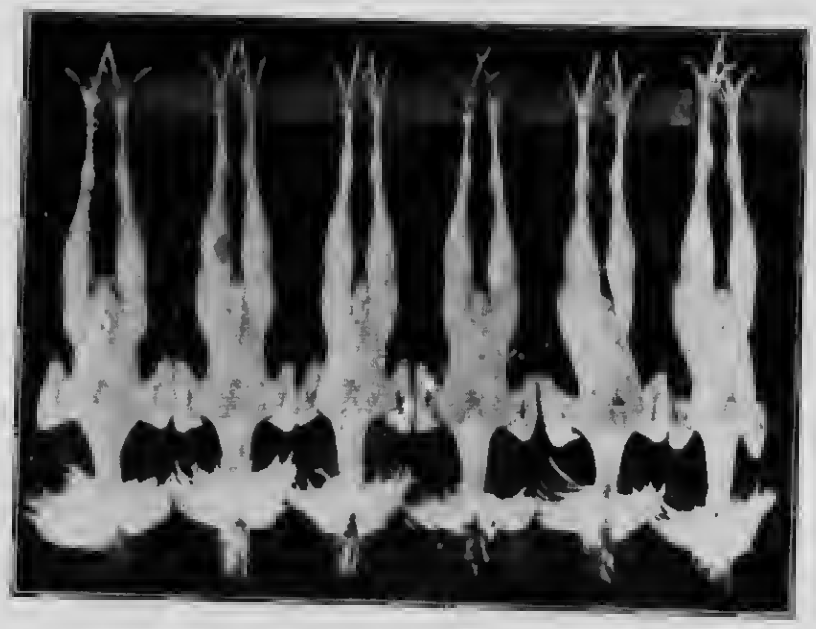


Fig. 88.—Well fattened and well finished poultry.

17 × 16 × 4 inside.—This is the standard heavy broiler box and will hold twelve broilers, twenty-five to thirty pounds per dozen.

19 × 16 × 8 inside.—This box will contain twelve roasters, forty-eight to fifty-nine pounds per dozen; also twelve fowl, weighing fifty-four pounds and up per dozen.

