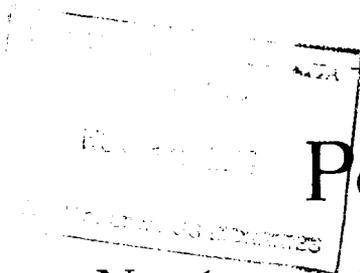


UNIVERSITY OF MINNESOTA
Agricultural Experiment Station

BULLETIN 119



Poultry

Northwest Experiment Farm

At Crookston, Minnesota



MAY, 1909 610

UNIVERSITY FARM, ST. PAUL, MINNESOTA

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Poultry

at the

Northwest Experiment Farm

University of Minnesota
Crookston, Minn.

1910

by
C. E. Brown, Poultryman

Judging by the inquiries we constantly receive at this Station relating to poultry keeping, there appears to be a general lack of knowledge of the practices of successful poultry raisers throughout the country. It is, therefore, the purpose of the writer to give whatever information he thinks most beneficial to this class of farmers and poultrymen, with the addition of a few experiments carried on during the last two years.

POULTRY HOUSES.

The question of poultry-house construction seems to be a stumbling block to almost every poultryman in these northern latitudes, and of the many different styles that have been tried, none seems to give perfect satisfaction. The chief difficulty seems to be dampness or the collection of frost on the walls during the cold weather; and, until we are better able to carry on more experimental work along this line, the best we can do is to offer a few suggestions.

At this Station we are using three styles of houses; none of which gives us perfect satisfaction, especially during cold weather, and from our observations, we believe we could remodel them with little expense and put them in shape to give very good results.

House No. 1.

House No. 1 is built with a brick foundation. The floor is raised about a foot above the level and is paved with brick. The walls are double boarded on the outside with tar paper between and the inside is lathed and plastered, the space between the walls being tightly packed with shavings. The ceiling, like the walls, is lathed and plastered and packed with shavings. The roof is made with a single slope and is covered with cedar shingles. The windows are 6-light 10x12 inches and do not admit enough light. In each end of the building there is a ventilator, one for admitting fresh air close to the ceiling and the other, which extends to within a few inches of the floor level, for the purpose of drawing off the foul air. The fowls thrive fairly well in this house and if it were possible to get clean, dry straw for litter at least twice a week during cold weather, the house could be kept tolerably dry. The plastered ceiling and walls of this house have a distinct advantage over those in house No. 2 which is boarded inside with inch lumber, as they apparently do not absorb moisture, thus allowing it to be absorbed by the litter on the floor and removed with it.

House No. 2.

House No. 2 is similar in construction to No. 1 with one or two exceptions. Instead of lath and plaster, the inside is boarded up with unmatched lumber. The boards not being matched is a serious mistake in a house of this kind, as the packing is exposed to the air of the house and the ceiling and walls become so saturated with moisture, especially during a spell of zero weather, that when the sun shines and the temperature rises, the moisture drips down, wetting the litter so it is often necessary to change it every day to keep it dry. The windows in this house are much larger than those in No. 1, which is an improvement, as fowls need an abundance of light and sunshine. We have given the muslin curtains a thorough test in both houses, but they do not supply sufficient air to be of any great benefit and besides there is the great difficulty of keeping them free from dust and dirt that sticks to the cloth and makes them practically useless. We prefer to have the air first hand instead of second hand, and this we can have by opening the windows or doors. Burlap would admit more air than muslin, because it is more porous, but owing to its dull color it makes the interior too dark.

House No. 3.

House No. 3 is really a colony house made of single ply matched lumber covered with prepared roofing. This house might be called the "extremely cold style." We wintered pullets of the Orpington, Rock and Leghorn breeds in it and they continued to lay well all through the season. On one occasion the thermometer inside the building registered as low as 28 degrees below zero, and with the exception of the Leghorns, whose combs being large, were frozen, the birds did not suffer in the least. This house was practically free from dampness, owing to loosely fitting doors and windows. A common remark of visitors was "How healthy the fowls look." These fowls were fed in the same proportion as those in the warmer houses and the egg yield was equally as good, one Leghorn pullet laid 25 eggs in December. The experiment with this house would lead us to believe that poultry will stand a great

deal of cold provided their quarters are dry, and that it is impossible to get dry, pure air if the house is very warm. The old idea of heating a house—as most of us know—is a failure, owing to the difficulty of maintaining an even temperature, and when we can get good results from a cold house, why go to the expense and danger of heating it?

SUGGESTED IMPROVEMENTS.

It has been the writer's experience with different styles of houses, in a climate quite as cold and much more humid than this, that in order to have a perfectly dry house during the winter time, it is well to have something to absorb the moisture. A straw loft is almost as indispensable to a poultry house as steam is to an engine. Some of the very best hog raisers owe their success to the practice of using plenty of straw in a loft over head to absorb the dampness during the winter. Now we feel safe in saying that house No. 1, with larger windows and a loft with at least three feet of straw, would make a splendid house for any farmer. Houses Nos. 2 and 3, instead of having six inches of straw in the ceiling should have at least three feet of straw; this straw would then take care of all the moisture and make a comfortable house. These houses have brick floors which are objectionable because they are usually damp and they afford poor protection against rats, as they can be so easily undermined or even gnawed through. A cement floor properly built is much better or even an earth floor where the building stands on a cement foundation would be satisfactory. Where one can get sand conveniently, it is a splendid plan to put four or five inches on the floor and each fall clean it out and put in a fresh supply.

INSIDE FIXTURES.

For best results six square feet of floor space for each hen in small flocks of 20 or 25 fowls is about right. Of course, in larger flocks and larger pens the hens would do just as well with a smaller space, as there is a greater area for each fowl to roam over. For instance, in a pen 20 feet square, $4\frac{1}{2}$ feet for each hen would be ample, while in a pen 10x12 feet, it would require 6 square feet. Dropping boards are an advantage in a poultry house, as they keep the floor and litter much cleaner. The droppings board should be about three feet wide for two roosts and also high enough (three feet being none too high) to make it convenient to work under. The old idea that bumble foot is caused by high roosting has little foundation as we find bumble foot where very low roosts are used. The roosts should be at least 6 inches above the droppings board and from 10 to 12 inches apart, care being taken to place the roost at the back far enough from the wall to prevent the male birds from breaking their tail feathers. From 8 to 10 inches space on the roost is sufficient for each hen, depending of course on the size of the birds. A 2x4 inch scantling, rounded on the edges and arranged so it may be reversed whenever it bends, makes a very good roost. There should be about 5 trap nests to every 25 hens or where the old style of nest is used, one large nest or box 2 feet by 3 feet is much better than having the box divided off into little compartments of 10 inches by 12 inches. The hen is a very sociable creature and you will frequently see three or four of them trying to lay in a 10x12 inch box, the result very often is several broken eggs. When the larger nest is used this is

avoided and they also seem to prefer it. The trap nests can be arranged under the droppings board or preferably in a rack made to hold them, such as is seen in the illustration. There are a great many styles of trap nests, but we find the old Morgan nest with our own improvements gives the best of satisfaction. One water pan can be arranged to water two pens by having it project through the partition and by fastening a slanting board over the pan the hens cannot step in the water. Where one is feeding dry mash a hopper is the best thing to use. There are a great many different styles, some of which are good, others are very poor affairs, being built so that the fowls waste the food and so that the hopper chokes up at times. We have designed one here that gives good satisfaction. There is very little waste and it never chokes. As can be seen by the illustration it is different from any other in that it is wider at the bottom than at the top. Where the mash is fed wet a convenient way of fixing the trough is to fasten it to the wall with a hinge and when not in use it can be hooked up. By raising the trough off the ground 8 inches it will give the hens more room while eating and besides keep them from wasting the food. A narrow strip of wood nailed across the top from end to end of the trough will prevent the hens from walking on the food. A dust box should be provided somewhere in the pen where the sun will reach it during the greater part of the day. Where the floor is covered with several inches of sand the dust box could be dispensed with as the fowls soon find out how to scratch away the litter and get at it.

