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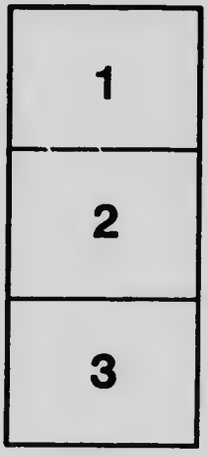

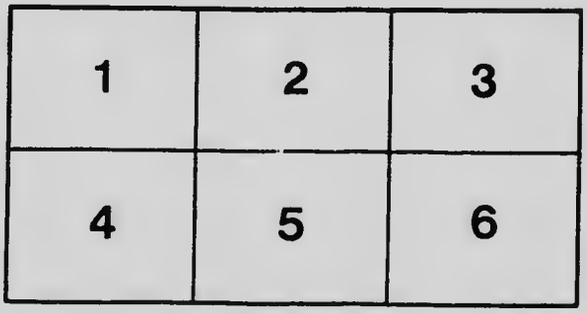

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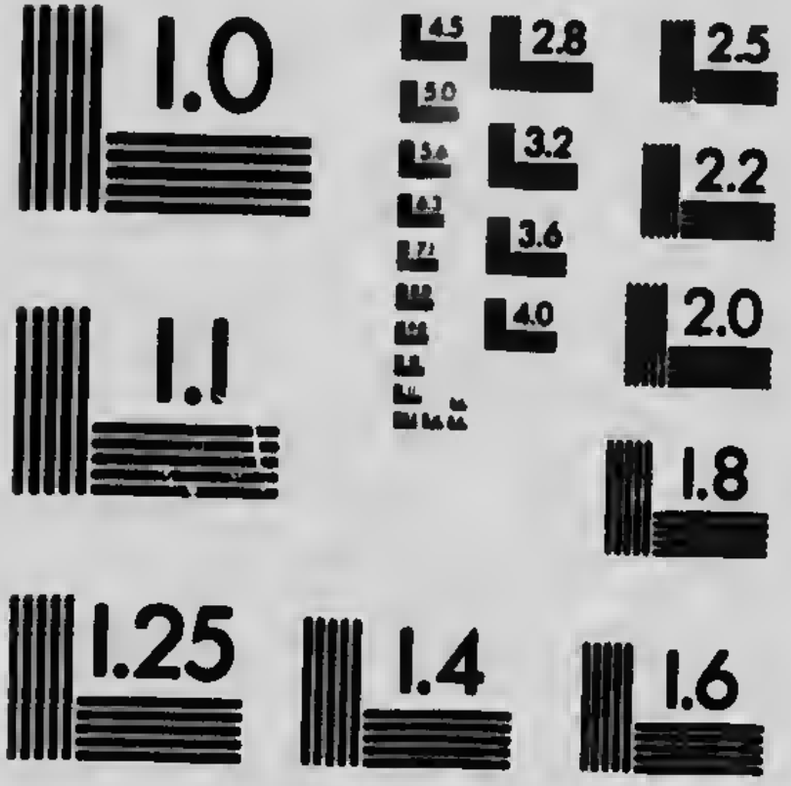

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BULLETIN 151. OCT '06

Ontario Agricultural College and Experimental Farm.

FARM POULTRY, WITH THE RESULTS OF SOME EXPERIMENTS IN POULTRY HOUSES AND FATTENING CHICKENS.

By W. R. Graham, B.S.A., Poultry Manager and Lecturer.

This Bulletin is intended to give information to farmers and others, on general matters pertaining to the keeping of poultry.

It also contains the results of a few experiments which have been conducted at this institution in fattening chickens for the home and export market; also the results of an experiment with poultry houses.

CONSTRUCTION OF POULTRY HOUSES.

We find poultry thriving and yielding good returns in so many different styles of houses, that it is very difficult to lay down any hard and fast rules. The tendency at present is towards cheaper houses, with better ventilation. The hot-house style of housing poultry during the winter has not been satisfactory, many of the houses being damp, and the air in them anything but agreeable. Disease has been quite common; and the results in many cases have been disappointing.

Fig. 1. Different Styles of Poultry Houses Suitable for an Ordinary Farm.

Every poultry house should be light; at least one-third of the south side of it should be of glass, or otherwise opened to the sun. It should face the south-east or south. The sun's rays are very beneficial to fowl, especially during the winter months.

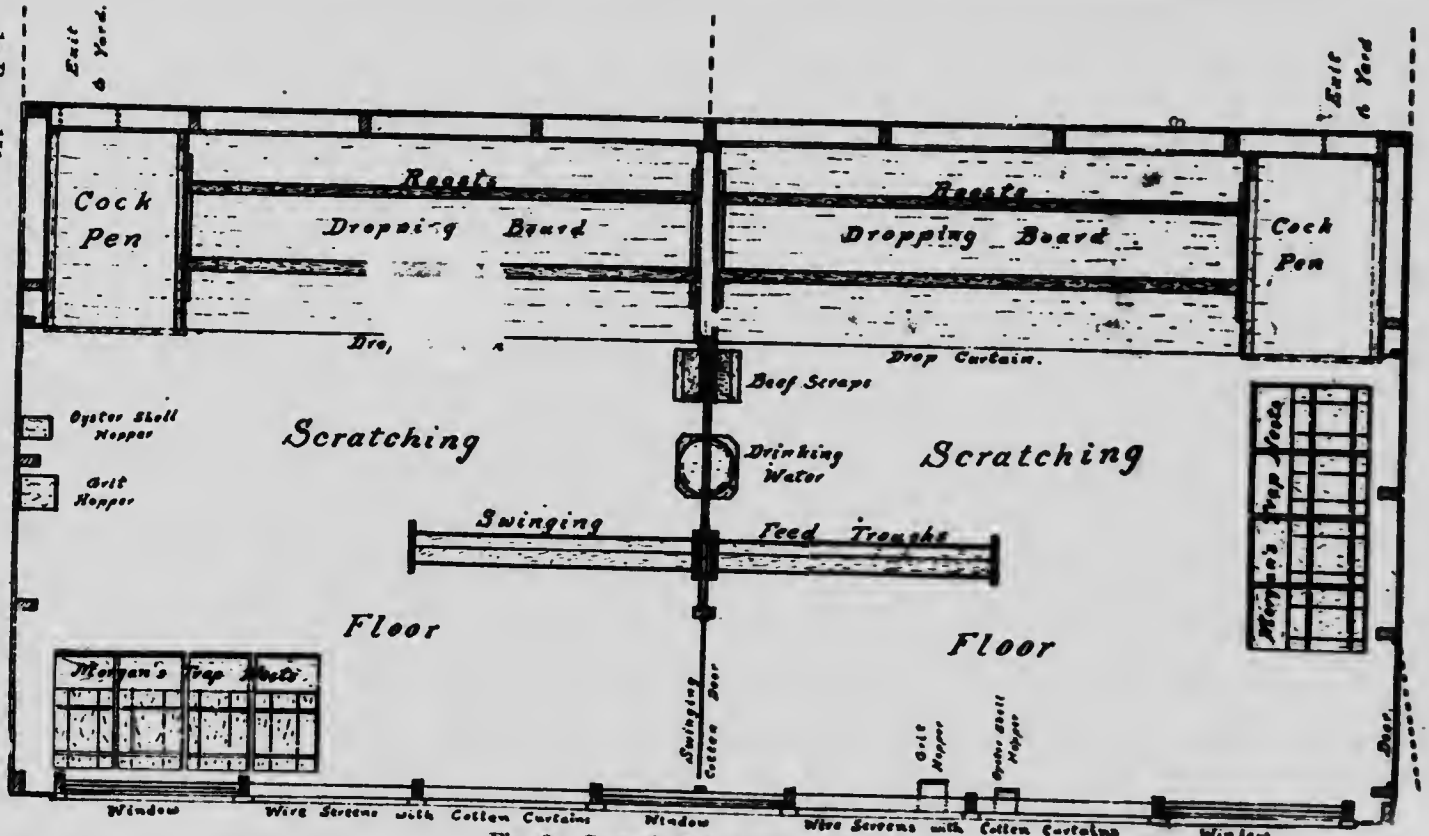


Fig. 2. Ground Plan of House No. 2.

The general arrangement in the other Houses are much the same.

College Poultry House.

During a number of years we have been trying different styles of poultry houses. The first houses constructed some ten or more years ago were built very warm and tight and were so arranged that they could be heated artificially. After a few years' trial the stoves, etc., used for heating purposes were removed, and later the double windows. Gradually we began opening the doors and windows daily, and not

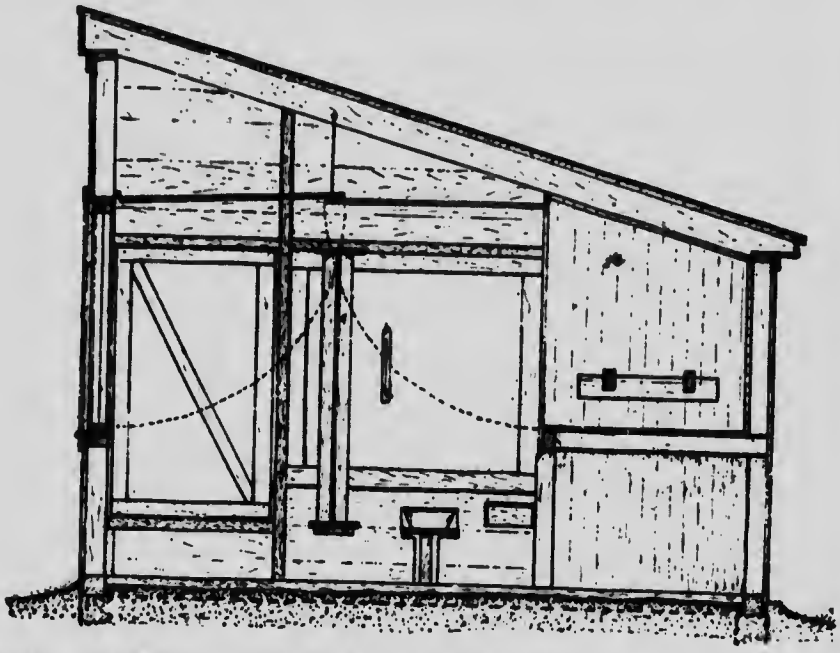


Fig. 3. Cross section of House No. 2, showing the curtains in position for the day, etc.

closing them in the fall of the year until the water would freeze in the drink tin. The fresh air treatment gave us healthier and more vigorous birds, and, as far as I can tell from the records, equally as many eggs, which were better eggs for incubating purposes.

We tried a few fowl in a small colony house constructed of single ply boards, the cracks of which were battened. This house gave fairly good results as regards egg production and hatchable eggs.

Two years ago four houses, representing different styles of popular poultry houses, were constructed. These houses were stocked with birds representing, as nearly as possible, the same strains of the breed. The breeds used were White Wyandottes and Buff Orpingtons, the one a rose combed breed, the other a single combed breed.

The houses are of equal size as regards floor space. Each house is 24 feet long and 12 feet wide. The house is divided by a wire and board partition, making two pens each 12 feet square. The pens will accommodate 20 to 25 birds each, or about 50 to the house. The cut shows fairly well the appearance as regards windows, etc., of the house. The roosting quarters of each house are very similar in construction. A drop-board is used which is constructed of matched dressed lumber.