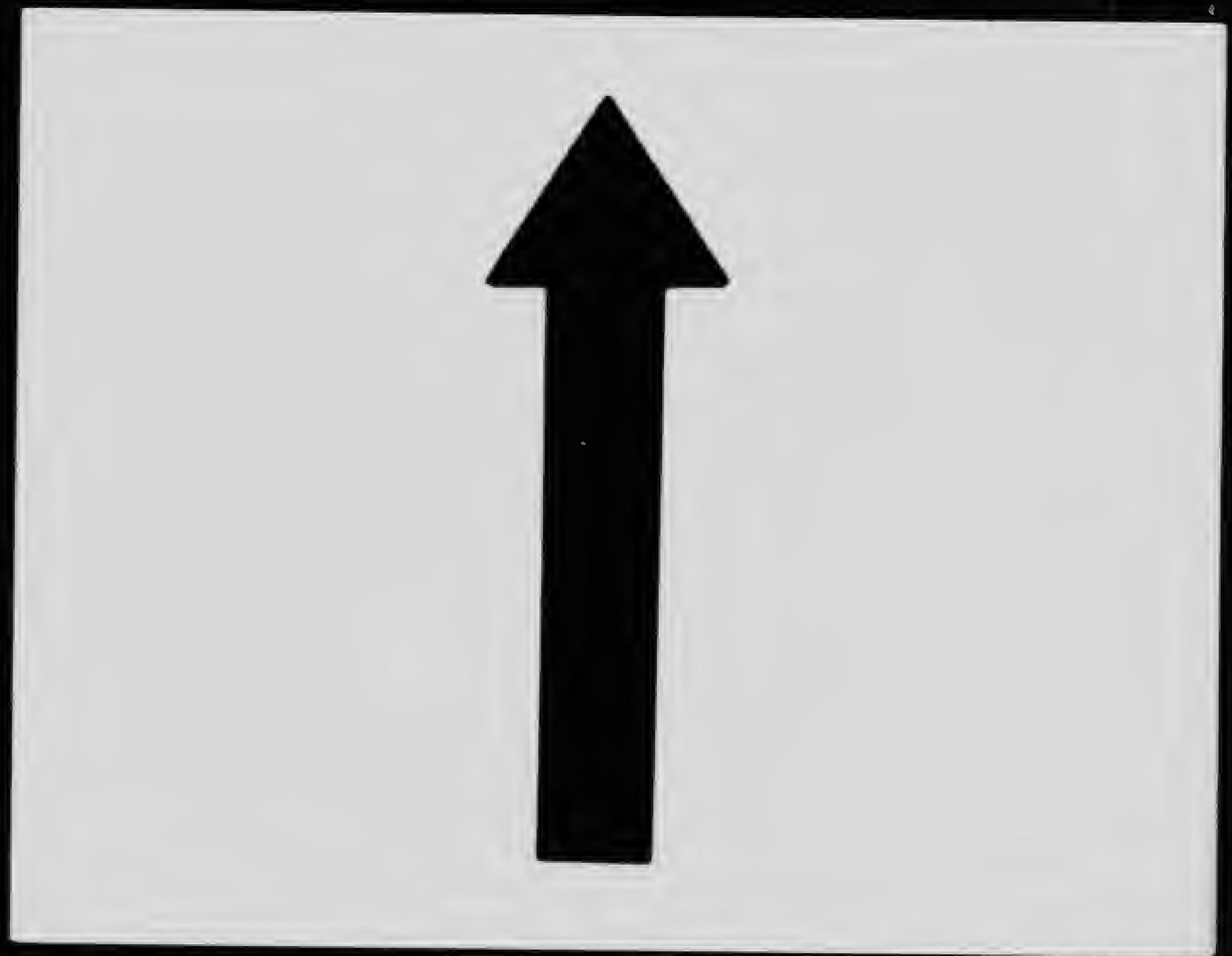
17½ × 15 × 7 inside.—This box will hold twelve double layer roaster style packed chickens, weighing forty-three to forty-eight pounds per dozen, and is the ideal small roaster box, and is used for that purpose universally. It will also hold, to quite good advantage, twelve fowl weighing up to fifty-three pounds per dozen.

18 × 17 × 9 inside.—This is used for heavy fowl weighing sixty pounds and up.

16 × 15 × 7½ inside.—This box holds twelve fowl, thirty-nine to forty-three pounds per dozen; also holds twelve double layer roaster style packed chickens, weighing forty-three to forty-eight pounds per dozen. This is an ideal fowl box.

21 × 17½ × 9 inside.—This box can be used for holding twelve old cocks, weighing seventy-two pounds a dozen and up. Can also be used for capons, packed roaster style, weighing 6 to 7 pounds each.

Fig. 89.—A case of poultry packed attractively.



POULTRY ACCOUNTING

Comparatively few farmers know whether their fowls are a source of profit or loss. Much of the product of the farm flock is used at home to supply the table with eggs and poultry, and the expenditure and receipts are spread over the year and are individually small, so that the farmer loses sight of the real value of his flock.

The farmer should know the expenses of feeding, housing, brooding and rearing, as well as the general management of the stock. He should also know the value of eggs and poultry sold annually. All this can be determined easily by the use of a simple monthly account sheet. The recording of the daily egg production will serve as an excellent guide in the general management of the flock. All deaths should be recorded and charged against the flock. If deaths occur in the laying flock it will be necessary to determine the average number of hens on hand for the month in order to ascertain the average egg production. The average number of hens in the flock for one month can be determined easily. Suppose there are 80 hens in the flock and that in the month of April, which has thirty days, one hen died on the tenth and four died on the twentieth. There were, then, 80 hens in the flock for the first ten days, 79 hens for the next ten days, and 75 hens for the last ten days. The average number in the flock for the month would be:

$$\frac{(10 \times 80) + (10 \times 79) + (10 \times 75)}{30} = 78.$$

From this the average egg production and the average cost of feed per bird could be determined.

