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PRACTICAL POULTRY CULTURE

BY

R·W·DAVISON·

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PRACTICAL

POULTRY CULTURE

A CONCISE AND PRACTICAL TREATISE ON THE MANAGEMENT OF POULTRY FOR PROFIT

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BY

R. W. DAVISON

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INTRODUCTION.

This little book is intended for those who are about to embark on the troubled seas of poultry raising, or those who wish to gain new ideas on the subject. It is just a plain, practical poultry book, giving the natural and artificial methods of raising, together with some, I trust, helpful hints all along the road.

I have tried to give, in concise form, what knowledge I have gained from observation and personal work during the past fourteen years. I am indebted to the poultry press for many ideas which I have tested and found reliable.

I have not attempted to deal in *fancy* poultry—so called—and yet I have found that thoroughbred poultry is practical poultry; that is, the practical up-to-date poultrymen use pure-bred poultry exclusively. I am anxious to reach the farmer, for no matter how well he understands general stock raising, he is, of all men, most ignorant when it comes to poultry. If this book proves the means of helping some one over the many hard places in poultry raising I will be satisfied.

R. W. Davison.

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PRACTICAL POULTRY CULTURE.

CHAPTER I.

THE EXTENT OF THE POULTRY INDUSTRY OF THE UNITED STATES—HOW TO START AND WHAT BREEDS TO USE—THE DIFFERENT VARIETIES OF POULTRY.

The poultry business is supposed by many to be a small business—not worth the serious thoughts of our agricultural colleges or of educated men. The fact is that the government has neglected its duty in this respect, and we, therefore, have no sure figures to go by; but it is estimated, by those in a position to know, that about 1,820,000,000 dozen eggs are annually consumed in the United States, and putting the average price per dozen at twelve cents (far below an average), we have the grand total of $218,000,000, which is far more than the value of our combined output of iron and wool. Along side of these figures put the value of dressed poultry and we have one of the most important industries in the United States. It is estimated that 258,871,125 chickens, 10,544,080 turkeys, 8,440,175 geese, and 7,544,080 ducks are annually consumed. If we average this lot and put the value of each at fifty cents, which is

about one-third less than it should be, we have the grand total of $360,699,730. Of course these figures do not include (excepting the estimate on eggs) the vast quantity consumed by private families who raise and eat their own fowls. Neither do they include that vast and growing business commonly called the "fancy trade," or the sale of eggs and thoroughbred poultry for breeding purposes. The West is becoming the great center of the poultry product. They lack the favorable markets of the East, but the cost of production is much less, and refrigerator cars and especially arranged cars for live poultry, now carry the product quickly and easily to the best market. To show the extent of this rail traffic, we will state that during the forepart of 1895 there was an average monthly shipment of no less than 100 car loads gathered up east of Kansas City, and carried East by one road only, and yet the poultry industry is constantly and rapidly growing. Will it soon be overdone? No, not while we, as we do, import over $5,000,000 worth of eggs annually, and while there are yet thousands of families who eat "chicken" but twice a year. It is stated on good authority that with some of the Missouri banks the exchange on the poultry product is greater than from any other branch of trade. The writer believes that if a correct census was taken of the poultry product it would be found to surpass, in money value, the entire wheat product.

The political economist has never imagined the hen worthy of scientific consideration. The world could easily survive the loss of all political economists, but what a howling there would be if the neglected hen should be threatened with extermination.

In the above we stated that the government had neglected its duty in this respect, and so it has; but yet in

Government Statistics.

1889 a census of the egg and poultry product was taken, and although it is "official," yet it is far below the true values; but we will give the figures, for it gives us something "official" to work on.

The number of chickens supposed to be in the United States in 1889 was 258,472,155, and other fowls (ducks, turkeys and geese), 26,816,545. The number of *dozen* eggs *produced in 1889*, 817,211,146. At the very moderate price of twelve cents a dozen the value of eggs alone amounts to $98,000,000, or about $100,000,000 in 1890, allowing for a healthy growth, compared with the past years, or from 1880, when the first census was taken. In order to give some idea of the egg yield we will state that if we were to count these eggs (produced in 1889), 9,806,533,752 (not dozens) at the rate of one a second, it would take us about nine years of 300 working days each.

Now, then, in 1889 there were 285,288,700 fowls of all kinds in the United States. If we use round numbers and call it 285,000,000 fowls—for convenience—and each one worth twenty-five cents, we have the sum of $71,250,000 as the value, but if we place the value of each fowl at forty cents (which is nearer the correct value), we have $114,000,000. Add this value to the value of the egg product and we have a product of $212,000,000. These figures do not include the amount of poultry and eggs consumed, but the value of what we produce in one year. Neither do these figures include the "fancy" trade. The broiler business was also in its infancy, we might say, in 1889; thus we look to see the next census double these values.

It is simply impossible to get a correct value of the poultry business, for every hamlet and log cabin has

its little flock; even good-sized towns have their "back-yard" chicken-coops.

The states which lead in the production of chickens are as follows, in the order named: Missouri, Illinois, Iowa, Kansas, Ohio, Kentucky, Indiana, Tennessee, Texas, Pennsylvania, New York, North Carolina, Nebraska, Georgia, Arkansas, Alabama, Michigan, Wisconsin and Mississippi.

The states which produce the most turkeys, ducks, geese, etc., are in the following order: Missouri, Illinois, Kentucky, Iowa, Tennessee, Texas, Indiana, Kansas, Michigan and Pennsylvania.

The states which lead in all kinds of poultry are Missouri, Illinois and Iowa.

Ohio is the banner egg state, which produced in 1889 over 70,000,000 dozen; following in the order given are Iowa, Illinois, Missouri, Pennsylvania, New York, Indiana and Kansas.

Let the good work go on. It does not ask government aid, but it does ask to be classed in its proper place as one of the great industries of a great nation.

How to Start.

It is well before starting in the poultry business, either as a business or for pleasure, to face the fact that everyone can not raise chickens. We will have to make up our mind to study and work. That there are many ups and downs, especially downs, and if we wish to make it an especial business we must invest large capital therein. There is no royal road to wealth in this business. Man must eat bread by the sweat of his brow. We have been in the poultry business long enough to know that there is a living in it if properly managed, and judicial investments have been made by practical and experienced men.

People are very slow to invest money in a business

that they are familiar with. They know that location and many other considerations will prove factors in future dealings, and yet people will invest largely in the poultry business, of which they know nothing, and when failure overtakes them the business gets the blame.

We will never advise a man to invest largely in poultry unless he has experience to carry him through. The proper thing to do is to commence at the bottom and gradually work up. Have some other occupation that will not require all your time, and devote the odd moments to poultry. In this way we can soon tell (in, say two or three years), when it will pay us to devote all our time to poultry.

It is a very fascinating occupation, and the person who once allows himself to thoroughly take the fever (it is very contagious) will never wholly recover. He may be involved in railroads or politics, or he may take up a profession, but somewhere—in the back yard or elsewhere—he will still keep a pen or two of thoroughbred fowls.

The first question to be decided by the would-be poultryman, is: What do I want to make a specialty of—eggs, market poultry, or both? The majority of people wish to raise fowls for both eggs and market poultry, or eggs and broilers or roasters. If we wish to take up the business merely for profitable pleasure, then several of the more fancy—so-called—breeds can be selected, but where dollars and cents count, then we would recommend only one breed, or at most, two. Thoroughbred poultry, or first crosses, should alone be used for the laying stock.

What Breed.

By first crosses we mean the progeny from two dif-

ferent breeds of thoroughbreds. The pullets from this first cross may be selected for layers, but there the crossing should stop, for it will only result in disaster, unless the person making the selection perfectly understands his business and has some definite object in view. The crossing of two similar breeds, such as a Leghorn on a Minorca or Red Cap, will produce nothing better than the parents. If our object is eggs, and a fair sized body is also desired, then we can cross a Leghorn on a Plymouth Rock or Langshan. This will give us a good sized carcass, good layer (probably not quite as good as the Leghorn pure) and a rapid, strong grower. If we desire a fine broiler or roaster, then we should mate an Indian Game cock on a Wyandotte hen, and we will get just what we want. Nothing will surpass this cross for the purpose, although an Indian Game crossed on Light Brahmas will give us excellent birds. The main gain in crossing two breeds is strong, healthy offspring, but on the whole, we do not recommend it, for eight persons out of ten who commence to cross will end by making scrubs out of their fowls inside of three years. When thoroughbreds are raised properly they are hardy, and as we have some seventy-five different varieties (this includes different varieties of a given breed) to choose from, it will be seen that we can select and breed just what we want. Of course new blood will have to be procured every second year, although by judiciously selecting the largest, earliest hatched and strongest cockerels from a large flock, we can fix desirable points and yet sustain our strain. This should never be practiced by the novice. It requires somewhat of practice and experience. It must be remembered that the best laying breeds are not the best market breeds, and *vice versa*, therefore we should

select with our object in view. The most popular breeds now used, especially for laying, are the several varieties of the Leghorns and Minorcas, while the medium weight breeds, general purpose, so-called, most in favor are the several varieties of Wyandottes and Plymouth Rocks. Light Brahmas are the largest of thoroughbreds and they and the Cochins make good winter layers in a cold climate. Being heavily feathered they can stand zero weather better than the smaller varieties. Indian Games and Dorkings are the best purely market breeds we have. They are fair layers also, but their dressed carcass presents a morsel that is hard to resist—several morsels in fact, for they are good sized, weighing about the same as Plymouth Rocks.

We have merely given the most popular breeds (except Dorking, which are little bred in this country), but if any one has a preference for any other variety, he should stick to it, providing it is suitable to his needs. We should breed just what we most admire, for if we can add pleasure to profit, without sacrifice, we ought to do it. Where our heart is, there we will be, literally in the midst. The person who undertakes to raise poultry on a large scale can not afford to take a day off twice in awhile. The business demands close application, and every little detail will have to be personally attended to. The hired man has been the cause of many failures.

The breeding stock is the very foundation of the business and therefore should be bred and selected with great care. It must be farm-raised with plenty of room, for if our chickens do not grow up strong and healthy we can not expect success. The hen, or breeding stock, is of the very first importance. "Like priest,

like people,'' applies to poultry in a peculiar sense, but we will touch on this later on.

There is some controversy over the question of the laying powers of the pullet or hen. We have demonstrated, to our own satisfaction, that the pullet, if hatched early and given a chance for a satisfactory growth, will make the better fall, winter and spring layer. With May, the hen (two years old or over) commences to pick up, and by June or July she is doing about as well as the pullet. We are presuming that both have been laying, more or less, all winter. As a general rule, after a hen reaches her second moult, she has passed her profitableness, although there are occasionally hens that will lay well until three or four years old. Do not dispose of a hen that has proved a good layer. Pick out all such and keep them separate so long as they prove profitable. Those who are in the business for eggs rely solely on early hatched pullets, they being far more reliable. If, however, broilers are desired early, then it is a question, which will give the better results. The generally accepted rule is, pullets for eggs, hens for chickens. This applies to early winter chicks. By spring the pullet will be sufficiently developed to give us healthy chicks. We have never been able to test this question as it should be tested, but we have had good results from early, well-matured pullet eggs, even when used for hatching in November. The main question is perfect development. If cockerels are used, they should be hatched not later than March 10th, but the general rule is to mate cocks with pullets and cockerels with hens.

The ''American Poultry Association'' is composed of the leading ''Fanciers'' in the country. Every five

The Different Varieties of Poultry.

years it publishes a book called "The American Standard of Perfection." More properly speaking, every five years it publishes a new edition, making slight alterations and adding any new breeds that are found worthy.

This book is the law and the guide for the judges at our shows. It describes minutely every breed or variety of poultry. It deals with ideal specimens, and by studying its pages we can see how nearly our birds come to the ideal as given in the Standard. It is sold by all poultry publications at one dollar, and should be in the hands of every poultry man, whether he is breeding for "points" or not.

For those who do not own a copy, or who are not familiar with the different varieties of poultry, we will give a list which will be nearly complete.

The Mediterranean class comprises the smaller breeds, and are the egg layers. It is composed of Leghorns—Brown, Rose Comb Brown, White, Rose Comb White, Black, Dominique, Buff and Silver Duckwing; Minorcas—White, Black, Blue Andalusian, and Black Spanish. We also have (among the egg-layers or smaller varieties) Red Caps; Houdans; Hamburgs—Black, Golden Penciled, Golden Spangled, Silver Penciled, Silver Spangled and White; Campines—Golden, Silver. In the American class, or general purpose class, we have Plymouth Rocks—Barred, Buff, Pea-Combed Barred, White; Wyandottes—Silver, Golden White, Buff, Black, Columbian; White Wonders; Javas—Black, White, Mottled; American Dominique and Jersey Blues. We will also place here Crevecœurs, Dorkings—Colored, Silver-Gray, White; La Fleche.

In the Asiatic class, which is composed of the heavier varieties, we have, Brahmas—Light, Dark, Buff;

Cochins—Buff, Partridge, White, Black; Langshans—White, Black, Blue.

The Polish class is composed of light-weight birds, and is as follows: Polish—Bearded Golden, Bearded Silver, Bearded White, Buff Laced, Golden, Silver, White, White-crested Black. We should have added White-faced Black Spanish to the lighter weights also.

There are a few miscellaneous breeds, such as Russians, Sumatra, Silky, Sultan, Frizzles, Rumpless.

In Games we have Black-breasted Red, Brown Red, Golden Duckwing, Silver Duckwing, Red Pyle, White, Black, Birchen; Game Bantams—Black-breasted Red, Brown Red, Golden Duckwing, Silver Duckwing, Red Pyle, White, Black, Birchen. We will add, also, Indian Game and Black-breasted Red Malay.

We ought to be able to pick out something desirable from this list. In ducks we do not have such a variety. Ducks—Pekin, Aylesbury, Black East Indian, Gray Call, White Call, Cayuga, Colored Muscovy, White Muscovy, Crested White, Rouen.

In turkeys we have—Bronze, Narragansett, Black, Buff, Slate, White. And in geese—African, Brown, China, Egyptian, Embden, Toulouse, White China, Wild.

It seems as though we had a sufficiency in fowls, and yet new breeds are constantly springing up, or, rather, different varieties. It is well to stick to a breed we have tried and found good, rather than branch off on something new, only to find that they are no better or not so good.

The most popular varieties to-day are the Leghorns, Plymouth Rocks, Brahmas and Cochins, Langshans, Minorcas, Wyandottes, Indian Games and Hamburgs. We can find here just what we want, providing we know what we want.

CHAPTER II.

THE BREEDING STOCK—SETTING THE HEN—THE CHICK, AND HOW TO RAISE IT (NATURE'S METHOD).

As we said before, the breeding stock is the foundation to the whole business, therefore it will be well to consider this question first.

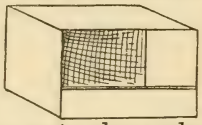
The Breeding Stock.

Do not commence the poultry business by buying a large number of hens and thereby think to gain a year or two at a single bound. Take things easy and commence with a few—say 15—and learn how to make these lay winter and summer first. The rest will follow in its natural course. Start with thoroughbreds. If you can not afford to buy a dozen or two, buy a pair or trio. Commence right and buy the best blood procurable and then you will not have to, in a few years, go back and commence all over again. Remember that the best is none too good. Probably some would prefer to buy eggs in the spring and start by raising their own stock. That is a good way, but we prefer to buy stock and raise the eggs for hatching. In buying stock be very careful about getting more than you pay for—disease. Always shut up the new birds for several days so as to make sure they are perfectly healthy. We will here take up the natural method of raising chickens, presuming that they are intended for stock, while market poultry, generally, will be taken up under the head of broilers or the artificial method.

Before we set our hens we should provide a "set-

ting-room"—a place set apart for this purpose exclusively. If many hens are to be set at one time, make a row of nests all around the house, using the ground floor for the bottom of the nests. If this does not afford sufficient room, build another row on top of these. Each nest should be fourteen by sixteen inches, and each should have some kind of a slat door, so as to always be ready to lock the hen in should it be found advisable. Shape up the dirt in bottom of nest, so that the center will be about two inches lower than the sides, but let the slant be gradual. Cover the dirt with an inch of hay, straw, or anything handy; procure a number of egg gourds or china eggs; capture the intended setter after dark, carefully remove her to the setting-room and lock her in one of the nests, previously having placed therein a few of the gourds. If she sits quietly for a couple of days, then good eggs may be substituted for the gourds. A great many people make the costly mistake of giving too many eggs to a hen; especially is this true during cold weather. During warm weather a hen can take care of more eggs, for it will not make much difference if an egg or two gets partly uncovered for a short time. During cold weather these partly uncovered eggs may get chilled, and then when the hen shifts them these eggs may get covered and other previously covered ones may get left out; thus nearly all the eggs will be spoiled. In general, thirteen fair sized eggs are plenty for an ordinary sized hen; it takes a large hen to properly cover fifteen eggs. Always test the eggs on the seventh (or fifth) day of incubation. If several hens have been set at once, then all the fertile eggs can be placed under one or more hens, and

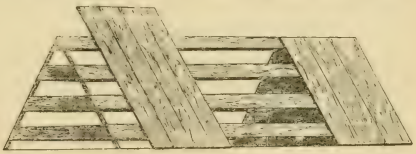
Hatching.



the balance of the hens, without eggs, can be reset, thus saving time and hens. Never use stale eggs for nest-eggs; they may get broken and soil the hen and nest.

There are various "lice preventives" to put in the nests, but we have learned to rely on the best insect powder we can find. After the hen settles down to business, give her a good dusting—also the nest—taking her by the legs, head down, and sprinkle the powder well into the feathers, using the first two fingers and thumb to grasp the powder with. About two days before the chicks are due to hatch, repeat the dusting. It is within the lines of fact to state that two-thirds of the mortality among small chickens is due directly to the ravages of lice, and we, therefore, can not be too particular on this point. It is better to err on the side of too much insect powder rather than not enough. Have proper coops prepared previous to the hatching of the chicks. A good coop is made in the shape of an inverted V. It should be about 2 ft. 6 in. wide at bot-

A V-SHAPED COOP.



COOP WITH PROTECTED RUN.

tom and 3 ft. long or deep, with a slat front. Have the slat or opening in one end, and never on the side, for in case of rain storms the hen can not keep the chickens dry, unless old carpet or bagging is thrown over this wide opening. Small dry goods boxes covered with tarred roofing also make a good coop. Early in the season, during chilly and damp weather, have a

movable board bottom for the coop. This will keep the chicks from the damp ground. Be careful to clean this bottom off and sand it every day or it will prove worse than no bottom. As warm weather approaches the bottoms should be removed, and the coops are cleaned by simply moving them each day to fresh ground.

It is very convenient to have these little lath runs for our chicken coops. Early in the season or on damp, rainy days the boards or muslin can be so laid on the frames as to give protection from the winds or rain and confine the chicks as well. They should be made tight enough to prevent chicks from getting out. As they grow then they can be let out by taking off an end lath. During the hot days of late spring they are useful to protect the chicks from the too hot rays of the sun. If preferred, wire netting (one inch mesh) can be tacked on the frames in place of the lath.

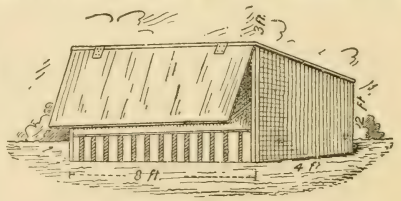
Allow the chickens to remain undisturbed in the nest for twenty-four hours after hatching, then transfer the hen and chicks to the coop, placing not more than twelve or fifteen (according to the season) with a hen. If two or more hens were set at one time, then the chicks can be given to one or more mothers and the remaining hens reset. The first feed should be rolled oatmeal or stale wheat bread moistened in milk. All surplus milk should be squeezed out of bread before feeding. Follow this for three days, when the feed may be scalded. This feed should contain all the elements of growth and development, and the three most easily procured elements may be ground corn, wheat middlings and ground oats (sifted so as to remove the hull), equal parts, with a handful of sweet ground bone. Scald this mixture

The Chick.

with hot water or milk and let stand covered an hour before feeding so as to let the steam cook it as much as possible. Do not use any more hot water than is sufficient to make the mess crumble. Never feed sour or sloppy food. Buy the best feed you can, for it will prove the cheapest in the end. Anything and everything is not suitable for poultry of any age. They require sound, sweet food and must have it to do well. Feed the chicks four times a day. Give rolled oatmeal or bread crumbs in the morning and the scalded mess thereafter. A good plan is to have fixed hours for feeding and always feed just at that time. The first feed should be given at 6 o'clock A. M. (5 o'clock if possible), the second at 10 o'clock, the third at 2 P. M., and the fourth at 6 o'clock. Every other day give boiled potatoes at 2 o'clock. A little finely chopped onion, top and all, is excellent to give every other day for the first month.

When the chicks have reached five weeks of age then three meals a day will be sufficient, and the night feed may be whole wheat. Occasionally mix in the soft feed a little finely ground charcoal. Grit is also an important item, and for small chicks we mix a little in the soft feed, using stone grit, chick size. The morning feed of oatmeal may be discontinued after the fourth week, and the scalded feed substituted. Always feed on a clean board, which should be washed off every few days. We use a board about three by ten inches, around the sides of which we nail on pieces of lath, letting them extend above the top side of the board about half an inch. This prevents the food from getting on the ground. Feed at one time only what will be eaten in—say ten minutes. If any should be left over carefully scrape it up and give it to the pigs.

Give clean water in earthen saucers twice a day. Cleanliness is a very important item. If there are any holes around where stagnant water stands, fill them up. After the chicks reach eight weeks of age then feed can be whole wheat most of the time, but of course oats, buckwheat and barley, fed alternately, is better. Corn should be fed very sparingly, for it is deficient in bone and muscle development, and we must feed for growth rather than fat. There is great danger, as the pullet reaches maturity, in getting her over-fat. It will surely retard egg production and proper development. We are presuming that these pullets are raised to supply us with early fall and winter layers. Therefore, just as soon as the weather permits, say June 1st or 15th, we should remove them to a coop and have this coop way out in the field, as far from the old fowls as possible. Build these coops out of light material and have them about 4x8 feet, on the ground. The front should be three feet high and the back two feet. Such a coop will provide roosting room for 50 chicks. The front can be left open or it can be made with a door hinged at the top. If the nights are cold it can be let down, and during the day it can be raised and thus afford shade for the chicks. Two or three broad, flat roost-poles (four inches wide) can be placed near the back. No floor is used, and therefore the coop is cleaned by moving it to fresh ground every day or two. If old lumber is used to build the coop, then it should be covered—roof, back and sides—with heavy roofing paper. Build



A FIELD COOP.

enough houses so as to accommodate all the pullets. The cockerels should be placed by themselves and marketed just as soon as possible. If the sexes are not separated neither will make a satisfactory growth, and growth is what we are after. When the pullets are three months old, if they are out on the range, then the feed can be given more sparingly, for they should be able to gather at least half their food. The morning feed can be wheat, oats or barley, but only give them enough to take off the sharp edge of their appetite. This will send them out looking for bugs, seeds, etc., and exercise is the most important consideration of all. The night feed (do not feed at noon) should be all they will eat up quickly, and consist of one of the cereals given above. Do not attempt to force the comb (undue early laying), for growth practically stops with the first egg. Get a good-sized frame first, and then feed for eggs. Thus by gradual steps we have come down to the laying period, which ought to commence by October or November 15 at least, and continue right through until the following fall.