BREEDS FOR THE FARMER.

Plymouth Rocks—There are several varieties, the Barred, the White, and the Buff being the most popular. They all have the same general characteristics. Individuals of these breeds hold the very highest records as layers. The **standard weights** are as follows: Cock, 9.5 pounds; Hen, 7.5 pounds; Cockerel, 8 pounds; Pullet, 6.5 pounds.

Orpingtons are an English breed. There are several varieties, the Buff, Black, and White being the most popular. They are all noted as winter layers, and for their excellent table qualities. The **standard weights** are: Cock, 10 pounds; Hen, 8 pounds; Cockerel, 8.5 pounds; Pullet, 7 pounds.

Wyandottes—There are several varieties, the Silver and the White being the most common. They are noted for their excellence as broilers and layers. **Standard weights** are: Cock, 8.5 pounds; Hen, 6.5 pounds; Cockerel 7.5 pounds; Pullet, 5 pounds.

Light Brahmas—They are the heaviest breed of fowl we have and in some districts where there is a market for Capons they make the best, owing no doubt, to their quiet disposition and great size. Some strains rank with any breed as layers. One possible objection to them is they have feathers on their legs, and a clean-legged fowl always sells better when dressed. The **standard weights** for them are: Cock, 12 pounds; Hen, 9.5 pounds; Cockerel, 10 pounds; Pullet, 8 pounds.

Leghorn—One of the hardiest breeds. There are a great many varieties, both Single Comb and Rose Comb. Probably the most common is the Single Comb White. The Leghorn is considered by many to be the best summer layer we have. There is no standard weight for them. They make splendid

broilers but are much too small for roasters. Some breeders are trying to increase their size and have succeeded to a certain extent.

Ducks—The Pekin, a creamy white breed, is one of the most popular with large duck raisers chiefly on account of its prolificacy. They lay a large white egg and we have had them lay as many as 130 eggs each in the season. Standard weights are: Drake, 8 pounds; Duck, 7 pounds.

The Aylesbury is a pure white duck, about one pound heavier than the Pekin and is very popular in England. It is a very good sitter and mother but does not as a rule lay so many eggs as the Pekin. Standard weights are: Drake, 9 pounds; Duck, 8 pounds.

The Rouen: One of the handsomest breeds we have. They are a non-sitting breed. They lay a fair number of large, greenish-colored eggs. On account of the dark plumage, they do not look so well when picked as the white birds, hence they are not popular with the market men.

The Cayuga—A splendid duck with characteristics much like the Pekin but its plumage is a beautiful greenish black. They are fair layers. Standard weights: Drake, 8 pounds; Duck, 7 pounds.

Indian Runner Ducks—White and fawn-colored. Splendid layers and quick growers. Weights: Drake, 4.5 pounds; Duck, 4 pounds.

TURKEY.

The Bronze turkey is the most popular with farmers in America. They are quite hardy and lay a large number of eggs. The male birds have been known to reach the enormous weight of 50 pounds. The standard gives the weights as follows: Cock, 36 pounds; Hen, 20 pounds; Cockerel, 15 pounds.

The White Holland, the Narragansett, the Black and the Buff turkeys all have their good points, but they are smaller and, therefore, are more suitable for markets that demand a small turkey.

GEESE.

The Toulouse Geese are one of the very best breeds for the farm. They grow to a great size and as a rule are splendid layers. They are very quiet, make excellent sitters and mothers. The general color is a dark grey or blue grey. Standard weights are: Gander, 20 pounds; Goose, 18 pounds.

The Embden Geese are pure white and of the same size and general characteristics as the Toulouse.

The African Geese are of the same weight and size as the Toulouse but they are more rangy with long necks and have a black knob on the top of their head. They are as a rule more timid than the others. They are very good layers.

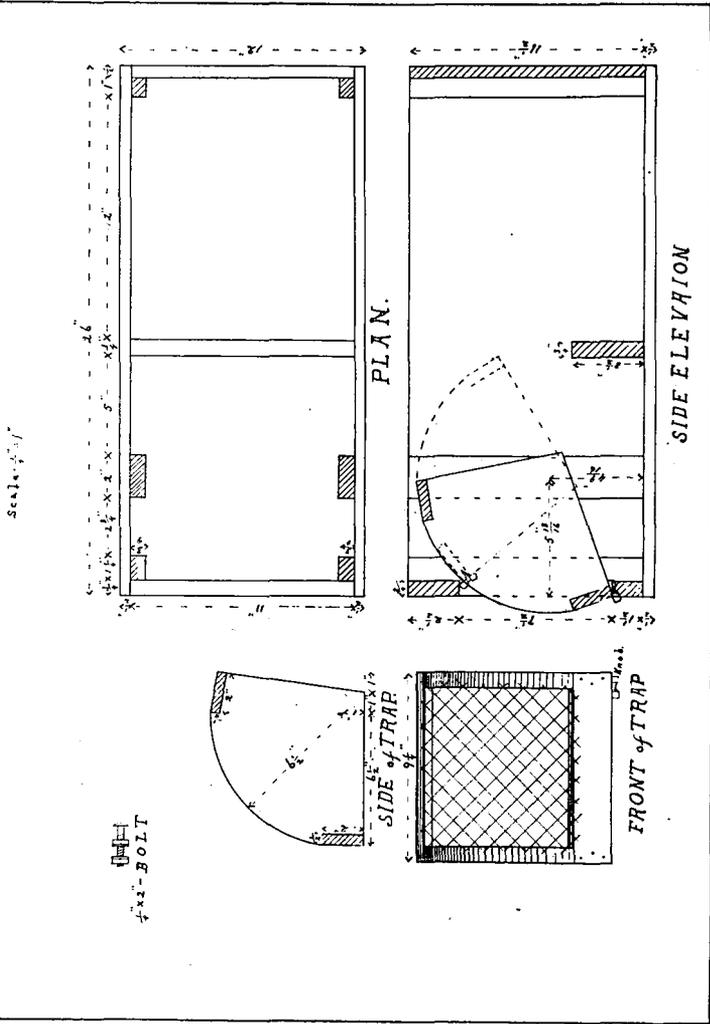
EGG PRODUCTION.

There are three important factors to be considered when the object is the production of eggs; the stock, the feed and the housing.

The Stock.

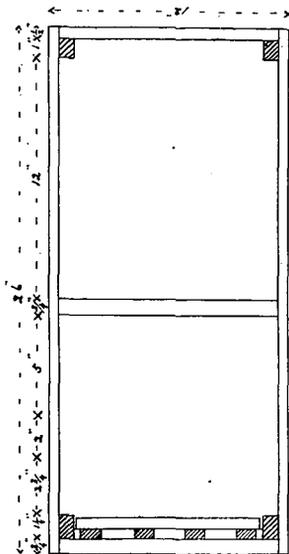
It is a comparatively easy matter to get eggs in large quantities in the warmer months of the year but in the winter time when eggs are high in price the problem is a very different one. We find at this station that our Banded Rock Pullets must be hatched not later than May 15th to get them in shape for laying in late October or the first of November. The Leghorns,

TRAP NEST.

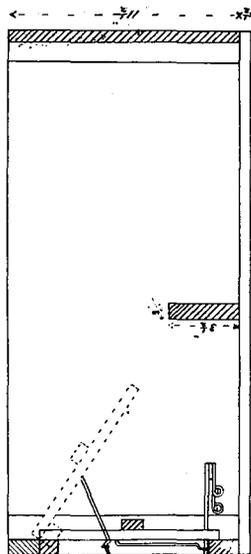


TRAP NEST

Scale $\frac{1}{4}$ "



PLAN.



Side Elevation.



Leather Hinge.



Leather Hinge.

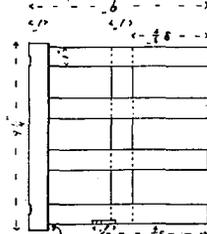


12-Gage Wire



Spring.