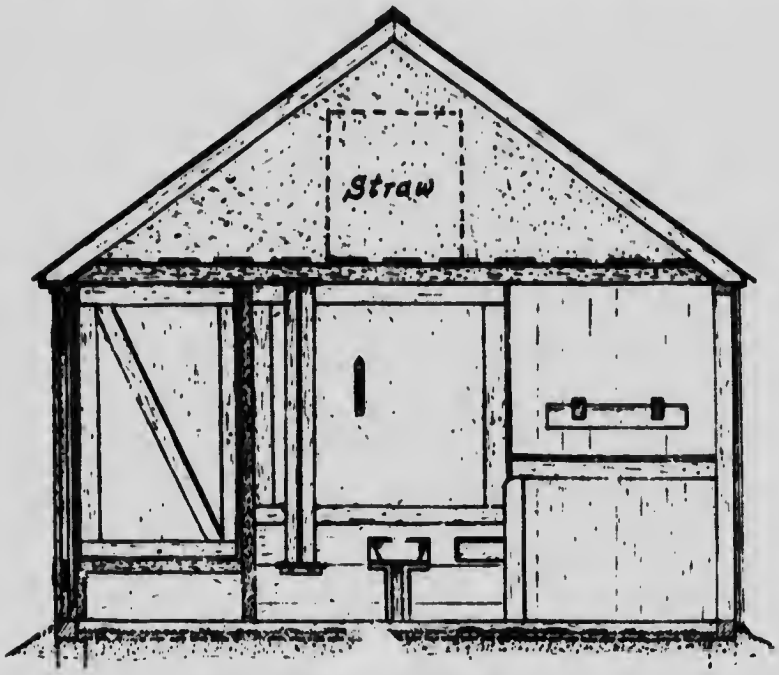


Fig 4. Cross section of House No. 4.

The board is placed at the back of the building and is about three feet above the floor level. The drop-board is three feet wide. The roosts are made of dressed 3x3 scantling, and are placed about six inches above the drop-board. A curtain is arranged to be let down during cold nights in No. 1 and No. 2 houses. There is no curtain used in No. 3 or No. 4 houses.

House No. 1 is made of matched boards which are dressed on one side. The front and ends of the house are single ply. The back is sheeted on the inside, building paper being used under the boards so as to make the wall tight or free from draughts. The windows in this house slide back and forth so that the ventilation can be adjusted to the weather conditions. The roosting quarters in this house have curtains which can be dropped on very cold nights.

Trap-nests are used in all the houses and are on the ground level. These take up some floor space that might be used for exercising the fowls were we using other styles of nests.

The second house is what is known as the "Main State" house. This house is practically open to the weather on the front or south side. There are canvas curtains which can be dropped as a protection against wind and snow on stormy days. On other days these canvas curtains are to be kept rolled up, and the fowls allowed to exercise in the fresh air. The ends of the house are single-ply matched lumber; the back wall of the house is matched lumber lined with paper, and is sheeted again on the inside. This is done in order to make a warm roosting coop, which is protected at night in front by canvas curtains.

The third house is the warmest of the four, and is built of matched lumber and lined with paper. There is a dead air space between the inside and outside walls. The building is made as tight as possible, the windows, doors, etc., all being made to fit tightly.

Many houses on this plan are moist inside. To do away with the moisture we have a straw loft. The straw is placed on boards which are four to six inches apart. These boards are placed on a level with the roof or ceiling. The straw absorbs the moisture and keeps the house dry.

The fourth house is one of the extremely airy ones, being made of boards that are dressed on one side and the cracks battened; about half of the front is open to the weather, but may be closed in on stormy days by large doors. There is not any special protection for the roost, the chickens roosting in this house in exactly the same temperature as they worked in during the day. This house, needless to mention, is much cheaper than the other styles.

EGGS LAID AND FOOD CONSUMED DURING JANUARY, FEBRUARY AND MARCH, 1906.

House.	Breed.	Jan.	Feb.	Mar.	Total	Total eggs for the house.	Grain consumed	Beef Scrap
							lbs.	lbs.
No. 1—Movable windows	Orpingtons	151		[illegible]	527	1,035	348.5	28
	Wyandottes	117			508		362.5	21.5
No. 2—Cloth front	Orpingtons	196		[illegible]	579	1,092	350.75	26.5
	Wyandottes	99	14	273	513		340.25	27.
No. 3—Warm...	Orpingtons	184	123	201	508	946	373.5	23.
	Wyandottes	94	126	318	438		329.	27.
No. 4—Cold. ...	Orpingtons	121	163	[illegible]	434	1,021	352.25	34.
	Wyandottes	188	169	2	587		361.	40.

* A number of hens in this pen moulted broadly.

Eggs Laid and Food Consumed During January, February and March, 1905.

House	Breed.	Jan.	Feb.	Mar.	Total	Total eggs for the house.	Grain consumed	Refuse Meat
							lb.	lbs.
No. 1—Movable windows	Orpingtons	79	152	233	464	819	391.75	71.
	Wyandottes	36	103	216	355		340.5	70.5
No. 2—Cloth front	Orpingtons	99	108	230	437	718	420.25	71.5
	Wyandottes	38	26	217	281		340.	68.75
No. 3—Warm...	Orpingtons	128	99	236	463	607	406.25	71.5
	Wyandottes	62	42	40	144		333.	64.
No. 4—Cold.....	Orpingtons	136	185	244	565	1,074	406.	71.75
	Wyandottes	123	120	266	509		378.	72.

Notes on Experimental Houses.

In the above table it will be noted that the hens laid a larger number of eggs for the three months of 1906 than they did for the same period of 1905.

During the period of 1905 the cold house. or No. 4, gave much the best results, and for the months of January and February, of 1906, it leads, but does not do as well in March, probably owing to more hens being broody.

The warm house, or No. 3, gave the poorest results in each year.

The average temperature in 1905 was lower than in 1906.

The average egg production was lower in 1905 than in 1906.

The food consumed during the winter of 1905 was greater than during the same season of 1906.

The fowls in the houses during the season of 1905 were not as good birds as those in the 1906 test, there being more old hens and late hatched pullets, these may be the cause of less eggs in 1905, although House No. 4 gave better results during the cold season.

Great pains were taken to have the birds as nearly alike as possible in each pen, but each individual is different, and it is practically impossible to have the birds exactly alike in every respect.

From the figures, hens appear to eat more grain during a cold season than during a warm season. There was a difference of 18 degrees in temperature between the coldest temperature in House No. 4 and House No. 3, their respective minimum temperatures being 7 below zero and 11 above zero.

In both years the cold house is better than the 3rd.

Houses No. 1 and 2 were about 4 degrees warmer than House No. 4. The curtain front house (No. 2) was usually one degree warmer than the house with moveable windows (No. 1).

The houses with scratch lofts are cooler in summer.

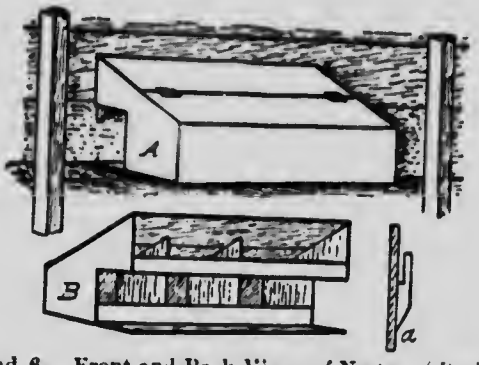
The birds in House No. 4 were not as healthy as those in the other houses. This applies particularly to the Wyandottes.

Were I building a house for my own use I would prefer a house like No. 4 with a front similar to No. 2.

The curtain in front of the roost is useful in zero weather. It saves the combs of the male birds.

General Rules for Building.

Every hen should be allowed at least six square feet of floor space. Each bird of the Plymouth Rock, Wyandotte, and such breeds, requires about nine inches of perch room; Leghorns, etc., about eight inches; and Brahmas ten inches.



Figs. 5 and 6. Front and Back Views of Nests. (*Poultry Craft*).

Roosts should be made low, or near the ground. There are several reasons for this. Fowls of the heavier breed cannot fly high, and those of the lighter breeds frequently injure the soles of their feet in jumping from high perches.

When dropping boards are used, they should be moderately low down, to admit of easy cleaning. Dropping boards should be made of matched lumber, and should be 20 inches wide for one roost, and three feet for two perches, the first being placed eight to ten inches from the wall.

Most poultry men prefer roosts two inches by two inches, with edges slightly rounded.

Nests.—Many use only old boxes; but such nests, if near the ground, are apt to induce egg-eating. Dark nests prevent this. (Figs. 5 and 6.)

Nests are usually made from twelve to fifteen inches square.

Ground floors are more in favor than board floors, and cost much less.

In my own experience, the best results are obtained from keeping 20 to 25 birds in a flock. Some succeed with 60 to 75 in a flock; but these are the minority.

Breeds of Poultry.

Plymouth Rocks.—There are three varieties of this breed, viz., Barred Plymouth Rocks, White Plymouth Rocks, and Buff Plymouth Rocks. The Barred variety is the oldest and most popular, owing to it having been introduced some years previous to the last two named varieties.

The same general characteristics apply to the three varieties. They are fairly hardy, good winter layers, fair summer layers, lay brown eggs, make fair mothers, are sitters, have naturally yellow legs and flesh, have single combs, and are all-round good general purpose fowl.

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

Wyandottes.—There are several varieties of this breed, viz., White, Black, Buff, Silver-Laced, Golden-Laced, Partridge, Silver-Pencilled, and Columbian.

The last two varieties are comparatively new, and are not at present nearly so plentiful as are the other varieties.

The White Wyandotte is bred by many market poultrymen, and is very popular.

This breed, in its different varieties, possesses the same general characteristics as the Rocks, with the exception that they have a rose-comb, and are more blocky in appearance.

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

Rhode Island Reds.—This breed is bred extensively by the farmers in the State of Rhode Island, where it originated. It has been admitted to the American standard of perfection.

They are said to be fairly hardy, fair winter and summer layers, are setters, only fair mothers, brown egg breed, have yellow legs and skin and mature early. They are a reddish buff in color, with a strong tendency to black colored tails and wings; also black ticking in the hackle feathers.

The R.I.R. Club gives the following weights: Cock, 7 lbs.; cockerel, 6 lbs.; hen, 5½ lbs., and pullet, 4½ lbs.

Orpingtons.—There are several varieties of this breed, viz., Black, White, Buff Orpingtons, Spangled, and Jubilee. The Buff variety is far more popular than the other two. Buff Orpingtons seem to be well adapted to this country, and have the color of flesh sought after in the British market. They will certainly be great rivals of the Rocks and Wyandottes as the farmers' fowl.

They are fairly hardy, good winter layers, brown egg breed, are setters, good mothers, have white legs, white skin, and usually have single combs. There are a few rose comb Buffs, but they are rather scarce.

Standard weights: Cock, 10½ lbs.; hen, 8½ lbs.; cockerel, 9 lbs., and pullet, 7 lbs.

In breeding this variety, where market chickens are wanted, I would prefer birds of at least one pound less in weight than the standard weight given.

Leghorns.—There are several varieties of Leghorns. The most popular are the Single-Combed White, Brown, Buff, and Black. The Rose-Comb White and Brown are also bred to some extent.

All Leghorns are considered to be non-sitters. An occasional one shows some inclination to sit, but these are not to be relied upon. They are excellent layers, especially during the summer months. The eggs are white in color. As a rule, the Single-Comb White lays a larger egg than the other varieties.

Leghorns require a fairly warm house on account of the size of their comb, particularly the male bird. These birds are fairly hardy and vigorous. They are too small for table use, unless as broilers.