CHAPTER III.

THE HEN—THE LAYING PERIOD—DIFFERENT METHODS—FEEDING FOR EGGS.

The Laying Period.

Feeding for eggs is a very particular business and can only be successfully carried on by experienced poultrymen. However, the novice can soon overcome the many difficulties by giving this branch his undivided attention. Every pullet is not cut out for a layer. Careful selection is now in order. It is advisable to save more pullets than will be required, for some that look promising when young will change for the worse when matured, and *vice versa*. Now, before commencing to feed for eggs, carefully select only the likely pullets. No matter whether thoroughbreds or not, the first consideration is health, then development. The leg is very important. The bone should be strong and thick. A good, strong frame is never supported by a thin, weak leg. Aim for a medium length leg, according to the breed.

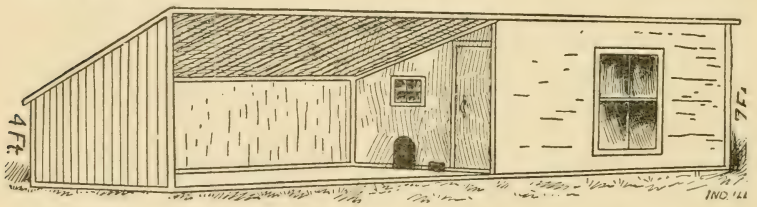
These are the points to look for if we want good layers: Medium length of leg; long, deep, broad-shouldered bodies, full breast, and legs set mediumly far apart, head rather small but strong, and a bright, active looking eye. The short, chunky, close-built bird, with a mild looking eye, can not be depended upon as a layer. Select the birds carefully, retaining only those that promise to be suitable. The haphazard way of select-

ing laying stock is too expensive, to say the least. There is no earthly use in keeping over and feeding birds simply because they are birds of the right gender. The feed is the expensive part of stock raising. Too many in one pen, or saving over indifferent layers, will cut down the profits more than anything else. If we expect to hatch the eggs then we should be just as particular about picking out the cockerels, for the cockerel or cock is "half the flock." Now, then, if the chicks are on the range and have attained a good growth, then by October 1 stimulating food should be given. Of course a box of sharp grit has been constantly accessible to the chicks. Meat, either cut green bone or cured ground meat and bone, such as is sold on the market for the purpose, must be added to the early morning feed, and this meat should be scalded and thereby partly cooked. The advantage thus gained is, we can give more of a variety than in any other way, and variety is essential. The variety suitable for poultry is composed of the following: Cut clover hay (any kind of clover) all vegetables—cut or cooked—including their green tops, wheat, oats, corn, buckwheat, barley, linseed meal and meat. Almost anything is suitable for poultry, providing it is sweet. Damaged or even partly damaged grain is very expensive in the end, for it will probably relieve you of the surplus stock by death. Feed good, sweet, wholesome food at all times. Now we should commence to feed pullets the same as we expect to during the following winter and spring, only do not feed so large a quantity while they are on the range and the picking is good; neither will we have to feed cut hay or green food. If the pullets are yarded then we will have to feed green food. The stock should be in medium flesh, but if too fat they will be very slow

about laying. We will illustrate: In the fall of 1894 we put up a pen of white Wyandotte pullets that had been running out around the feed room, and consequently they had received more food than they ought to have received. They were very fat. Alongside of this pen was another pen that had been taken from the field, and these were only in fair condition. The result was that this second pen commenced to lay some two months earlier than the first pen. In other words they commenced to lay about October 10, while the fat pen did not commence before December, age and development being about the same.

Housing.

Before we enlarge on the egg food we will say a few words on housing the pullets. These pullets have had unlimited range since they were hatched, for that is absolutely essential for their perfect development. Now, by October 1, as stated above, these should be fed for egg production, and as they near the laying period they should be put in winter quarters. There are several plans of housing. The

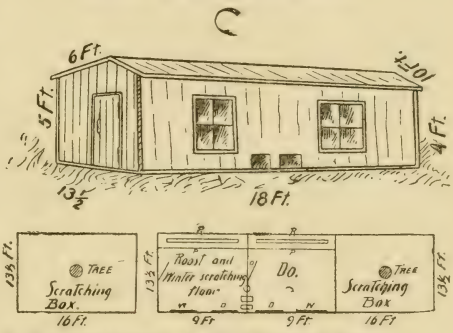


A Model Poultry House for Fifty Fowls—Colony Plan.

"colony plan" is the cheapest, but no roosters can be used unless the houses are far apart. It is best to put about one hundred hens or pullets to the acre, placing them in four houses of twenty-five hens each. No fences are required. Never place more than fifty in

one flock. Let small raisers or farmers keep but fifty fowls for layers, or if more are kept, then build more houses and place them as far apart as possible. Eggs will usually hatch better and stronger chicks will result if the fowls have free range and are properly kept, but we have had the best results, in egg yield, from yarded fowls. In yarding fowls two styles of buildings are used, viz., the long (continuous) house and individual houses. We prefer the individual or double houses, for they can be placed anywhere and the yards made to suit the lay of the land. For the double houses we would, and do, make them 13½x 18 feet, thus each flock has a pen 9x 13½ feet, and each yard should be about 35x85 feet. Place not more than fifteen hens and a cock in each, or thirty-two in the whole house. This is a good method, but we very much prefer the individual house with scratching shed. Build the house the same size as above, and make the roosting room 13½x7 feet, and the balance will form the open front scratching shed. If desired, the front can be closed in bad weather by having hinged doors. These doors can be simply a frame with muslin tacked on and same hinged at the top so as to be out of the way when opened. They should swing in and hook against the roof raf-

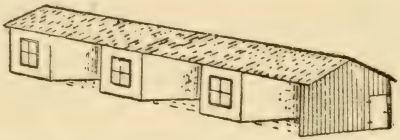
ONE OF OUR DOUBLE HOUSES.



R. R.—Roost poles. P. P.—Dropping board.
D. D. D. D.—Doors. W. W.—Windows.
C.—Water fountain. B.—Grit and charcoal boxes.

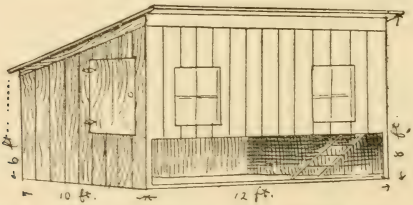
ters. The yard should be 70x85 feet, and twenty-five to thirty hens kept in each.

LONG HOUSE, OPEN-FRONT SCRATCHING SHED PLAN.



The above cut illustrates the much desired (in the long house) open-front scratching shed plan. A walk can extend along the back if desired. The open shed should be six feet wide and the roosting-room four feet wide for a flock of fifteen in each ten feet. The house should be ten feet deep without the walk or thirteen feet with the walk. Of course, the house can be made any length or depth desired. The front should be at least seven feet high, so that the sun can shine on the entire floor of the scratching shed. Curtains of muslin tacked on frames and hooked back during nice weather are a great convenience; also wire netting should be stretched across the front so the fowls can be kept in during bad weather.

ECONOMICAL POULTRY HOUSE.



POULTRY HOUSE WITH OPEN-FRONT SCRATCHING SHED UNDERNEATH.

This plan is cheaper than where the open scratching shed is built alongside. It is not so good but vastly better than none. Fifteen or twenty fowls can be housed comfortably, and the nests can be arranged underneath if convenient, and also a wire netting can be run across the opening if it is desirable to confine the fowls. The birds will soon learn to go up and down the stairs.

These houses are excellent to use in the colony plan. When the fowls have unlimited range, twenty to twenty-five fowls can be placed in each house of this size.

Before we speak of exercise, etc., we will go back to the feed for the pullets or hens if we keep any of the latter over. People often get terms mixed, and thus cause trouble. Chickens, pullets and cockerels are fowls that have not passed the one year mark; after one year of age they are hens or cocks. We will give the feed for yarded fowls, but if the fowls are not yet yarded, then the clover or green food can be left out. The first feed should be given at 6 o'clock, or as early as the fowls can see to eat it. A good many scald this mess, or mash, as it is called, and feed it warm, but this is not necessary. Mix it up the day before, if convenient. This mash should be composed as follows: Four quarts (solid measure) cut clover hay, or hay chaff; two quarts wheat bran, two quarts ground oats, one quart ground corn and one to one and one-half quarts ground dried meat (freshly cut green bone is better than anything else in this line, but it should be fed clear and at noon at the rate of one pound to fifteen hens). This amount will feed sixty-five or seventy-five fowls. The quantity to feed will have to be decided by each person, and give the amount that experience teaches. The size and activity

Feed.

is a factor; also whether the fowls are yarded or are running at liberty. For yarded fowls we usually give what they will eat up clean in, say, ten minutes. Twice a week substitute linseed or cottonseed meal for corn meal, and, in fact, vary the feed as much as possible, using boiled mashed potatoes or any kind of roots for the foundation feed two or three mornings in each week. We believe in a noon feed. Give a pint of small seed—wheat, buckwheat, sorghum seed or kaffir corn—in the litter of scratching shed to about sixteen hens. At night feed whole wheat, oats, buckwheat, barley or corn alternately. Throw this feed also among the litter. Feed it an hour before sundown so that the hens will have time to work it all out. Give this feed more liberally so the fowl will go to roost with a full crop and yet have none left over. By feeling of the crop, at night, we can tell whether we have fed enough or too much. We usually find that fifteen good handfulls of grain will be sufficient for fifteen fowls at night feed. The object should not be to fill up the crop in the morning and then keep it full, but to gradually fill it up. In this way the hen will scratch and exercise more. The kind or variety of the feed is very important, and yet not more so than the manner in which it is given. Always keep the hens busy, thereby insuring health and preventing feather pulling and egg eating. The floor of the house or shed is very important. It should be filled in each fall with six inches of dry, fine sand or dirt, and be covered with six or eight inches of straw, leaves, or any kind of litter so that the hens will have to work hard in order to dig out the grain. Green food of some kind should be provided twice a week, although the clover hay is in itself a green food. In starting the pullets

we add, to the soft mash, a little condition powder. We do not believe in stimulants to any great extent, but a little at the start will help to put the fowl in good condition, purify the blood, etc., thus gradually stimulating the egg producing parts or ovaries. Occasionally give a couple of feeds in which a little condition powder has been mixed all during the laying period. If we wish to hold any hens over the molt we can, as they reach this period, hasten it a little by feeding stimulants, such as linseed meal or cottonseed meal at the rate of one quart to seven quarts of mixed ground food, and we can also profitably use condition powders during this trying period.

It will not pay us to hold over the molt indifferent layers. In fact, if the production of eggs is the "all-important," then we should sell the old hens just before they molt or stop laying. If, however, we wish to hold any over, then we should pick out the best layers only for this purpose. Molting is the most trying period in the life of a fowl, and many die from the strain caused by the production of a new crop of feathers. As stated above, they should have special care. The molt proper lasts about one hundred days, but it can be shortened or lengthened according to the food and care. If lice are found on the body sprinkle with insect powder. The lice not only sap the vitality, but often injure the young feathers, which is a consideration if the bird is a show specimen. Do not feed much corn during this period, for it is lacking in nitrogen and mineral matter. If the birds are yarded, see that they have a good supply of green food. Use the condition powder during the entire period. Green cut bone should be given in place of the linseed or cottonseed meal three days during a week; also, add tincture

of iron in the drinking water twice a week. Hens that molt late in the fall will not lay during the fore part of the winter, so it is advisable to sell these late molters unless they are valuable breeders. Pullets do not molt, except occasional feathers, the first fall, unless they have been hatched before March. We would not advise holding over hens that show no sign of molting before November 1. Late molters require careful housing on cold or damp days.

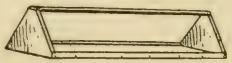
The Ration.

Let us give a few tables for feeding for eggs. We will base our calculations on sixty fowls. The amount may prove too little or too much, according to the size and activity of the birds. We are presuming that the fowls are yarded, and that they are in four flocks, although this last does not affect the feeding. We will give four tables, and they should be given on alternate mornings:

No. 1.—Shorts or middlings	5	quarts.
Ground oats	2	"
Corn meal	2	"
Prepared meat	1	"
No. 2.—Shorts	4	"
Ground oats	2	"
Corn meal	2	"
Ground buckwheat	1	"
Prepared meat	1	"
No. 3.—Boiled vegetables	4	"
Shorts	2	"
Ground oats	2	"
Linseed meal	1	"
Prepared meat	1	"
No. 4.—Cut clover hay	5	"
Ground oats	2	"
Ground buckwheat	1	"
Shorts	1	"
Prepared meat	1	"

Give No. 4 three mornings in the week, No. 3 two, and Nos. 2 and 1 one morning each. As we stated be-

fore, thoroughly scald this mixture (after having first mixed the ingredients while dry) and use only enough water to moisten it. Let it stand tightly covered for one hour after mixing, so as to cook it. Feed it either warm or cold, and be sure that it is not too soft or sloppy. It should be just wet enough to be crumbling when fed. This should be fed in a trough. Have this trough long enough so that all the fowls can get to it at once and not crowd. A good one is made as follows: For fifteen fowls take a piece of board eight inches wide by five feet long. Nail an upright piece to each end, as shown in cut. Nail a lath on either side of bottom and let it project up three-fourths of an inch, so as to keep the food from falling off. The cross-bar on top should be two or two and a half inches wide. This is the handiest trough we know of. It can be easily moved around, and after feeding, can be hung up out of the way. It does not need any cleats on the bottom to keep it out of the litter, for it is only in use a few minutes each day, and it is wide enough so that if set level it will not be readily knocked over. Fresh water should be given twice a day, and in such a manner so that the fowls can not readily soil it. We use gallon paint cans. One can answer for two flocks (in our double houses). It is set in the partition fence, half projecting on each side, and high enough from the ground so that very little, if any, litter can be scratched in it. The platform that the can rests on is about a foot up from the floor, and this projects out in each pen far enough for the fowls to stand on while drinking. About fifteen minutes after feeding the morning mash, start around to water, at the same time hanging up the feed troughs, and if any food is left, carefully gather it



up, and if it will keep sweet, save it for next morning. The proper way to do is to feed only what they will eat up clean in say ten minutes or less. After watering, the droppings should be removed; at the same time look for signs of lice, and if any are found, give the things a painting with kerosene. At noon or before, say 11 o'clock, give about six good handfuls of small grain in the litter, taking time to kick it well under. At night, an hour before sundown, give a good handful of grain, as given above, for each fowl.

Our object, of course, is eggs, not fat fowls. We should aim to keep our birds in fair condition; avoid the two extremes—too poor and over-fat. Do not mix up all kinds or conditions of hens; keep each variety separate. Old hens take on fat more readily than pullets, and therefore should be kept separate. Feed enough, but let there be plenty of bulk. Concentrated food is too rich for laying hens. Never place Leghorns and Brahmas in the same pen. Whether thorough-breds or common fowls are used, the rule should be the same, *i. e.*, place fowls of the same weight and build in their respective pens, and if only one variety is raised, then each fall save over only the hens that come nearest to the ideal. With some people the custom prevails to sell all the largest birds because they bring more on the market. This is very doubtful economy. The early, quick-maturing pullets are the ones to save for breeders, for like surely begets like. If the runts and inferior or late hatched birds are retained for breeders, then it will only be a question of a year or two when the poultry yard will cease to pay expenses. The pullets will not lay, nor the chicks thrive. The best is none too good. When the fowls are running at liberty, then the summer food

Some Remarks.

should be partly withheld. Give a light breakfast of the mash, as given above, and rely almost wholly on wheat for the night feed, giving only what the hens seem to eat with a relish.

During cold weather give as large a variety as possible, and if very cold, feed whole or cracked corn at night. Give warm water, if weather is cold, twice a day. Do not let the fowls out in the yards if very cold or stormy, but keep them busy indoors scratching in the litter. Remember that warmth and exercise is, if anything, more essential for the production of winter eggs than the quality of the food. Try to preserve an even temperature day and night. On mild days open the door and windows, for it must be remembered that the fowl will have to sleep in the same clothes it works in, and if we keep them too close during the day, then they will feel the cold of night more and colds will follow. Eggs are composed largely of nitrogenous elements, and the variety given above is largely-nitrogenous. Carbonaceous foods produce flesh and heat, and while a certain proportion is necessary to sustain the fowl, yet too much is a great hindrance to egg production. Corn is largely carbonaceous and should be fed with care. It is far safer to feed wheat the year round than it is corn, it being a more complete food. The smaller and more active varieties can carry a corn ration better than the large and less active ones, and in feeding we will have to decide many things for ourselves. The size of the fowl and whether yarded or not are factors of importance. Fowls running at large can stand more corn than those yarded, because more exercise is taken and they can gather a large variety for themselves and thus balance the ration. For experiment, we have kept yarded fowls for a year, winter and summer, with-

out a particle of corn, and had them to give us an excellent egg yield, even in the coldest weather. While a small proportion of corn is beneficial, yet it can not be too strongly condemned as a summer feed for yarded fowls. With yarded fowls the watchword should be: Plenty of sun during cold weather and plenty of shade for warm weather.

THE EGGS.

While a proper food for egg production will bring the eggs, yet with yarded fowls it is not so easy to get eggs with nice yellow yolks. These pale yellow yolks do not denote weakness or staleness, but a lack of coloring matter in the food. Lack of green food and coloring matter affects the egg the same as lack of grass affects the color of butter. True it is that yellow corn will give us the desired color, but if we feed it largely to yarded fowls, then we will not get the eggs. Cotton-seed meal gives us a good yellow yolk, but that is also fattening, and should be fed with care. The only thing to do is to feed plenty of green food and a little yellow corn and cotton-seed meal if we must have yellow-yolked eggs. The customer will seldom find fault on this account, providing he is sure the eggs are strictly fresh, but if he does then try to remedy the defect.

It is stated that a good hen will produce five or six times her weight of eggs in a year. The average weight of an egg is two ounces, and about 12 per cent. of it is shell.

Under chemical analysis we find these elements:

	White.	*Yolk.*
Water	85.4	50.6
Nitrogenous substances	12.9	16.1
Fat	.3	31.4
Other non-nitrogenous matter	.8	.5
Ash	.6	1.4
	100.	100.

The yolk contains less water than the white, and nearly all of the fat and the larger proportion of ash (mineral matter). The ash, which consists of potash, soda, etc., is best seen in the following table:

	White.	*Yolk.*
Potash	31.4	9.3
Soda	31.6	5.9
Lime	2.8	13.0
Magnesia	2.8	2.1
Oxide of iron	.6	1.7
Phosphoric acid	4.4	65.5
Sulphuric acid	2.1	.....
Silicia	1.1	.9
Chlorine	28.8	1.6

The white is therefore rich in alkalies, potash and soda, a part of the latter being present as common salt. The yoke is extremely rich in phosphoric acid and carries a large amount of lime—in fact it is the part that contributes largely to the formation of bone.

Chemists have figured out the amount of fertility taken away from the soil in different crops. Thus, 1,000 pounds, or 666 dozen of hen's eggs, shells included, contain about the following quantities:

	Pounds.
Nitrogen	20.
Potash	1.75
Lime	60.82
Phosphoric acid	4.22

Now we see that 8,000 eggs, worth at least $160, takes only about $3.56 worth of fertility from the farm. Let us contrast this with other crops sold off the farm, $160 worth of each:

Eggs	$3 56
Wheat	42 28
Milk	14 08
Cheese	11 04
Live Cattle	18 88
Timothy Hay	95 84

If we sell $160 worth of wheat, $42.28 worth of fertility goes off the farm. If we feed this to the hens and sell the same amount of eggs, only $3.56 worth of fertility goes. When we sell eggs, we sell largely water, which is given in the first table.

It is also stated that a good cow may produce in a year six times her weight in milk, with a calf in addition. If we take the cow as weighing 1,000 pounds, we have in the salable product about 800 pounds of dry matter, containing 36.8 pounds of nitrogen. Hens of good laying breeds weighing 1,000 pounds will yield in the same time 6,000 pounds of eggs, the contents of which will include 1,404 pounds of dry matter, containing 120 pounds of nitrogen. It has often been pointed out that since cows' milk is much richer in nitrogen than the carcass of an animal, so the food supplied to cows in full milk should be of a specially nitrogenous character. The argument has still greater weight in the case of the hen, as we have just seen that her produce, in the same time, from the same body weight, contains three and one-quarter times as much nitrogen as that of the cow. The albuminoid ratio of eggs is, indeed, as high as 1:1.82. Under natural conditions, a fowl's diet is in the summer time of a decided

nitrogenous character, the food consisting largely of (grass) insects, worms, etc. The advantage of giving hens a good "run" is well-known; this is partly due to the active exercise obtained, which is essential for the continuance of the egg-laying condition, but is also in part owing to the supply of insect food which the hens thus obtain.

It will be seen in the above that the old-fashioned way of feeding hens on grain alone must be discontinued, if we wish to make our poultry pay, and meat and bone must be supplied, especially in winter. Wheat and corn are too carbonaceous, and while a little is excellent, yet we will have to balance the ratio with more nitrogenous foods.

EFFECTS OF YARDING FOWLS.

The very nature of fowls and the fact that small flocks pay the best, makes it necessary for the poultryman who keeps a large number to yard them.

Yarded fowls, if properly handled, will lay more eggs during an entire year than those running at large. This is so because, in the former case, the poultryman can determine to a nicety just how much to feed and the variety to give. It is impossible to know how much a fowl will gather during the day when running at large, and therefore the poultryman is liable to either overfeed or underfeed.

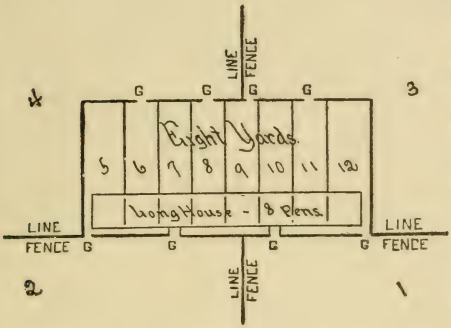
Most people who are not expert in feeding yarded fowls, overfeed and provide too little exercise.

While yarded fowls will give the best result in egg yield, they will also give the poorest result when the eggs are used for hatching.