10-Gage Spring Wire.



Trap.

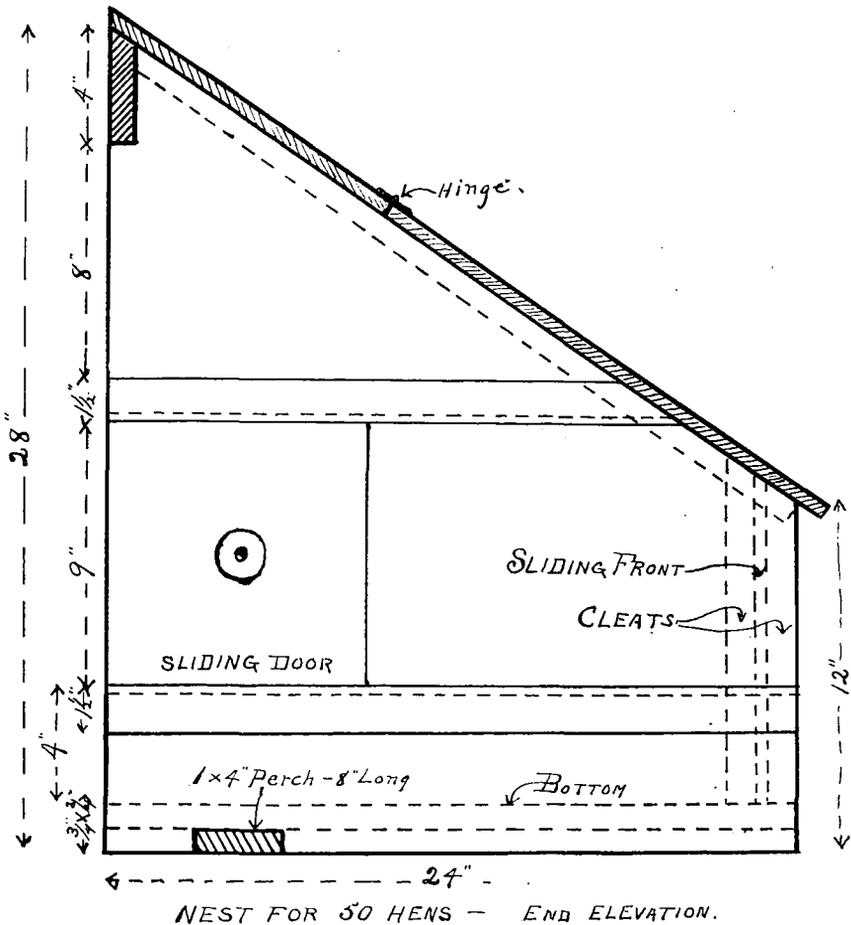
being quicker to mature, will do just as well when hatched two weeks later. Although these dates will do for our birds, it might not do for other strains of the same breed. Our birds are laying at an earlier age now than they did a few years ago. We have been, by using the trap-nests, weeding out the later maturing birds and breeding only from the best. Many of us make the mistake of thinking that "breed" is everything when in reality it counts for very little. It is "strain" that we should consider when purchasing breeding stock as there are good and bad strains, or families, in every breed.

The Food.

If we are fortunate enough to have a good egg-laying strain it follows that we must feed properly in order to get the best results. No amount of food and attention will make a non-producer lay, and many times we find people condemning the food and the care, when it is the inability of the birds to produce. It is not sufficient, as many think, to give the hens a properly balanced ration of grain, but we find by experiment that they must have some form of animal protein in the shape of beef scraps, ground bone, or lean meat. It does not take very much of this meat to satisfy them but the difference in the supply of eggs is wonderful. That our hens need plenty of food is beyond question, for a lean hen cannot lay to her fullest capacity, and if she is a profitable layer there is practically no danger of her becoming overly fat.

The Housing.

We are inclined to think that a cold house has very little effect upon our laying hens, provided it is well lighted and dry. Our records show that the amount of sunshine in winter time affects the egg yield as much as at any time. For the months that give us the most bright, clear days show the best egg records. The hens should be allowed outside in winter whenever the weather permits, provided they have a straw pile or manure heap to scratch in, and it will be found that it tends to keep them in better health. They enjoy it and when hatching-time arrives the percentage of fertile eggs will run higher. A good plan is to throw the litter out in front of the pen and leave it there till spring, as this affords them an ideal scratching place during warm days. In the fall, when we first put the pullets in, we should be careful not to close the house up too tightly at night, till the really cold weather begins. The chickens having been accustomed to plenty of fresh air all summer, are in good condition to withstand the first cool nights and the real danger of their catching cold is in keeping them too warm. There is little danger of a draft where there is only one opening in the building but having two windows open, especially if there is one at each end, should be guarded against.



GRAINS.

Without doubt corn is more commonly fed to poultry in this country than any other grain. Some poultrymen feed their fowls almost entirely on corn with apparently no evil results. It is a heating and fattening food and is, therefore, excellent for winter feeding. It is fed either whole, cracked or ground. When fowls are liable to become over fat on it, it is advisable to crack it and then make them scratch for it in the litter.

Wheat is probably the best single grain to feed and in Europe and Canada is more largely fed to chickens than any other. Wheat screenings, having more protein, are superior to the plump grain for laying hens, and when they are good and clean are very much cheaper than good wheat.

Oats, being the nearest to a balanced ration, should be an excellent poultry

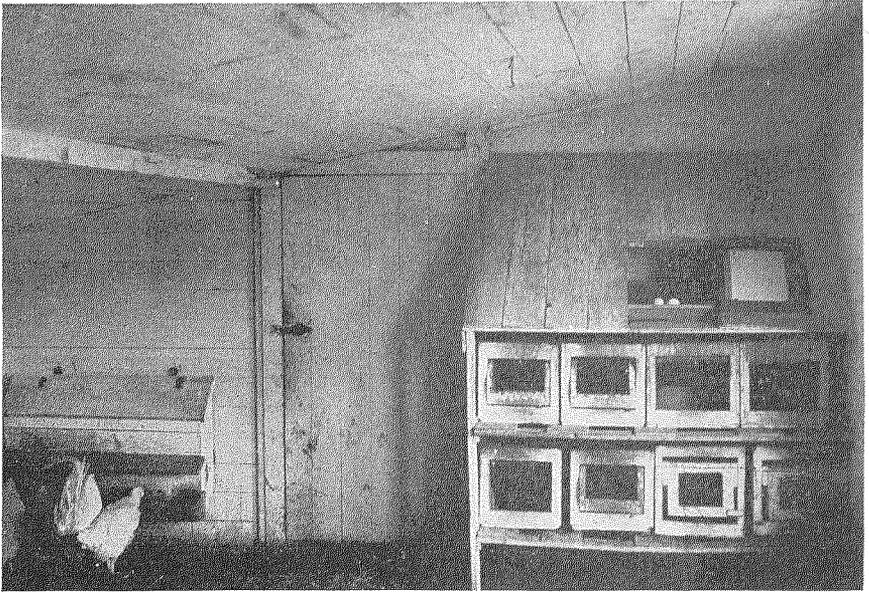
food. They are almost always the cheapest to buy, but the hull is too often so coarse that it is not relished by the fowls.

Some oats are very much finer in hull than others and are fairly well eaten by the birds and, soaking them in warm water for 24 hours, softens them so that they are eaten quite readily.

Barley, either ground or whole, is good. Like the oats it has rather too much hull. However, we have fed considerable quantities and the hens appear to do as well on it as with wheat. Some poultrymen consider it equal to wheat. Buckwheat makes good feed, especially as a mixture for fattening fowls.

DRY MASH FEEDING.