Minorcas.—The Single-Comb Black is the most popular variety. The Rose-Comb Black and Single-Comb White are not so generally bred. This breed is larger than the Leghorn or Andalusian. They lay very large white eggs. They are good summer layers and are usually non-sitters. Their very large combs are an objection in cold climates. These fowls are fairly hardy and vigorous.

Standard weight: Cock, 8 lbs.; hen, 6½ lbs.; cockerel, 6½ lbs., pullet, 5½ lbs.

Blue Andalusians.—This breed is midway in size between the Minorca and Leghorn, and generally non-sitters, and lay a large white egg. They are splendid summer layers. The chief objection to them is that they do not breed true to color, the chicks coming blue, black, and nearly white. There are usually about 50 per cent. blue chicks. The size of their combs is also considered an objection in a cold climate. They are fairly hardy and vigorous.

Standard weight: Cock, 6½ lbs.; hen, 5½ lbs.; cockerel, 5½ lbs., pullet, 4½ lbs.

Games.—The Indian Game is the chief variety of interest to the farmer. They are a good market fowl, having a splendid development of breast meat; but their breast is considered by some to be rather short. They are fairly hardy, but are only moderate layers of medium-sized brown eggs. They are good sitters and mothers. Crossed with Dorkings, Rocks, or Wyandottes, they make excellent fowls for the market. These crosses are, however, seldom good layers.

Standard weight: Cock, 9 lbs.; hen, 6½ lbs.; cockerel, 7½ lbs., pullet, 5½ lbs.

Dorkings.—There are several varieties of this breed, the most popular being the Silver Grey and colored varieties. Birds of this breed are among the best market fowls yet produced, and they are fair layers

of good-sized, white eggs. They are fair sitters and mothers. They have white legs, white skin, and five toes.

The fault of this breed in Ontario is that they do not do well in confinement, and are not considered hardy. With some farmers, however, they are very popular.

Standard weight of Silver Grey variety: Cock, 8 lbs.; hen, 6½ lbs.; cockerel, 7 lbs., pullet, 5½ lbs.

Egg Production.

To produce eggs in winter time, we have to consider the stock, the quarters or housing, the feed, and the weather.

Stock.—The stock needs to be the best obtainable. An ideal bird for winter egg production is a pullet that is mature at about Nov. 1st, and is strong and vigorous, and of a good laying strain. Something depends upon the breed, but more on the strain of the breed; also much upon a good strong constitution, and an abundance of vigor. These are the essential points.

To get pullets of such birds as Rocks, Wyandottes, and Orpingtons matured by November, it is necessary to hatch them in April. Some seasons May chicks mature quickly and begin laying about the first day of December, but not as a rule. If a pullet does not commence to lay before Christmas, it is doubtful if she will begin much before March, unless the weather is favorable. Then again, good yearling hens that have moulted early are likely layers. The problem, how to get hens to moult early, is not entirely solved as yet. No doubt it has been noticed that hens which sit and bring out a brood of chicks from June 10th to July, usually moult about the time they are leaving their chicks. Some hens that sit earlier also moult early; but as a rule they begin to lay after sitting, and are rather inclined to late moulting.

From the above, it would appear that the best method to get the flock in general to moult would be to place the flock under conditions similar to those of the sitting hen. This is done by some egg-farmers with more or less success. The plan followed is to change the hens to a new, free range about July 1st, and feed but very lightly, not more than one handful of grain to each hen daily. The object is to induce the hens to dine largely on grass and water, and *stop egg production.* After being thus treated for from two to three weeks, the hens are again well fed on a good laying ration. In many cases they begin to moult, and, if fed well, get their new coat of feathers in quickly, and thereby save time. I have had a few hens which have begun to lay heavily as soon as I have started to feed them well; but this is not very often the case.

Hens over two years of age are seldom good layers. Leghorns, Minorcas, etc., are sometimes good during their third and fourth years; but, generally speaking, the Rocks and such fowls are of little or no use as layers after the second year, being much inclined to become excessively fat.

For *summer egg production* the lighter breeds and late-hatched pullets of the heavier breeds are best. Do not expect a hen that has

laid well all winter to lay exceptionally well during the summer. A hen that lays early is inclined to show a desire to sit early in the season. The following tables show plainly that eggs can be produced at a profit during the summer, even where all the grain has to be bought.

Egg-Production at the O. A. C.

April 22nd to May 22nd. Rocks—13 hens, 1 cock:

Mixed feed—17.687 lbs., at $1.33 per cwt	23.526	cents.
Bone—16.687 lbs., at $1.00 per cwt	16.687	"
Mash—32.375 lbs., at 90c. per cwt	29.137	"
Wheat—21.875 lbs., at $1.13 per cwt	24.71	"
Milk—32 lbs., at 10c. per cwt	3.20	"
Total	97.26	"

Eggs laid, 16 dozen; cost per dozen, 6.08 cents
Nearly all Rocks were broody during last week.

April 22nd to May 22nd. Andalusians—13 hens, 1 cock:

Mixed cracked grain—14.3 lbs., at $1.33 per cwt	19.01	cents.
Green bone—13.75 lbs., at $1.00 per cwt	13.75	"
Mash—35 lbs., at 90c. per cwt	31.50	"
Wheat—24 lbs., at $1.33 per cwt., or 68c. per bushel	31.92	"
Milk—35 lbs., at 10c. per cwt	3.5	"
Total	99.68	"

Eggs laid, 20¼ dozen; cost per dozen, 4.86 cents.

May 22nd to June 22nd. Barred Rocks:

Oats—2 lbs. 8 oz., at $1.00 per cwt	2.5	cents.
Bone—2 lbs., at $1.00 per cwt	2.00	"
Mash—40 lbs., at 90c. per cwt	36.00	"
Milk—40 lbs., at 10c. per cwt	4.00	"
Wheat—34.8 lbs., at $1.13 per cwt	39.32	"
Total	83.82	"

Eggs laid, 13 dozen and 10 eggs; cost per dozen, 6.15 cents.

May 22nd to June 22nd. Andalusians:

Milk—40 lbs., at 10c. per cwt	4.00	cents.
Oats—3 lbs., at $1.00 per cwt	3.00	"
Wheat—35.437 lbs., at $1.13 per cwt	40.04	"
Mash—40 lbs., at 90c. per cwt	36.00	"
Bone—11.375 lbs., at $1.00 per cwt	11.37	"
Total	94.41	"

Eggs laid, 18 dozen and 2; cost per dozen, 5.06 cents.

June 22nd to July 22nd. Barred Rocks:

Wheat—26.375 lbs., at $1.13 per cwt	29.80	cents.
Oats—6.25 lbs., at $1.00 per cwt	6.25	"
Mash—41.75 lbs., at 90c. per cwt	37.57	"
Milk—41 lbs., at 10c. per cwt	4.1	"
Bone—1 lb., at $1.00 per cwt	1.00	"
Total	78.72	"

Eggs laid, 13 dozen and 10; cost per dozen, 5.69 cents.

June 22nd to July 22nd. Andalusians:

Wheat—35.625 lbs., at $1.13 per cwt	40.25	cents.
Oats—6.25 lbs., at $1.00 per cwt	6.25	"
Mash—40 lbs., at 90c. per cwt	36.00	"
Milk—40 lbs., at 10c. per cwt	4.00	"
Bone—1 lb., at $1.00 per cwt	1.00	"
Total cost	87.50	"

Eggs laid, 16 dozen and 1; cost per dozen, 5.44 cents.

July 22nd to August 22nd. Barred Rocks:

Wheat—32.625 lbs., at $1.13 per cwt	36.86	cents.
Oats—9 lbs., at $1.00 per cwt	9.00	"
Mash—35.9 lbs., at 90c. per cwt	32.31	"
Milk—40 lbs., at 10c. per cwt	4.00	"
Bone—2 lbs., at $1.00 per cwt	2.00	"
Total cost	84.17	"

Eggs laid, 14 dozen and 1; cost per dozen, 6.2 cents.

July 22nd to August 22nd. Andalusians:

Wheat—27.25 lbs., at $1.13 per cwt	30.79	cents.
Oats—14.875 lbs., at $1.00 per cwt	14.875	"
Mash—40.5 lbs., at 90c. per cwt	36.45	"
Milk—40 lbs., at 10c. per cwt	4.00	"
Bone—3 lbs., at $1.00 per cwt	3.00	"
Total cost	89.115	"

Eggs laid, 14 dozen and 9; cost per dozen, 6 cents.
Average cost per dozen for Rocks, 6.02 cents per dozen.
Average cost per dozen for Andalusians, 5.34 cents per dozen.

Housing.—The housing of fowl was discussed in a previous paragraph. It is well to remember, however, that the house should be clean, the droppings being removed at least twice a week; it should also be well aired and kept dry, to avoid dampness and foul, stagnant air.

Feeds and Feeding.—The main points to be considered in feeding are, that there be a good supply of green food, meat food, and grain, the latter both ground and whole. It is also necessary to feed so as to induce birds to take exercise. In winter, green food is supplied by feeding cabbage, turnips, or other roots, pulped or whole, and by feeding steamed cut clover or clover leaves in the mash. Meat food is supplied in the form of ground green bone, cooked offal, such as beef heads, etc., and in the form of animal meal, beef scrap. In Ontario the ground bone is perhaps the best and cheapest, where one has a bone mill; where not, beef heads, livers, etc., give good results. Animal meal, dried blood, etc., are good foods, but in many cases are more expensive than the others mentioned. However, they are very useful during the hot weather, when it is almost impossible to use fresh meat. Partially decayed meat *should not be used*, as it is not healthful.

Wheat is, undoubtedly, the most popular grain food for fowl in Ontario. It is certainly a good food, and is very much relished by poultry.

Corn is not used so much in Ontario as in New England States. There it appears to be used quite freely in both summer and winter

feeding of fowls. It is used whole, ground, and cracked, the meal being used principally in the mash foods. Cracked corn is used largely for young chicks and fowls when scattered in the litter. The whole corn is rather large and conspicuous; and, when in the litter, does not give enough exercise. I am of the opinion that corn can be used in portions of Ontario, where it is grown extensively, much more freely than it has been heretofore. Corn is a heating and fattening food, and is, therefore, best adapted for winter use. It is considered by many, when fed in large quantity, to make the hens fat; yet it is used extensively by many progressive poultrymen with little or no evil effects.

Oats should be a first-class food for poultry; but, owing to the large percentage of hull, they are not relished by chickens, and for this reason they are somewhat indigestible. When ground they are used pretty freely in mash food; also the rolled and granulated oatmeals are used for feeding young chicks. The ground oat, without the hull, is used extensively for fattening fowl. We have found that oats soaked in water for 24 hours increases their palatibility.

Barley, either whole or ground, is very good. It has rather too much hull, but otherwise it is a satisfactory food. It is considered by many to be next to wheat in point of value.

Buckwheat is very popular as an egg-producer in districts where it is grown extensively. Some difficulty is at times experienced when first feeding it to fowls in getting them to eat it, but this is usually overcome in a day or so, if other feeds are withheld. Boiling the buckwheat will sometimes start the birds to eat it. After the birds once get accustomed to its appearance, it is much relished by them. Ground buckwheat is an excellent food to use in a fattening ration. It is somewhat like corn in its fattening properties and therefore it is better for winter than summer use.

Shorts and wheat bran are both used extensively in making mashes, or soft foods. They are excellent foods to use in maintaining the health of the flock.