Few people realize the importance of thoroughly healthy, vigorous stock when used as breeders. The eggs are usually blamed, or the hen did not set good, when the root of the matter could be traced to the breeders. Fowls are under a constant strain while laying, and in order to retain perfect vitality they must roam the fields, gathering here and there a mite of nature's food and gaining needed exercise and fresh air. True, if they are overfed they will not take proper exercise, and the result is a lot of lazy fowls who hang around fence corners and whose eggs will give poor results when used for hatching purposes.

Where more than one breed is kept on a place (the majority of fanciers keep several breeds), it becomes necessary to yard them. From ten to twenty fowls are kept in each yard. Very often these yards are small and bare, thus making fertile, strong-germed eggs almost impossible; neither is the condition improved to any great extent when the yards are of a fair size and have grass or other green stuff growing in them. True, this last is better than the former, but it is not unlimited range. The colony plan can not be followed in these cases. The only plan that will work fairly satisfactorily is to give partial free range by letting one pen run out in, say, the forenoon and another pen in the afternoon. The next day keep these pens up while two other pens have an outing. If more than four pens are kept, then the houses should be built far apart, in blocks of four, or if the land is so divided that two pens can be let out in different parts at one time, so much the better. To better illustrate the subject we will give a plan that, with a few modifications, can be put to practical use on many farms. Here we have the long house containing eight pens and eight yards.

The four line fences can run straight out from the house east, west, north and south, and by making them some two hundred yards long the fowls will seldom, if ever, go round them and thus get mixed. These line fences can have convenient gates, so that they will cause very little inconvenience, and the ground can be tilled right up to the small yards. If they are in grass the fowls will do it no harm and much good. If corn is to be planted, then the fowls can be kept out after the ground has been plowed until the corn gets knee high, when they can be turned in again to advantage to the corn crop.



Pens Nos. 5, 7, 10, 12 can run alternately in fields Nos. 1 and 2, while pens Nos. 6, 8, 9, 11 can run out in fields Nos. 3 and 4. Thus the entire eight pens can have unlimited range a part of each day. We have tried this plan and it works very nicely. It is surprising how closely a flock, say fifteen birds, will stay to their house, and the only way to keep them out of their small yards and houses is to feed very little for their morning feed, thus forcing them to seek their food in the fields. Remember, it is the active bird that lays the strong-germed eggs, and activity is fostered by a craving for food when it can not be found in a feed box. The natural division of many farms, on account of buildings, yard fences, etc., makes it easy to give an outing to this or that flock if we are wise enough to

place our roosts in such positions as to take advantage of them.

A great many object to devoting large space for poultry runs or yards, but the progressive poultryman will grow fruit above and fowls below. An apple orchard, especially an old one, is an excellent place for poultry. Build the yard so as to give one or two large trees to each yard. The trees will do far better under this treatment than any other, but when the apples commence to fall they should be gathered up, for too many apples will decrease the number of eggs. Fruit trees of all kinds do well in the poultry yard, and beside being useful for shade, will return a good profit from their fruit. In fact, fruit farming and poultry travel hand in hand, and will greatly add to the yearly income. There is nothing that will do better in the poultry yard than small fruit, such as blackberries and raspberries. The young plants will require a little protection until they get a good start, but after that they require no care, for the hen supplies the fertilizer and does all the tending. As the berries enlarge they should be protected with wire netting, or the fowls can be turned out until the crop is gathered. Those who have tried this method report that the fruit is abundant, large and fine flavored. Grapevines should be trained along the fences, projecting a part of the way in and over the yard, thus not only giving a fine crop up out of the way of the fowls, but providing excellent shade as well. If natural shade is wanting, than erect a trellis. Drive two rows of posts in the ground, running them east and west; along the top of each row run a board and throw on cross pieces. Cover with straw, cornstalks or anything that will cast a shadow. Strong muslin or sail

Fruit and Poultry.

cloth is also good. In short, provide shade or sell the fowls. An out-door scratching place can be erected under this shade. Have the sides about eighteen inches or two feet high, and throw therein any kind of litter to the depth of eight inches. A box 14x18 feet is about right for fifteen to twenty fowls.

It will be noticed that certain breeds lay larger eggs than others, and different members of the same family lay different sized eggs. The color also varies. The smaller, or Mediterranean class, laying a white-shelled egg, while the medium and heavier varieties lay a dark-shelled egg. Some markets—Boston, for instance—pay a better price for dark colored eggs, while others, like New York, prefer a white egg. The brown-egg varieties lay eggs of various colored brown; some will be very dark, while others will be nearly white. This can be partly overcome by setting eggs that are a uniform brown color. Produce just what your market will pay the most for.

Size and Color of Eggs.

The Minorcas and Black Spanish, among the white-egg breeds, lay the largest eggs, while the Brahmas head the list among the dark-colored-egg breeds.

It is possible to build up a large-egg strain, but it will require some years to do it. Set only large, well-shaped eggs of the desired color, repeating each year thereafter.

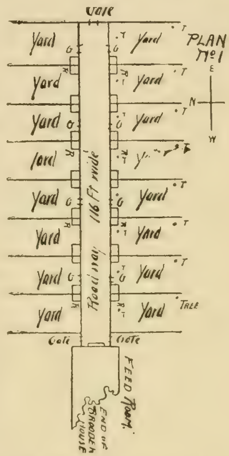
The cock is half the flock, and he should be of the same strain as the hens, or else your work will be to no purpose. In order not to in-breed too closely, have two pens and keep the chickens separate by marking those from each yard when hatched by punching a hole in the web between the toes with the little punch that is made for this purpose. One year use the pullets from one pen and mate them to the cockerels from

the other pen and *vice versa*. A strain of excellent layers can also be improved by selecting the eggs for setting from hens that are known to be prolific layers. This last will require somewhat of personal watchfulness, of course. If we do not wish to bother with two families of the same breed, then we can get a neighbor to go in with us. Start with birds not related, and then after a year or two interchange males, thus keeping up the vigor of the strain. Of course only the very choicest males will be used as breeders, paying particular attention to health and strong development. A strain may mean much or nothing. The term strain, as used by poultrymen, means keeping in line; breeding together fowls from, originally, the same parents, not necessarily brothers and sisters, but family ties must be preserved, and the more remote the connection the better for the future health of the offspring. The novice should not enter on this line, but introduce new and distinct blood every year or every second year at least. In-breeding does not tend to strong development. It merely fixes desirable points. "Like begets like."

A STUDY ON ARRANGEMENT.

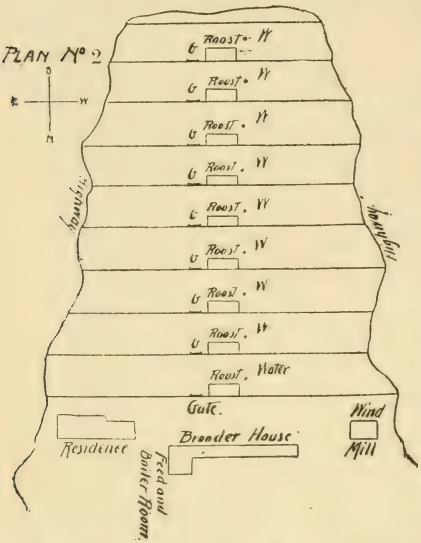
In planning a poultry plant, great care should be exercised as to arrangement of the buildings and house, or it will soon be seen that a great mistake has been made, and extra work and expense will have to be incurred in order to remedy the defects. Not only is it necessary to arrange things conveniently on a large farm, but it is just as cheap and almost as important to have things arranged "handy to the house" on a small farm, or where only one or two hen roosts are used.

We have prepared two plans that may prove of service to some of our readers. Plan No. 1 shows how we arrange our houses and runs. Our brooder-house is 117 feet long, with the feed and boiler-room on the east end. The roadway, running out east from the feed-room, has a fence along its south side with the double houses (see cut of same elsewhere) as shown, but the north fence and row of houses are not yet up, but that is how we intend to arrange them sometime. Thus we have roadway and gates so we can drive a team through and thus cart litter, sand, or remove droppings and dirt. We have a number of houses scattered around in inconvenient places, which were built before we had an idea of entering largely in the poultry business. We now see what costly mistakes were made. We expect to run water through these yards, as shown in Plan No. 2. The plan explains itself. The attendant can load his feed and water in a cart, go down one side and back on the other; thus he will not have to take a single unnecessary step.



Plan No. 2 is taken from a plant situated near Englishtown, N. J., which we had the pleasure of visiting several years ago. The yards occupied a rough, triangular piece of ground, as shown. The highway came down to the end of the field and then branched off on either side. The party only owned the land between the roads, therefore his arrangement was wisely made. The wind-mill raised the water up in a large tank, whence it was conducted in pipes (underground)

down the line, each house having a small tank sunk a little in the ground and pure, running water therein at all times. It is a great saving in labor, and cool water can be had by the fowls at all times. There are more houses than those shown in the plan. The houses are of the open-front, scratching shed plan, and accommodate from fifteen to twenty-five fowls each. We would judge the yards to be about twenty or twenty-five feet wide, and varying from twenty to forty yards in length. There are also other buildings not shown in the plan.



It is no more expense to arrange things conveniently than otherwise, and yet it costs less, in time, to care for our fowls properly when we have things as they should be. Of course, these plans would not be suitable for every one. The lay of the land and distance from the residence will have to be considered. Then, again, if the colony plan is followed and no fences are used the houses will have to be situated far apart. In this plan only place 100 hens on an acre of land, using four houses. Of course, no cocks should be used if fights are to be avoided, and hens are expected to "go home to roost."

CHAPTER IV.

ARTIFICIAL INCUBATION—THE INCUBATOR—TESTING THE EGG—THE THERMOMETER—TURNING EGGS—MOISTURE.

After we have been successful in raising chickens in the natural way, and can keep our hens in a healthy condition, and laying during the winter season, then we may look into the artificial method a little, for this is the only practical method if we enter the poultry business on a large scale, and expect to devote all our time to it.

Artificial incubation was practiced by the ancient Egyptians, and is so conducted, not only in Egypt, but in China, at the present day. There the climate, or temperature, is very even and near the degree required to hatch the egg. Therefore, large rooms are devoted to the hatching process, very little artificial heat being required. Incubators have been in use in England, France and Germany for nearly a century, but in this country we have only had them about thirty-five years. These early machines did not prove successful. The first really successful machines were built between 1870 and 1880. In fact, Mr. James Rankins, the great duck raiser, built the first successful machine as late as 1880, but incubators did not come in general use in this country until about 1885 to 1890. Without a doubt there have been more machines built and sold since 1890 than during all the years previous to that date. While artificial incubation is a comparative success to-day, yet we believe new and improved methods are to fol-

low, and especially is this so along the line of brooding after the hatching period is safely passed. It would be strange, indeed, if among all the various inventions that are to follow, artificial incubation and rearing were to be allowed to stand still. Certainly there is a chance for improvement.

The first thing to consider is the incubator. There are many good machines on the market. If we have no knowledge in this direction we should send for the catalogues of several leading makes of machines, and then make our selection. Do not consider the price, but try to get the best according to the light we have. They all are regulated fairly well, but some do not supply air enough during the latter part of the hatch, therefore select one with large ventilators. Small ventilating pipes are apt to get clogged with spider webs, and it is next to impossible to clean them out without ripping the machine open.

The Incubator.

A dry, well ventilated cellar is an excellent place to set up a machine. Large operators build a room which is half under and half out of the ground, and the inner walls are plastered. The object is to get as even a temperature as possible, for any sudden change from warm to cold or cold to warm will affect the machine, no matter what the manufacturer may say to the contrary. Sixty degrees is a good temperature, but the main point is evenness. Have the room well ventilated, but be sure there are no draughts directly on the machine, neither should the sun's rays be allowed to strike it. Keep the room sweet-smelling and the air pure. Set the machine perfectly level and solid, so that there will not be any jar, although we have had machines to hatch well when set on a floor where there

was much walking and some pounding, with a varied temperature, but the best plan is to avoid all this as much as possible. Other things being equal, the eggs are the direct cause of good or poor hatches, and the hens that lay the eggs are at the root of the whole matter, while the owner of the hens has it within himself to cause success or failure. We have already told how to care for the hens. It is important for the operator to raise his own eggs. It is far cheaper, and then he has the power to raise eggs from any variety or grade he chooses, and to have fertile eggs that will hatch if he has done his part faithfully.

Let us go briefly over this ground again. The first thing to consider is the variety. Wyandottes, Plymouth Rocks and Brahmas are the varieties most used for broilers or roasters. These are all yellow-skinned fowls, and that is what the American people want. True, the New York market—the best trade—is demanding white skin, but that is largely owing to the high-toned hotels and restaurants, where French cooks are employed. White-skinned fowls being most desired in France and England. If we prefer grades then we can recommend a cross of Indian Game cock on White Wyandotte or Brahma hens, or White or Buff Leghorn male on Plymouth Rock or Brahma females. The pure Indian Game is an ideal table fowl, but the pullets grow much slower than the cockerels. In general take a male from any of these varieties, Indian Game, Dorking, Leghorn or Houdan, and cross them on Wyandotte, Plymouth Rock, Cochin or Brahma females and we will get a good growing chick. Get a perfectly developed frame, keep in perfect health (not too fat or too poor), and have bright active cocks, and the egg will be sure to produce healthy, quick-

growing chickens. Never let eggs get chilled, and do not keep them over three weeks before setting. The fresher they are the better. If kept over one week be sure to turn them half over three or four times a week. Fill up the machine, but do not over-crowd it. Run the machine according to the printed directions. Incubator catalogues give very full details as to the operation of the machine and many other points, therefore we will run over this part very briefly. One hundred and three degrees is the proper temperature to maintain, but we prefer to keep it at 102° the first week, and then the balance of the time at 103°. After the chicks commence to pip the shell run the heat down to 102°, and after all are out run it down to 100° and keep it there about twelve hours before removing the chicks.

Testing the Eggs.

We prefer to test the eggs on the seventh and fourteenth days. By the seventh day we can not only remove the infertile eggs, but also the weak germs—those eggs that had vitality enough to start, but not enough to carry them through. These last can easily be picked out after a little practice by comparing them with the fertile ones. The novice should mark all doubtful eggs, and after the hatch these should be opened and notes taken. Infertile eggs are of course perfectly clear. By the seventh day a live egg will show a small black spot with red veins running out therefrom in all directions and partly filling the egg. The dead germ will show probably the same, only the development will not be so complete, according to the date of the germ's death. Again, the egg may have a dark or addled appearance, and the contents mass at the top as the egg is slowly turned, or a few red veins may be seen to adhere to the inside of the shell, while the balance of the egg will

appear clear. Remove all such, for it is very important to have the thermometer rest on a live egg. At the last testing take out all the eggs that are not properly developed. At this stage the egg ought to be nearly opaque. True, the dead germ will look similar to the live one, but the contents will turn as the egg is turned, and a little experience will teach us what eggs to remove with tolerable certainty.

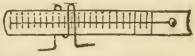
A good, inexpensive egg tester is necessary, whether we set eggs in incubators or under hens. If three or more hens are set at one time, by using the tester we can give all the good eggs to two or more hens and then re-set those that have no eggs. It is a great saving of time and hens. There is no use in letting a hen set three weeks on a lot of infertile eggs.

A Handy Egg Tester.

This tester is made out of an old stiff pasteboard box. Take the bottom of the box and bend it round and tack or sew the ends together. Make it large enough around so you can slip it down over a common lamp chimney. Cut a hole in the pasteboard, opposite the lamp flame, about the size of an egg. Cut notches in the bottom so as to give the lamp plenty of air. Light the lamp, slip over the tester, and by holding the egg up to the hole sidewise you can see through it without trouble. Eggs can be tested the fifth day, but beginners ought to test on the seventh day.

The thermometer is a very important factor in operating an incubator. If it is not correct then we can not expect success. Always buy thermometers of an incubator manufacturer, and one that is *guaranteed* correct. Cheap thermometers are a delusion. Have nothing to do with them. If

The Thermometer.

possible, test your thermometer even when guaranteed correct, and each year have them tested, for possibly they may be incorrect. Not only should we know that the thermometer is correct, but also whether the heat is uniform in all parts of the egg trays of the machine. In order to test this we should have three or four thermometers that register alike, and place these in all parts of the egg tray, changing them frequently so that all parts will be tested. If there is over one degree difference or variation the machine should be rejected. If correct, or a variation of one degree is noticed, then by reversing the trays and changing the position of the eggs at each turning we can equalize the temperature and all will be well. It is well to do this anyway. The proper place for the thermometer is near the center of the machine, and placed so that the bulb will rest upon and between two  *fertile* eggs. Push the bulb down until the top comes on a level with the top of the eggs. Keep the face turned towards the front of the machine and raise the top of scale up so that the degree of heat can be seen without opening the glass doors of the egg chamber. In order to keep the thermometer in the proper position we make a little stand of wire, as shown in cut. The wire is bent in the form of a letter M, the bottom of feet extending out and resting on the bottom of the egg tray. It is made high enough so as to just raise the thermometer scale above the eggs at about 100°. It is a very handy little affair; any one can make it in two minutes. The reason for placing the bulb of the thermometer between two fertile eggs is because the eggs, as they commence to develop, throw off heat of their own, and therefore at, say, the eighteenth day, the artificial heat in the machine will be very much lower than at the

commencement of the hatch, for each egg will be generating a small amount of heat, and if the lamp flame is not lowered then the egg chamber would get too hot. We recommend two eggs, for if only one is used to rest the thermometer bulb on it might die and thus lower the thermometer. Do not place the bulb on top of an egg, for, it being thus above the egg it would give a false temperature. As it is, in most machines there is a variation between the top and bottom of the eggs of one degree, and there should be. Be sure to use fertile, live germed eggs. In order to be sure, test several eggs every few days and mark them; thus we can know just what eggs to put our thermometer between.

To Turn the Eggs.

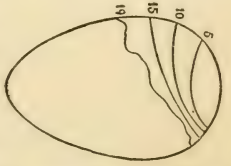
Remove the tray from the machine and place it on a stand, table or anything convenient. Take out a few eggs from one end of the tray, place them on top of the eggs at the center and gently roll the eggs to this end, when the eggs at the center will drop in place; repeat this operation at the opposite end of tray. Thus all the eggs will be turned half over, if carefully done, and the position of each egg will be changed, counteracting any possible variation of the heat of the egg chamber. If the room is cold, perform this operation as quickly as possible, but if warm, then more time can be taken, thus airing the eggs. No other airing is necessary, for this operation is performed twice a day—as near twelve hours apart as possible—and thus the eggs will get all the fresh air necessary.

The Moisture Question.

The moisture question has always caused more or less trouble, and will so continue for years to come, probably. Experience thus far has taught us to rely more on the ventilators than on the moisture pans.

The location of the machine and the outside temperature will have to be considered first. It is a well-known fact that the greater the difference between the inside and outside of the machine the more air will pass through. The air as it becomes hot inside the machine will naturally rise and expand and thus be forced out, while the cold air from outside will rush in, for nature can not allow a vacuum. When the outside temperature is high, thus nearer the temperature inside the machine, there will be less artificial heat, therefore less inside expansion, which very much lessens the rush of air through the ventilator; therefore we can give more ventilation during warm weather than during cold weather.

The egg itself should teach us how to ventilate for the drying down of the egg is the only guide to the moisture supply. This drying down process is really enlarging the air space. A freshly laid egg has little or no air space, but as the process of incubation progresses this air space gradually enlarges, as shown in the cut, until the nineteenth day when it should occupy nearly a quarter of the entire space. We usually commence by giving plenty of ventilation, and after the seventh day giving more or less—usually less—until the eighteenth day when the moisture pans are placed in the machine. The evaporation of the egg can be plainly seen with the aid of the egg tester. Every five days a few (say a dozen) eggs should be examined to see if the evaporation is proceeding, as shown in the cut. If too rapid then close the ventilators a little; if too slowly open them. Moisture is supplied just before the eggs pip so as to soften the inside skin



or lining of the egg and thus make it possible for the chick to get out. The reason for this drying down is to allow the chick room to expand and turn in, for just before he pips the shell he expands or suddenly grows and if too much moisture has been supplied he will grow too large before the nineteenth day and therefore when he comes to expand he will not have room enough left inside of his prison in which to turn, therefore, he can not crack the shell all around. Death follows. A healthy chick will turn clear over in the shell, cracking as he goes, and finally, with a vigorous kick, liberates himself and steps out into the world.

On the other hand, if too much ventilation has been given then the egg will dry down too much, thus dwarfing the chick and rendering the lining too tough for him to break through. There are many causes why chicks die in the shell, some of them are: Too much or too little moisture, irregularity of heat in the egg chamber, too high or too low temperature, stale eggs, eggs from sickly or inbred hens, eggs from over-fat hens, lack of vigor in cocks, lack of exercise with the hens, lack of uniformity in egg shell. In short the breeding stock is as important as the machine. Some eggs are porous at the large end and others have weak spots in the shell, thus evaporation is greater.

CHAPTER V.

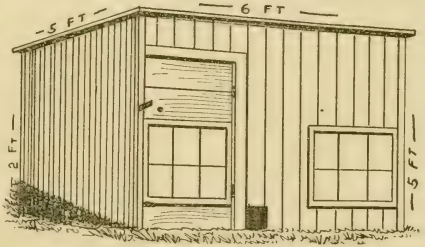
THE BROODER—BROODING HOUSES—FEEDING.

The method of brooding is of vast importance. It is often easier to hatch the chicks than it is to raise them. On large plants the brooding house is from 100 to 200 feet long by from 12 to 15 feet wide. At one end is the feed room, and this also contains the hot water heater that supplies heat to the brooders. Along the back or north side of this long building runs a walk or passage, usually three and one-half feet wide. Along the front side of this passageway run the brooders. This brooder is simply a long box two or three feet wide, and extending the length of the house. Along the top and just under the cover run the hot water pipes which supplies the desired degree of heat. Inside of the brooder the space is divided into five-foot lengths, and the space in front of them is divided by a fence to correspond to the brooder divisions, thus each space or pen inside of the house is 5 feet wide by 7 or 9 feet long. Outside of the house the yards are usually 5 feet wide by 16 feet long. The stove that supplies heat to the brooders burns coal. The whole outfit is supplied by incubator manufacturers.

Another method is to use individual brooders, heated by a lamp, in place of the coal stove and hot water pipes. This is better for a small house where only a few brooders are needed, but too expensive for a long building. Coal is cheaper than oil. Both of these

methods are good, and are used by those who go in for early winter broilers, but it is not the ideal method for raising stock birds. It is all right for cold weather, but as spring and warm weather approaches conditions change. Chicks will bear confinement during cold weather (it is the only way they can be successfully raised at such times), but with warm weather we must prepare for the changed conditions and give the chicks their freedom. For this reason we strongly advocate the individual house and brooder. Outdoor brooders are preferable, and for early spring the small house is an additional protection.