Through the keeping of careful records the farmer should be enabled to make considerable improvements in management, which would mean larger profits.

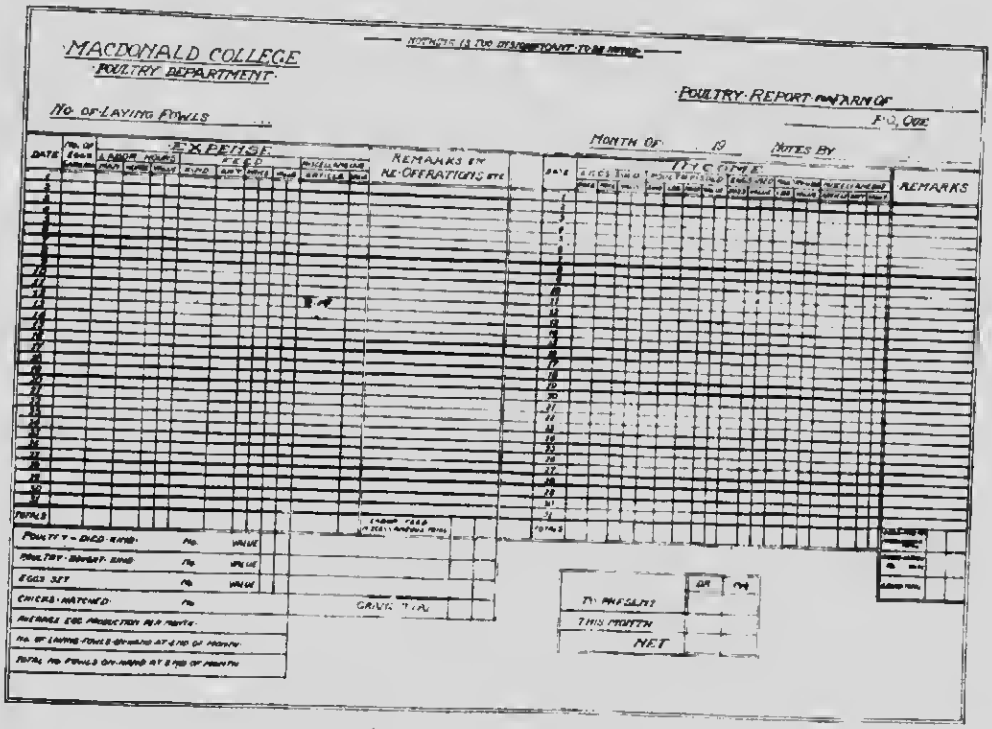


Fig. 90.—A monthly report blank on which all items of expenditures and receipts may be kept in connection with farm poultry keeping.

EXTERNAL PARASITES OF POULTRY

BY

W. LOCHEAD, B.A., M.Sc.

Professor of Biology, Macdonald College

A prominent specialist says, "When anything is found wrong with poultry the maxim should be 'Look for Lice.'" The presence of lice and mites interferes with growth as well as egg production, hence the control of these pests is one of the first considerations of the successful poultryman.

FEATHER OR BITING LICE

There are more than thirty species of external parasites of poultry, but it is unnecessary to be familiar with all of these forms in order to deal effectively with them. They may be grouped into *lice* and *mites*. The lice differ from the ordinary sucking lice in that they do not suck blood, but feed on the rough parts of the skin and base of hairs and feathers, causing considerable irritation. Their sharp claws are able to injure the skin and draw blood upon which the lice sometimes feed. For this reason these lice are called Feather or Biting Lice, and the most common species found on fowls is the *Common Hen Louse* (Menopon pallidum), which is a pale yellow active flat insect with six legs, 1-25th inch long. The eggs or "nits" are oval objects, attached to the barbs of the feathers, usually on the down feathers. They hatch in 8 to 10 days and become mature in 2 or 3 weeks. Dirtiness, filth and warm weather favor their increase.

MITES

There are three species of Mites, each producing its characteristic disease of poultry. These are the *Common Chicken Mite* (Dermanyssus gallinæ); the *Poultry Itch Mite*, which produces the "scaly leg" disease (Sarcoptes mutans); and the *Depluming Mite* (Sarcoptes gallinæ), which causes the feathers to break off at the surface of the skin.