Dry Feeding.

The tendency at the present time is to feed dry grain and to use no wet mash foods. It has been claimed by some writers that mash foods, while tending to force growth, and possibly egg production, does not tend to produce good eggs for hatching purposes; that is to say, the mash is more or less of a forcing food. In the production of eggs, the number produced is probably as large if not larger where mashes are used, but the hatchability of the eggs is not as high. During the last year or two we have not fed very many mashes to our breeding birds, but have fed in place sprouted grain. So far as we can see at the present time the sprouting does not improve the feeding qualities of the grain very much, with the exception of oats. The palatability of oats is increased considerably. We have made the oats equally as palatable by soaking them in warm water about six hours. At the present time our plan of feeding is to feed whole grain in the litter

in the morning, using about one to two pounds for twenty birds, the latter amount when they are laying heavy. At noon feed mangels, clover hay and meat food in the winter time; if we have no meat a small quantity of grain is scattered in the litter on the floor. In the summer time no grain or feed of any description is given. At night they are fed all the sprouted grains, either oats or barley, sometimes wheat, they will eat. During very cold weather in the winter they are fed occasionally corn, either in the morning or evening. Where this is given it is scattered in the litter.

Those who adopt the dry method of feeding entirely, usually feed a mixture of ground grains dry, from hoppers or troughs. We have not as yet done much experimental work with these methods of feeding, but may do so during the coming winter, unless something unforeseen prevents us.

Feeding When Wet Mashes are Used.

The general method of feeding is to give a mash of mixed ground grains moistened with water or milk, in the morning; a little whole grain scattered in the straw covering the floor, at noon; and all the whole grain they will eat at night. This latter meal is usually fed in the straw. Some poultry men adopt the plan of not feeding the mash until evening. We have been practising this plan for some time, and we like it very well. The objection to the former plan is that the hen is likely to become gorged with food early in the morning, and thus take to the roost for the rest of the day, which is usually followed by hens becoming too fat, and the egg record becoming small; but, notwithstanding, many successful poultrymen use this method to advantage. The objection to feeding the mash at night is that it becomes quickly digested, and the bird has not sufficient food to last it during the long winter night; but this objection can be overcome by giving a little whole grain after the mash at night.

Some poultrymen feed their fowls but twice a day, morning and evening, and get very good results; but I favor feeding three times a day. Our plan is somewhat as follows:—

Early in the morning the fowls are given half a handful each of whole grain. This is buried in the litter on the floor. Thus the fowls get exercise (a very necessary thing) in searching for it and at the same time keep themselves warm. At noon about two handsful of grain are given to a dozen hens in the litter; they are also given all the roots they will eat, either pulped or whole, as fowl relish mangels, sugar beets and turnips. Cabbage also—a very good green food—is sometimes given. About four o'clock in the afternoon they are fed a mash composed of equal parts of bran, shorts, oat-chop and corn-meal (during cold weather); and to this is added about 10 per cent. of animal meal if we have not cut green bone or cooked meat. These foods are thoroughly mixed together in the dry state, after which is added steeped clover, which has been prepared by getting a bucket of clover leaves, or cut clover hay, and scalding it with boiling water. This

is done early in the morning, and the bucket is kept covered with a thick sack throughout the day. This will be quite warm at night, if it has been kept in a warm place. There is usually sufficient liquid to moisten the meal that has been mixed. Our aim is to have about one-third of the ration, in bulk, of clover. After the mash a small amount of whole grain is fed in the straw. There is—and should be—a plentiful supply of good, *pure water within easy reach at all times.*

Natural and Artificial Incubation.

Whether it will pay to buy incubators and brooders depends largely on one's circumstances. Where chicks are wanted in considerable numbers earlier than April 15th, an incubator becomes practically a necessity, as it is seldom that hens become broody in numbers until after the 1st of April. Again, where one wishes to hatch more than 150 chicks, an incubator is in many cases cheaper and better than the natural method. It is also a necessity where one is breeding from the non-setting varieties.

There are numerous illustrations of chicks being raised in large numbers by the natural method in the States of Rhode Island and Massachusetts, particularly in the former State. Where this method is followed, the chicks are hatched largely during the months of May and June; and where from 500 to 1,500 laying hens are kept, there is little difficulty in getting a sufficient number of broody hens. Those who are keeping large numbers of hens appear to be well satisfied with the natural method; but there can be no doubt that the number of incubators in use is increasing from year to year.

Hen and Incubator.—As to results, I am of the opinion that *on the average*, the incubator will hatch as many chicks as the hen. There is no doubt that some individual hens hatch a much higher percentage than a machine; but when we put 240 eggs into a machine and the same number under 20 hens, our experience is that we get about equal results in the number of chicks hatched.

The average hatch is probably one chicken from every two eggs set. This, of course, varies with the different seasons, also with the percentage of fertile eggs, and the strength of the germ. We have found during the months of February and March, when the ground is covered with snow and the fowls are closely housed, that the percentage of fertile eggs is small, and that the germs are very weak. Under such conditions we have very poor hatches and chicks that are very hard to rear. Much better eggs are obtained in December and early January, or when the fowls get out into the fresh air and are able to pick some grass. Thus it will be seen that, as a general rule, as the percentage of fertile eggs increases, the vitality of the germ increases, the percentage hatched is larger and the mortality among the young chicks smaller. For example, we would expect to get a much larger percentage hatch of the fertile eggs from eggs that were 90 per cent. fertile than from those that were 60 per cent. fertile; and, moreover, we would

figure on raising a much larger percentage of chicks from the former eggs than from the latter, owing to the chicks being stronger and having greater vitality.

Setting the Hen.—It is generally agreed that, in order to secure a good hatch, the hen must be placed where other hens are not likely to disturb her; for, as a rule, we seldom get good hatches where other hens lay in the nest with the sitter. Some farmers do not set a hen until one becomes broody on a nest where no others lay, which often necessitates late chicks. The difficulty can be overcome by making a new nest for the broody hen. Get a box about twelve inches square and six inches deep; put some earth, or an overturned sod, in the bottom, taking care to have the corners very full so that no eggs can roll out from the hen and get chilled; next put on about two inches of straw or chaff; and then put a few earthen eggs into the nest. Place the nest in some pen where nothing can disturb the hen, and put her on after dark. Feed and water must be within easy reach and a dust-bath should also be convenient. If the hen is sitting quiet the next day, you will be safe in putting the eggs under her. In our experience we get 90 per cent. of the hens to sit by following this method.

It should be remembered that the hen will be in better condition if dusted with insect powder when set, and also a few days before the hatch comes off. This will usually keep the lice in check, especially if some tansy or mint leaves are used in making the nest.

Incubators.—There is really very little known about the running of incubators. Some people succeed in hatching a large percentage, while others, under exactly the same circumstances, fail. The exact reason why, we do not know. This much, however, can be said; the machine should not be placed in a direct draught, nor yet in a building where there is a lack of ventilation. Fresh air is one of the most important things in an incubator room. I have known machines to hatch in well-ventilated cellars, kitchens, dining-rooms and bed-rooms. Hardly any two people agree as to which is the best place to operate the machine. As a general rule, it is wise to follow the manufacturer's directions. I find that different makes of incubators require different treatment, both as to temperature and otherwise, and we generally get the best results when running closely to the directions. Where possible, the temperature in the room should vary but little; for, if it varies 30 to 40 degrees in 24 hours, it is very hard to keep an even temperature in the machine; and it is absurd to expect that the machine will not vary with such changes in the surrounding temperature. We are conducting a large number of experiments with incubators. The results of these experiments will be published in detail in another bulletin to be issued at an early date.

Rearing Chickens.

Experience and observation has led me to believe that chickens, in order to do their best, require to be grown on fairly good land, probably a clay loam or a sandy loam being the best. I have never been

successful nor yet have I seen good flocks of chickens grown on very light sand. Chickens require dry ground at times, yet, at the same time, a rather moist location near by renders a good foraging ground.

Young chickens require plenty of ground to range over; some convenient shade, such as fruit trees, or growing corn or artichokes; tender green food and insects. Many growers of large numbers of chickens on limited areas crowd the birds far too much, the result being a large proportion of unthrifty chicks. These last mentioned chickens have been very much in evidence on nearly all the large, intensive poultry plants that I have visited. The chicks frequently outgrow these conditions to such an extent that they are very difficult to pick out when mature, but are readily seen when about one-half grown. Many growers appear to believe that as long as a chicken is alive it is a good one, but this is folly. I believe by breeding from such stock the vitality will gradually decrease until we shall reach a point where eggs are practically unhatchable.

Chickens when taken from the nest or incubator should be placed on ground upon which no other chickens have ranged that season. The range or run for a chick during the first four weeks of its life need not be large, but it should be fresh.

Many make the mistake of putting late hatched chickens on old tough sod, the green grass (if there is any) being so tough that the chicks cannot break it, and often the grass too thick to admit of a chick catching an insect before it is out of reach. I much prefer a cultivated piece of ground. A little tender lettuce, or rape, or even weeds for green food are preferable to summer sod, or grass. But after the middle of May the cultivated land gives better results than grass land.

A corn field well cultivated appears to be nearly an ideal place for raising late hatched chicks.

Chickens hatched in an incubator can be reared either with hens or with a brooder. Some people are able to make good hatches with their incubators; but they are unable to rear the chickens in brooders. In this case I would advise the use of broody hens for mothers; and the same would apply to those who have an incubator, but do not care to invest in a brooder.

The best plan I know of to get the broody hens to take the chicks, is to give the hen two or three eggs out of the incubator on the 18th or 19th day and allow her to hatch them. When your incubator hatch is over take a dozen or fifteen chickens and put them under the hen after dark. Even if they happen to differ in color from those she has hatched, she will mother them all the same. If you give them to her in the day time she may not do so. Never neglect to give the hen a thorough dusting before giving her any eggs. If there is one thing more than another that requires careful attention in rearing young chickens, it is to keep them free from lice. If lice get upon them, from the hen or elsewhere, a large proportion of them will be almost sure to die.

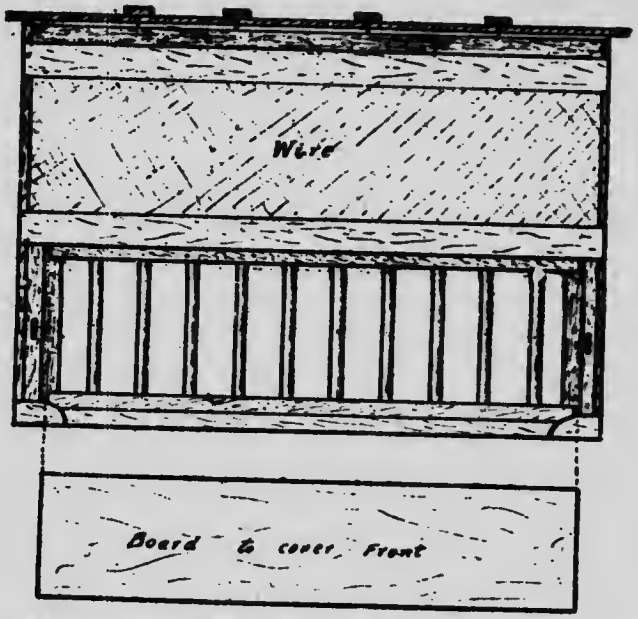


Fig 7. Front of a convenient coop for hen and chicks.