These houses can be made light and cheap, so that they can be moved from one place to another as desire or need presents. Build these houses about five by six feet on the ground, with the back about two feet and the front five feet high. After the chicks get old enough to do without the brooder it can be removed and roosting poles put in. These poles should be not less than four inches wide and twelve inches above the ground floor. Move the coop every other day to fresh ground. Each house will accommodate 100 chicks until they are three months old, when they should be divided into two flocks. If room is lacking these houses can be placed as close to each other as 50 feet, but give each flock all the room possible. Of course, these houses should be far enough removed from older fowls so that there will be no mixing. Brooder chicks have two decided advan-



tages over the natural method, viz.: Free from lice and gapes. We have never had a case of gapes among our brooder chicks, although other chicks with hens have had it when raised only a few yards away from the brooder chicks. The reason for this is that the brooder chicks are always fed on a clean board inside of the brooder house, and thus have failed to pick up the gape worms or their eggs. Gape worms breed only in moist earth and during warm weather. We have placed chicks in our long brooder house as late as May, and after they were two weeks old have taken away the fences and allowed them full liberty, and yet they failed to get the gapes while running on infected ground.

Some writers claim that brooder-raised chicks never attain the perfection of build and feather that natural raised chicks attain. This is doubtless so where the forcing method is practiced or where the chicks are raised during the winter or unnatural season. When, however, we use the individual house and brooder, and give the chicks free range in the fields (we refer to spring hatches) and feed for a natural rapid growth, then the brooder chicks will usually outstrip the natural raised ones and prove better specimens for either breeding or exhibition, providing intelligence has been used. Brooder-raised chicks can not surpass natural-raised ones when both are handled in the proper way, but far too often the hen is supposed to perform part of the owner's duties in connection with her own, and thus the chicks will suffer from this neglect more than the brooder chicks, for the latter will have to be looked after more closely. The work in caring for a given number of chicks (say 100) is far less under the artificial than under the natural method. About ten hens will be required to hover 100 chicks. Some hens are

cross and some careless. Ten coops will require cleaning, and a great many steps will have to be taken to properly attend to their wants, and during storms the work is much greater. One hundred chicks in one brooder and one house can all be taken care of in a very short time, and the saving of feed necessary for the ten hens will more than pay for the oil used to heat the one brooder. We believe that every farmer should own at least one 300-egg size incubator and two to five little houses and individual out-door brooders. It costs something to start, but these hings will last for years, and double the number of chicks could be raised each year with less work and worry on the part of the good wife. If "mother" desires it, fit her up, for she can manage such things far better than the average "good man." We do not advocate women going into the poultry business exclusively on a large scale. The work is too hard for her strength, but if she has the talent and money to hire a "handy man" to do the rough work, then we see no objection. We do not like to think of "mother" doing such work, but it is necessary for a great many women to make their own unaided living and to such we would far rather see them the proud owners of a poultry plant than working in some one's kitchen or sitting all day in a close office using a typewriter.

The proper degree of heat to allow in the brooder is a disputed question. Let us start from the incubator. The chicks are now about all out of the shell, and the heat has run down to 100°, and they should be allowed to remain in this temperature about twenty-four hours, or until all are hatched and have had a chance to dry off and expand their legs and lungs. The brooders should be started up several days before the chicks

are hatched, so as to have the heat under perfect control, and the proper degree, which is 98°. The room or nursery should receive proper attention. Nearly all large plants have a room set apart for this purpose, and the chicks are kept in here for the first ten days before they are put in the regular brooding pens. This room can be fitted up with individual brooders, and the run can be the length of the brooder and three feet deep. It is necessary to keep this room at 70°, even if a stove has to be placed therein for this purpose. Plenty of sunshine and good ventilation are necessary, but no draught should be allowed to strike the chicks. Run the brooder at 98° for the first two days, and then lower it to 95°.

We now have reference to winter-hatched chicks, where the business is carried on a large scale. When we say to have the brooder at 98°, we mean when the chicks are all in it. If the brooder is large the chicks will not raise the heat any, but if it is small and tight the chicks may raise the heat from two to five degrees, so it will only be necessary to have the brooder at from 90° to 93°, according to size and tightness. Make it a point to know all about your brooder and the heat, for chicks can not be successfully raised in a varied temperature. Some writers say that there is no place for a thermometer in a brooder, yet we always use one or more.

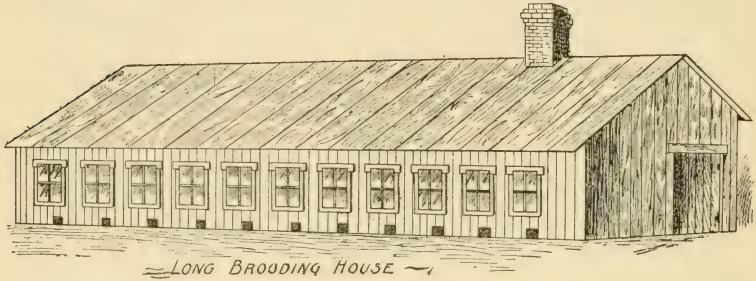
True, the experienced operator can tell how the heat is by the action of the chicks. If they sit around comfortably all is well, but if they huddle together then it is too cold. If they try to get away from the heat by sticking their heads out of the brooder, etc., then it is too hot. Sometimes little chicks will crowd, even if all is right, and the operator should separate them be-

fore going to bed. The proper way is to test the brooder in all parts (two inches up from the floor) with several true thermometers, and then place—fasten—a thermometer in such a position so it will give about the true heat in all parts. A degree's variation will do little or no harm.

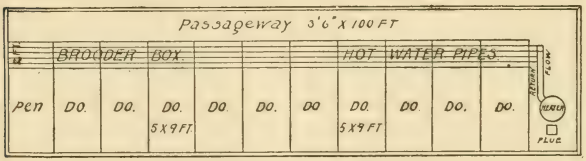
The second week it should be lowered to 90°, and this heat maintained for four weeks, when it can be lowered to 85° and then 80°. *It is just as important to maintain the proper degree of heat day and night in the brooder as it is in the incubator.* This is a comparatively easy thing to do during even weather, but not so easy during changeable weather or during day and night. Do not roast the chicks during the day, but give less heat if necessary. Some brooders are provided with a regulator, and it is a convenience, but do not rely too much thereon, for we have yet to see a regulator that does not require *regulating*. Before we speak of the feed, let us once more study the different plans of brooding houses. The one in most favor for large plants is the long house. One hundred feet to 200 feet seems to be the length most desired, and if this does not provide space enough then another one is added. These houses are usually 14 feet wide. A room is left at one end, say 14x12, or longer, as feed and cook room. The brooder heater is also situated here. For mixing and cooking the food we use a Mott Patent Portable Caldron (thirty gallon capacity). We could not get along without it. It is very convenient and requires very little wood to run it, for it only requires a fire from one to three hours a day. This room enters by a door, the walk or passage-way which runs the whole length of the brooder house and along the back, or north side of the house.

Brooding Houses.

This walk is most convenient if 3½ to 4 feet wide. The brooder-box runs along the front side of the walk, and we prefer them two feet wide. The top should be made in five-foot lengths, so as to be readily removed should anything require it. The back of brooder should be a door (five feet long each) which when lifted makes it convenient to remove the droppings with a



LONG BROODING HOUSE



GROUND PLAN.

T scraper, letting them fall in the walk, where they are easily swept up and removed. The front of brooders should have a three-inch opening, hung with fringe. The chicks soon learn to push this aside when entering and it helps to keep in the heat. As the chicks grow they are moved along away from the stove or warm end of the house, and the opening can be deeper, of from four to five inches. Along the top of this brooder and directly under the cover, run the hot-water pipes. We prefer a system using four pipes, three inside the

brooders and the fourth, or return pipe, running outside the brooder box. The little inside pens in front of the brooders are five feet wide and as long as the width of the house will allow; of course, the brooders are divided into five-foot spaces to correspond with the width of the pens. We also prefer three tight board partitions, with doors in the passage-way, in a house 150 feet long. Thus the smaller chicks get more warmth from the stove, and these partitions check all drafts and make the house warmer. This plan is certainly the best and most convenient for winter use, but a failure for late hatching. It seems to draw the heat, and will get as hot as an oven in spite of everything. Then again, the chicks, as spring progresses, require more freedom and a grass run. Winter chicks seem to thrive and fatten in the long house, but will do neither in warm or hot weather. In fact, some raisers have discarded the long house altogether, relying solely on small detached houses fitted with outdoor brooders.

One brooder large enough to hold 100 chicks is used for every house. These brooders are heated with an oil stove or lamp. We do not like them for winter use as it requires too much time to feed and care for so many, and too much exposure on the part of the attendant during stormy weather. For spring use they are excellent, and especially should they be used by those who only raise a few hundred chicks. These houses should be about 6x8 feet, 3 feet high at rear and 5 or 6 feet high in front, or any convenient size. Cover roof and sides with roofing paper. The window should be about 3x4 feet and up only four inches from the sill. Put the window in lengthwise, so as to get all the sunlight possible on the floor. Hang it so it can be readily opened

during warm days. The door can also be in the front, and a little slide arranged in the bottom of same to allow the chicks liberty during warm, clear days. Place in the brooder, and, if large enough, place in 100 chicks. Another advantage this house has is that as the chicks grow the brooder can be removed and the house used as a roosting place. These houses should be placed out in the field away from old stock, and can be moved at the will of the operator—twenty-five yards apart will do for small chicks. No fences are used, so the chicks will have perfect freedom. Still another method is used for April, May and June months. This is simply to use the outdoor brooders without houses.

We prefer the small house, especially if the weather proves damp and chilly, but good success has followed their use, and persons with little capital can safely use the outdoor brooders for ordinary spring weather.

All incubator manufacturers make outdoor and indoor lamp brooders.

Now since we have considered the brooder houses or methods of housing we can turn our attention to feeding.

Feeding. Nature has provided the chick with food for the first thirty-six hours, as the chick absorbs the yolk of the egg just before it breaks the shell thus gaining a supply of food as stated above.

After the chick is thirty-six hours old commence to feed by giving dry rolled oat meal (some prefer the hard or pin-head oat meal.) For newly hatched chicks we confine them to a board about twelve inches wide just in front of the brooder. A wire screen runs across the front of this board and thus the chicks can not wander away from the brooder and get chilled before old enough to know how to get back. Five days is long enough to confine them to this board. Cover

the board with coarse sand and sprinkle a little of the oat meal on this. Feed every three hours for the first two days and arrange it so that the chicks will clean all up at least in an hour before the next feed, thus they will not overeat and will also pick up some grit or sharp sand, which is very necessary. This board should be cleaned off every day and re-sanded, of course.

The third day commence to feed every two hours and let this food be baked the same as bread, or if a portable caldron is used then it can first be scalded and then baked or cooked until quite dry, stirring frequently to keep it from burning. (We find a long-handled lightweight spade the most convenient for stirring and mixing with when the caldron is used.)

This bread should be composed of the following: One quart each of ground corn, wheat middlings, bran and ground oats—the hulls being removed. If the oats are ground very fine all the heart can easily be sieved in the mash. Mix this well while dry and add enough milk or water to moisten it; also, add a little salt. If it is to be baked use sour milk and salaratus. Feed this dry and only what the chicks will eat up in, say, fifteen minutes. Keep pure clean water by the chicks at all times. A flower-pot and a saucer makes a good convenient drinking vessel. The hole should be stopped up with a cork and a slit about half an inch made in the lower edge of the pot with an old saw. Fill the pot, place in the saucer and invert quickly, thus about half an inch of water will always be around the edge of the saucer and the chicks can not wet themselves while drinking. It is easily cleaned, which should frequently be done. If milk is at hand boil it and use it with an equal quantity of water, or half milk and half wa-

ter. The vessel will require a washing every day though, and a frequent scalding out in order to keep it sweet.

It is best not to give meat or green food for the first week. At the beginning of the second week commence to feed a very little chopped onion at noon. After the second week feed more liberally, or all they wish to eat for their mid-forenoon or noon feed. Give chopped onion, cabbage or any other green food you have, provided it is good. Chopped grass or cured clover hay is also excellent. The hay should be cut up very fine, one-eighth inch lengths. This should be slightly scalded with hot water and let stand tightly covered for an hour before feeding. A little bran or middlings can be mixed in to dry it up if desired. Never feed bran raw, as it is very hard to digest. Have little boxes at convenient places in the pens near the feeding board, and keep them full of small sharp grit, ground bone (coarse), and cracked charcoal. We often mix a little ground charcoal in the food, for it is an excellent blood purifier and corrector. After the first week it is best to mix a little ground bone (it must be sweet and good), in the soft mash or bread, and after the second week say a handful of prepared ground meat to a pailful of food should be added. The best thing is green bone and meat. This should be cut up fine and let it take the place of one meal (all they will eat up clean quickly and with a relish) every other day, or three times a week. Stale baker's bread makes a good change also. Feed the baked food until the fourth week, when the food can be scalded instead of baked. Be careful to use only enough hot water or milk to thoroughly wet the mess, and let it stand tightly covered for an hour before feed-

ing. Always feed dry food, or as near dry as possible. Overfeeding is a serious mistake, for it will soon derange the digestive organs and cause death. It is better to underfeed than overfeed.

Exercise is another important feature with brooder chicks. Have the little pens in front of the brooder well littered with finely-cut straw, or better, clover hay. Into this scatter pin-head oatmeal or cracked wheat, and you will be surprised how early in life the chicks will learn to scratch for it. They should be set to work the second week, if possible. After the second week they should be allowed to run out in the outside pen or yard on all nice days unless very cold. After they are six weeks old they should be allowed to run out every day unless it is actually stormy. Plenty of outdoor exercise and fresh air should be the rule at the above age. It is a mistake to keep them too warm or housed up. The brooder should be not lower than 80° at six weeks of age, but the house can be down to 50° if necessary. Too much heat will make them delicate. They should be made vigorous by plenty of exercise in a moderate atmosphere. If the chicks have grown as they should they may have whole wheat or cracked corn for the night feed when they are a month old and thereafter. This feed should be scattered in the litter an hour before sundown, so they can find it before dark. Be sure they go to roost with a full crop.

If we are raising for market, the chicks should be fed soft food at all ages, feeding hard grain at night only. They will thus do better and grow faster, for the soft scalded food is more easily digested than the hard food.

A great many people make the serious mistake of overfeeding brooder chicks. It is so easy to fill up the

feed trough at each feeding time, or giving them enough to last them from one feed until the next. It is simply suicide to the chicks and to the owner. In order to have them grow properly, it is necessary to keep them hungry. When you go to feed, they should be hungry enough to walk all over you. True, they will sometimes try to do this even if not hungry, but the feeder can soon tell how hungry they are.

Remember you can never fatten chicks by keeping food before them at all times. It is just as necessary for the fowl's digestive organs to have a rest between feeds as it is in the human being. Overfeeding tends to indigestion, which is often taken for cholera and a number of ills, of which we will speak further on.

Feed liberally, or what the chicks will eat up in, say, half an hour. Thus all will have a chance to get enough for the time being. After this meal the chicks will soon go to work, thus hastening digestion and preparing themselves for the next feed. We have tried feeding abundantly, even keeping food before the chicks all the time, and have been surprised to find a large part of them go to roost with almost an empty crop. Chicks or fowls will stand heavy feeding for about ten days, but after that they will commence to go back, and especially is this so with brooder chicks when they are yarded. If a chick gets good and hungry, he will fill his crop before stopping, and as the food digests very rapidly, then we can get them to take a full meal three or four times a day, and especially is this necessary at the night feed, which should be hard food after they are five weeks old. They will thrive all the better if they are not allowed a full crop at any feed except at night.

Let us now sum up for convenience.

Have the brooder at the proper heat at least a day before the chicks are due. Let them remain, undisturbed, in the incubator twenty-four hours after hatching (some recommend thirty-six hours), and then feed rolled oats, as previously stated, changing to rolled oats in the morning and bread the rest of the day.

When four weeks old, the food may be scalded instead of baked, and the night feed may be whole or cracked wheat, cracked corn and Kaffir corn. Kaffir corn is an excellent food for old or young fowls. It is sown in drills the same as fodder corn, and is tended the same. It yields abundantly, surpassing corn, and if it is headed can be threshed the same as wheat. One head will often shell two large handfuls. The grain is about the size of a large grain of wheat, only it is round.

Exercise is very important to health and growth, and this should be encouraged by keeping the pen well littered. After five weeks of age, the soft mash may be composed of ground corn, wheat middlings, and finely ground oats, equal parts, to which may be added a pint of ground meat and bone to ten quarts of the mixture. If we are feeding green cut bone, then the prepared meat should be left out. It is well to add a pint of linseed meal also, for it is an excellent food, only it is too rich to be used freely. Boiled small potatoes should form the noon feed three days a week from four weeks of age on. Finely cut clover hay should always form at least one-third of the bulk, and the measure should be pressed down and running over. If the pens are littered frequently with clover hay, then none need be fed in the soft mash, and this we consider the better way to feed it. Little green food must be fed if hay is given. This method of feeding can be con-

tinued until the chicks are nearly ready for market, when the mash should be largely ground corn, and the meat and linseed meal may be increased somewhat, but not enough to produce diarrhea. Should the feed produce diarrhea at any stage of growth, then it should be changed immediately, but the cause of diarrhea is usually lack of heat in the brooders or an irregular heat. Keep plenty of good sharp grit constantly before the chicks; also charcoal and cracked bone. Feed on a clean board, and clean it off before each feed. Do not put over 100 chicks in a brooder when first hatched. When they reach four weeks of age, or even three weeks, separate them and put only fifty in a brooder. In separating put all the strongest ones by themselves, otherwise they will crowd out and trample the weaker ones. Thin out the chicks as stated above or they will take things into their own hands and drop out by death.

The feed board should be long enough so that all the chicks can get to it at once and not crowd. We use a board six inches wide and six to seven feet long. A lath is nailed around the edges and projects up half an inch, thus keeping the food from falling off. In the pens where the larger chicks are we raise the board up about four inches by nailing pieces of boards on the under side edgewise. The pieces are longer than the width of the board, so that it can not be upset. We find a mason's plastering trowel to be the best thing out for cleaning off the board. It cuts right down to the hard board every time. These boards should be kept scrupulously clean, even to the use of soap and water occasionally. Provide clean water twice a day. Clean the brooder floor off each day, and sand it afterwards to keep the droppings from sticking to it (if board floors are used). The pens should be raked over

and droppings removed at least once a month, and each fall the little outside yards should be dug up and sowed with rye, or better, crimson clover. This will purify the ground, and if sown early and thick will provide a good picking ground. Even the roots will be dug up, thus affording the chicks exercise.

Mr. Arthur G. Duston is a practical poultryman and broiler raiser. He is one of the few who can make broilers weigh two pounds each at only eight weeks of age. He describes his method in the *Reliable Poultry Journal*, from which we propose to take a few extracts.

Mr. Duston says: "We will say that we have decided on what variety (of fowls) we have decided to run. Our eggs are as fresh as possible and of uniform size. We have put them in the incubator and, with proper care, on the morning of the twenty-second day we find the chicks nicely dried off. We now get our warm, cloth-lined basket, with a heavy cover or shawl, to prevent them getting chilled [very necessary precautions—Ed.].

"Well, we have got them safely, we hope, into the brooder, which has been brought up to the temperature of the incubator. Of course, we have placed our board in slides about a foot outside of the hover, so that the babies can not get out in the long pen and not be able to find the way back, and thus get chilled. Just bear in mind for the first week that to keep them warm is more essential than food.

"The first day of their lives in the brooder has almost passed, and they have not eaten anything but sand (grit). Night has begun to come on, and it is time to feed the hens; but let us first scatter down for the babies a liberal supply of rolled oat meal, the white

flakes of which will instantly attract them, and they are left to themselves. The next morning, as we turn out at daylight, we find them calling for breakfast. We touch up the fire, and then a feed of rolled oats is given them with a dish of warmed skimmed milk. We use an old fruit can for this purpose, with a notch cut in one edge. Some of the little fellows that would not eat will drink, so you save them along until they will eat. That you will save more chicks by giving them warmed skimmed milk than by any system of feeding grain is my way of thinking. We next powder some charcoal, and this is put into a dish and set in for the chicks to eat.

"We are now going to feed every two hours until our young charge is turned over to the butcher. For the first week you are limited to rolled oats, millet seed and cracked corn, run through a mill to make it fine enough, then sifted to save the meal, which, of course, is wasted by throwing it on the ground. We have kept milk before them all the time, and have carefully washed the dishes twice a day. Some think skimmed milk expensive food, but after trying it you will be convinced that the increased growth that comes by feeding it gives you a good profit on it. As we have put into each hover about one hundred chicks, we must see that the sand is scraped off the top as often as necessary, probably twice the first week, which will be increased each week until about the third, when we commence to clean them every morning.

Feed every two hours.

"Now the second week we will remove the board (in front of the hover) and keep an eye on the chicks to see that they do not get lost by staying away from the fire too long and thus get chilled. For this week we

will feed about the same, only perhaps it will be best to try them on a little mash made up of one-third corn meal and two-thirds wheat bran, seasoned with salt and red pepper. Not much will be eaten, but they will get so before the end of the week that they will look for it, as you feed your hard and soft grains alternately. The third week we always settle down to our regular routine to be continued until about ready to market. During the second week we have cracked some wheat in our mill, so have had that for our extra dish and a change. Give corn as a last feed generally. There is one thing absolutely imperative. That is to get your chicks out on the ground. If it is bright and warm, put them out for a few minutes when a week old. Don't let them stand 'humped' up and shiver, but make them hustle around by driving or feeding a handful of millet seed. After the second week they must go out every day unless it storms, no matter if it is zero weather.

"As we enter upon the duties of the third week, we will now get our routine started, and will see the chicks push along for the next five weeks, at which time we hope to see two-pound birds ready for the market. The first thing in the morning is a feed of hard grain; then comes a feed of chopped raw potatoes (a meat chopper with a large holed disc is used for this purpose). Now take their food dish and give each pen all they will eat. A little later we throw in a little cabbage cut in strips, which they will seize and chase each other around until it is eaten. This constitutes all the green food they have, unless once in a while we may substitute onions.

"We have gotten our mash ready for the day, and as nine o'clock has come we will feed our first feed of it for the day. Only feed what they will eat quickly.

At eleven o'clock another feed of the mash. Then the dishes are picked up and washed. Again at one and three o'clock we feed the mash, and if we have used good judgment we have had a hungry mob at each feeding. At five o'clock, or before dark, we throw down a liberal feed of cracked corn. We follow this bill of fare for about four weeks.