We have been following the method of dry mash feeding for several years and can see no good reason why it should not be recommended. The



Trap Nests and "Never Choke" Feed Hopper.

principal advantages it has are, in the saving of labor and the prevention of gorging on the part of some of the fowls. The mixture being fed from hoppers saves the customary daily feeding, as the fowls have free access to it at all times and once a week is sufficient to fill the hoppers, provided that they are made large enough. By keeping the food before the fowls in this manner we rarely find a hen out of condition; while with the wet mash, where the fowls have only ten minutes or so to eat, the strongest or more active birds will get more than their share while the male birds are apt to be too attentive to the hens and neglect to eat enough for themselves; but where the hopper is used they are always able to get plenty even after the hens are satisfied.

It is interesting to watch the hens eating where the dry mash is hoppers-fed, they appear to enjoy it so thoroughly. They never seem to spend much time at the feed box but will taste a little of the food at a time and then go off to scratch in the deep litter for a kernel of corn or wheat or go over to the water pan for a drink, or perhaps to the grit or oyster shell box to satisfy themselves there. The customary crowding and fighting and over-eating, so common with other methods of feeding are conspicuous by their absence. When hatching time comes we get a higher percentage of fertility than from the others, due, no doubt, to the fact that they have better health.

WET MASH FEEDING.

The most common method of feeding throughout the poultry world today is to give a wet mash of some sort to the fowls once a day; whole grain being fed in the morning and evening. Some people prefer to feed the mash warm, and some cold, and some feed it in the morning, some in the middle of the day and others give it for the evening meal. Our preference is to feed it at noon for the reason that we want to make the hens scratch in the early morning for the whole grain in the litter to keep themselves warm and when in the middle of the day it is warmer and the hens naturally want a rest, we give them the mash. The chief objection to the evening mash is that a full crop of it will not last them during the long winter nights, so well as whole grain, as it is so often composed of such a bulky mixture. Care should be exercised in not over-feeding on the wet mash. The hens should not have more than they will eat up clean in 10 minutes.

A good mash for the farmer is as follows:

Equal parts of finely ground corn, oats, bran or shorts, mixed with about 10 per cent of cooked meat, green cut bone or beef scraps. These foods are mixed up dry and then thoroughly mixed with about one-third their bulk of steeped clover leaves or finely cut clover which has previously been scalded by pouring hot water on it and covering it with a sack. The clover should be steeped about 12 hours before using. Another method and one of the best we have tried is to take a mixture of 200 pounds bran, 100 pounds shorts, 100 pounds ground corn, 100 pounds ground oats, 100 pounds beef scraps and 10 pounds of charcoal. Slightly moisten this with water when feeding to the fowls, but never make it sloppy.

HOW MUCH TO FEED.

It would be impossible to tell the exact amount of feed necessary for the fowls each day. One must be governed by the eagerness with which they come for their meals. The hens eat more while in full laying than they do when idle. The method followed at this station for 50 hens is to give about 3 pounds of whole grain in the litter in the morning and if feeding a hot mash at noon to give them all they will eat up clean in ten minutes, at night about 4 pounds or enough to send them to their roosts with a full crop. We give them a bunch of clover to pick at and a four-pound mangold at noon. A very convenient way to feed the roots is to stick them on nails driven

in the walls of the pen; and the clover can either be cut up fine and placed in boxes, or a bunch of it may be fastened to a piece of wire suspended from the ceiling and the fowls will pick off all the leaves and fine stems. We believe clover is one of the very best foods for keeping fowls in condition during winter time.

THE INCUBATOR.

Whether or not it will pay a farmer or poultryman to purchase an incubator will depend upon circumstances. If he does not wish to raise more than 100 to 150 chicks and has a good strain of setting fowls, we should not advise him to go to the expense of buying an incubator. Where one is properly situated and has had experience, the matter is quite a different one. Raising chickens in large numbers and especially with a non-sitting breed is out of the question without the incubator. There are so many different kinds of good incubators that it would be impossible to recommend any one make. The manufacturers are putting on the market two types, the hot air and the hot water. With us the hot air gives the best general satisfaction and there is practically no limit to its life of usefulness, while the hot water system, no matter how well built, is bound to leak sooner or later and serious loss is the result. A very important point to note in purchasing a machine is the thermostat. Many machines have the small disc regulator which is one of the cheapest to make and the most uncertain in its action and lasting qualities. We have had them leak and spoil the hatch, while the solid metal bar thermostat never gives us any trouble.

THE SETTING HEN.

We believe a great deal of the so-called trouble with sitting hens is that we do not understand them or have not the patience or perseverance necessary for success. The hen should be moved to a quiet place preferably in the evening, where a good, roomy nest has been prepared by making a box at least 14 inches square and six inches deep. This box should be filled with earth to within two inches of the top and a place hollowed out and lined with a little chaff or straw and then the hen should be placed on some stale or china eggs for a day or so until she takes kindly to her new surroundings, when the good eggs should be given her. She should be thoroughly dusted with sulphur or other insect powder at least twice during the hatch as a lousy hen will never make a good sitter. Another very important point is the selection of a healthy hen. A fowl with a weak constitution will not have the proper temperature for a successful hatch, besides she will be restless and probably leave the nest before the hatch comes off. When the hen is confined in a box she should be let off once a day to feed and dust herself. If, however, she is in a good, roomy pen by herself she could have food, water and a dust box before her at all times, thus saving a lot of care and attention.

CARE OF THE CHICKS WITH THE HEN.

April and May-hatched chicks give us the best results. Chickens hatched later than this do not, as a rule, grow so well, owing to the warmer weather and the lack of nice, juicy grass and worms, and besides they do not have the time to develop for early winter layers. If they are hatched earlier than the first of April it costs more to rear them and the eggs, as a rule,



Cheaply Built Food Hopper for Chicks.

are high in price and are not so fertile. They require warmer coops and it also takes a great deal more time to look after the little ones. There is the danger of the very early hatched pullets moulting just as winter sets in, thereby spoiling all prospects of an early winter egg yield. When they are hatched in April and May everything is in their favor, they thrive and grow and make much stronger and better birds. We do not feed little chicks before they are two days old, but from the beginning give them water. During this period the hen is given her food out of reach of the little ones. The first feeds are given sparingly every two hours and are usually wet mashes. After the third day we commence to feed some of the cracked grains a little at a time till at the end of the 5th or 6th day we are giving only two feeds a day of the mash, and three feeds of the cracked grain. Occasionally we give a little whole wheat, and by the end of eight weeks we are feeding most of the grains whole. If the chicks are unable to get worms or insects in sufficient

quantities, they must be supplied with a substitute such as milk or beef scraps. Green food is given in the form of finely chopped lettuce, a piece of potato or turnip or mangold, when they are not able to run outside on the grass.

EGGS FOR HATCHING.

The eggs for hatching should be as fresh as possible, and incubator eggs especially should not be over ten days old for best results. In cold weather they should be gathered quite often during the day to prevent their becoming chilled. They should be kept in a temperature of not over 70 nor below 40 degrees. Eggs kept in a temperature of over 70 degrees will spoil rapidly, in fact they will commence to incubate. Some operators recommend turning the eggs every day while saving them for hatching, and others think it quite unnecessary. We believe that with eggs ten days or two weeks old before setting, it is best to turn them regularly twice a day.

CARE OF THE BROODER CHICKS.

The rules for feeding incubator-hatched chicks are the same as those for feeding hen-hatched chicks. Of course the little fellows without a mother to teach them are apt to contract bad habits. Sometimes we have found it a good plan to put in an older chicken with the young ones to start them off and it is surprising how quickly they will learn from it how to distinguish a food from what is not a food. They will often eat the litter and sand on the floor in preference to the food and for this reason we sometimes use paper on the floor for a few days. Clover chaff or wheat chaff is good for litter. Sawdust or anything that would prove injurious to them if they should eat it should never be used.