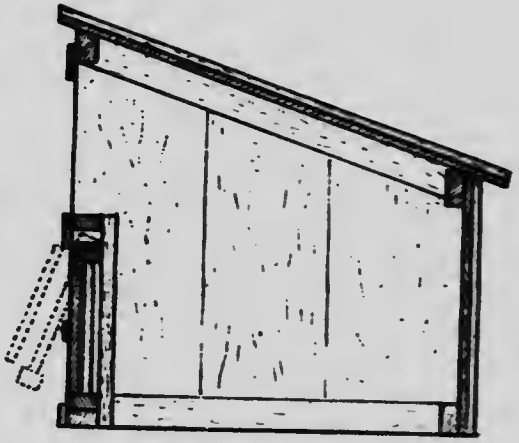


Fig. 8. Cross secti

This coop can be closed at night so as to keep out all animals that might destroy the chicks. The wire front is necessary to supply an abundance of air.

The movable front is a great convenience when the hen is running at large during the day.

The coop is two feet high in front, fifteen inches high at the back, and is two wide by three in length. The wire portion is one foot in width.

There are many good brooders upon the market which are well described in the manufacturers' catalogues; hence a description here is unnecessary. Personally, I am in favor of a three-compartment brooder, as it admits of keeping the chicks in near the heat when young, and on stormy days. The brooder lamp should always be arranged so as to give little chance of fire.

If the brooder can be placed in a small portable house, it is a good plan, as the brooder is thus protected from stormy cold winds in the early spring; also from the heat later on. The house protects the chicks from rain, and serves as a roosting coop after they become too large to stay in the brooder.

Chicks should not be fed until they are at least 36 hours old. It is a serious mistake to feed them earlier. Too early feeding is the cause of indigestion and bowel trouble in many cases. We keep the temperature of the brooder between 90 and 95 degrees the chicks level throughout the first week. After the first week temperature is gradually lowered, generally speaking, about one degree day. When the chicks are put into the brooder, it is well to remember that every 15 chicks will raise the temperature of the brooder one degree. Be careful not to get your brooder too hot, nor yet so cool as to chill the chicks. This is very important, especially during the first ten days.

The floor should be covered with clover chaff before the chicks are put into the brooder. Luke-warm water should also be put into the brooder for drink before the chickens are taken from the incubator. I have had best success in starting young chicks on hard-boiled eggs, finely chopped, shell included, and bread crumbs—about four parts by weight of bread to one of eggs. This is fed dry. After the first two days we begin to give an occasional feed of seed chick-food, which is made as follows:—

Cracked wheat	25 parts
Granulated oat meal	15 "
Millett seed	12 "
Small cracked corn	10 "
Small cracked peas	6 "
Broken rice	2 "
Rape seed	1 "
Grit (chicken size)	10 "

This can be used for the first feed and continued through the first eight to ten weeks with good results. We aim to feed the chicks five times a day. Generally after the first few days, there are three feeds a day of this chick-food, one of bread and milk (the bread being squeezed dry and crumbled), and one of whole wheat, or a mash made of equal parts of bran, shorts and corn meal, to which has been added ten per cent. of animal meal or blood meal. If we can secure fresh liver and get it boiled, this is generally given twice a week, and the animal meal is then omitted from the mash. If the chicks cannot get out to run

about, the seed chick-food may be scatte ed in the chaff, and the little chicks will work away most of the day or it. This gives them exercise, which is a necessity in rearing chicks. If there is no green food to reach, it must be supplied. Lettuce is excellent. Sprouted grains are very good, as is also root sprout, cabbage, rape, etc.

When the chicks get to be about eight weeks of age, we usually feed about three times a day—the mash food in the morning and whole wheat and cracked corn at noon and night. If we are anxious to force the chicks, we give two feeds of mash and increase the animal meal a little.

Chicks hatched at a season of the year when they can range out of doors need not be fed as often or as carefully as described above. During the winter season where chicks are reared in doors too liberal feeding often causes leg weakness, etc.

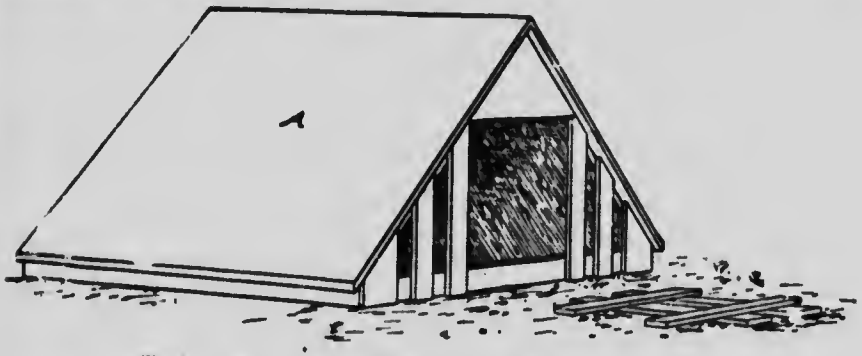


Fig. 9. Coop A.—Each side of roof 21 in. by 30 in.; bottom 2 ft. 4 in.

We have used during the season of 1905 the hopper plan of feeding chicks during the spring and summer months with good success. We have tried placing a hopper or trough of chick feed, made of grains as previously described (seed chick feed), in a coop along with the h and chicks and keeping the supply constant in or near the coop, from the day the chicks were put out until well grown, with most satisfactory results. Where chickens have a good range about the fields of the average farm I know of no better plan of feeding chicks. The hoppers may be made of any size or shape so long as the supply of grain is constant and the supply large enough to last for about one week. A hopper which slopes from both sides will feed better than one with a slope to but one side.

Where the hopper plan is adopted on the farm, the labor problem is very much reduced. This plan can be carried out with chicks in brooders, but for the first ten days or two weeks I prefer feeding the chicks about five times daily, after which time the hoppers are used. Water should be given daily in a clean dish. We have had chicks with hens do extra well when turned in a large corn field with a hopper of grain constantly near the coop, but no water. These birds were a long distance from a water supply, hence they were tried without water

with no bad results. I would prefer giving water if the supply is clean and constant.

The chicks are taken from the out-door brooders at from six to eight weeks of age, according to the weather. A small coop (Fig. 9) is set in front of the brooder, so that the chickens cannot get to the brooder entrance, the result being that they get into the coop A. After a day or two take away your brooder, and the coop can then be moved daily to fresh ground. This will keep the coop clean. When the chicks get too large for the coop A, which will be in about ten weeks, they are put into coop B. (Fig. 10.) The same process is gone through with coop B. It is set in front of coop A, so as to obstruct the entrance: and the chicks then go into the coop B, and soon take to the roost. Coop B will roost 20 chicks until full grown. Try to keep your chickens roosting in the open air as long as possible. Never house them in close, stuffy houses. If you do they will be sure to go wrong, become weak, and be of little or no value, either as breeders or egg-producers. Where an indoor brooder is used in a colony house, the brooder is removed from *the house* and the chickens roost in colony house until they are ready to market.

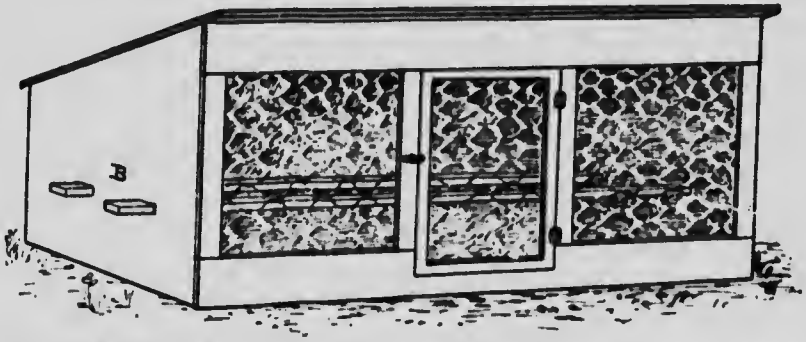


Fig 10. Coop B.—Length, 6 ft.; width, 2 ft. 6 in.; height in front, 2 ft. 1 in.; height at back, 18 in.

We use mostly colony houses similar to the one to the left of the picture. This house could be improved by having a portion of the front made of cotton.

The house is eight feet long by six feet wide. It is six feet six inches high in front and four feet six inches at the back. Two 4x4 scantling are placed under the building and act as runners so that the building may be moved about.

The door is at the back of the building and is four feet wide; this allows a brooder to be taken in or out.

Breeding Market Fowls.

When looking over dressed poultry in some of the exporter's shops, I have often thought how easy it would be to improve the appearance of much of the ordinary poultry, and some of that which is specially fattened, if the birds were bred to a proper type. I have spent much

time in examining different types of birds, alive and dressed, and in observing the feeding capacity of certain types; but it would take years to arrive at definite conclusions on these points. I am, however, of the opinion that one of the most important things to be sought after is *constitution*. This may have no actual market value, but it certainly has much to do with the bird's ability to grow and put on flesh. What we want is a good feeder, and an economical producer. Generally, a bird with a short, stout, well-curved beak, a broad head (not too long), and a bright, clear eye, has a good constitution. And I have noticed that when a bird has a long, narrow beak, a thin, long comb and head, and an eye somewhat sunken in the head, it is usually lacking in constitution. Such a bird is likely to have a narrow, long body and long legs, upon which it seldom stands straight. There are some exceptions to this rule; yet, generally speaking, if a bird has a good

Fig. 11. Colony houses used for rearing chicks. Artichokes growing as shade for the chickens.

head the chances are favorable for a good body; and, if it has a poor head the chances are against it. I have frequently noticed in the rose-comb breeds, such as Wyandottes, that a good-shaped one is seldom found with a long, narrow comb.

The neck should be moderately short and stout, indicating vigor. The breast is the most important point in a market chicken. It should be broad, *moderately* deep; and, if broad, it will present a fine appearance and appear well-fleshed. It is quite possible that a broad, deep breast will carry more meat than a moderately deep breast of the same width; yet there is no doubt that the latter will present much the better appearance, and sell more quickly and at a higher price in the market. The breast bone should be well covered with flesh to the very tip.

When considering the length of breast, we must try to have it come well forward (see Fig. 12), and not be cut off at an angle, as in Fig. 13. The body, in general, should present the appearance of an oblong when the head, neck, and tail are removed.

We frequently see birds that are very flat in front, and cut up behind, as in Fig. 14. Chickens of this class have a very short breast; and, if the breast happens to be deep, as it is in this bird, the chicken

Fig. 12.

will have a very poor appearance when dressed, as it will show a marked lack of width and length of breast, with excessive depth. (Notice that the head is narrow and long, the body is narrow, the eye is bright but slightly sunken, the legs are long and not straight under the body.)

In Fig. 13 observe the very flat breast, the length of back, the long neck and head, the narrow comb, the sunken eye, and the length of legs. The breast comes fairly well back, but not well forward.

In Fig. 12, the bill is short and stout, but not so well curved as it should be. Note the breadth of head, the prominence and brightness

of the eye, the short, stout neck, the great width of the breast, the fulness caused largely by the breast bone extending well forward, the

Fig. 13.

short, stout legs (straight under the body), and the width between the legs. There is an expression about this chicken that indicates health and the essence of vigor.

Fig. 14.

Fig. 15.

The back should be broad, to give lung and heart capacity; and the width should extend well back to the tail-head. We do not want the wedge-shaped back, as seen in some fowls that have great width at the shoulders and taper rapidly toward the tail-head.

Fig. 16.

Fig. 17.

Fig. 18.

Fig. 19.