"To come back to the six or eight weeks old chicks, we must think of finishing them off. We examine them, weigh a few, calculate how much flesh can be made on them in about ten days, for as broilers Boston has no use for anything over four pounds to the pair. We have fed so much bran that, as we lay back the feathers on the breast, we say, 'They ought to have more color.' How can we get it? We know corn (yellow) will do it, but we lose time if we drop off from soft feed to hard. Therefore, we put into the mash all the cotton seed meal we can stir in and not make it 'salvy' or 'puddingy,' as we call it. With a little treacle added we have accomplished the result. We now have a fine yellow skin if we have not foolishly chosen a blue-blooded carcass; but any yellow-legged variety will succumb to the treatment. I will caution you against feeding this for too long a time, say more than two weeks, as the chick will get clogged of it, and you can not hold their flesh, to say nothing of making any, unless you can keep their appetites 'up to the clip.' We have now 'forced' the birds for eight weeks, and have obtained what we set out for—two-pound broilers at eight weeks. This has been successfully accomplished on our farm here with White Wyandottes. We have not done quite so well with any other variety. By continuing the regular feed we have made five and five-eighths pound

Finishing off.

roasters at fifteen weeks old. One word of caution, don't attempt to raise your breeding females under such hot-house methods, because you will sacrifice size through early maturity, as after a period of forcing, as given above, it is no uncommon thing for pullets to lay at sixteen weeks old and we all know that is enough to stop growth. The summing up of the discussion is breed, food, care."

Some Remarks.

Probably the greatest boom in artificial methods of raising chicks was started at Hammonton, New Jersey. Mr. P. H. Jacobs, editor of the *Poultry Keeper*, was the main mover, and we are indebted to him for the first practical light. Mr. James Rankin was probably in the field a little earlier, but today these two men still hold the fort, and can tell you more about raising chicks artificially in half an hour than almost any one else can in half a day. Hammonton has seen its day, however, but the many lessons learned there have been very beneficial to the poultry world. It was there clearly demonstrated that broiler raising alone is a failure. Broilers and eggs are all right, but broilers, eggs and fruit are better.

Mr. Pressey was also one of the pioneers in the artificial method, and he successfully raised thousands of chicks. We will here briefly give his method of feeding and handling: Mr. Pressey ran his incubator in a room on the second floor of his dwelling, but had a regular brooder house, with muslin windows (instead of glass). He used individual lamp brooders. In a recent lecture he made the following statements: "Very much depends on the kind of food given chickens, how prepared and when given. Of course, the principal food must be the different grains. Corn alone will not make a good chicken; it is most valuable for

its fattening and warming qualities. Wheat contains the material for bone, feathers, etc.; oats for muscle. So we feed corn, two parts; wheat, one part; oats, one part, and we have a fast-growing chicken. Feed either of these grains alone and we have all kinds of monstrosities—weak-legged, sore-eyed, no feathers, and every conceivable deformity [referring to brooder chicks that are yarded—Ed.]. Add to these grains a quantity of meat to take the place of insects, which form a part of their natural food. See that they have plenty of sand or gravel. They have no teeth, and must have this grit to grind the food in the gizzard. Give oyster or clam shells ground as fine as wheat. Keep by them, also, powdered charcoal; it prevents the digestive organs from becoming clogged with soured food if they have eaten too much. If all these things are provided for them, the sheds kept clean, occasionally sprinkled with carbolic acid, and once a month given a thin coat of whitewash, the chicks should keep in perfect health. But if any signs of roup or other disease to which they are subject should appear, we use a liberal supply of Douglas mixture, which is simply one pound of sulphate of iron (copperas) and one ounce of sulphuric acid dissolved in one gallon of water. Dose, two or three tablespoonfuls to each 100 chicks in their food or drink for each day until they are better."

CHAPTER VI.

DRESSING FOR MARKET, PACKING, ETC.—GETTING A REPUTATION.

Of course there are two ways of dressing chicks—scalding and dry picking. The latter method is the one used by all large broiler plants, for it pays, although it is the most expensive. It is impossible to pick a chick after being scalded and not rub a little of the skin off. Wherever the skin is rubbed off the chick will turn dark in an hour after picking, and as time passes the dark places grow darker and give the chick a stale look. On the other hand the dry-picked chick will look fresh for days; in fact we have kept dry-picked chicks seven days (fall weather and only moderately cool) and then sold them to private customers and no questions asked. How much longer they would have kept we do not know. We only made the experiment once. There is an art in dry picking. A few men have become expert, and can pick a chick clean in ten minutes or less, but the average person will require twenty minutes. The object is to get the large feathers out before life is extinct. After all these feathers are removed then the bird is handed over to the pin-featherers, who are usually women. It is customary to pay three cents a bird, and they will average about thirty birds per day of ten hours. It takes a lively woman to pin-feather fifty chicks a day, although some do it. A man who understands it can easily keep four women

going. It takes one to three minutes to take out all the large feathers.

All the arrangements for picking should be made the day before. A long, narrow coop should be arranged close to the sticking pole, and this pole should be placed near where the pin-featherer is to sit. We nail a pole or shingle rib fast to the side of the feed room on end of brooder house. This pole projects out about four feet. Near the end we tie a piece of twine (doubled), and this comes down just low enough so that when we slip the chick's feet in the slipnoose in the end of the string the body of the chick will come down just below our shoulders. A high stool can be used to partly sit on if desired. As the chick is relieved of its large feathers it is passed in the door to the pin-featherers. If the weather is hot, then things are moved to a shady corner. Thus the sticker has to take but three or four steps to either get a chick or pass one along to the women. A large barrel (oil barrels after the oil has been burned out are good) stands handy to the pickers (outdoors under a window and protected from the sun). This barrel is filled with fresh clean water, to which a little salt has been added, and as the chick is dressed it is thrown in, and should there remain two or three hours. but let us return to the killing process. The chicks should be shut up the night before in a clean coop with board floor. They may be given a supper, but do not feed them a particle the day they are to be killed. Some writers say they should not be fed for twenty-four hours before killing. Probably that is correct, only we haven't the heart to let them starve as long as that. At any rate the crop should be entirely empty when killed, and twelve hours will accomplish this.

The chicks that are to be killed in the morning should be placed handy to the killer. The small blade of a pocket knife (if sharp) answers well for sticking. The doomed chick is bound up by the feet in the slip noose, and the killer should run the backs of the first and second fingers of the left hand between one wing and the backs of the third and fourth fingers between the other wing. Shut down on the wings and with the right hand raise the head and place it between the thumb and third finger of the left hand; open the beak and prop it open with the first finger of the left hand. The head should be in such a position so that the beak will point out from the hand and so the roof of the mouth (when opened) will be presented full to the killer. Thus we hold the chick securely, and by holding tightly and pulling down on the string the bird can not move, no matter how hard he may try. The right hand is left free to stick and pull the feathers. The killer now places the knife in the bird's mouth and shoves the point into the brain of the bird. This is the particular point in killing. This stab should be made in the center of the mouth, between the eyes and ears. If correctly done you will feel a slight shiver—so to speak—pass through the bird, and thus he loses control of the feathers so that they can be pulled out by the handful without tearing the skin. Remember it all depends on this sticking, and a little practice will soon tell how it should be done. Draw the knife from side to center on each side at top or roof of mouth. These cuts should be made just back of the eyes, and if cut sufficiently the blood will run a stream out of the mouth. The mouth is then dropped, but the thumb and finger of the left hand should still hold a few feathers on top of head so the bird can not

Killing.

spatter blood on the killer. All this is done in much less time than it takes to tell it, and the feathers should be drawn immediately.

Dry Picking.

By twisting the wrist of the left hand the breast of the bird is brought around to the front, and the feathers should be removed here first. If they come easy they can be drawn anyhow, but if hard then pull all feathers toward the tail or up, and only a few at a time. Give the wrist of the left hand another twist and bring the back around. Remove the tail feathers—by pulling up—and then work down the back to the neck. Now pull the feathers (carefully) from the butts of the wings and parts of the neck, then return to the fluff, after which let go with left hand and grasp a wing. Pull the short feathers and then the quills. In this hasty pulling we have only drawn the larger feathers and have very probably left a good many scattering ones, which can now be pulled more leisurely. About this time the bird will be going through its death struggles, and it can again be held as formerly, while the picking proceeds, and it is now ready to be passed to the pin-featherers. If done as it should be it will take from one to two minutes to undress him. The pin-featherer is supposed to carefully sow up all torn places, if any. This method may seem cruel, but it is the only way to get the feathers off. After the bird has struggled the feathers can not be drawn without taking the flesh with them. The market demands dry-picked chicks, so dry picked they will have to be. Personally we do not believe it is cruel at all, for the moment the brain is touched (in the first stab) all feeling seems to leave the bird and the eyes will close. A fowl never shuts its eyes so long as it retains its senses. Of course we do not know for

a certainty, but that is the way it appears. As we state above the bird should be placed in the barrel of cold water immediately after picking. At noon these should be washed—the feet and mouth—and placed in another barrel of clean water, in which they may remain over night. If the weather is warm ice should be added to the water. If the chicks are to be shipped to a distant market early next morning and ice to be used then the chicks need not be dried, but if no ice is to be used the chicks should be hung up an hour before packing to dry.

Packing. Pack in boxes that will hold not over 100 pounds each. Place in a layer of clean straw and then a layer of chickens. Fold the neck under one wing and press the shoulders well up against the straw at sides of box. The chick should rest on the breast-bone with the legs straight out. Place in row all around the box, then another row behind these, shoving the shoulders well up to the tail of the first row, but let each chick come between two of the first row. If a small space should yet remain place in enough chicks to fill it up, but lay these on their sides on top of the legs of the other chicks. A thin layer of straw can now be used, or the second layer of chicks may be placed directly on top of the first layer, and so on. Pack as tightly as possible so there will be no moving. Fill up remaining space, if any, with straw and press on the cover. If ice is used keep the chicks in place by nailing in narrow pieces of board, cut so as to just fit inside the box, and place the ice (broken up rather fine) in these, and be sure to have enough to last until chicks arrive in market. The narrow slats will keep the chicks from moving as the ice melts. If bar-

rels are used then fine ice will have to be worked in between the layers of chicks.

Scalded chicks should be treated in this way also after they are dressed. In scalding two points should be observed: first, have the chicks as fresh killed as possible, and second, have the water just below the boiling point. Ten or more chicks can be hung in a row by the pot at one time. Open the mouth and stick as in dry picking, only use a larger blade, and run it down deeper, giving it a twist before removing, and cut the veins on both sides as the knife is withdrawn. Thus the chick will die more quickly than when the knife is not twisted. In dry picking the object is to retain life until the feathers are removed; but not so in scalding. It is a good plan to grasp the chick the same as for dry picking, and after he is bleeding freely the feathers can be removed from the legs. These feathers come easily, and if not scalded retain their skin and color. In scalding take the chick by the feet and head and hold under the hot water about a minute. When the head is scalded it gives the face and comb a whitish, sickly look. Have a bench or low table convenient, and tack thereon a soft cloth so as to prevent rubbing of the skin. Commence at the wings, and after removing the large feathers the balance can be rubbed off with the hand. Take the chick by the legs, turn it on one side and remove all the large feathers, and then by rubbing the hand briskly towards the chick's head all the remaining feathers will be removed, including nearly all the pinfeathers. It is surprising how quickly a chick can be dressed by the rubbing process. Of course great care should be used so as not to rub the skin, but in fowls

Scalded Chicks.

you can slash away without fear. The rubbed places will not turn dark so long as they remain in the water, nor will they show very badly until they have been removed some hours. Scalded chicks are usually "plumped" by being held for a minute or two in boiling water, and then thrown in cold water. The "plumping" swells out all shrunken places especially around the vent, and the cold water holds or fixes these parts.

Very few markets require the chicks to be drawn. They should, therefore, be left whole and the feathers left on the head and an inch down the neck, it gives them a better appearance. Chickens are called "broilers" when they dress from 2 lbs. to 4 lbs. per pair. Early in the season 1-pound chicks sell best, and as the season advances the weight of the chicks should advance. The market opens for broilers about February and pays fairly until July, while the best prices are realized between April 15 and May 15. At that season New York usually pays 50 cents to 55 cents per pound, wholesale, and chicks may average 4 lbs. per pair, although 3½ lbs. are better.

The market for "roasters" commences about May and runs the balance of the year. Roasters weigh from 5 lbs. to 8 lbs. per pair. The best weight is 6 lbs. or 7 lbs. per pair. Roasters reach 40 cents per pound in the heart of the season. Capons come in to market about January, and large ones sell for about 25 cents per pound. In dressing capons do not remove feathers from the neck, end joint of wing and a small spot on each thigh or fluff. There are a number of raisers who claim that there is more money in roasters and capons than in broilers, for, after the broiler age

losses by death are rare. The writer believes that the vast amount of food the chick consumes after passing the broiler age offsets the death rate, and then the extra room (buildings) and care should be added. Broilers give us quicker returns, and the man who is successful in raising roasters must be successful in raising broilers. All we have to say is that those who prefer to raise roasters or capons, why that is just what they should do.

Get a Reputation.

There is nothing like a reputation, and the poultryman who wishes to get a reputation must send only choice chicks and eggs to market. Eggs should be clean and assorted as to size and color. Chicks should be uniform in weight and plumpness. Do not mix large and small, fat and poor chicks together. If it is necessary to kill poor or large chicks, why pack them in a box by themselves and send the choice ones by themselves. In mixed lots the price is cut heavily, and often the good chicks bring no more than the poor ones. It is a good plan to have a trade-mark and make it known by sending only choice goods under it. Leave it off of poor packages.

One of the best markets for choice chicks and eggs is Boston, with New York a good second. Prices are much higher in the East than in the West, but to balance things grain is much higher in the East than in the West. Usually the *best* market is the one nearest home. If we live near any fair sized town then we can easily work up a good trade without much trouble. Every one wants strictly fresh eggs and poultry. Have a card printed and state thereon your business, viz.:

RIVERSIDE POULTRY FARM.
JOHN JONES, PROP.
Farm-raised chickens and fowls; fed on good, sweet grain only. Freshest of eggs from my own fowls, gathered and delivered daily. Your trade is respectfully solicited.
JOHN JONES, Squeedunk, Pa.

Call at each house and see that the card gets into the hands of the "good woman," and if not successful call again. A few sales of good, fresh stock will usually secure the custom and prices can be under your own control, which ought to be higher than the regular market price. Then, too, we can control the weight of chicks. They are apt to shrink amazingly when the commission merchant gets them. Orders should be taken a day or two in advance. The chicks can be dressed, sorted and tied (as ordered) and then weighed. Mark each order and put the weight down in a book and drop them in a barrel of clean water, as stated previously, where they can remain over night and be ready to deliver next morning. Chicks thus treated will not shrink in weight, if anything they will gain a trifle, but, by weighing shortly after being killed and before lying long in the water, no one will be cheated. We have no difficulty in getting from 6 to 10 cents per dozen for eggs above New York prices, and the same holds good with chickens to private well-to-do families the best of the season. We aim to double the wholesale price of live chicks. Of course we have a good market, living close to the finest summer resorts on the New Jersey coast—Asbury Park, Ocean Grove and surrounding resorts.

CHAPTER VII.

THE TURKEY—THE DUCK—THE GOOSE.

Turkey raising is also very profitable, especially where one is on a large farm. The turkey is largely self-supporting, and although somewhat difficult to bring to the two months age, yet very hardy thereafter. The most profitable breed, and by far the most popular, is the Bronze. It is the largest variety, grows very rapidly and is fine flavored. If hatched reasonably early, it will outweigh any other variety of the same age by several pounds. It costs no more to raise, and therefore is more profitable. Following them in popularity is the White Holland and Mammoth Whites. These are more on the medium weight order, although the last named variety is somewhat larger than the former. They are excellent varieties. The Narragansett is nearly the size of the Bronze, but is little bred outside of Vermont. Other varieties are the Slate, Buff and Black. Each variety has its admirers, and one should choose the breed he can take the most pride in. On every hand we see the common or scrub turkey. If, however, these common turkeys are crossed each year with some of the larger varieties, then they will prove profitable. We believe in thorough-breds, even to cats and dogs—especially dogs.

Turkeys for Market.

Turkeys are not easy to raise at the best, but when precautions are not taken then look out. In-breeding

is worse with turkeys than with hens. Always procure new blood, in the shape of gobblers, each year. Lice, did we hear you say? Well, they will kill a young turkey quicker than anything else.

Improper feeding is another cause for delicate turkeys. Corn is usually fed rather lavishly to the hens during winter and early spring, and the old turkeys are apt to be very fat when they commence to lay, which is generally the last of March in New Jersey. Fat hens and fertile, strong germed eggs do not go together worth a a cent. Toward spring the turkeys should be fed on a regular egg ration, and have them in only fair flesh. If it is not desired to hunt for eggs, then the turkeys should be confined in a large, shady yard until twelve o'clock each day. Young turkeys do much better if hatched by a turkey hen, although the first eggs should be set under common hens; and, as it gets later, then the turkey hen can be set. If the turkey hatches late, say about June 1, or later, then she will take all the care of the young and do better than if confined and fed by hand. Let them run if grass and bugs are plentiful, and don't feed except at night, but we have raised many a turkey that never received a bit of food except what nature provided. Thus treated, they will usually outgrow the home ones. Sixteen to twenty eggs can be placed under a turkey hen, while nine or ten is enough for a common hen.

If it is desirable to set the turkey hens in their own nests, then they can be allowed to "steal" them, only these nests should be shaped up, and after the turkey commences to set erect a temporary cover over her to keep off the rain. The first consideration then is lice. Be sure to dust the hen thoroughly with a good insect

powder when commencing to set. Hold her up by the legs and work the powder down into the feathers with the hand. After ten days dust her again so as to kill all the new hatches. A day before she is due to hatch repeat the operation. Be sure there are no lice, especially on the head and between the flight feathers on the wings. Here is where lice delight to stay, whether it is turkeys or hens.

Always look out for lice, and when found, dust every turkey, or if preferred, place a drop or two of lard or castor oil on the head, under the wings and around the vent. Repeat once a week. Do not use too much, or it will hurt the turkey. If we wish to take care of the little fellows, then we should proceed as follows: Use a roomy coop and have a board bottom. Have it a little smaller than coop, so the coop will just clear it when set down. Each morning clean this off and resand with coarse sand if possible. The ground is usually damp during the early spring months, and dampness is fatal to young turkeys, especially when cooped. Build a little pen either of 12-inch boards, set up edgewise, or use 12-inch wire netting on frames, inch mesh. The turkeys should be confined to the coop and pen for about five days, when the boards can be removed and only used on damp days. After the seventh day open the coop on all clear days and let the hen and brood run, but be sure to get them back at night, and do not let them out until the dew is off the grass. Feed about the same as for chickens. Commence when the turkeys are about twenty-four hours old. Rolled oat meal for the first two days, and then stale bread can be given. A little chopped onion daily is also beneficial. Milk is a good drink and milk curd is excellent. In fact they should be fed the same as chickens. Feed

every two hours for the first month. Always feed on a clean board and what they will eat up clean in about ten minutes. Do not keep feed before them all the time. It is worse than folly. What would we think of the farmer who would keep corn and hay before his horses all the time? It would soon ruin them, and it will do the same for poultry. Each morning carefully look the turkeys over, and if any look droopy, examine for lice, and at the same time give each ailing one a grain of whole black pepper. Keep a dish of grit and one of charcoal before them all the time, and add ground bone to the soft scalded feed after they are one week old. The feed may be scalded the same as for chickens, only give the milk curd once or twice a day, at the morning and afternoon feeding time.

As we stated above, we recommend the go-as-you-please plan when a turkey hen is used and the weather is mild, or after June 1. We have had turkeys raised thus without a particle of feed or care from us, and the young toms have weighted twenty pounds and over by Thanksgiving. One first of October we had two hens come off with ten and eleven turkeys respectively. We left home the next day, and when we next saw the turkeys they were over three weeks old and only one missing. At seven weeks old they were growing like weeds.

Notwithstanding freezing weather at nights, the turkeys stuck to their fence rail roost. They came up every morning and evening for their feed of whole wheat. We did not put them under cover until snow fell. Late turkeys should never be used as breeders, but these little fellows will make royal eating after the holidays. In ordinary winter weather we allow the turkeys to roost in the trees, but during stormy or very

cold weather we put them under cover. An old shed—made tight on top and sides with building paper—answers the purpose. It should be roomy, and arranged so it can be opened on the south side. Have wire netting across the opening so that during the day the front can be opened and yet keep the turkeys in if there is snow on the ground, or if it is stormy. Do not try to keep them housed closely. Keep them hardy but avoid all draughts. A costly mistake is often made by people selling all the large early-hatched birds because they will bring more, forgetting, apparently, that next year's hatches depend on this year's stock. The best is none too good, and avoid in-breeding as you would the roup. Two-year old hens mated with yearling toms will give stronger chicks than will yearling hens, even if mated with two-year old toms. In fact turkeys three and four years old will give good results as breeders, but they will not lay as many eggs as yearling hens. One reason for this is that old turkeys get fat more readily than young ones, and fatness will decrease the number of eggs every time. Keep them in good, healthy condition, and in moderate flesh. Turkeys will not stand confinement. They are an American bird, and as such love liberty. They dearly love the turnip patch and cabbage patch, otherwise they will do little harm, and they will destroy an amazing lot of injurious insects during a season. It is the usual custom to have one tom with seven hens, but if the tom is vigorous he will mate with twelve hens. In fact that is the usual number of turkey hens to a tom on our farm. We find the eggs very fertile with such mating.

We do not claim that turkeys will always do the best if allowed to take care of themselves. Many things should be taken into consideration. If hawks or other

destroyers are about them we should be very watchful. Such practice will not do early in the season, and even later it is best to teach the hen and brood to come up to the barn at night, thus gaining a good supper of whole wheat, and if not off too early, a breakfast of the same. It will hasten maturity. If we wish to hatch early (May), when cold storms threaten them, we will have to exercise great care, as given above.

Let us go over the ground again for these early hatches. Have the coop roomy and *dry* with a board floor. Keep the floor well sanded, and build a small yard in front of coop by standing up boards so the little fellows can be confined for the first week. As the hen hatches remove a part of the turks after they dry off, and occasionally remove the shells, for they are apt to slip over an unhatched egg and thus kill the chick. If the hen is wild or very cross it is best to leave her severely alone. After all are hatched and about twenty-four or thirty-six hours old, remove all to the coop and feed the hen first, then encourage the little ones to pick up small pieces of the hard-boiled egg crumbled for them, but only feed the egg clear the first day; after that time feed it mixed thoroughly with twice the amount of bread crumbs, or feed as stated above. Discard the egg after the third day and give oatmeal and bread crumbs every two or three hours and only what they will eat up in about five minutes. Keep the hen well fed with wheat, corn, etc. The bread crusts can be soaked in milk and squeezed dry before feeding. Give milk to drink, and if a saucer is used place a heavy board partly over it to prevent suicide. Give milk curd frequently, for it is excellent for them. If the weather is damp mix, once a day, a little pepper in their food. When the turks reach the advanced age

of one month, then cracked corn and whole wheat should be given at night; and as they grow the corn and wheat—especially wheat—can be increased until it composes their whole ration. After they reach a week or two of age, then on pleasant days the turkey hen may be liberated, but at this time we should be careful to let her roam only in the direction we wish her to go, for if taught this lesson at the start she will usually follow the same path during the remainder of the season. Before the turkeys become full-feathered we should keep our eye on the weather, and if a storm threatens, gather all in their coops, or prepare to bury the dead. Turkeys can not stand a wetting until they are full feathered, when they can be trusted to look out for themselves. Keep everlastingly at the lice, for they are more to be feared than all else combined. We can not raise a crop of lice and a crop of turkeys at the same time. Lice and dampness will cause a turkey famine sure.