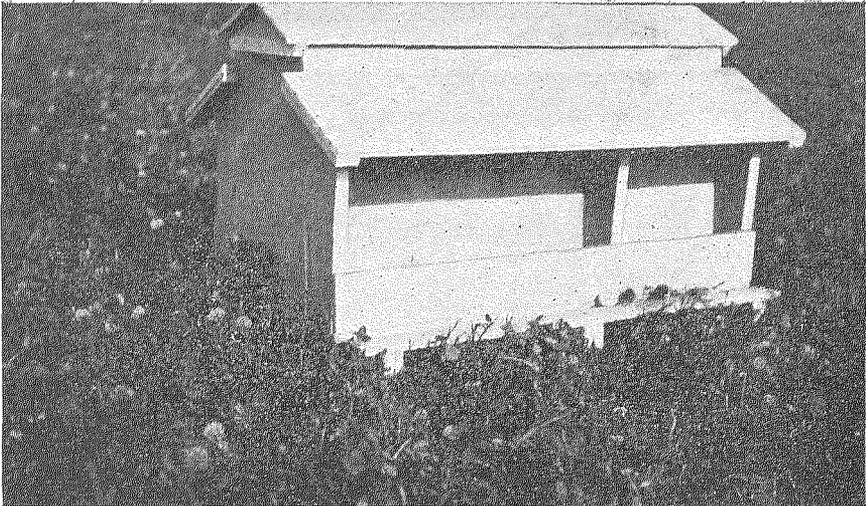
We feed the young brooder chicks five times a day for the first three weeks. After that if they can get out on nice, clean grass and are given a good range, three times a day is quite sufficient. When they are 48 hours old we give them their first feed, which is usually a mash, care being taken not to over-feed. No more is given than they will eat up clean in ten minutes. After a day or two cracked grains may be fed, gradually increasing the quantity till three feeds of cracked grain and two of mash are given. Water and grit are before them at all times.

We are having very good results from feeding the mash dry, right from the beginning, but unless a suitable box or hopper is used the chickens will waste the food considerably.

When the chickens are 8 to 10 weeks old we give them a free range and feed them from hoppers which are filled once a week. These hoppers have two compartments, one for the meal mixture and the other for the cracked grains. Some poultrymen even water their chicks once a week. They use a good-sized barrel, fill it with water and haul it to a shady place where it will keep cool. The barrel is fitted with a tap which is open enough to let the water drop into a pan just fast enough to prevent wasting. This plan is followed till the time for rounding up the chicks for the winter time.

MASH MIXTURES FOR LITTLE CHICKS.

1. Equal parts by weight of finely ground corn, bran and shorts mixed crumbly with sour skim milk.
2. Hard boiled eggs, mixed, shell and all with four times their weight of dry bread.
3. One pint corn, one-half pint bran, one teaspoonful of meat. One egg, one teaspoonful of soda, mix with one-half pint of water and bake two hours. Crumble this up when feeding.



An Out-door Food Hopper for Chicks.

CRACKED GRAIN MIXTURES.

1. Twenty pounds wheat, 20 pounds cracked corn, 10 pounds millet, (whole seed.)
2. Thirty pounds cracked wheat, 30 pounds cracked corn, 20 pounds granulated oat meal.

We find that these mixtures give us very satisfactory results and can be made and mixed up very cheaply. We crack the grains with a grain grinder to the required fineness and then put it through a common fanning

mill and sift out the finer particles for the mash, thus saving what would otherwise be wasted.

The following experiment was made with a view of determining whether hard boiled eggs and bread had any particular advantage over other feeds, with reference to the growth of chicks; these chicks were all hatched in the same machine at the same time. The result as will be seen in the experiment gives the sour milk and mash a slight advantage.

Lot 2. Fed on Sour Milk and Mash.

Lot 1. Fed on Eggs and Bread.

HATCHED MAY 10th		1st Day	1st Wk.	2d Wk.	3rd Wk.	4th Wk.	HATCHED MAY 10th		1st Day	1st Wk.	2d Wk.	3rd Wk.	4th Wk.
No. of Chicks.....	63	62	60	60	60	60	No. of Chicks.....	63	62	61	61	61	61
No. Dead.....	.....	1	2	.....	.....	.....	No. Dead.....	.....	1	1	.....	.....	.....
Wgt. of Chicks.....	5 lb.	6.13 lb.	6.9 lb.	11.4 lb.	15. lb.	.....	Wgt. of Chicks.....	5 lb.	6.29 lb.	7.65 lb.	12.58 lb.	17.15 lb.	.....
Egg and Bread.....	.....	2 lb.	2.5 lb.	4 lb.	5.25 lb.	.....	Mash and Sour Milk.....	.....	2 lb.	2.69 lb.	3.25 lb.	4.5 lb.	.....
Cracked Grain.....	.....	3 lb.	3.25 lb.	4.25 lb.	7.8 lb.	.....	Cracked Grain.....	.....	3 lb.	3.25 lb.	4.25 lb.	7.8 lb.	.....
Per Cent Alive.....	.....	98.44	95.25	95.25	95.25	.....	Per Cent Alive.....	.....	98.4	96.94	96.94	96.94	.....
Wgt. of Chicks.....	1.27 oz.	1.584 plus	2.04	3.12	4.	.....	Wgt. of Chicks.....	1.27 oz.	1.62	2.08	3.3	4.5	.....

THE COLONY HOUSE.

The Colony House is almost indispensable in this state for the rearing of little chicks. The cold, wet weather that we so often have in April and May is very trying to the youngsters, during the early days of their lives especially, and when they are confined to small coops or outdoor brooders, they are, as a rule, too cramped and crowded to do well. We find it much more economical to use these Colony houses with the indoor brooders; besides the houses can readily be moved to new ground or to the grain fields where the chicks can pick up the greater part of their living.

Colony houses are built in a great many different styles, most of which have their merits. The style we have at the present time gives very good satisfaction. It is made 6 feet wide and 12 feet long and is 3 feet high at the back and 5 feet high at the front. By using two large-sized indoor brooders, 150 chicks can be housed in it, and they will do nicely. When they outgrow the brooders these are removed and roosts are placed lengthwise in it. This serves them till fall when they should be removed to their winter quarters. This house may be used for the ducks and geese during the winter, thus saving any extra building or coop for them.

MARKET POULTRY.

The markets of this state offer splendid inducements to producers of the proper type and quality of dressed poultry. There is far too great a proportion of inferior stuff offered for sale, chiefly from the lack of knowledge, upon the part of the farmers and poultrymen, of the proper methods of breeding, feeding and preparing for market.

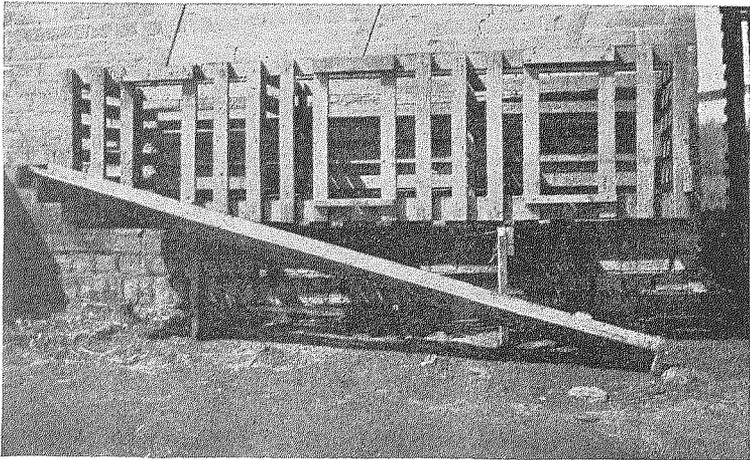
What we want in a market bird is the ability to put on flesh of the right quality and at the least possible cost. One of the essential points in a bird of this kind is a strong constitution. This is indicated by a short, stout, well-curved beak, a bright, clear eye, rather short, broad head, moderately short neck, broad back, and well-rounded, full breast with legs of medium length and well set apart. A bird of this description will be ready to eat at every meal and when dressed will present the very best possible appearance and return a good profit to its grower.

POULTRY FATTENING AND KILLING.

Fowls, before they are killed and dressed, should be fattened for at least ten days or two weeks. This is not for the purpose, as many people think, of making them as fat as possible, but to give them the right proportion of fat and lean to make the bird tender and juicy when cooked. The over-fat bird, like the old hen, is not wanted.