It is much easier to get good-shaped market pullets than good cockerels. The market demands a five-pound bird when dressed, and farmers have gone into raising big chickens. To that end they are asking for large, overgrown cockerels, of excessive depth, for breeders; and the result is that we get dressed chickens weighing four to five pounds each, that have immense, high breast-bones and very long legs. These are not attractive to the buyers, and they sell at less per pound than plumper birds. For example, if given two birds of the same width of breast, one is one and one-half inches deeper in the breast than the other. The result will be that one bird will look plump and sell readily, while the other will lack in plumpness and be slow in selling. This lack of plumpness can be bred out by using such males as that shown in Fig. 12.

We like to have birds as well built as we can get them, and Fig. 12 is as near the ideal market chicken as we have in the breed which he represents.

The hen as seen in Fig. 15 is of a good market type. (Note the width and fulness of breast.) As a breeder, she is a little fine in bone, and rather too small. She has, however, that blocky appearance which is desirable.

Fig. 16 is a photo of a cross-bred chick (sire, Buff Orpington; dam, Houdan). Note the length and fulness of the breast; also good beak and eye.

Fig. 17 is a ten weeks' old son of Fig. 12. You will observe the same general characteristics as seen in the father—fair beak, good eye, excellent breast, both as to length and width, without excessive depth. The thigh is also medium in length.

Fig. 18 represents the long, narrow sort. (Note the long beak, the narrow head, the sunken eye, the long neck, and long, crooked legs.) When dressed, his appearance will not be pleasing.

Fig. 19 shows a good head throughout, very full and wide breast, and legs that stand well under the body and well apart. This bird is of the type we like to feed in the fattening crate.

Trap-Nest.

Fig. 20 represents a trap-nest made by the college carpenter. This nest is very simple in construction. The door is adjusted low enough so that the hen on entering raises it slightly, thus relieving the hook, which drops back and allows the door to fall. This nest works well. The only objection to it is that the fowls using it require to be pretty much of the same size. A small hen may not raise the door enough to unfasten it. We also use the Moyan trap nest. This nest is sold by A. J. Moyan, London, Ont.

Where one is anxious to build up a certain strain of birds, either for special utility or for fancy exhibition purposes, the trap-nest, if looked after, will show what hens lay, and which hens lay certain eggs, thus enabling the breeder to know exactly what he is doing.

They require considerable time in the way of keeping records, and releasing hens after laying.

Fattening Chickens.

A number of experiments have been conducted in fattening chickens for the market. There is an unlimited market for well-fleshed fowls in England, and the demand at home is constantly increasing. Fatted chickens were on September 18th, 1903, selling for 13 cents per pound in Montreal, and the dealers could not get nearly as many as they wanted.

The English market requires a white-fleshed chicken, and our best home market also appears to favor this color of flesh. Black-feathered chickens, and those having black legs, are not in favor.

There is little use in trying to fatten scrub stock. Good pure-bred males of such breeds as Plymouth Rocks, Wyandottes, and Orpingtons can be purchased at moderate prices, and these only should be used to breed from. Very large chickens are not in favor. What is

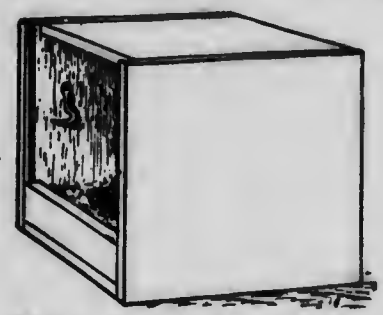


Fig. 20 (a). Showing hook which holds up the door. The nest is 12 inches wide, 12 inches high, and 15 inches long.

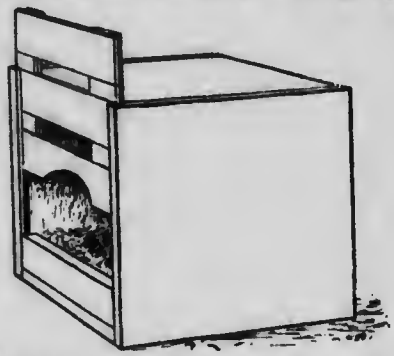


Fig 20 (b). Nest set ready for the hen to enter.

required is a meaty bird weighing from four to five pounds. The breast should be especially well developed, and should be plump, as this is the most valuable part of the body.

Construction of Fattening Crates.

Fattening crates are usually made 6 ft. 6 in. long, 18 to 20 in. high, and 16 in. wide. The crate is divided into three compartments, each holding from four to five birds, according to the size of the chicken. The crate is made of slats, except the ends and partitions between the compartments, which are solid wood—those on the top, bottom and back running lengthwise of the coop, while those on the front run up and down. The slats are usually $1\frac{1}{2}$ inches wide and $\frac{5}{8}$ inches thick. Those in front are placed 2 inches apart to allow the chickens to put their heads through for feeding. The slats on the bottom are placed about $\frac{3}{4}$ inch apart, so as to admit of the droppings passing through to the ground. Care should be taken not to have the first bottom slat at the back fit closely against the back. An opening between the first

slat and the back prevents the droppings from collecting and decomposing. The slats on the top and back are usually two inches apart.

There is a small V-shaped trough arranged in front of the coop for feeding and watering the chickens. This trough is from two to three inches deep and is generally made of ¾-inch lumber.

Very fair coops may be made from old packing boxes, by taking off the front and bottom, and substituting slats in their places, (see Fig. 21). During warm weather, these crates may be placed out of doors. They need to be protected from the rain, which is easily accomplished by placing a few boards over them. In cold weather the crates should be placed in a house or shed where they are protected from raw, cold winds. When fattening chickens inside of a building, it is well to darken the building and keep the birds as quiet as possible.

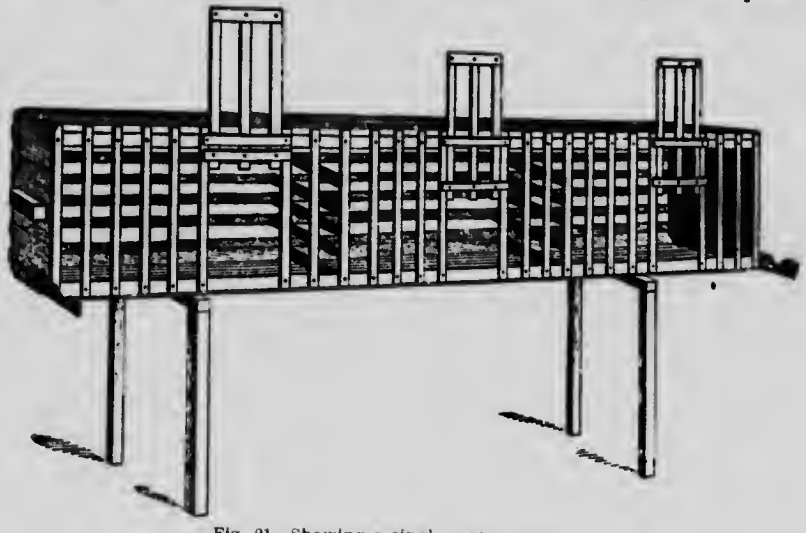


Fig. 21. Showing a single crate or coop.

After each lot of birds is killed, we paint the crates with some liquid lice-killer. Coal-oil and carbolic acid is very good. Use one gallon of coal oil to one pint of crude acid. We have used some of the prepared mixtures with good results. If the birds (bought from different parties) are very lousy when put up, they should be well dusted with sulphur. The birds should be watered at least twice every day in warm weather. Grit should be given them twice a week.

During the first week feed lightly—never quite all the birds will eat. I prefer feeding three times a day during the first week, and twice a day during the succeeding weeks. It seldom pays to feed the birds longer than three or four weeks. Chickens weighing from three to three and one-half pounds each, that are thrifty and of good breeding, appear to be the most profitable for feeding. Large chickens, weighing from five to six pounds, gain less and eat more than smaller ones.

Should a bird become sick in the crate, I find that if it is given a teaspoonful of salts and turned out on a grass run it will usually recover.

Cramming Machine.

The crammer consists of a food reservoir, to the bottom of which it attached a small force-pump moved by a lever and treadle which is worked by the foot of the operator.

Communicating with the pump is a nozzle, through which the food passes to the bird.

Fig. 22. Cramming machine for the forced feeding of chickens, turkeys, etc.

"A," is the food reservoir; "B," the pump; "E," the pump rod; "O," the lever, which on being depressed at the lettered end, causes the pump rod "E," to which it is attached, to move downwards, and to eject the contents of the pump "B" out of the nozzle "K." On relieving the pressure at "O," the lever and the parts connected therewith are drawn up by the spring "C," until the motion is arrested by a stop "M," which serves to determine the quantity of food ejected at each depression of the treadle.

The charge may also be varied by arresting the pressure at any point in the downward thrust of the lever "O."

The illustration (Fig. 22) shows one method of operating with this crammer, and this plan is now largely followed in some parts of Sussex, England.

Kind of Food Used in Cramming Machine.

Not all kinds of foods can be used in the machine. The food must be in a semi-liquid condition in order to pass through the machine. This necessitates the use of some kind of grain that will stay in suspension in the milk, beef broth, or whatever liquid is used in mixing the grain Finely ground oats, with the hulls removed, or shorts, answer the purpose well. We use almost entirely the former food. Grain, like corn-chop or barley meal, are not suitable, as they sink to the bottom of the hopper and clog the machine. When cooked they work well, but are not good foods, as is shown by experiments conducted here. See page 33.

The food is mixed to the consistency of ordinary gruel, or until it drips from the end of a stick.

Will it Pay to Buy a Cramming Machine?

For the ordinary person, I think not. First-class chickens may be had by feeding in the crate from the trough only; indeed, I have had equally fleshy birds that have been fed for four weeks from the trough as where we have fed them two weeks from the trough and one week from the machine.

Where one has a special trade for high-class poultry, I am of the opinion that a more uniform product can be secured by using the machine. Machine-fed birds should realize at least one cent more per pound than trough-fed birds in order to pay for the extra labor, etc.

Birds that are fairly well fleshed when put into the crate will do better if put at once on the machine, instead of being crate-fed first.

Fattening Chickens in July.

Early in July, several groups of chickens were put in crates for fattening. The results are given below.

Lot I. consisted of 12 Barred Rock cockerels weighing, when put up in crate, a total of 37 pounds.

	Lbs. Grain Consumed.	Lbs. Skim-milk Consumed.	Lbs. Gain.	Lbs. of grain to make 1 lb. Gain.	Average gain per bird in 4 weeks.
First week.....	17	25	9	1.8	
Second week.....	24¼	31	5	4.8	
Third week.....	20	30	8	2.5	2.1 lbs.
Fourth week.....	22	33	4	5.5	

Average of grain per lb. of gain in 4 weeks.....3.2 lbs.

They were sold to a Montreal firm at 15 cents per pound f.o.b.

These chickens were rather leggy, and had high breast bones, and would have dressed much better when they had reached a weight of six or seven pounds.

Lot II. consisted of 8 high-grade Leghorns, weighing 18¼ pounds.

	Lbs. Grain Consumed.	Lbs. Skim-milk Consumed.	Lbs. Gain.	Lbs. of grain to make 1 lb. Gain.	Average gain per bird in 4 weeks.
First week	7	10	4	1.8	
Second week	11	16	1½	7.3	
Third week	10	15	3	3.33	1.28 lbs.
Fourth week	7	10	1¾	4.	

Average of grain per lb. gain in 4 weeks.....3.4 lbs.

When dressed these chickens were somewhat plumper than the Rocks owing to their being mature, but they were rather small. They were sold at 13 cents per pound.