The Chicken Mite is a flattened, elliptical mite, 1-30th inch long, with eight legs, and distinctly reddish after feeding. The eggs are laid in cracks and crevices of the wood or straw of the nests and roosts, and the young mites become mature in about 10 days. They usually make their attacks at night, fixing themselves to the body of the fowl and sucking the blood through their needle-shaped beaks. They thrive best in damp and dirty houses.

The Itch or Scaly-leg Mite attacks the comb and beak as well as the legs. It bores under the scales of the foot and leg and goes deeper and deeper into the tissue, setting up an irritation, frequently a lameness and sometimes the loss of some of the toes. The disease is readily transferred from bird to bird, and is therefore contagious.

The Depluming Mite produces a kind of disease which causes the feathers to break off at the surface of the skin. The symptoms usually appear first at the rump and later become visible on the head, neck and other parts. The mite lives at the base of the feathers in the mass of epidermal scales. On account of the irritation produced the birds pull out their own feathers. The disease is c[illegible]ntagious, inasmuch as the mites are readily transferred from one bird t[illegible]her.

THE CONTROL OF POULTRY LICE AND MITES

It has already been stated that the poultry lice and mites increase in dirty and unsanitary surroundings and in warm weather. One of the first considerations in the control of these pests is, therefore, to clean the poultry-house thoroughly. The following extract taken from a special bulletin prepared by the Maine Agricultural Experiment Station, entitled "Poultry Diseases and Their Treatment," gives a clear, concise statement of how a poultry-house should be cleaned:—

"The first thing to do is to remove all the litter and loose dirt which can be shovelled out. Then give the house—floor, walls and ceiling—a thorough sweeping and shovel out the accumulated debris. Then play a garden hose, with the maximum water pressure that can be obtained, upon floor, roosting boards, walls and ceiling until all the dirt which washes down easily is disposed of. Then take a heavy hoe or roost-board scraper and proceed to scrape the floor and roosting-boards *clean* of the trampled and caked dressing and dirt. Then shovel out what has been accumulated, and get the hose into action once more and wash the whole place down again thoroughly, following this with another scraping. With a stiff bristled broom thoroughly scrub walls, floors, nest boxes, roost-boards, etc. Then after another rinsing down and clearing out of accumulated dirt, let the house dry out for a day or two. Then make a searching inspection to see if any dirt can be discovered. If so apply the appropriate treatment as outlined above. If, however, everything *appears* to be clean, the time has come to make it *really* clean by *disinfection*. To do this it is necessary to spray or thoroughly wash with a scrub brush, wet in the solution used, all parts of the house with a good disinfectant *at least twice*, allowing time between for it to dry. For this purpose 3 per cent. cresol solution is recommended. The chief thing is to use an effective disinfectant and plenty of it, and apply it at least twice. To complete the cleaning of the house, after the second spraying of disinfectant is dry apply a liquid lice killer (made by putting 1 part crude carbolic acid or cresol with 3 parts kerosene) liberally to nests and roosts and nearby walls. After all this is done the house will

be *clean*. In houses cleaned annually in this way the first step is taken towards hygienic poultry-keeping."

(*a*) Poultry should have access to a dust-bath at all times. (*b*) When *biting lice* are found upon them they should be dusted with some lice powder, such as insect powder, or one prepared as follows by the Maine Poultry Station: Mix together 3 parts gasoline, 1 part crude carbolic (90 to 95 per cent.) or 1 part cresol, and add with stirring, enough plaster of paris to take up all the moisture (usually about 4 quarts to 1 quart of liquid.) Whatever lice powder is used it should be applied more than once.