There are two common methods of fattening poultry. The "Crate Method" and the "Loose Pen Method." Each has its advocates. We prefer the Crate Method for roasters or birds over 3.5 pounds in weight. The birds are much more easily handled and do not take up so much space and besides they are always at your command.

The fattening crate is quite easily constructed and will last for years if properly made. It is usually 6 feet long, 16 inches wide, 18 inches high and is divided into three equal-sized compartments, each holding from 4 to 6 birds, as the case may be. The slats or laths which are usually $1\frac{1}{4}$ inches wide are placed $1\frac{1}{2}$ inches apart at the ends, sides and top of the crate, but those in front are placed vertically and are 2 inches apart, giving the birds plenty of room to put their heads through to eat from the trough. The floor of the crate is made of slats which run lengthwise and are placed one inch apart, leaving a 1-inch space on either side between the first lath and the sides of the crate. The crate should stand on short legs or trestles to allow for convenience in cleaning out the droppings which fall to the floor. The trough is made the full length of the crate and should be about 3 or 4 inches deep.



Fattening Crate.

Loose Pen Feeding.

The loose pen feeding method of fattening market chickens might be properly described as the practice of feeding the birds in small yards or pens in lots of 25 to 50. We prefer this method for broilers or cockerels of the lighter breeds, such as Leghorns, as they are very active and are apt to be restless in the crate. Our plan is to have a small coop or shelter for roosting quarters with small yard attached; the whole structure being portable. Each morning at feeding time the coop is moved the length of itself to give a clean floor for the chicks. Where the coop is placed in an orchard or grove, it serves a double purpose for, besides accommodating the chickens, it enables you to enrich the soil. A coop large enough for 30 broilers should be 3 feet wide, 6 feet long, 2 feet high at the back and 3 feet high at the front, with three roosts running lengthwise. The yard should be made of three hurdles; two 12 feet long, 18 inches high and one 6 feet wide, and a large hurdle to cover the top to keep the chicks from flying over.

KILLING AND DRESSING FOR MARKET.

Fowls should always be starved for at least 24 hours before being killed, so as to have their crops and intestines thoroughly free from food of any kind. There are several reasons for this. One is that it makes the task of



Dislocating the Neck.

drawing them a much more pleasant one and another is that the dressed fowls will keep much better when shipped to the market undrawn. We also find that a starved bird can be plucked much more easily than an unstarved one.

There are two good methods of killing fowls followed in this country. One is by dislocating the neck and the other by bleeding in the mouth with a knife. The former method is very commonly practiced in Europe and Canada, the dealers and poultrymen claiming that in case birds are to be shipped long distances or are to be held for any length of time they keep much bet-

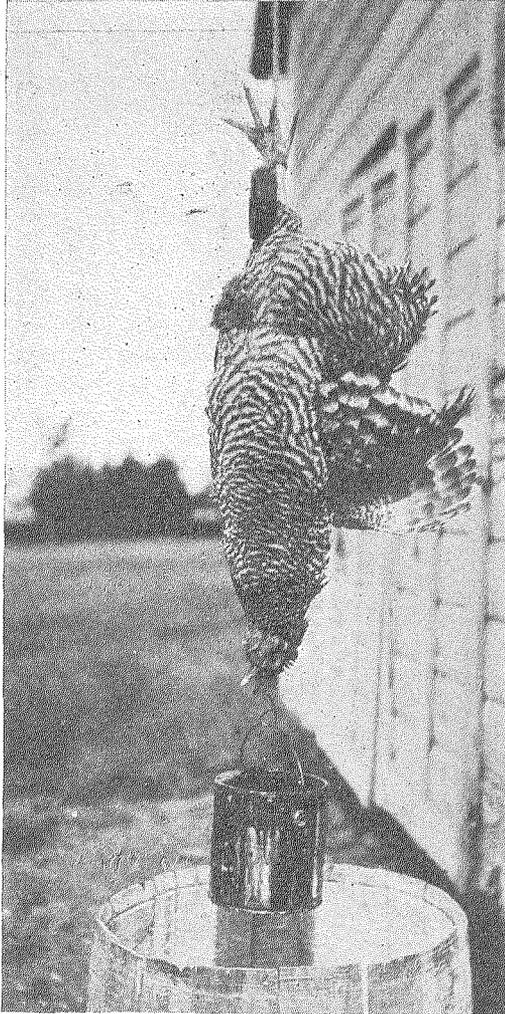
ter and retain their flavor and juiciness much longer. We like this method of dislocating the neck; the birds are much cleaner to handle, since one does not have the bloody feathers to handle, and when the bird is dressed, the



Sticking.

head is cut off and the blood goes away with it. Farmers will find this method to work nicely when killing and scalding a few birds for their Sunday dinners.

When the market calls for a bird to be bled, the best plan is to stick it in the mouth; and by doing so avoid that unsightliness so common where they are hacked about the throat. To proceed with this method one should



Bleeding.

first of all have a stout cord fastened to the ceiling with a two-pound weight attached to the lower end. This should be just high enough to bring the bird to be picked to a convenient height. The weight is used to save tying a knot each time, as all that is necessary is to wind the string around the birds'

legs and the weight will hold it securely. We use a box or barrel to catch the feathers and a small paint-can with a hook fastened to the handle is hooked into the birds' mouth to catch the blood and prevent its soiling the feathers. It requires very little practice to kill the birds in this manner. After the bird is hanged by the legs, cross the wings at the back and grasp the head in the left hand, the back of the head in the palm and with the end of the second finger hold the mouth open, then with the knife in the right hand make a diagonal cut across the roof of the mouth just where the arteries enter the head. Then, with the point of the blade, piece the brain in about the middle of the roof of the mouth, this will loosen the feathers. The moment the operation is finished the bird should be plucked, as the cooling of the body makes the feathers harder to pick. A common pocket knife with a medium-sized blade makes a good instrument for sticking.

FATTENING.

Before commencing to fatten, chickens should be thoroughly dusted with insect powder, and this should be repeated at least twice during the feeding period to keep them free from vermin. As far as possible the birds penned together should be graded according to size to prevent fighting. During the first few days care must be taken not to over-feed; as a chicken at the beginning is apt to over-eat and lose its appetite. We aim to give very little the first day but gradually increase till the end of the first week we are giving all they will eat three times a day. We never leave the feed before them longer than 15 minutes. From 10 days to 3 weeks, according to the condition the fowls are in at the start, is sufficient to fatten them.

Fattening Rations.

There are many good fattening rations, but we find by experiment that although the ration may be properly balanced with grain some form of animal protein such as beef scraps or skim milk is needed to get the best results. Beef scraps and meat meal are, as a rule, too expensive for the farmer, but skim milk gives equally good results and should be quite easy to get on any farm. We have the grains finely ground and mix them with sour milk. Where the scraps are used we moisten with water.

Rations for Fattening.

1. Equal parts by weight of finely ground corn, oats and shorts mixed with sour skim milk.
2. Equal parts by weight of finely ground barley, oats and shorts mixed with sour milk.
3. Finely ground oats mixed with sour skim milk.
4. Equal parts of finely ground oats, corn and low grade flour. Where one is using beef scraps 15 per cent is the best proportion to use.

SHIPPING DRESSED POULTRY.

A great deal of our market poultry is shipped alive and at times quite satisfactory returns are obtainable. Where one has the time to dress his fowls he will find it will pay him. There is less liability of loss from dead birds or short weight, as his dressed birds should weigh practically the same with the buyer as with the shipper himself.

Care should be taken in the packing of the dressed birds. In warm weather they should be thoroughly cooled in cold water before being packed for shipment. A convenient method of packing in warm weather is to take a barrel and put 4 or 5 inches of broken ice in the bottom and then pack a layer of chickens, legs toward the center, and then a layer of ice and so on till within 6 inches of the top. put on some pieces of ice and cover the whole with a bran sack. Poultry packed in this way and shipped in refrigerator cars will keep 4 or 5 days on the road.