SUCCESSFUL TURKEY RAISERS.

In order to make this chapter more complete we have solicited articles from several successful turkey raisers throughout the country, believing that the reader will appreciate such letters, for they tell just how these people manage their flocks successfully. We believe that this chapter, especially the letters, will prove invaluable to would-be turkey raisers.

[From Illinois.]

We will give our experience last year raising with chicken hens—not that I think it best to use chicken hens, but, of course, we often have to do so.

Our first 25 poults were hatched the 22d of May by hens. We gave them to 2 hens in good coops with a board in bottom. In front had a lath coop, into which the old hen could come out to exercise; around that was a pen a foot high, made of 4 12-inch boards about 10 feet long. The poults could run around in this.

Their first feed was millet seed, then for about two weeks fed them hard-boiled eggs mixed with dandelion leaves cut fine with a knife or scissors, the whole seasoned with a little salt and pepper, bread and milk and milk curd. Fed at first three times a day, but soon saw this was not often enough, and fed them five times a day, the same as we do early chickens—only fed them a little at once, just what they ate in a few moments, and always left them looking for more. Kept coarse sand before them all the time, cleaned the floor of coop every day, usually scrubbing it with cold water.

First Feed.

When they were one week old, removed the board pen and let them go where they liked. When two weeks old, turned the old hen out, also, but kept her shut up mornings till the grass was dry. The poults would not go far enough from the coop to get wet without the hen. The ground, of course, was bare for a short distance around coop. When about two weeks old, fed them but three times a day, a little later but twice a day. At about three weeks commenced the feeding of wheat screenings; this and curd was about all I fed, but of course they often ate with the chickens, but didn't allow them to when I could help it.

When lice made an appearance, which was often enough, I assure you, we dusted them with insect powder, and even when quite large did the same or rubbed fresh lard along the wings. I did not use lard while they were small.

Lice.

All 25 were alive, going in the trees to roost, and all healthy, but one was killed and most all of the rest took cold. Some were so bad that I consented to have the hatchet used on five of them, although think some of them would have lived had we borne with them; so we raised 19, which wasn't bad, after all, but would like to have raised them all, not so much for what they'd have been worth as the satisfaction it would have been not to have lost one of that 25.

We had trouble with our later ones taking cold, too.

Drinking Water.

As to drinking water, some old turkey raisers told us not to give any water, so we didn't give them much at first—but that's all nonsense. We let them have water twice or three times a day, but when they were through drinking emptied out what was left; didn't let them drink late in the evening. Don't know that there is anything in this, but we did it.

All food was fresh and clean, all soft feed fed on a clean board. Now, this looks like lots of trouble, but it's just as easy to do a thing right as wrong, and takes no more time. Who wouldn't be proud of a nice flock of Mammoth Bronze turkeys, to say nothing of the dollars they'll bring? Yours, for lots of turkeys.

MRS. B. F. H.

Milford, Ill.

[Turkeys in Mississippi.]

I am well situated for raising turkeys, having splendid range woods both front and back of house, with "Rocky Spring" branch running through. Set my hens in a quiet, secluded place. When they hatch I put them in a large coop out in front away from other

fowls. The first food is bread, or corn meal made up with buttermilk and soda, soaked in sweet milk (not enough to make sloppy), yolk of hard boiled egg and onion tops cut fine, all mixed together, put in the coop fresh three times a day, removing what is left from former feeding. Have grit where they can get it at all times—bits of broken china-ware broken up fine. The second day the egg is left off. Feed bread, milk and onion tops, with now and then curd mixed in. If they are strong enough to walk, let them out for a while in the warm sunshine. It seems to strengthen them. In cool, rainy weather confine the hen in the coop, letting the young pass in and out. Give a sprinkle of black pepper in morning feed. In the evening when they come up, if there is a sick or droopy one, give it a bit of cold boiled fat meat. When they have free range they often eat poisonous bugs and spiders. I gave fat meat in food once a week. (If I am not mistaken I got that suggestion from the *Epitomist* long years ago.) If the weather is good the third day I feed and turn them out. The hen knows how far they can go. The older they get the further they range. At noon I take my feed pan, go hunt them up and feed out in the woods. They will soon learn to watch for one, so it is not hard to find them. They come running and flying to meet me, so ravenous, eating the last bit of onion first, then the bread. I could write a whole chapter on that noon feeding in the woods; I enjoy it as much as the turkeys. Hope some poor, tired-out housekeeper will take a hint. Think fresh buttermilk better than sweet for every day feed. Give onion tops as long as they last; the turkeys never tire of them. Let them have free range and do pretty much as they

Grit.

Noon feed.

want to; only make them come home to roost. When the weather grows hot and they show a disposition not to go in their coop, I set a plank over a large low-limbed walnut tree for them to roost on. They are no more trouble; are off their roost and gone by the time it is daybreak; come up about eight or nine o'clock for their breakfast. Have always raised the common turkey up to last year, when I bought a setting of Mammoth Bronze. Kept one of my old-stock turkey hens to raise them. Out of nine eggs raised eight turkeys. They are beauties. I expect to raise a large flock this year, and make it profitable as well as a pleasure. I don't think my success is due to my management as much as to the natural advantages of range. They go all over the neighborhood, if there is a large flock, and in October and November they are like Bo Peep's sheep until I begin to thin them out about Thanksgiving. MRS. L. O.

Thoroughbreds pay best.

Kelly, Miss.

[From Pennsylvania.]

Use eggs from large, vigorous stock, gathered daily and kept in a temperature of 50° and turned twice a week. Set the hen in a coop with lath or wire run, using 9 eggs for a common hen and 15 to 20 for turkey hen. Have the nest roomy, using a box 8 or 12 inches deep. Place 2 inches of soft dirt in the bottom, and after shaping, put fine hay over it. Dust the hen with insect powder when setting her, and again before hatching. Food: Hard-boiled egg one part and bread crumbs four parts, with finely broken egg-shell, also oat meal and onion tops. Bread, curd cheese, wheat and oat meal are main foods, with bone meal and grit. Place the coop on short grass, moving every few days.

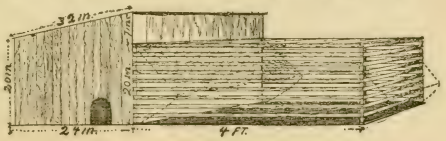
Feed Board. Feed on clean board. For larger or half-grown turkeys feed on a board 9 inches wide, hinged to the side of a building or on stakes up out of the reach of small chickens Always feed on a flat surface and not in a V-shaped trough. Feed once a day on ground corn—oats, shorts or bran—adding one pint of ground meat and bone to two gallons of the feed, stirring to a stiff mixture with hot water. Keep coop, hen and poults well dusted, and in addition rub a trace of melted lard on the head and throat. Wash the fountains and give fresh water daily. Once a week disinfect them with carbolic acid. If other turkeys are in the neighborhood, mark the turkeys with a punch through the web of foot between the toes.

If the weather is warm when the turkeys are hatched, keep them confined to run only a few days. After two weeks give both the hen and turkeys liberty, feeding and shutting in coop at night. If it is desired to have the young roost in a shed or building, teach them to go there before the hen weans them. If a common hen is to be used to hatch the turkey eggs, then a small coop can be used 22 inches deep, 31 inches wide, 16 inches high at back and 24 inches high in front, with an open lath pen 4 feet long for the young poults. N. B. C.

In Warm Weather.

Oliphant Furnace, Pa.

[Mr. C. finds this coop for young turkeys convenient and safe. There is an 8x10-inch window in the back for light, and a door (lath) in front for convenience of cleaning. There is also a board bottom (movable) in coop. The run is made of lath so close together at the bottom that the young turkeys can not get



through. These lath at the bottom can be made to slide, so one or two may be removed if it is desirable to let the turkeys out. The door in end is to let the mother hen out or in. The top of run is also made of lath. The turkeys can be fed in the run and not be disturbed by other chickens.—Ed.]

[Pepper for Turkeys.]

When I take young turks from the nest I give each a grain of black pepper. I feed some milk curd, with plenty of ground black pepper and a few scraps of stale light bread, about five or six times a day, with plenty of pure water.

I teach them to eat corn as soon as they are large enough, but never feed corn meal. I watch for lice, which I find on wings where large feathers start. That is why the wings droop. I grease with lard on wings where lice are, but never on head or body. I don't allow my young turks to get wet. Last year I didn't lose a turk. I find no more trouble raising them than chickens. A Farmer's Wife.

Liberal, Mo.

[We have great faith in black pepper for very young turkeys, especially during damp weather. Whenever a poult droops, give a grain of whole black pepper and then look for lice. In our grandmother's day they used to use black pepper for young turkeys.—Ed.]

THE DUCK.

The domestic duck is believed to be descended from the wild Mallard. The *American Standard* gives the names of eight breeds and ten varieties. The most

popular breeds are the Pekin, Aylesbury, Rouen and Muscovy.

Really there is only one popular variety, and that the Pekin. This is the breed used on all the great duck ranches of the country. It is a very quick grower and has pure white or creamy white plumage. Adult drakes should weigh eight pounds and ducks seven pounds.

The Aylesbury is an English importation and resembles the Pekin closely, excepting in color of feet and bill, which should be a pale flesh color instead of a deep rich yellow as in the Pekin. It is also a pound heavier.

The Rouen is of the same standard weight as the Aylesbury, but has a rather dark, varied plumage. The darks, especially, are very beautiful.

The Muscovys are heavier than any of the above. The standard weight for drakes is ten pounds and for ducks eight pounds. We have two varieties, the colored and white. When crossed with other breeds the offspring is a mule or barren.

Duck raising has become a leading industry in certain parts of the country.

Long Island, N. Y., raises and ships, probably, more ducklings annually than all other districts combined. Incubator rooms with a capacity of from 4,000 to 10,000 eggs at one time are common on Long Island. Tons of ducklings find their way into New York markets each spring. Five hundred to twelve hundred breeders are kept especially for eggs, and thousands of dollars is invested in the business. We have, really, more large duck farms than poultry farms, although the poultry farms are much more numerous, of course. Ducks delight in free access to water, although thou-

sands of Pekins are raised with only enough water to drink and none to swim in. While this is a fact, yet better results are usually obtained where the ducks have free access to water, especially during the breeding season. A duck will eat almost anything from a shoe string to lath nails, but if good results are expected good sound food, especially bulky food, should be given.

The Pekin is a very timid bird, therefore great care should be exercised in handling.

The duck house should be in two parts, one for feeding and one for roosting. No roosting poles are used, of course, therefore the floor should be well littered with straw or anything dry. The water should be given in vessels so that the bird can only dip its bill therein, or a swimming pond will soon be made around it. If a stream of water is at hand, then the yards can run down to it and a portion enclosed. A fence two feet high will confine them.

The Duck House.

If given their liberty they will not require any food from the owner for six months of the year. Feed very little hard food to ducks. They do not have a crop like a chicken, and hard food is not readily assimilated. Ducks can be allowed to range at all seasons of the year except when snow is on the ground. They will commence to lay from January 1st to April 1st, according to the food and care. If early eggs are desired then they will have to be kept reasonably warm and fed for eggs. Probably the average number of eggs laid per year by the Pekin is 100, although 150 is occasionally reported. Ducks lay early in the morning, seldom laying after eight o'clock, while the bulk of eggs are laid between five and seven

Food.

o'clock. Six eggs per week can usually be expected, although frequently they will lay 100 eggs in 110 days.

During the fall and winter the food may consist of corn meal, wheat bran and boiled vegetables—half the quantity should be vegetables. Scald this before feeding by mixing in the corn and bran while the potatoes are hot. Do not have it sloppy. As the birds near the laying period, meat in some form should be added, say from ten to twenty per cent. Grit is also very necessary, and green food should not be omitted during the laying season. Birds that have their liberty may be allowed to gather their own green food, but do not omit the meat during the laying season, but if the picking is fairly good they should not be fed so liberally as when confined. Never feed more than is eaten up quickly.

The Artificial Method.

The incubator is operated about the same with duck eggs as with hen eggs. One hundred and three degrees is the proper temperature, but let the tendency be rather under that degree than over it. They require a little more air than hen eggs in order to dry them down sufficiently, for the shell is thick and tough. The air space should be larger at the seventeenth day than in a hen's egg, but when they commence to pip, then they should receive a little more moisture. Test the eggs on the fourth and fifteenth days, and be sure to have the thermometer between two fertile eggs, as stated elsewhere. It is more important to remove the addled eggs at the last test than if hen eggs are used, for they are apt to explode and bring dire calamity to the machine and attendant.

They require a week longer to incubate than hen eggs, and the young duck will break the shell thirty-six to forty-eight hours before they get ready to come

out. A chick that can not get out of its shell alone will rarely amount to anything, but the duck seems to thrive as well when helped out as when he is able to get out himself. To help the duckling out, take off the top part of shell and he can be dumped out of the rest, but should he bleed leave him alone until he has absorbed all the blood. Never try to help him out unless you are sure he can not get out himself.

Ducks require the same degree of heat as do chicks. Start the brooders as given for chicks, and reduce it to 90° at the end of the first week, 87° at the end of the second week, and 80° to 85° at the end of the third week. After the end of the sixth week they are usually put into a "cold house." This can be built the same as a long brooder house without heat. They do not require heat after they are feathered out on the breast, unless it is cold weather, when a little heat is beneficial.

The Temperature.

Feed about the same as for chicks, only let there be more bulk, such as potatoes, cut clover, and, as they get older, feed cut green corn at noon.

The Feed.

The first feed—first three days—may be one part hard boiled eggs (infertile eggs) and three parts bread crumbs, and after that equal parts wheat bran, corn meal and boiled potatoes, with a little ground meat or scraps added. This food should be softer (at first) than for chicks, and the water should be handy, so that the duckling can take a little with each mouthful. It is very interesting to see ducks eat. They do not swallow like anything else we have ever seen. They seem to get it down by giving a number of spasmodic jerks. If water is not handy, they will often choke, and then they are apt to get the nostrils clogged unless they have plenty of water to wash

the bill in, but under no circumstance should they be allowed water to swim in until they are feathered, at least on the breast.

A good drinking fountain for young ducks is made by taking a gallon paint can well cleaned out. Punch a few holes with a nail half an inch up from the top or open end. Fill it with water and place over the opening an earthen flower saucer and quickly invert. The saucer should be about an inch larger in diameter than the can, thus the ducks will have half an inch of water only to "muss" in, and you will find this quite enough. Never give milk to ducklings, for they have a knack of sticking themselves all up with it. Rather mix it in with the feed in place of water. The feed should be scalded of course. Never feed corn meal exclusively to ducklings, for it is apt to cripple them in their legs and feet. Ducklings are much easier to raise than chicks and the eggs are more fertile, thus hatching a larger per cent. Early in the season the eggs, however, are not very fertile, especially the first few eggs laid. As the season progresses the eggs seem to become more fertile, and good results are assured. Of course we have had (in the above) the Pekin duck in mind, for this breed seems to be peculiarly adapted to the forcing process used on all broiler or duck farms.

Marketing.

The ducklings are marketed when about nine weeks old, when they do, and should, dress from 8 to 10 pounds per pair. The time to dress ducklings is when they are partly feathered out. Do not let the second crop of feathers start, for it will not only cause delay in dressing, but also reduce them in flesh. All large ranches have their dressers. The price paid is 5 cents per duck, and forty ducks are counted a day's work. They are dry picked.

Clean Houses.

The pens should be kept heavily littered with straw or, better, salt hay, for it is fine and soft. Ducks are very dirty things, or, rather, they have the knack of making things in general dirty—themselves included—therefore their pens, as well as the brooders, should be frequently cleaned out. A brooder house for ducks is built the same as for chicks—pens included—only the fences need not be over a foot high for young ones and two feet high for old ones. Ducks are enormous eaters. They are always on the lookout for something to eat. Fill them up, and in half an hour they will appear as hungry as ever. If it wasn't for their astonishingly rapid growth they would soon "eat their heads off," but as it is they will return a good profit on feed consumed.

An Experiment.

Mr. P. H. Jacobs, editor of the *Poultry Keeper*, once made an experiment to show the relative difference in growth between chicks and ducklings. Here is the result:

	DUCKLINGS.		CHICKS.	
	Lbs.	*Ozs.*	*Lbs.*	*Ozs.*
One week old	...	4	...	2
Two weeks old	...	9	...	4
Three weeks old	1	...	...	6¼
Four weeks old	1	9	...	10
Five weeks old	2	2	...	14
Six weeks old	2	11	1	2½
Seven weeks old	3	5	1	7½
Eight weeks old	4	...	1	12
Nine weeks old	4	8	2	...

As they approach maturity (after the eighth week) the ratio of gain begins to become proportionately less, while some were heavier than others. The ducks were kept in a small coop, and fed to demonstrate the highest point they could be made to attain; the purest Pekins being used for the experiment.

If the old stock is kept in confinement then five ducks to one drake is usually allowed, and twenty-five to thirty ducks can be kept in one pen. If given their liberty six or seven ducks to one drake will answer. Ducks are not as susceptible to in-breeding as hens, providing only the strongest and best specimens are used. If the flock is small then new drakes should be procured occasionally. Unlike hens, ducks are good breeders and layers until six or eight years old. Probably two and three-year-old ducks make the best breeders. Ducks frequently lay in the fall, thus surpassing the hen in productiveness. Ducks stand confinement very well. They do not stand much, though, for inactivity does not agree with Mr. Duck. He is always on the go; even at night he will be up and doing. Ducks do not scratch nor wander far from home. Nowadays (in Pekins) the keel duck is all the fashion. We often see show specimens with as deep a keel (breast bone) as the goose. While the standard weight is eight pounds for a drake yet they often reach ten to eleven pounds. The deep keel adds largely to the weight. The feathers of the Pekin command nearly as high price as do geese feathers, thus adding somewhat to the income. In fact these feathers are often sold for geese feathers. While running water is best for old ducks, especially during the breeding season (some raisers do not use any water except for drinking purposes), ducklings should never be allowed this privilege. Ducks make good incubators but poor mothers. Always set duck eggs under hens, and by following the above directions success can be had by those who wish to raise only a few each year. When running at liberty they are apt to pick up injurious insects

Breeding.

and die from the effect. Rose bugs are usually fatal to young ducks.

Noted Duck Districts.

The great duck-raising district of the United States, as we stated before, is Long Island, N. Y. The villages most noted in this line are Eastport, Speonk, East Moriches, West Hampton and a few others in their vicinity. The output of ducklings for the season of '95 was nearly one million, and nearly half a million duck eggs were sold for eating or hatching, besides the immense quantity used for hatching purposes at home. Probably the banner town is Eastport. It is but a small town, and about eight out of every ten of its inhabitants raise ducks for a living. Over 150,000 ducklings were shipped from there during the past season. The statement is made that the towns of Speonk, Eastport, Westhampton and Central Moriches, all of which are near each other, shipped 900,000 pounds of ducklings to market during the past season.

THE GOOSE.

The standard gives us six breeds, viz.: Toulouse, gray; Embden, white; African, gray; Chinese, brown and white; Wild, gray, and Egyptian, colored. The standard weight for the two most popular breeds is Toulouse, 20 pounds for gander or goose; Embden, 20 pounds for gander and 18 pounds for goose.

There are more geese raised in the West than in the East. Probably Rhode Island takes the lead in the East.

The China is considered the best layer and the Embden best for feathers, as they are large and pure white. A cross of the Toulouse gander and Embden goose makes an excellent young goose for market. Geese

derive most of their food from the water and pasture fields. They pasture much the same as cows. They can be kept in confinement if supplied with grass, vegetables and a little grain. They should be fed much the same as ducks. The goose usually lays between 20 and 40 eggs, and make good mothers.

During the winter they should be cared for about the same as ducks. Cooked vegetables and bran, together with clover hay, and a little corn during cold weather, will pull them through in good shape. They fatten readily, and care should be exercised as they near the laying period (March or April) so as not to have them over fat. As spring approaches and pasture begins to pick up, very little need be fed, but at night give them a feed of boiled vegetables, bran and a little meat. If confined, then feed the mash in the morning and wheat, oats, barley and corn at night, alternately. Give sharp sand and grit, and plenty of fresh water.

The first eggs can be set under hens. Put a sod in the bottom of the nest and fill in with a little loose dirt, shape up a little and cover an inch with cut straw. Five to eight eggs are enough for a hen. If it is desirable to make the goose lay a second litter she can be confined away from the nest when she shows signs of wanting to set. A few days will break her up usually. It takes about 30 days to hatch geese eggs. Geese usually lay every other day. Sometimes they lay at night and sometimes during the day. It is just as well to bring the goslings up by hand, especially if the weather is moderately warm. They can be kept in a soap box in the kitchen at night and allowed to run in a pen during the day. The pen should be moved to fresh grass every day so they can pasture. If possible sow some wheat, oats or

Hatching.

rye, and pasture them on that; they will do better so treated. For the first few days feed them on chopped boiled eggs mixed with stale bread, and finely chopped grass or cabbage. Nettles, if procurable, make the best of green food. They seem to be peculiarly adapted to young goslings. They should be chopped up fine. After the fourth day feed about the same as ducks. A mash of vegetables, bran, cornmeal and grass, or anything green, makes a good feed. They should be fed four or five times a day.

Always have separate houses for ducks and geese. Keep the floor well littered with straw or leaves and do not let it become filthy. They must have clean quarters to sleep in, especially during cold weather. During mild or warm weather they may be allowed to sleep anywhere they choose out of doors, except during the laying period and then they should be guarded so as to get the eggs.

Geese feathers are quite valuable. Indeed, many persons raise geese especially for this purpose. Geese should be picked about once in two months during the late spring, summer and early fall. It is not a cruel practice, for otherwise they will pick themselves and the feathers are thus lost. They should be picked when ripe, *i. e.*, when no blood is in the end of the quill. Never pick geese feathers when there is danger of drawing blood.

Feathers.

In picking it is necessary to protect the operator's person by drawing a stocking over the goose's head and down the neck. Also secure the wings by holding or tying them.

Many a small boy can testify to the biting or striking—with the wings—power of the goose. We have carried black and blue marks more than once from

coming into contact with their wings. Children should never be allowed to go near geese during breeding time. Picking geese too frequently or at improper times is extremely cruel, and any person who is cruel enough to do such a thing ought to have his hair pulled out so as to realize how it feels.