With regard to the control of the *Chicken Mite* the great essentials are: (*a*) Thorough cleanliness of the house and the admission of sunlight and air. When houses become infested the droppings and all old nesting material should be removed; the perches, roosts, nests, floor and walls should be cleaned and scrubbed thoroughly, then sprayed or painted with a 5 per cent. cresol solution or with 3 parts kerosene and 1 part crude carbolic acid, or with kerosene emulsion. Two or three applications are necessary at intervals of a few days. (*b*) When houses are whitewashed 4 oz. crude carbolic acid may be added to each gallon of whitewash. (*c*) It is often of advantage to scatter a mixture of 3 parts of dry slaked lime and 1 part sulphur about the house, with the doors and windows closed.

The Itch or Scaly Leg Mite and the Depluming Mite can be controlled (*a*) by rubbing oil of caraway, 1 part to 5 parts white vaseline, into the diseased leg and foot every few days; (*b*) by bathing the affected parts in warm soapy water and applying sulphur ointment or naphthaline mixed with 9 parts of lard, or 5 per cent. creolin or zenoleum, or vaseline and zinc ointment.

SHORT COURSES IN POULTRY HUSBANDRY

(A) One and Two Day Short Courses.—In conjunction with other departments of the College, short courses are provided at various places in the Province of Quebec. Lectures and demonstrations are given, relating to the most important problems of the average farmer.

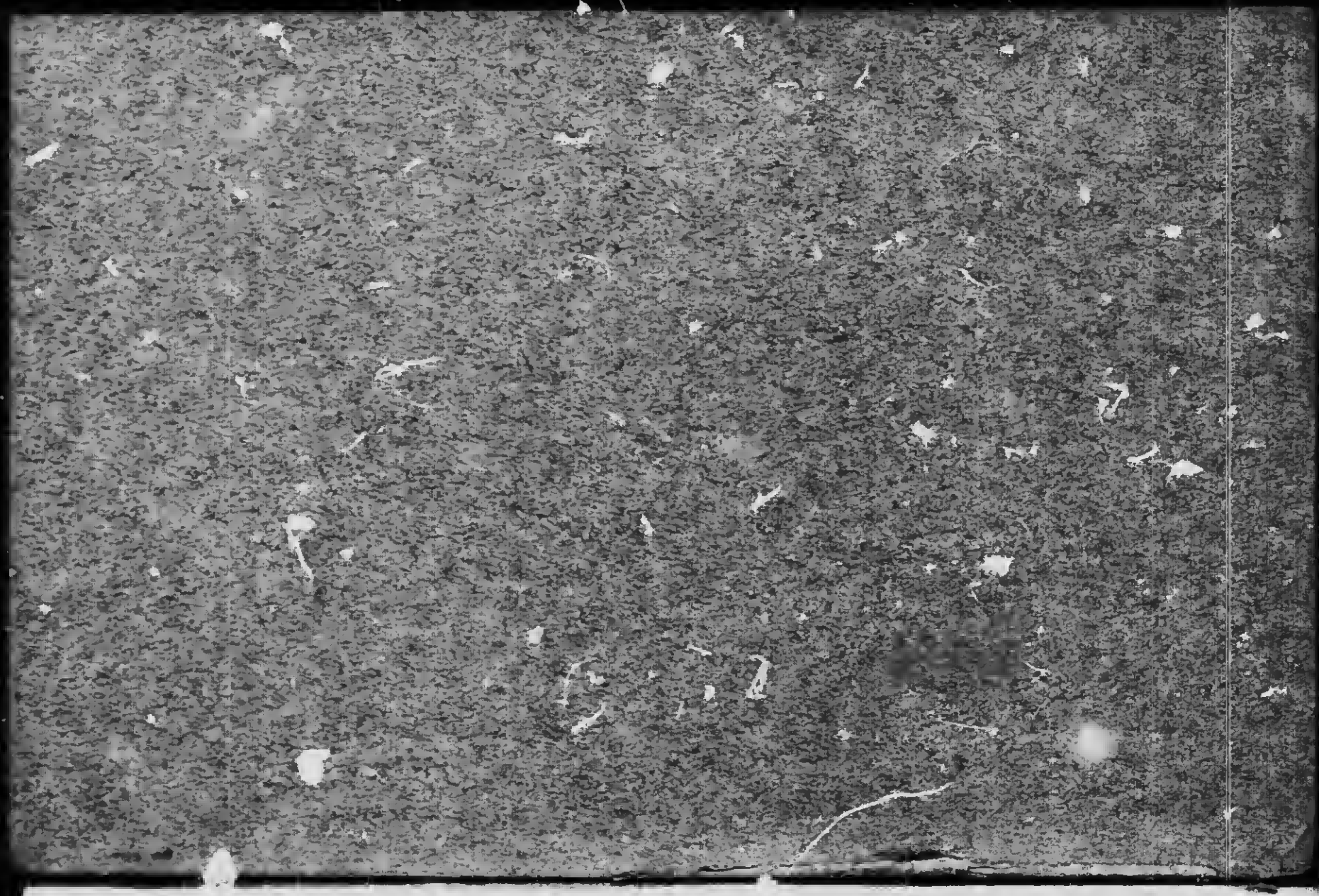
(B) Short Course of Three Weeks in February and March.—This course of three weeks' duration is given at the College, and is intended to assist in supplying the demand for practical knowledge combined with a lecture course on the more important aspects of poultry culture. In connection with this course the following lectures and demonstrations are given: Bacteriology, a lecture course with demonstrations; hygienic requirements of poultry, location of buildings, ventilation, cleanliness, disinfection; avian tuberculosis, blackhead (infectious entero-hepatitis), fowl cholera, roup, canker, diarrhea, asthenia, diseases of the ovary and oviduct, etc.; Biology, the anatomy of the fowl; the embryology of the chick; parasites of poultry; cereal husbandry, lectures on crop production and soil management as related to poultry raising; horticulture, lectures on horticultural subjects of interest to poultrymen; the school of household science will give lectures on the value of poultry and eggs in the diet and demonstrations on preparing these for the table.