When shipping in cold weather the birds, if perfectly cooled, may be shipped packed in paper in boxes holding 50 pounds or 100 pounds. If they are of uniform size and nicely laid in the box they will present a much nicer appearance and will of course sell much more readily. The best paper to use is parchment since it does not absorb moisture as other paper does.

PRESERVING EGGS.

We have tried a number of different methods of packing eggs and so far have found nothing which gives such good results as water-glass. The following different methods were tried:

1. A mixture of 1 part of water-glass to 20 parts of water gave good results where the eggs were not kept in the solution longer than 6 months, after that they were somewhat lacking in flavor.

2. A mixture of 1 part water-glass to 15 parts water, gave excellent results, some of which we kept till they were 18 months old.

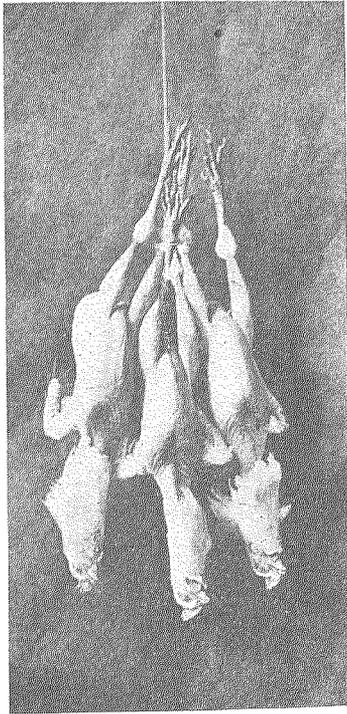
3. We have had very good results packing eggs in dry salt. Great care should be taken to cover them well. These were all good after being packed for seven months, though they had separated considerably.

4. Two pounds of fresh lime were slaked in a pail and a pint of salt added. 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 a second time and left to settle, after that only the clear liquid was poured over the eggs, which were in a tub. The eggs in this solution kept very well but were not so good in flavor and in cooking quality as solution No. 2.

We find that to get the very best results with packed eggs they must be from birds having no males running with them. Also it is very important, especially with the water-glass solution, to have the eggs stored in a cool cellar. Earthenware jars make the best receptacles for packing the eggs, although good, clean butter kegs or lard pails, if not made of spruce wood, give good satisfaction.

CAPONS.

Capons are castrated male birds. After being caponized they become very quiet and grow and put on flesh very rapidly. In the eastern states they are reared in large numbers and when a year old and weighing from 10 to 14 pounds, 20 cents to 40 cents per pound is realized for them. The operation is quite a simple one to perform when one is equipped with the proper instruments and very few birds die. Birds of the larger breeds are used for capons and they frequently weigh from 10 to 14 pounds when ready for market. The demand in this state is very limited at present but we see no good reason why a market for them could not be developed as it has been in other places.



Trio of Roasters Dressed for Market.

BROILERS.

Broiler raising is regarded by experienced poultrymen as a specialty and a business that requires the greatest skill to succeed and for this reason we find so very few exclusive broiler plants in America. It is true that the broilers bring very high prices in the early spring months and even as late as June but when one stops to consider the cost of rearing early winter chicks

and the great risks and losses connected with it, these prices are not so glaring after all. Our advice would be for farmers to sell their eggs and wait till April or May before hatching any chicks.

Broilers are young chicks which are usually killed at the ages of 6 to 12 weeks and they derive their name from the fact that they are usually cut in half and broiled. They are dressed in three sizes—the squab broiler, weighing $\frac{3}{4}$ to 1 pound; the small broiler, weighing 1 to $1\frac{1}{2}$ pounds, and the large broilers, weighing from $1\frac{1}{2}$ to 2 pounds. The small broiler is, as a rule, the most in demand and they are nearly always dry picked.

ROASTERS.

A roaster is a young fowl about full grown, weighing from 4 to 8 pounds. The most profitable age to fatten them is from 3 to 4 months as they grow and put on flesh at the same time and, therefore, make greater gains than at any other time. They should be fattened as early as possible as the prices, as a rule, are low in the fall when most farmers rush their stock to market.

LICE AND MITES.

The two most common parasites which effect chickens are the red mites and the common lice. The latter are comparatively easy to keep under control where the chickens are supplied with a good dust bath made by filling a large, shallow box with road dust or fine coal ashes. The louse breathes through tiny holes on either side of its body and when the hen is dusting herself these breathing holes become filled and the louse is choked to death. The mite is differently constructed as it breathes through its nostrils and the dust or insect powder has little or no effect on it. Besides it rarely stays on the hen during the daytime preferring to hide in the cracks and crevices of the building till the fowls return to roost at night. One of the best plans to rid a house of this pest is to fumigate the building with sulphur or fumigating candles. The hens must first be driven out and the windows and doors tightly closed, then smoke the building thoroughly for at least three hours. This should be repeated once or twice afterward at intervals of three or four days so as to catch the mites that hatch from the eggs that were not destroyed by the sulphur. The mites have never given us any trouble at this station as we whitewash the houses every year and keep the roosts thoroughly soaked with kerosene during the warm weather which is the mite breeding season.

During recent years there have been many widely advertised systems for choosing the laying hen and the discoverers have made a great deal of money from this system. They claim that by certain signs and types they are able to estimate quite accurately the number of eggs a hen will lay in a year.

With a view of giving one of the most popular of these systems a trial, we persuaded the discoverer to come personally and estimate the laying qualities of 50 Leghorn pullets.

The birds were then carefully trap-nested for a year, and the result in the table gives a very good idea of the worth of the system:

No. of Hen	No. of Eggs Laid from Jan. 1 1906 to Dec. 31 1907.	Estimated No. of eggs hen would lay in one year	No. of Hen	No. of Eggs Laid from Jan. 1, '06 to Dec. 31, '07.	Estimated No. of eggs hen would lay in one year
2	40	200	51	88	100
3	116	160	52	127	96
6	115	220	57	129	140
7	116	120	58	139	60
8	122	120	62 ^r	104	96
9	132	210	68	92	80
10	92	72	70	72	200
11	197	200	72	92	160
13	126	180	75	134	60
15	128	150	78	162	210
18	131	150	81	112	72
20	134	230	82	126	180
22	86	250	84	138	140
24	143	170	85	116	160
28	70	200	86	165	220
30	136	220	88	120	180
32	96	220	89	129	220
34	56	72	91	164	160
39	137	220	93	123	96
40	81	250	96	133	200
41	91	180	97	91	180
42		160	98	111	100
43	100	220	99	110	80
44	163	200	100	152	80

Two months experiment with 50 Leghorn Pullets.—Dry Mash Fed.

<i>PEN 1</i>	Wheat	Oats	Barley	Bran	Midds	Ground Barley	Beef Scraps	Cut Bone	Alfalfa	Shells	Grit	Nutritive Ratio	No. doz. Eggs	Value at 27c	Av No. eggs laid per day	Cost per doz.	Cost of Feed	Profit
Dec. 12th to Feb. 12th	177 lb.	157 lb.	172 lb.	28¼ lb.	23¾	28¾	69	13	11	20	13	1:41	93 7-12	25.28	18.2	7.3	6.855	\$18.42

Two months experiment with 50 Leghorn Pullets.—Wet Mash Fed.

<i>PEN 2</i>	Wheat	Oats	Barley	Bran	Midds	Ground Barley	Beef Scraps	Cut Bone	Alfalfa	Shells	Grit	Nutritive Ratio	No. doz. Eggs	Value at 27c	Av No. eggs laid per day	Cost per doz.	Cost of Feed	Profit
Dec. 12th to Feb. 12th	183½	163½	178½	51	44½	51	39½	19	18	20½	13½	1.50	101%	27.45	19.6	6.7	6.844	\$20.60

Amount of feed to 100 Leghorn hens for four months and cost of egg production.

PEN 4.