The picking should be done in a close room, for every little puff of wind will send the feathers flying. Remove only the smaller feathers. The larger ones should be left on, excepting five or six under each wing; this will keep the wing from drooping. The down should be removed only during very warm weather. The number of times during a season that a goose can be picked will depend on the climate, but for the North three times will be about all. Only pick when the feather is clear and not filled with bloody matter. About one pound of feathers will be obtained from the three pickings per goose, and these will sell at from 50 to 70 cents. When the goslings are about nine weeks old they can be picked. At the first picking all the feathers on the back and shoulders, and the larger one on the hips should be left. In about six or seven weeks they should be picked again and more freely. If we raise them for market, probably it would be best to pick only once, and that when they are from three to four months old.

CHAPTER VIII.

DISEASES OF POULTRY.

Poultry is subject to quite a number of diseases, mainly produced by lice, which sap the vitality, and improper feeding and housing. In the fall and winter season, colds, due to exposure, or more commonly draughts, are frequent, and these soon turn to roup or other diseases. We will take up the various diseases as they are suggested to us. In suggesting remedies we have drawn somewhat from various works on the subject, paying particular attention to simplicity of treatment.

Dr. Sanborn, in "Farm Poultry," describes it as follows: "The word roup is probably derived from croup, an inflammatory disease of the larynx, and trachea in the human biped. Roup is a purulent catarrhal affection of the air passages."

Roup.

It is not a difficult thing for cold to degenerate into roup, and it is one of the worst enemies that fowls are heir to.

Many seemingly trifling things or conditions may produce roup, viz.: Draughts, impure, close air, damp, unclean houses, small cracks in walls near roost poles, improper food, filthy water, stagnant water, any form of improper handling which tends to lower the vitality, thus causing the body to be susceptible to disease; overfeeding or underfeeding, or a leaky, damp house. Roup is a very contagious disease, and a bird that once

has it in a bad form will never wholly recover, and although apparently well, yet the offspring will be very susceptible to it. We have seen flocks of two to three hundred fowls completely prostrated. One flock seemed to recover as spring opened, only to take it again the following fall. The only sure remedy is the ax, and this should be applied just as soon as we are sure of the disease. As soon as a bird shows any symptoms of disease it should be separated from the flock and given a clean, dry house by itself.

Symptoms.—Roup commences with a catarrhal inflammation of the mucous membranes of the eyes and nostrils. The discharge is at first thin; as the disease progresses respiration becomes difficult, due to a clogging of the nostrils and throat. A closed eye may not be roup but simply due to the fowl roosting near a crack or nail hole in side of house. The best plan is to cover the outside and inside of roost with tarred paper and close up all ventilators in freezing weather.

The most dangerous form commences by a swelling of the head and a strong-smelling breath. If not treated the fowl will die in from six to twelve days. A mild case of cold—more properly catarrh—will run along for several weeks, but with mild treatment and proper food can be cured in a few days.

Treatment.—First remove all causes of colds, such as cracks, overhead ventilators, dampness, etc. If the fowls sneeze and shake their heads it is best to commence at once and add spongia to the drinking water (we are inclined to the homeopathic remedies for all diseases of poultry), say 25 to 40 drops of the tincture to a pailful. Continue this treatment until

cured. Should one or more birds seem to be worse than the majority remove them to separate quarters.

Dr. Woods gives an excellent roup mixture, as follows: Tincture of aconite, ten drops; tincture of spongia, ten drops; alcohol enough to make one ounce. Put a teaspoonful of this in a quart of drinking water daily.

Should the head swell and cheesy matter form in the roof of the mouth, with strong breath, then the bird will have to be bandled. The kerosene remedy is a good one. Take a quart can and fill it with the oil. Take the bird by the feet and neck and plunge the head in the oil; hold it there a moment and withdraw; immediately wipe the head dry with a soft cloth to prevent the feathers coming out. For sore eyes we use a simple eye wash twice a day and bathe the head with glycerine or carbolated vaseline. At the same time administer a small liver pill until the bowels are moving freely. Feed the birds on bread and milk. Mr. A. F. Hunter, editor of *Farm Poultry*, recommends the following mixture for colds and roup: "A tablespoonful of clear lard, half a tablespoonful each of ginger, cayenne pepper and mustard; mix well together and then add flour until the whole has the consistency of dough; roll into slugs about the size of the top joint of the little finger, and put one down the patient's throat. The dose can be repeated in twelve or twenty-four hours, according as the case seems to need it. For swelled head we bathe with a glycerine-turpentine lotion made of one part spirits of turpentine to six parts glycerine; and for sneezing colds and swelled heads combined, use both remedies. If the patient does not show signs of improvement within three days after beginning treatment, take off its head and bury or burn it." Mr. P. H. Jacobs says: "Dissolve a teaspoonful of chloride

of lime in a pint of water and give the bird a teaspoonful of the solution. Burn tar and turpentine in the house after the fowls have gone to roost." A cold can be easily cured, but if not taken in hand soon then the best remedy is the ax, as we stated before.

If the fowls show signs of colds wash the drinking vessels thoroughly each morning with hot water to which a little carbolic acid has been added. Nearly all diseases are transmitted through the drinking water. Roup is not necessarily contagious of itself, but the germs are transmitted through the drinking vessel; thus it is wise to separate all sick birds.

Cholera.

The much-dreaded disease, cholera, is happily very rare. It affects the mucous surfaces and is always accompanied by diarrhea. Cholera soon runs its course and the victim usually dies in from eight to forty-eight hours from the time of contracting it. It is seldom seen here in the true Asiatic type, but nevertheless it is severe enough as it is. It is seen usually during warm and damp weather, especially if the surrounding conditions are filthy. Cholera never enters a flock that is properly housed and fed and everything clean and sweet, especially the drinking water, unless brought by carelessness, like introducing an affected bird, or even brought home from a neighbor's by a dropping adhering to the foot and thus getting into the feed or water. There is no breed that is proof against cholera. Age is not proof against its ravages, but young, growing stock will not contract it as readily as older. Freezing weather puts a stop to its ravages, at least for a time. When first attacked the bird seems mopish, picks out warm corners to sit in; the feathers are ruffled, the wings droop. The feathers round the vent are stuck together, due to a di-

arrhea discharge. The feet seem to drag when walking and the eyelids close. The bird has no appetite, but a feverish desire for water. The discharge at first is slightly thick and soon becomes watery and frothy, and later on is slightly bloody. The mucous membranes of the body become inflamed and a frothy discharge comes from the nostrils, eyes and mouth. The comb turns to a dark or purplish color.

TREATMENT.—As the disease is so rapid and severe, we will have to be ever on the alert and immediately remove every bird that shows signs of diarrhea to separate quarters. Give the entire premises a thorough cleaning, especially the drinking vessels. Fill in all low places where water does or may stand. Whitewash all buildings thoroughly inside and sprinkle air-slaked lime freely inside and outside of roost. Sprinkle a little over the birds at night, also. Dr. Sanborn recommends this mixture in the drinking water for the diseased birds: "Water, one quart; spirits of camphor, one-half teaspoonful; sulpho-carbolate of zinc, one-fourth ounce. Give the apparently well birds for drink: Water, one quart; sulpho-carbolate of zinc, one-eighth ounce. If there is violent diarrhea, give every two hours a tablet or pill of Dover's powder (one grain each). This will relieve some of the pain, and lessen the number of discharges. A diet of meat juice is best for a cholera case."

A homeopathic remedy is arsenicum iodatum, or arsenicum, 6, in the drinking water. In cleaning the roost about six inches of the earth should be removed and this space filled in with fresh, clean sand. It is not wise to keep yards so crowded that grass or weeds can not grow. If the yards are not in grass, then once a year they should be spaded up and rye or crimson

clover should be sowed. This will purify the ground. Poultry should never be kept on low, damp soil. A high and rather sandy soil is preferred.

Indigestion, or dyspepsia, is often taken for cholera. It is usually produced by overfeeding and poor housing. Nature's method is a little at a time and often, until by night the crop is, or should be, full. Man's method is, usually, to fill up the crop in the morning and keep it full; this is the main cause for indigestion. Improper food is another cause, especially lack of grit or green food. Chicks, as well as grown fowls, suffer from this, therefore care in feeding and housing should be exercised. In this condition the bird will seem droopy, and constipation may result or a hardening of the crop.

Indigestion.

TREATMENT.—Proper housing and care, with an absence of food for a day or two. Supply grit and broken charcoal, then feed often and sparingly, with plenty of outdoor exercise. Two teaspoonfuls of sulphate magnesia in a quart of drinking water is a good tonic for a week or two. A teaspoonful of fenugreek in soft food for every ten hens is also good.

This is usually seen in the fall of the year in young, growing stock. Damp weather seems to suit it. The sores or ulcers usually appear on the head, face and underside of wings. If the inflammation extends to the eyes it may result in the loss of one or both.

Chicken-pox.

TREATMENT.—Carbolated vaseline is excellent to apply twice a day to the sores. Feed a mash rich in meat and green stuff. House securely, especially on damp days.

Dysentery.

A too heavy ration of meat will bring on diarrhea. If diarrhea is neglected it will run into dysentery. The discharge is watery and streaked with blood.

TREATMENT.—Keep the water dishes clean and give ten grains of sulphate of magnesia, followed in three hours by five grains Dover's powder. If not checked give two grains Dover's powder morning and night.

The Liver.

Diseases of the liver are caused by overfeeding, especially of fat-producing foods, such as corn, etc., or by feeding too much stimulating food or spices.

CONGESTION.—This is the first step leading to inflammation. It is caused by the obstruction of the free circulation of the blood due to diseased crop, gizzard or bowels.

SYMPTOMS.—A watery diarrhea, from brownish to yellow in color; rough plumage. The comb turns from a purple to almost black in color. The bird cares little for food or exercise.

TREATMENT.—A teaspoonful of castor oil once a day, and a diet of cut-clover hay, sprinkled with wheat middlings. If this condition is not soon checked it will pass on to

INFLAMMATION, which is usually fatal, and little can be done for the patient.

SYMPTOMS.—Diarrhea of a yellowish color, poor appetite and increasing thirst. Breathing is slow and hard, while the bird gradually wastes away.

TREATMENT.—put a teaspoonful of tincture nux-vomica in a pint of drinking water. Feed as given above. Castor oil, as given above, may prove beneficial.

ENLARGEMENT.—The too liberal feeding of fattening foods, with little exercise, is the main factor in this disease. Old fowls are more susceptible to it than young fowls, because they lay on fat more readily.

SYMPTOMS.—General sluggishness. The fowl preferring to sit on the ground and later refusing to go on the roost at night.

TREATMENT.—Feed as before stated. For drink, put one-half teaspoonful of powdered muriate of ammonia in a pint of water. Feed sparingly and reduce fat.

Probably we would better consider these two diseases here, as they are more or less caused by improper food.

Constipation and Diarrhea.

Constipation is not very common and is usually caused by lack of green and bulky food. Increase the amount of bran in the feed and supply green food, and give clover hay chaff (loose parts) on the floor of pen. Diarrhea in brooder chicks is usually caused by too low a temperature, thus giving the chicks colds on the bowels. Be sure the heat is right first. If the chicks spread out and seem to be contented at night, then all is right. If they crowd and cry, then look out for deaths in the morning. Remember that the proper degree of heat is of more importance than the food. Diarrhea is also caused by feeding too much bran or coarse and half-cooked food in the mash. A sudden change in the weather may cause catarrh of the bowels. If the food is all right then it must come from colds due to lack of heat or draughts. Keep the chicks dry and warm. Add a handful of linseed meal to, say, six quarts of the feed and put a tablespoonful of tincture of iron to each quart of the drinking water. Do not feed sour milk to very young chicks, and leave plenty of grit handy. The best way to feed milk is to boil it and add one-fourth water. Milk is one of the

best foods that can be used, but care should be exercised in cleaning the drinking vessels. They should be washed out in cold water and then scalded every day.

Diphtheria is not only dangerous, but can be transmitted direct from one bird to another. Canker is a mild form of diphtheria. It is a cold-weather disease, not necessarily contracted by filthy or damp housing.

Diphtheria and Canker.

Symptoms.—The feathers are ruffled and the bird seems to be sleepy and showing signs of catarrh. The neck seems to be stiff. Soon there is a slight discharge from the nostrils, and more or less of a sticky substance from the mouth. The mouth will be found to contain this sticky or stringy substance, especially well back towards the throat. This substance soon becomes thicker and vile smelling. The back of the mouth and throat first becomes red and then purple. The membrane finally runs together, thus closing the opening of the larynx, thus suffocating the bird. This disease usually runs from six to twenty days.

Treatment.—The bird should be moved to a room that can be kept warm night and day and the atmosphere kept moist by boiling water. Keep the discharge wiped off of the mouth and throat, and with a quill blow sulphide of calcium, in powdered form, over the mucous membrane three or four times a day. If the bird is able to swallow, put a grain of calcium sulphide in a little warm mash and give before each application of the powder to the throat.

Canker is a mild form of diphtheria. The bird seems to be dumpish and has a desire to swallow, even when not eating. The best thing to do is to blow, with a quill, finely pulverized chlorate of potash on the sore places in the mouth.

The Oviduct.

INFLAMMATION OF THE OVIDUCT.—Old hens are more subjected to this disorder than pullets, for the simple reason that they lay on fat more readily than do pullets, and this is the main cause, together with the over-feeding of spices, etc. This disease usually follows the egg-bound condition.

SYMPTOMS.—The bird suffers greatly while in this condition, and there is at first a violent straining, which gradually subsides as exhaustion follows, with death not far off. The vent is hot, but as the disease progresses the fever gradually runs down. The wings droop and feathers are ruffled or puffed out.

TREATMENT.—Act quickly with this disease and give one-half teaspoonful sulphate magnesia in a tablespoonful of water. Examine the egg passage with an oiled finger and remove all foreign substance, such as an egg shell, etc. Keep the bowels well opened with the magnesia or castor oil and feed on a soft mash.

Egg-Bound.

This disease, like inflammation, is caused by overfeeding on fattening foods, thus crowding the internal organs by the accumulation of useless fat. The liver is usually enlarged and the whole muscular system weakened by fatty degeneration. Thus the muscles are not only weakened, but quite easily ruptured.

The muscles around the egg passage (oviduct) are likewise weakened, and when an extra large egg is passing or fright causes an extra pressure upon the muscles, the passage may be torn open and the egg passes into the abdominal cavity, and death follows. Hens found dead on the nest are killed by this same fatty degeneration. The strain caused by laying is too much for the

weakened heart. Misshaped eggs, soft-shelled eggs or extra large eggs all point to too much fat.

SYMPTOMS.—The bird goes around with tail depressed and occasionally going to the nest as if to lay. She will be found straining and with an oiled finger we can sometimes feel the hard substance within the vent.

TREATMENT.—Dip the finger in castor oil and anoint well the inside of vent. If the egg can be felt it should be broken and the pieces removed, after which give a teaspoonful of linseed meal mixed with bread. Little can be done in this case, as the cause is overfatness. Feed sparingly on a mash of cut clover bran and middlings until hen is reduced in flesh. Plenty of exercise, scratching, after recovery, is necessary.

The Leg.

Leg weakness is especially prevalent in brooder chicks, and is the result of high feeding, thus producing rapid growth. A lack of bone or food rich in lime, together with little exercise, is largely the cause. The chick is apparently well in all other directions—eats well, but can scarcely stand, and often moving around on its knees.

TREATMENT.—Feed more finely-ground bone, clover hay, etc., and less corn or fattening food. Provide exercise for those able to take it. This condition is not dangerous if it is not continued too long. One grain of quinine per day for each bird, given in form of a pill, is an excellent help.

RHEUMATISM.—This disease is apt to affect the whole body. The joints swell, and the skin over them is red and hot to the touch. It is caused by exposure to cold or dampness, the feeding of sulphur during damp weather, or lack of green food or too much nitrogenous

food. It usually attacks the bird in the legs. Young turkeys are especially affected with rheumatism, also young chicks to a less extent. Old fowls are occasionally subjected to it.

TREATMENT.—Place the affected birds in a dry, clean room with board floor. Feed on a variety of green stuff, such as cabbage, lettuce, carrot tops, beet tops, etc. Give fresh water, so the birds can not get it on themselves or the floor. Rub the legs with a soft cloth dipped in extract witch-hazel, and then wrap them in flannel. Also put twelve or fifteen grains of iodide of potassium in the drinking water.

Cramps. This usually attacks young chicks and is caused by crowding, too little exercise, or too much heat. The remedy is to correct the conditions that produce it.

Scaly Legs. This is a very common disease and is purely the fault of the owner. In advanced stages it is also dangerous and always unsightly. It is caused by a minute insect burrowing under the scales of the shank and causing them to enlarge. One fowl can spread the disease to all; even half-grown chicks can take it, although fowls are the ones most affected.

TREATMENT.—A mixture of sulphur and lard, rubbed on the legs once a week until cured, is good. The quickest treatment is kerosene. Take a quart can, fill it with kerosene and dip the legs of the affected fowls therein. Have the can deep enough to cover all the enlarged scales, and hold each leg under the oil from one to two minutes. Repeat after one week. This treatment is too severe for chicks.

Bumble-Foot.

The foot becomes puffed and will be found to be hot and tender, and matter gathers beneath the thick skin on the sole or bottom of the foot. It is usually caused by birds jumping from high roosts on a hard floor; the heavy breeds are, therefore, the ones most afflicted.

TREATMENT.—If taken in hand before matter has formed, the foot should be washed in strong vinegar and then painted with iodine. Keep the bird on a soft straw bedding. If matter has formed, then a sharp, slender knife should be used. Press out and wash out with warm water, to which a few drops of carbolic acid has been added. Apply nitrate of silver—ten grains to an ounce of distilled water.

Broken Bones.

If on the shank, bind with two or three turns of a wide band. Place wooden tooth-picks up and down around the broken place and give two or three more turns of bandage; cut off and sew up. If the wing or thigh is broken, cut off the head and serve as pot-pie. (Not the head.)

Apoplexy.

The causes for apoplexy are either a week condition of the blood vessels of the brain, or a great pressure on them, thus causing a break letting out the blood into the brain. Overfat hens are in a good condition for apoplexy; thus they will be found dead under the roost in the morning. A too hearty meal may cause it, or violent exercise caused by a fright from dog or man. Straining in laying an extra large egg often ruptures a blood vessel in the brain. Extreme heat in summer may also cause it.

TREATMENT.—If seen in time, bleed the bird by cutting a vein on under side of wing. The proper thing

to do, however, is to keep the birds in proper condition by giving a varied diet and plenty of exercise. Avoid all excitement and do not let them get overfat.

The Crop.

IMPACTION.—The crop often becomes impacted with food or trash picked up by the fowl. If this mass gets dry and hard, it can not pass into the gizzard and, unless relieved, the bird will starve to death. This state of affairs is caused by the bird swallowing long pieces of hay or dried grass, or by giving a heavy feed of cracked corn or other grains. The bird fills the crop, and when this mass swells there is not room enough for it to work. Sometimes a large piece of wood or bone will get across the outlet to the gizzard and thus block up the passage-way. True, every time a bird swallows long substances or eats too much, impaction does not follow, yet it is apt to, especially if the bird is not in prime health.

TREATMENT.—The crop must be softened by giving a tablespoonful of castor oil and then gently working the crop with the fingers, especially working the mass back from the opening to the gizzard. Take the bird by the legs and try (if the mass is softened) to work the food —a little at a time—down and out of the mouth. If not successful then the crop will have to be opened. Have some one to hold the bird. Pull out a few feathers along the center of crop, in a line with the breast-bone, and with a very sharp knife make a cut, about an inch long, of the outer skin, push this slightly aside and cut through the crop about three-quarters of an inch long. Remove the contents with a small blunt instrument, after which insert the finger and make sure everything is out, especially away from the passageway to the gizzard. Now take three or four stitches

in the crop, making each one separate, then the same in the outer skin, using fine white silk or cotton. Place the bird in a dry coop and feed lightly on soft food for a week.

Inflammation.—This is caused by the fowl eating irritant material. The bird seems restless, occasionally holding the head down and trying to vomit; breathing not regular. We seldom know just what the bird has been eating, so the only thing to do is to try to work the material down and out of the mouth, first forcing warm water into the crop. If the crop can be emptied then flaxseed tea can be given for drink and feed lightly for a week.

Enlarged Crop, or slack crop, as it is sometimes called. This is usually caused by irregular feeding, thus causing the birds to overload the crop when they do get the food. After awhile the crop will become weakened and lose its power of contraction. It hangs down and has not the power to contract and thus force the food into the gizzard. The only thing that can be done is to make a long slit in the crop (as in impaction) and cut out on each side of the opening a piece so the opening will look like this ( ) and then ew up as above. The piece removed should be about two inches long by one or two inches wide, according to the size of the crop.

Bronchitis.—This is often confounded with pneumonia, but is really a disease of the mucous membrane lining the bronchial tubes. It varies from a slight cold to a copious outpouring of mucus, so that the fowl is in danger of strangling.

The Lungs.

This disease is more prevalent in the fall and winter. Sudden changes in the weather, too much glass in the house so that it becomes very hot during the day and cold at night. Dust or irritating matter, such as air-slaked lime, or if the birds are the offspring of roupy parents, damp currents of air may also produce it. When suddenly attacked there is an increased heat and dryness of the mucous membrane and intense thirst. A whistling noise in breathing can be heard, but as the disease progresses the whistling sound will give place to a rattling sound.

TREATMENT.—In the first stages of bronchitis there is nothing better than aconite—say one drop of the tincture every hour for four or five hours and then one drop every three hours. If this treatment does no good then Dr. Sanborn recommends a pill called "Dumas Antimalarial," made of strychnine, iron and quinine. This is recommended to cure nine-tenths of such cases. In all cases where the mucous membrane is involved the patient should be kept in a warm, moist atmosphere. Keep water boiling on the stove. Give a hot mash of ground grains, half of which should be bran.

Pneumonia.

This disease is the inflammation of the air cells of the lungs, and is apt to prove fatal. Some writers also claim that it is contagious. Pneumonia comes from a cold or exposure to damp, cold storms, keeping the fowls or chicks too closely housed or babying them. Dry cold does not hurt fowls. Fowls must have exercise in the open air, and when stormy, or snow is on the ground, then open a window away from the windy side of the house dur-

ing the day time. It is all right to close the house up tightly at night if cold weather.

Symptoms.—The bird is hot and feverish, with short, labored breathing. The bird does not move around but stands with wings down, and its only effort is to get its breath, which is no small matter.

Treatment.—Keep the bird in a warm, moist atmosphere. Put tincture aconite in the drinking water, and every three hours give one grain phenacetin and one grain sub-phocarlolate of zinc mixed with bread crumbs enough to make a pill. Feed on raw egg and milk. If the bird shows signs of recovery then feed a mixture of soft feed and keep quinine or nux vomica in the drinking water.