Students are expected to do practical work from 8.00 to 9.00 a.m., from 1.00 to 2.00 p.m., and from 4.00 to 5.00 p.m. Lectures are given daily from 9.00 a.m. to 12.00 noon and from 2.00 to 4.00 p.m.

EXTENSION WORK IN POULTRY HUSBANDRY IN QUEBEC

The Poultry Department of Macdonald College will supply information regarding the poultry industry and answer questions in connection with poultry culture. Poultry shows requesting an educational exhibit will be provided with same whenever practicable. Blue prints with specifications of poultry houses may be secured upon application. For the purpose of demonstrating to the farmers of Quebec suitable types of houses for laying fowls, this department has had constructed six demonstration houses, one each at the following places: Shawville, Rougemont, Athelstan, Dunham, Capelton, and Cookshire, P.Q. These houses are open for inspection at any time. Rural schools and academies wishing to co-operate with the Poultry Department in the improvement of the poultry industry may secure, when advisable and practicable, hatching eggs for free distribution to deserving school children. Applications for these should be made to the nearest Demonstrator.

Address enquiries, etc.: The Manager and Lecturer, Poultry Department, Macdonald College, P.Q.



Macdonald College

SCHOOL OF AGRICULTURE

TWO-YEAR COURSE

Gives free instruction to farmers' sons of the Province of Quebec in:

Live Stock,
Horticulture,
Farm Crops,
Farm Management,
Farm Machinery,
Poultry,
Dairying, etc., etc.

All practical subjects for practical men.

Candidates are required:

1. To have passed their 17th birthday.
2. To produce certificates of physical health, including successful vaccination.
3. To have worked for a season (seed-time to harvest) on a farm.
4. To read and write the English language acceptably, to be proficient in the use of elementary mathematics, and to be acquainted with history and geography, especially of Canada.

FOUR-YEAR COURSE

A continuation of the foregoing for the training of specialists in the various branches of agriculture, leading to the McGill University degree of Bachelor of Science in Agriculture. The production of a University Entrance Certificate or the passing of a special entrance examination for this course is required.

Cost of board and lodging, $4.00 per week.

All Quebec students in Agriculture receive a grant from the Provincial Government of $7.00 per month of attendance, to apply on account of board and lodging.

Short Courses in Horticulture and Poultry Keeping will be given in February and March. Write for particulars.