Crate Feeding vs. Loose Pen Fattening of Chickens.

The term "fattening of chickens" has been in use for some time, but it does not exactly convey the meaning intended by the feeders of chickens. The object is to make the chickens more fleshy, with just sufficient fat to make the chicken cook well. The chickens are not intended to be abnormally fat, yet at the same time, they carry considerable fat well intermixed with lean meat.

We have, for a number of years, conducted experiments with chickens in crates and in loose pens. We have tried about six different feeders and the results vary. With some feeders we had equally as good results with birds in crates as with them in loose pens. We have had two feeders in particular who could not feed birds to advantage in loose pens as compared with crates. We have had one feeder who could get slightly better returns in some cases, not all, with birds in pens as compared with crates.

In speaking to the buyers of chickens, the majority of them seem to think that the crate fed birds are much superior to those fed in loose pens. Personally, I would prefer feeding birds in crates, for the reason that it takes less room, and I believe that I can feed them with less expenditure of labor and get a more even product. There are now many people who can get good results from feeding birds in box stalls, etc. No matter which method is followed, cockerels should be fed for two weeks or more before they are killed and sold.

Grain Rations.

The following table shows the amount of feed consumed by the different groups of chickens, the cost of producing a pound of gain, and the number of pounds of grain it took to make one pound of gain :—

Grain Rations.		No. of trials.	Weight when put in crates.	After two weeks' feeding.	Gain.	Grain consumed.	No. of pounds of grain to make 1 lb. gain.	Milk consumed.	Cost of pound of gain.
			lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
GROUP I—									
Cornmeal, 5 parts..	cost	First trial	43	55	12	35	2.916	35	3.5
Shorts, 4 parts	per cwt.,	Second "	48.5	59.5	11	39	3.54	39	4.263
Pearl oat dust, 1 part	$1.10	Third "	49.5	61	11.5	38	3.3	38	3.974
Animal meal, 1 part		Average	47	58.5	11.5	37.38	3.252	37.33	3.912
GROUP II—									
Cornmeal, 2 parts.	Cost	*First trial	.....	.....	.....	.....	.....	.....	.....
Ground buckw't, 2 parts.....	per cwt.,	Second "	48.5	65	15.5	42	2.54	42	3.303
Pearl oat dust, 1 part	$1.23	Third "	48	63	15	40.5	2.7	41	3.56
		Average	48.25	64	15.75	41.25	2.62	41.5	3.461
GROUP III—									
Cornmeal, 4 parts.	Cost	First trial	45	53	8	35	4.375	35	5.797
Ground buckw't, 2 parts.....	per cwt.,	Second "	47.5	63	15	41	2.66	41	3.63
Pearl oat dust, 2 prts	$1.22½	Third "	50	62	12	40	3.3	40	4.416
		Average	47.5	59.33	11.66	38.66	3.445	38.66	4.614
GROUP IV—									
Cornmeal, 2 parts.	Cost	First trial	48	53.5	5.5	34.5	6.27	35	8.34
Pearl oat dust, 1 part	per cwt.,	Second "	48	60	12	38	3.18	38	4.22
	$1.23	Third "	48	58.5	10.5	37	3.52	37	4.686
		Average	48	57.33	9.33	36.5	4.32	36.66	5.748
GROUP V—									
Pearl oat dust.....	Cost	First trial	48	60	12	34	2.83	34	4.83
	per cwt.,	Second "	49	63	14	40	2.85	40	4.57
	$1.50	Third "	47.5	60	12.5	40	3.2	40	5.12
		Average	48.166	61	12.83	38	2.96	38	4.84

*This food was not used in the first trial.

The following prices were paid for grain: Corn meal, $1.10 per cwt.; ground buckwheat, $1.20 per cwt.; middlings or shorts, 90c per cwt.; animal meal, $1.60 per cwt. There were 12 birds in each trial of each group. The last ten days of the feeding the birds were fed from the cramming machine, one and one-half pounds of milk being used to one pound of grain.

CONCLUSION.

Ration No. 1 is a good economical producer, but is objectionable, because it has a tendency to produce yellow flesh, which is undesirable in our best market.

Ration No. 2 is, perhaps, the most palatable of any, and it is one that makes a nice white flesh at a moderate cost.

Ration No. 3 is much the same as No. 2, except that it contains more corn-meal, which tends to make it less adapted for use during warm weather. Note the results of the first trial. It has a slight tendency towards producing a creamy flesh.

Ration No. 4 is the most unsatisfactory of all. The excess of corn in it decreases its palatability, and also makes it unsuitable for feeding during warm weather.

Ration No. 5 is a good one, when the oats can be purchased at moderate prices. I am of the opinion that rations Nos. 2 and 5 are

both excellent, and which it would be advisable to use would depend largely upon the prices of the different grains.

How To Feed.

We receive a number of inquiries as to how we feed the birds that are being fattened. Most inquirers wish to know the exact amounts fed each day.

It will be noticed that we fed very lightly at the beginning—a very important point—and that the amount was gradually increased until such times as the birds refused to eat all that was given them. No feed was left in front of them longer than ten minutes after it was placed in the trough. Any food left after such time was removed.

Crate N.

Ration :—Equal parts of oat meal, corn meal, and barley meal mixed with sour milk.

	Lbs.	Ozs.
Weight at Commencement	53	4
Weight at First Week	55	0
Weight at Second Week	66	4
Weight at Third Week	70	2

Date.	Morning.		Night.	
	Meal.	Milk.	Meal.	Milk.
	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.
Oct. 17	12	1 8	12	1 10
" 18	14	1 8	12	1 8
" 19	1 0	1 12	1 0	1 12
" 20	1 2	2 2	1 2	2 4
" 21	1 4	2 8	1 4	2 8
" 22	1 6	2 12	1 6	2 12
" 23	14	1 12	1 8	3 0
" 24	1 10	3 0	1 12	3 4
" 25	2 0	4 0	2 0	4 0
" 26	2 5	4 8	2 8	4 8
" 27	2 0	4 0	2 0	4 0
" 28	2 8	4 8	2 12	5 0
" 29	2 8	4 8	2 8	4 8
" 30	1 4	2 8	2 12	5 0
" 31	2 0	3 8	2 0	3 8
Nov. 1	2 4	4 0	2 8	4 8
" 2	2 0	3 8	2 4	4 0
" 3	2 4	4 0	2 4	4 0
" 4	1 12	3 8	1 12	3 8
" 5	1 12	3 8	1 12	3 8
" 6	1 12	3 8	....	....

The following are the individual weights of each bird for the three weeks' feeding in Crate N.

Ration :—⅓ oatmeal, ⅓ cornmeal, ⅓ barley meal.

Breed.	Com.	1st. week.	2nd. week.	3rd week.
	lbs.	lbs.	lbs.	lbs.
1. Wyandotte cockerel.....	3¾	4	4½	4¾
2. Wyandotte cockerel.	4¼	5	5¼	6
3. Wyandotte cockerel.....	4¼	4¾	5	5¼
4. Wyandotte cockerel.....	3½	3¾	4¼	4¾
5. Wyandotte cockerel.....	5	5¼	6¼	6¾
6. Wyandotte cockerel.....	4¼	4¾	5¼	5¾
7. Wyandotte cockerel.....	5¼	5¾	6¼	7
8. Wyandotte cockerel.....	5	4¾	5¾	6
9. Buff Orpington cockerel.....	4¼	4¾	5¾	6
10. Buff Orpington cockerel.....	4¼	4¾	5¼	6
11. Buff Orpington cockerel.....	4	4¼	5¼	6
12. Barred Rock cockerel.....	4¾	5	6	6¼

Notes.

For a number of years we have been testing grain mixtures wet with skim milk, and grain mixtures containing various animal meals wet with water. We have been trying to find a feed equal to milk for fattening chickens. In this year's tests we have, in addition to the above foods, tested whey. The whey was taken from an out-door tank, and would be a fair sample. All grains are figured at $1.15 per hundred.

Skim milk at ten cents per hundred.
Whey at four cents per hundred.
Beef scrap at three cents per pound.
Pork scrap at two cents per pound.

The following table gives the results of this season's tests.

Sour skim milk, *i.e.*, milk that is thickened is, without doubt, the best liquid to mix with grain rations where a uniform product is wanted, and more so where white fleshed chickens are in demand.

Sweet skim milk has not a feeding value for grown chickens equal to sour milk.

Whey is a better food than is generally considered. The results appear to indicate that it aids digestion.

Whey and pork scraps have not given the results expected, and I would not recommend this combination.

Where pork scrap and beef scrap can be procured at reasonable cost, say two cents or less per pound, they are good value, especially where a yellowish flesh is in demand.

Grain mixtures only, mixed with water, are not economical considering this test.

TESTS OF WHEY, SKIM MILK AND ANIMAL FOOD FOR FLESHING CHICKENS.

Rations.	Number of birds.	Date of feeding.	Weight at beginning of experiment.	Weight at end of first week's feeding.	Weight at end of second week's feeding.	Weight at end of third week's feeding.	Pounds of grain consumed.	Pounds of grain to make one pound of gain.	Pounds of milk or milk substitute.	Cost of milk or milk substitute.	Cost of grain.	Total cost.	Cost of one pound of gain.
			lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs.	lbs. oz.	cts.	cts.	cts.	cts.
Equal parts of shorts, oatmeal, cornmeal, and sweet skim milk. .....$1.15 per cwt.	12	Aug. 26	38 0	42 8	46 12	50 12	48 4	3.8	64 4	6.4 10c. per 100 lbs.	55.48	62.32	4.98
Equal parts of barleymeal, cornmeal, shorts and sweet skim milk.....$1.15 per cwt	12	Oct. 7	54 0	59 4	63 8	69 4	68 0	4.46	126 12	12.67	78.2	90.87	5.95+
Equal parts barleymeal, oatmeal, cornmeal and sweet skim milk..	12	Oct. 22	55 8	56 0	66 8	.....	43 0	3.9+	76 0	7.6	49.45	57.05	5.2—
Equal parts of shorts, cornmeal and oatmeal mixed with sour skim milk.....	12	Aug. 26	37 12	43 12	47 *	50 3	44 12	3.6	74 0	7.4	51.48	58.86	4.7+
Equal parts of shorts, cornmeal and oatmeal mixed with sour skim milk.....	12	Aug. 30	48 4	53 8	61 0	67 0	62 8	3.3	100 0	10	71.875	81.875	4.36
Equal parts of shorts, cornmeal and oatmeal mixed with sour skim milk.....	12	Sept. 5	40 0	48 8	53 8	58 12	62 12	3.34	103 8	10.35	72.16	82.5	4.4
Equal parts of shorts, cornmeal and oatmeal mixed with sour skim milk	12	Sept. 23	48 4	49 4	56 12	66 8	62 8	3.38	112 0	11.2	71.875	83.775	4.69—
Equal parts of cornmeal, barleymeal and oatmeal mixed with sour skim milk.....	12	Oct. 22	48 8	49 12	60 4	.....	42 14	3.65	75 8	7.5	49.3	56 8	4.8