1906	Wheat	Oats	Barley	Beef Scraps	Bran	Midd.	Gr. Barley	Gr. Oats	Corn Meal	Clover	Grit	O. Shell	Char-coal	% of Hens Laying	Cost per doz.	Cost of Feed	Value of Eggs	Price per doz.	Profit
MARCH.....	228 lb.	228	141 lb.	38 lbs.	40 lb.	40 lb.	40 lb.	.....	.....	18 lb.	37 lb.	63 lb.	13¼	36.4	.094	8.98	15.05	16c.	\$ 6.07
APRIL.....	247	247	80	38	43	48	38	.....	.....	56	13	27	9¼	50.2	.064	8.41	16.91	13c.	8.50
MAY.....	364	349	4	36	40	43	.....	11	7	.....	15	28	8½	60.6	.064	10.10	21.91	14c.	11.81
JUNE.....	228	228	228	27	43	44	.....	.....	24	.....	4	19	7½	57.8	.062	8.97	21.69	15c.	12.72

Amount of feed fed to 100 Barred Rock hens for four months and cost of egg production.

PEN 5	Wheat	Oats	Barley	Beef Scraps	Bran	Midds	Gr. Barley	Gr. Oats	Corn Meal	Clover	Grit	Oyster Shells	Char-coal	% of Hens Laying	Cost per doz.	Cost of Feed	Value of Eggs	Price per doz.	Profit
MARCH.....	251 lb.	252	155	41½	50	50	50	.....	.....	25	37	63	13¼	47.54	.08	9.87	19.84	16c.	\$ 9.97
APRIL.....	262	262	88	42	47	52½	42½	.....	.....	60	14	31	10	61.13	.06	9.25	24.50	13c.	15.25
MAY.....	400	400	14	39	44	47½	.....	12	8	.....	16	30	9	64.45	.066	11.11	26.64	14c.	15.53
JUNE.....	250	250	250	31	47½	48	.....	.....	26½	.....	5	21	8	55.	.07	9.87	22.06	15c.	12.19

Fattening experiment with 12 Plymouth Rock Cockerels.

LOT 1.

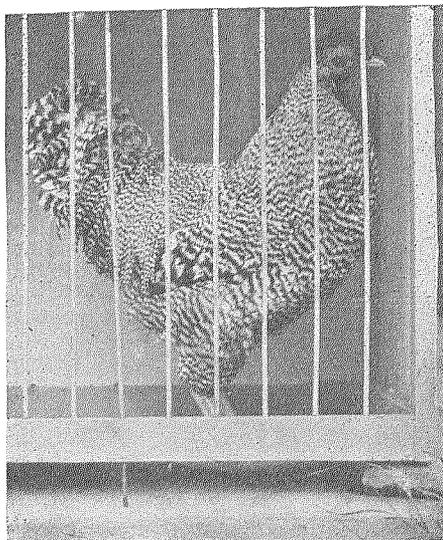
	Total wgt. of birds	Lbs. grain consumed	Lbs. Skim Milk Consumed	Lbs. Total Gain	Average gain per bird in 3 weeks	Average amt. of grain per lb. of gain in 3 weeks	Cost of food consumed in 3 weeks	Average cost of 1 lb. gain	Average value of each bird when sold at 18c. per lb. live wgt.
First Week.....	38	17.5	25	9.5					
Second Week.....	47.5	24.5	30	6					
Third Week.....	53.5	21.	28	8.5					
Total.....	62	63.	83	24	2 lb.	2.625	\$1.048	4.35c	.93

Fattening experiment with 12 Leghorn Cockerels

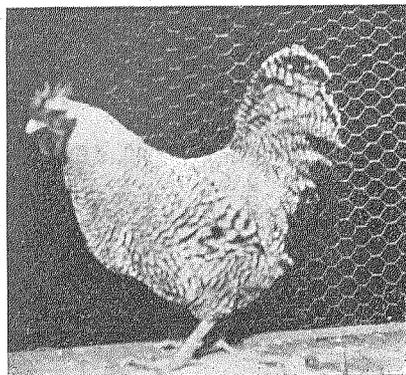
LOT 2.

	Total wgt. of birds	Lbs. grain consumed	Lbs. skim milk	Lbs. total gain	Average gain per bird in 3 weeks	Average amt. of grain per lb. of gain in 3 weeks	Cost of food Consumed in 3 weeks	Average cost of 1 lb. of gain	Average value of each bird when sold at 18c per lb. live weight
First Week.....	30.	10.	16	5.5					
Second Week.....	35.5	16.5	24	4.					
Third Week.....	39.5	12.	19	4.5					
Total.....	44.	38.5	59	14.	1.18	2.75	65.7c	4.9c	66.2c

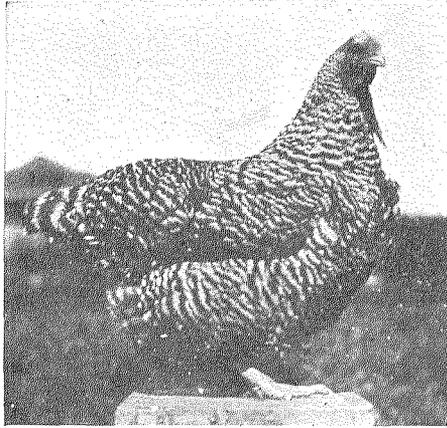
Both lots were about 3 months old when experiment began. They were fed equal parts by weight of corn, oats and shorts finely ground and mixed quite sloppy with sour skim milk. The average price of grain was \$1.40 per cwt. The milk was figured at 20c per cwt. The birds were brought in from free range and were in good growing condition but not fat.



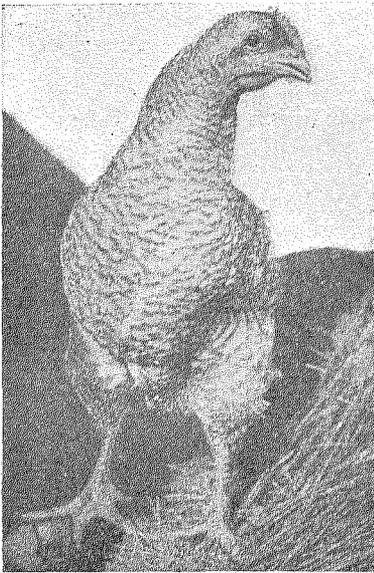
Cockerel Whose Dam and Grandam and Several Full Sisters Have a Record of 200 Eggs per Year.



Sire of Several Pullets with Records of 200 Eggs per Year.



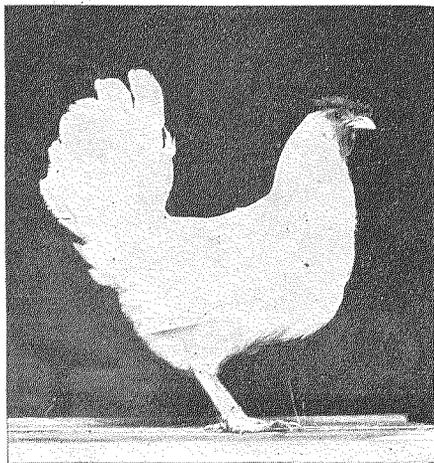
A 200 Egg Barred Rock Hen.



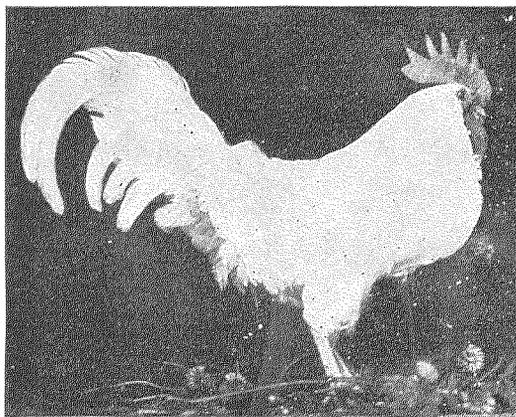
Strong Constitution.



Weak Constitution.



White Leghorn Hen.



White Leghorn Cock.