Rations.	Number of birds.	Date of feeding.	Weight at beginning of experiment.	Weight at end of first week's feeding.	Weight at end of second week's feeding.	Weight at end of third week's feeding.	Pounds of grain consumed.	Pounds of grain to make one pound of gain.	Pounds of milk or milk substitute.	Cost of milk or milk substitute.	Cost of grain.	Total cost.	Cost of one pound of gain.
Equal parts cornmeal, oatmeal and shorts mixed with whey	12	Sept. 30	lbs. oz. 46 8	lbs. oz. 52 4	lbs. oz. 56 12	lbs. oz. 63 4	lbs. oz. 59 8	lbs. 3.55	lbs. oz. 86 8	cts. 3.46	cts. 68.425	cts. 71.885	cts. 4.
Equal parts shorts, oatmeal and cornmeal mixed with whey	12	Sept. 23	50 12	50 12	55 12	64 0	63 14	4.8	106 14	4.275	73.45	77.73	4.8
Equal parts barleymeal, cornmeal and oatmeal mixed with whey	12	Oct. 22	50 12	51 8	60 12	.....	43 12	4.375	72 4	3.05	50.31	53.36	5.33
Equal parts barleymeal, cornmeal and oatmeal mixed with whey	12	Nov. 9	53 4	60 8	64 0	.....	41 5	3.846	71 4	2.85	47.5	50.35	4.66
Equal parts shorts, cornmeal and oatmeal, and 10 per cent. pork scrap mixed with whey	12	Oct. 7	53 0	58 0	62 4	68 4	55 9	3.65	5.57 lbs. pork scrap, 121 lbs. whey	16.[illegible]	64.	80.58	5.2+
Equal parts barleymeal, cornmeal and oatmeal, and 10 per cent. pork scrap mixed with whey	12	Oct. 22	54 8	54 8	64 0	.....	39 8	4.16	3.95 lbs. pork scrap, 74 lbs. whey	10.86	45.[illegible]	56.34	5.9+
Equal parts cornmeal, shorts and oatmeal, 30 per cent. pork scrap, mixed with water	12	Sept. 30	54 12	61 0	68 12	.....	48 8	3.46	Pork scrap 14.53 lbs.	29.06	55.7	84.76	6
Equal parts cornmeal, barleymeal and oatmeal, 25 per cent. pork scrap mixed with water	12	Oct. 22	54 8	54 12	65 12	.....	34 4	3+	Pork scrap 8.625 lbs.	17.25	39.675	56.925	5+
Equal parts shorts, cornmeal and oatmeal, 25 per cent. beef scrap mixed with water	12	Oct. 25	52 8	59 12	66 4	.....	39 6	2.5	Beef scrap 9.9 lbs.	29.7	45.54	75.24	4.77
Equal parts shorts, cornmeal and oatmeal, 25 per cent. beef scrap mixed with water	12	Oct. 25	59 0	63 8	71 8	.....	39 4	3.15	Beef scrap 9.85 lbs.	29.55	45.31	74.86	5.98
Equal parts cornmeal, oatmeal and barleymeal mixed with water	12	Nov. 12	61 0	64 0	65 0	.....	42 15	10.73	.....	.....	.....	49.36	12.34

General Conclusions.

1. It is evident from these experiments that chickens which are being fattened produce a pound of gain at a less cost when fed in crates than when allowed to run at large in a pen.

2. That the birds fed in the crates from the trough and the cramming machine in addition produce a pound of gain at the least cost, the food consumed being taken into account only.

3. That feeding chickens in a pen loose, is not to be commended when the object is to fatten or flesh them for market purposes.

4. There is a slight difference in favor of a chicken weighing less than four pounds.

Fig. 23. A chicken weighted in shaping board. (Lewis Wright.)

Dressing and Shipping Poultry.

All fowls should be fasted from twenty-four to thirty-six hours before killing. Where this is not done, the food decomposes in the crop and intestines, the result being that the flesh becomes tainted and does not keep well.

There are two methods of killing that are considered proper. One is to kill by bleeding. This method is considered to be the better one in the Eastern States and also in some parts of Canada. The other method is to kill the bird by wringing or pulling the neck. This is done by taking the chicken in the hands, stretching the neck, holding the crown of the head in the palm of the hand, and giving a quick turn backward, and at the same time a steady pull. This method was favored by the exporters of dressed fowls, but is not now, owing to the discoloration where the blood collects in the neck. Where chickens are placed in cold storage this is a serious objection. It is claimed by the exporters that the flesh will keep longer and will not be so dry as where the birds are bled. I prefer the latter method.

After the bird is killed, plucking should begin at once. Care should be taken to keep the head downward, to allow the blood to collect in the neck. Where the birds are allowed to become cool before being plucked, it is very hard to avoid tearing the skin; and the plucking is much more tedious. The birds should be plucked clean with the exception of about two inches of feathers adjoining the head.

After the chicken has been plucked it should be placed on a shaping board, as seen in Figs. 23 and 24. The weight placed on the top of the chicken is used to give it a compact appearance. This weight may be of iron, as seen in the cut, or a brick may be used in its place. If chickens are hung by the legs after being plucked, it spoils their appearance, making them look thin and leggy.

Many good chickens are spoiled by being packed before they are thoroughly cooled. Care should be taken that all the animal heat is out of the body before the fowls are packed. We always cool the birds at least twelve hours before packing them.

The chickens are packed in boxes as seen in Fig. 25. The box is lined with parchment paper; and, if the chickens are to be shipped a long distance, each bird is wrapped in paper. This prevents the chickens from bruising each other, and, at the same time, to a considerable extent, checks decomposition. Do not use ordinary wrapping paper, as it draws dampness, and will cause the chickens to become clammy, which make them more or less unsaleable.

There are several other kinds of boxes used for shipping poultry. Nearly every exporter has his own shape of box, and his own method of packing. For shipping locally, we use a box three feet long, twelve inches wide, and twelve inches deep. The chickens are packed similar to those seen in Fig. 25, with the · ·tion that they are three tiers deep. The box will hold thirty-s.· ·und chickens. The boxes are made strong so that we can have · ·ealer return them to be refilled. Do not use cedar in the construction of the boxes, as in some cases it taints the flesh. Basswood or spruce answers well.

Egg Preservation.

Several methods of preserving eggs were tested in our Poultry Department during the year of 1900. The eggs for this purpose were taken early in June, and were tested in December. Many of the same methods that proved fairly successfu previous years were again tried.

Method No. 1. A solution composed of one part water glass (sodium silicate) and five parts water that had been previously boiled. This was a very strong solution, and unless an egg was absolutely fresh in would not sink in the solution.

The eggs from this solution were of fairly good flavor, and all were well preserved.

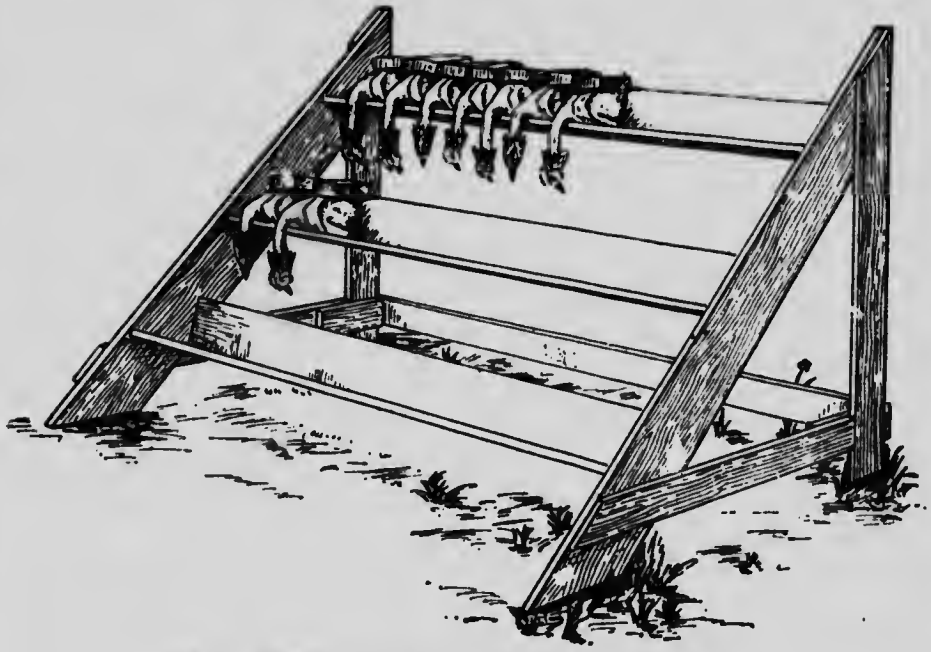


Fig. 24. Showing a number of chickens in the shaping boards.

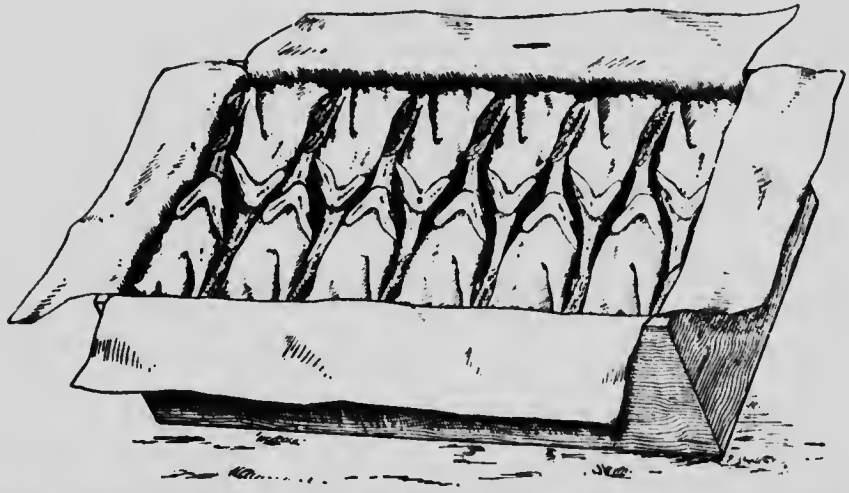


Fig. 25. Showing the top layer of chickens in a shipping case as used for local trade. This is one system of packing dressed poultry. The boxes are usually made 3 feet long, 17 inches wide and 7 inches deep for 24 chickens weighing about 5 pounds each.

Method No. 2. This was similar to No. 1, except that eight parts of water were used instead of five parts. The eggs in this were nearly as good eggs as those in No. 1. This is a good preservative where it is desired to keep summer eggs for winter use.

Method No. 3. This was composed of ten parts of water to one part of water glass. There were no bad eggs in this solution, but the eggs were inferior in flavor and in poaching quality to those kept by methods No. 1 and No. 2.

Method No. 4. This consisted of the same solution as No. 2; but in place of allowing the eggs to remain in the liquid, they were removed after having been in it for a week, except the last lot, which was put into the solution. This lot was left in the solution for the remainder of the season.

(*a*) The eggs, after being in the solution for a week, were removed and placed in an ordinary egg case in the cellar. They were all good when tested, but had evaporated considerably and were lacking in flavor.

(*b*) These were the second lot of eggs to be placed in the liquid. They were handled similarly to those in (*a*), and were of about equal quality.

(*c*) These eggs were allowed to remain in liquid. They were well preserved, all being good.

They were scarcely equal in quality to those from No. 2 method, but were superior to those from No. 3.

Method No. 5. A lime solution made as follows:—

Two pounds of fresh lime were slacked in a pail and a pint of salt was added thereto. After mixing, the contents of the pail were put into a tub containing four gallons of water. This was well stirred and left to settle. Then it was stirred thoroughly the second time and left to settle; after which the clear liquid was poured over the eggs, which had previously been placed in a crock or tub. Only the clear liquid was used.

These eggs were well preserved; but those from the bottom of the tub had a decidedly limey taste, and the yolk in them was somewhat hardened.