Fungoid.—This is a contagious disease. At first a few small swellings or ulcers appear on the comb—occasionally on the wattles also. At first they are hard, but soon become soft and break and discharge a yellowish liquid. Other ulcers appear and so continue until the head swells and the whole head and neck is affected. If the disease is far advanced the birds had better be killed. Separate all sick birds. Tie the legs so that the bird can just walk around but can not scratch the head. Sponge the head often with warm water to which a little carbolic acid has been added—say a teaspoonful to a cup of water. Feed on soft food to which a little pepper has been added.

The Comb.

Black Rot.—The comb, especially the points, become purple, which soon changes to black. It is a sort of dry rot, and if the bird lives long enough, the comb—part of it—drops off. Remove the bird to clean,

dry quarters, with plenty of pure air and sunshine. Put one-half teaspoonful muriate of ammonia in a pint of drinking water. Paint the comb three times a day with a mixture of one ounce of water, one-half ounce glycerine and five grains of carbolic acid. Feed on soft food with plenty of green food handy.

White or Scurvy Comb.—This is a fungus growth, and the comb seems to be covered with a whitish dust. It soon spreads to the head and neck, causing the feathers to drop off from the affected parts. Sulphur in the drinking water is recommended, or paint the comb with a mixture of sulphur and tar ointment. Give a dose of castor oil.

Injuries to the Comb, caused by fights or otherwise, need no attention, except in severe tears or cuts. Wipe away all blood with warm water, to which a little carbolic acid—half a teaspoonful to cup of water—has been added, and take a stitch or two if the cut is severe. Remove all birds that meet with mishaps in order to protect them, and thus prevent the fowls from learning to pick at each other's combs.

Frost Bites.—The comb, when frosted, turns dark and then black, and in time drops off. This is very painful, and the fowl is of no use until well. Never take a bird with frosted comb into a warm room, but try to thaw out the frost gradually by removing to a room but little above the freezing point, and twice a day anoint the comb with carbolized vaseline. During freezing weather a fowl will often freeze its wattles by getting them wet while drinking and then going out of doors. Keep the birds housed during such severe

weather and give warm water to drink, and in such a manner so that the wattles will not get wet. The tall comb varieties can not stand as severe weather as the low-comb varieties, but even with these the wattles may freeze. It is pure carelessness on the part of the owner when combs are frozen. It puts a stop to all egg laying.

Debility or Going Light.

This is quite common, both in chickens and fowls. It is no particular disease, but a general weakness due to improper handling or feeding, and yet one chick will have it while the rest of the clutch will be all right. It is probably some inherent weakness. A good condition powder mixed with the soft feed is good. Have plenty of grit, charcoal and bone handy, also.

VERTIGO.—This is due to brain pressure. The bird seems dizzy, and will turn round and round. Derangement of the digestive system also has an influence this way. It is usually seen with over-fat hens. In severe attacks the bird will whirl around and then fall to the ground.

TREATMENT.—Give a good dose of castor oil and feed on light diet of largely cut clover and wheat bran.

Pip.

This is not a separate disease, but is caused by the fowls being compelled to breathe through the mouth, the nostrils being closed. The tip of the tongue becomes dry and hard. Treat the disease that causes it and bathe the tongue with glycerine. Do not remove the hard lump from the tongue.

Little attention has heretofore been paid to worms in fowls. The United States Agricultural Department has lately published a bulletin on worms in fowls, especially worms in turkeys. In some sections of the country it is almost impossible to raise turkeys on this account. They play a far more important part in poultry raising than is generally known. There are two kinds, viz.: roundworms and tapeworms.

Worms.

ROUNDWORM.—These worms are from a third of an inch to five or six inches in length. They are white in color. These worms, while quite common, do little harm unless present in large numbers. They may produce "stoppage" of the bowels, diarrhea, or, by taking large quantities of food, weaken the bird.

TREATMENT.—Every other morning give a two-grain pill of santonine followed by a half teaspoonful of castor oil. Remove such fowls, so other birds will not pick up the worms that may pass.

TAPEWORM.—Some writers affirm that tapeworm in fowls is identical to the tapeworm found in cats. The bird may grow thin without apparent cause. If the joints of the worm are seen in the droppings give five drops oil male fern in a teaspoonful of sweet oil. Give this early in the morning, and about two hours thereafter give the morning feed or mash and a spoonful of castor oil for each bird.

With this disease the fowl loses all control of the neck and it hangs loosely down, the head often resting on the ground. This is largely confined to portions of the south, and is caused by fowls eating maggots. Give four or five drops of turpentine in a spoonful of water.

Limber Neck.

Feather Eating.

This is not a disease but rather a habit. Some breeds learn this habit more readily than others. It is especially common among yarded fowls, and is the direct cause of overfeeding, therefore, lack of exercise. The fowls are not compelled to work, and too many in one pen make work impossible. Not feeding a variety of food, thus causing the fowls to long for something to sustain all portions of the body, is another factor. Fowls properly fed and given exercise will never acquire this habit. One bird in the flock will soon teach others to follow suit.

TREATMENT.—Feed on a balanced ration with plenty of green food, meat, etc. Provide scratching pens and feed sparingly and make the birds work. Do not overcrowd the pens or runs. Remove such birds—if only a few have acquired the habit—to a separate coop. Put tar on the feathers around where the birds pick, or bitter aloes.

The poultry bit, lately placed on the market, is a good thing; or take a small piece of metal one inch long and one-sixteenth of an inch thick, fasten a fine wire to each end and place in mouth, running the wire through front of comb and fasten. Have it small enough, so the bird can pick up corn, but so it can not quite shut the mouth. A week or two will usually cure the habit.

Egg Eating.

This is another vice, and the same causes lead to it as in feather pulling. It is also caused by hens laying soft or thin-shelled eggs, and when one is broken the hens will eat it, thus forming the habit. Be careful to gather all the eggs each night and provide sufficient nests, so there will be no

crowding while laying. Do not feed egg shells to hens unless crushed fine. Place nests in dark places, and so protected that the hen can hardly see the egg after laying. Kill all inveterate egg-eaters.

Gapes attack small chickens, and are caused by small red worms attaching themselves to the walls of the trachea or windpipe and becoming so numerous as to close up the passage, thus choking the chick. This trouble, not only found in chicks but in the young of all wild birds, has been known for more than one hundred years. Thousands of chicks die each year from this cause. This trouble, or disease, is prevalent during warm, especially warm and moist weather. The earth worm is supposed to at times carry the gape worm eggs within its own body. The chick picks up the eggs, or the earth worm containing eggs, and the eggs coming in contact with the heat of the body hatch, and the worms find their way to the trachea.

Gapes.

Dr. H. D. Walker has found that if newly hatched embryos were introduced into a chick, that in eight days full grown gape worms would be found in the trachea. When well grown the worms are about one-half inch long and appear to be double; in reality they are two worms, male and female, permanently united for breeding. The eggs are deposited when, from various causes, the worms are torn apart or the female is ruptured, thus letting out the eggs; the parents die of course.

Symptoms.—At first there is a slight cough not unlike a cold, and in a few days the chick will throw up its head at every breath and gasp or gape, thus giving the name to the disease. This disease acts very much

like bronchitis, etc., but an examination of the windpipe will show what it is.

TREATMENT.—There are nearly as many remedies as there are people who have this trouble to contend with, and we will give a few remedies that have been tried successfully on our own farm and others. The horse hair, stripped feather or silver gape worm extractors will remove the worms from the windpipe, but this requires individual handling and is slow.

Tie some assafœtida in a thin cloth (about the size of a small marble) and keep this in the drinking water for a few days (one quart of water). Turpentine or carbolic acid is also good to put in the drinking water.

Be sure to fill up all holes where water is apt to collect after storms, for these places are good breeding grounds for gape worms.

Some have success in this way: take a soap box, place therein a dozen chicks and tie over the top a thin coarse cloth; dust through this some fine air-slacked lime. In breathing this the chicks will be forced to cough violently, and probably the worms relax their hold a little. Many worms are thus coughed out and the chicks recover.

Never try to raise chicks on infected ground. Remove the coops to new ground, and if the infected ground is left unoccupied for three years the worms will die out, or if new ground is not to be had then build a chicken yard, the yard should be twenty or more feet square for each one hundred chicks. Make the fence tight and place the chicken coops therein. Before the chicks are due spread a bushel or two of air-slaked lime over each twenty by twenty foot yard. This will kill the worms, and after the chicks are eight or ten weeks old they may be allowed to run about at

will. We recommend this method to all who have trouble of this kind.

Onion tops mixed freely in the food for the little chicks will often prevent them from getting the gapes.

Lice.

We have tried to describe nearly all poultry diseases and suggest remedies for them, but prevention is the best of all, and when we prevent the ravages of lice we aim at the root of at least half the diseases to which poultry is heir to. True, lice may not be the direct cause of the special disease, but they are at the root of the matter by sapping the vitality (blood) of the fowls, thus weakening the system and causing the birds to be susceptible to any special disease that may be in the air. The keeping down of lice is a constant warfare.

The lice that give us so much trouble during warm or hot weather are the little red mites and the little but active gray or spider lice. This latter variety is the one that gets all over a person when working in the roost. These two varieties do not stay on the hens during the day time but they make life a burden during the night. The little red mites are more easily seen during the day time for they cling in bunches under the roost-pole, in the cracks of the house and around the nests. The large body lice are, like the poor, always with us. These stay on the hens day and night. These are brownish. There is also a large gray louse, called head lice, that stay on the head and neck. There is yet another kind of body louse. It is long but thin and more of a gray color.

The red and spider lice are the easiest to deal with and if our roosts are lousy it is our own fault. Just as soon as warm weather sets in in the spring we should

commence. In the first place have everything movable in the hen roost, nest, boxes, roost poles and dropping board. Thoroughly clean out the house and after shutting it up tightly burn sulphur in it for several hours. Then take a quart can of kerosene oil and, armed with a large paint brush, paint everything in the house, taking pains to get the oil well into the cracks. Paint the walls of house around the roost poles and nest boxes and "slap" the oil well into the cracks. After this is thoroughly done whitewash the whole house inside. One whitewashing is enough during the season. If the roost poles, dropping boards, nests and sides of house are thoroughly gone over about once a month with kerosene the first battle will be won. The body lice are harder to get at. There is a certain liquid preparation, we understand, that is guaranteed to kill all the body lice by simply painting the roost poles and dropping boards. Persian insect powder or Death to Lice will kill the body lice, but each fowl will have to be handled. At night go into the roost and take each fowl by the feet—head down—and rub a few pinches of the powder well down in the feathers on the neck, wings, fluff and around the vent. In about ten days repeat the operation, so as to kill the new batches, and you can be sure that the hens are free from lice for a month or two at least.

Provide good dust boxes with plenty of fine dry road dust therein and the hens will be able to keep down the lice to a certain extent. There is no use in looking for a large egg yield when the fowls are nearly devoured by lice. The chicks suffer even more from this cause than do the older fowls because they are not strong enough to withstand the strain. Half the chicks that die the cause can be traced to lice. Turkeys are even

more susceptible to the ravages of lice than are the chicks.

Head lice are especially destructive to chicks and young turkeys. If the chicks grow thin, or if the feathers are rough, or if they seem to be dizzy headed, look for lice. They are there whether you see them or not. Look also on the top side of the wing, down between the large feathers, and they will be seen.

Commence to fight lice when the hen is first set by thoroughly dusting her with insect powder and sprinkling a little in the nest. Repeat this in ten days and again on the eighteenth day of incubation. Dust the hen and chicks every two weeks, or lard can be safely used, also sweet oil. Put a little—do not use much—on the head and neck, under the wings and around the vent of each chick every two weeks. Don't try to raise fine poultry and lice at the same time, for it can not be done. Decide first which it will be, and then go ahead. More young turkeys die each year from the ravages of lice than from all other causes put together. Don't neglect the head lice especially. One big fellow is enough to kill a young turkey.

CHAPTER IX.

CAPONIZING.

While the United States occupies the front rank in poultry culture, yet caponizing is little practiced. Capons make far better eating than any other form of poultry meat, yet we have never acquired that fondness for them that the English, French and Chinese have, owing, probably, to the art not being generally understood; therefore, capons have never been properly forced upon the market. A few years ago green or young ducks received little attention, and, therefore, few buyers; but with the advent of the incubator the industry developed. Green ducks were forced upon the market by the ton, and, strange to say, prices steadily advanced until now 40 cents per pound is realized for the earliest shipments. Why? Simply because people have acquired a taste for duck meat, because of their abundance.

We venture to predict just such a healthy demand for capons, providing caponizing becomes generally practiced. Caponizing improves the flavor of the carcass, and the meat is also finer grained. This is probably accounted for in the fact that capons are of a very quiet disposition, never fighting or taking vigorous exercise. The size is also increased about a third, and frequently these mild birds are used to mother a batch of chicks. They de-

Create a Demand.

light in the company of small chicks and make excellent mothers with very little training.

The object, of course, is size. The larger the capon, the greater the price per pound. Large capons bring from 20 cents to 25 cents per pound, while small or slips bring less, therefore the larger breeds should be used. Plymouth Rocks, Cochins or Brahmas make good capons, although any breed, excepting the large comb varieties, will do fairly well.

Size Desirable.

An expert can perform the entire operation in two minutes or less. The operation is painful while it lasts, so is dehorning of cattle; yet with cattle the advantage thus derived, in an additional flow of milk and quiet in the barnyard, more than compensates for the operation. Thus, in caponizing, the quiet disposition of the always pugnacious cocks will easily compensate for the pain thus caused. The higher price derived, added to the increased weight, ought to compensate the owner for the trouble of caponizing. We all know that it is almost impossible to keep a large number of cockerels together; especially if yarded. Caponize these same cockerels and they will live together far more quietly than the same number of hens.

Is Caponizing Cruel?

Slips are partly caponized fowls. They are often as pugnacious as cockerels, but usually do not grow so large as a full capon, neither is the flesh so tender and juicy. This is caused by leaving some of the testicle within. With proper instruments, few slips will be the result. If a small particle is left within, it can be removed by spooning it out with a proper instrument.

Slips.

The cockerels to be caponized should be without food

for twenty-four hours before the operation. For the next few days they should be fed very sparingly on soft food, after which they can be fed as other fowls. For a month or two after the operation they will be very ravenous, but this will gradually subside. If confined, feed green food, cut bone or meat, or grit and powdered charcoal, with plenty of fresh, clean water. Also keep them free from lice. Ducks and pullets can also be caponized, but the operation is harder to perform and may not prove profitable.

Food.

The proper age to caponize is when two or three months old. They are usually sold when from ten to fifteen months old. The market opens soon after the holidays. This art can readily be learned by any one who has a steady hand and good eyesight. Of course experiments should be tried on dead birds, for when the operation is slowly or poorly done it is extremely painful and cruel. The proper way is to take a few lessons from an expert.

When to Caponize.

We are indebted for the following cuts of instruments and birds to Mr. Wm. H. Wigmore, who is a maker of caponizing instruments. No person should attempt to caponize without a full set of instruments. Figure 1 shows the method of securing the bird. A narrow table, box or barrel should be used, so it can easily be turned in order to get the sunlight to shine on and in the opening, thus making the parts to be removed plainly visible. Lay the bird on its left side, securely tie the legs above the knees; also pass another cord around the wings. A half brick can be used to

The Instruments.

FIGURE 1.

hold the ends of the cords securely, thus keeping the bird quiet. Wet the bird's side and feathers with cold water, to prevent bleeding. This will also allow the feathers to be twisted back out of the way, thus preventing the pulling of the feathers. Now push the flesh down toward the hip, so that when the operation is performed the flesh will come back and completely close up the hole between the ribs; thus the opening in the skin will be three-quarters of an inch above and between the ribs, enabling the wound to heal up in a couple of days.

The incision must be made between the first and second rib, about one-half inch long. When ready to cut press the point of the knife in quickly one-quarter of an inch and hold it there a second, as the bird will move his ribs up and down at that point a moment, then he will become quiet. Increase the cut one-half inch. Lay the knife aside, keeping the skin in place with the left hand. Now take up the spreader (see figure 2) between the thumb and first finger. Press the

FIGURE 2.

two points together and insert the hooked ends in the incision, making sure to have the hooks between the ribs. Hold the spreader in position with the left hand, and with the knife increase the opening by cutting towards the backbone and forward in a line between the ribs, until large enough to allow the free passage of the scoop twister. Do not cut too near the backbone. Lit-

tle or no blood should be drawn by cutting in a line with the veins, not across them. If blood should be drawn carefully wipe it off with a damp rag or sponge before opening the inner thin skin, otherwise the blood will run in on the testicles and make the lower one hard to find.

Now take up the scoop twister and with the hook end tear open the thin skin until the right testicle is in full view. Use the hook with great care, so as not to puncture an artery or the bowels.

No. 1—Figure 3.

No. 2—Figure 3.

No. 3—Figure 3.

Take the canula spatula (see No. 2—Figure 3) in the left hand, and with it push the bowels aside; just below will be seen the left testicle. Now introduce the scoop twister (see No. 3—Figure 3) with the right hand, catching the lower or left testicle endwise in the scoop. Gently shake it to get it all in and make the spermatic cord settle well down in the slot. Now carefully twist the testicle off. The spatula is valuable to help push the testicle in the scoop and preventing the bowels from being twisted up with the scoop. Next perform the same operation on the right or upper testicle. The reason for removing the left or lower testicle

first is because it is the hardest to get at, and being lower down, should blood be drawn, it will make the operation harder to be performed. After removing the left testicle it will only be a very few seconds before the right one will be removed and the operation completed. If a small piece has been left in by not getting quite all of the testicle in the scoop, put the scoop in again and catch it in the slot. A piece no larger than a pinhead left in is what produces slips. If the testicle is large, as in the older birds, the only thing to do is to remove as much as possible and then go again for the balance. If much blood has been drawn, spoon it out with the scoop.

The next day after the operation, if they have a windy swelling around the wound, run a darning needle through the skin to let out the air, although they will usually come out all right without the use of the darning needle.

If the operation is successful they shortly have a passage. After the operation place the bird in a pen or enclosed yard for a few days, after which it can be allowed to run at will. Capons never crow.

In dressing them for market leave the feathers on the neck, wings and tail.

CHAPTER X.

SHORT ITEMS—KEEPING EGGS—KEEP AN ACCOUNT—COLD STORAGE.

Good goods command good prices.

The sales of produce are largely based on the supply and demand, especially the supply. Is there an overproduction of poultry or eggs? Fifteen years ago the incubator was comparatively unknown. Chicks were raised in the good old way, and in the spring and summer only. Broilers in March, April and May were unknown, and indeed they were in but slight demand. Since that time thousands of incubators and brooders have been sold and used. Thousands of broilers have been thrown on the early and late markets, and yet prices keep pace with the supply. In 1893 the crash came, but the poultry product seemed to suffer less than any other farm product. During the year that has passed wheat has been selling below the cost of production. Other farm crops—including calves, beeves and hogs—have been way down, and yet poultry and eggs have been selling at a fair profit. Why is this thus? The population of our cities is increasing, and as the supply of the poultry product has also vastly increased, the people, seeing the attractive and nutritious food on every hand, have been induced to purchase more freely. Poultry exhibitions in nearly all the large cities have helped to attract the attention of the people. The growing interest in thoroughbred poultry and the de-

sire to produce choice articles of food has had its effect, and to-day there are many times the buyers of poultry and eggs there were a few years ago. There is, therefore, no overproduction in sight as yet. There are thousands of people who do not purchase dressed poultry more than two or three times a year, and we believe that as the supply increases the demand will increase. We do not expect to see an over-production of choice poultry or eggs, in our day at least. We say choice. There is now, and always has been, an over-supply of inferior grades. If we wish to secure good prices we must put our goods up in attractive packages. If we send chicks or fowls to market they must be well dressed and plump, and so packed that when they are taken out by the dealer they will have a fresh and clean appearance. If we send eggs they should be assorted as to size and color. Some markets demand a white egg, some a brown egg. Raise and send just what your market will pay the best prices for. Watch the market and send just when the prices are at their best. From February to June the New York market demands broilers that weigh 3½ pounds per pair. From June to September roasters that weigh 5 to 8 pounds per pair are in demand, and after that fowls are in demand. Eggs bring the highest prices during cold weather, therefore have the hens laying from October to February. A hen is simply a machine, and if she is kept warm and fed for eggs, under proper conditions, she can not help herself, but must lay. Let us not only study the market, but study the wants of our fowls as well, for there is money in them.

It has always been the custom to put eggs down in salt or lime if they are to be held for higher prices.

Keeping Eggs. There are about as many different ways of keeping eggs as there are people who wish to keep them. We will give a simple method used by a few. In the first place, all eggs that are intended to be preserved should be laid by hens not mated with a cock. Infertile eggs will keep for a long time. It is always more or less risky to attempt to keep fertile eggs, for if there is much change in temperature the germ may start and then die, thus causing the egg to "addle," or spoil. If, however, there is no germ there to start, then the egg stands an excellent chance to keep. True it is that the longer we keep eggs the staler they will get—they never seem to go the other way; but if they are kept in a cool, dry place they will not get musty. Keep eggs so that the air can get to and all around them. The room should be cool (from 40° to 60°) and well ventilated. Don't let it get musty. Build racks that will hold, say 100 eggs each. Make the bottoms of wire netting and run sticks across every two inches apart. The sticks should be half an inch wide at bottom and come to a point at top. They should be triangular, in fact. Make the sides of tray one inch high. Now make a rack the width of the trays, with cleats on the inside, say four inches apart, so that the trays can be shoved in the rack, one tray above another. In this way a great many eggs can be placed in a small space and always be out of the way. Turn the eggs half over two or three times a week. Draw out a tray of eggs, invert an empty tray over the full one, take firm hold on each side and invert, replacing the formerly empty tray in the rack. Thus it only takes about a minute to turn 100 eggs.

How many farmers are there who really know whether their poultry pays them or not? Very few, we would

Keep an Account.

say. The keeping of accounts is very simple, and we now have books already ruled and printed for this very thing.

We have kept such a record for years, and it is a source of great satisfaction to look over these occasionally and compare one year with another and thus see wherein we have failed. Poultry furnishes us our main support, and if the credit was not on the right side we would come out rather slim, but we have no fear of that. Disease never enters our flocks. We never had a case of roup or cholera, and never expect to. We always have a good supply of eggs, and our broilers command good prices. Why? Well, if we must say it, we attend to all the details, both small and great, personally. We try never to neglect a single duty; have everything snug and tight, and never go to bed wondering how things are getting along, for we always know that everything has been attended to. In fact, we carry business principles in our chosen business, and keep a record of every detail—the cost of production and the price realized from all sales, and when sold. We study the markets, and know just when and how to ship, and at the end of the year we can tell to a cent just how we stand. This account should not only take in what we sell on the market, but also what we use in our own families, for it is just as much credit to the hens to supply eggs for us as for market.

If we keep an account with our hens we will be apt to each year try to do a little better than the year before, and thus good results will follow. How often we hear farmers say, "Oh, well, hens don't pay anyway." The fact is that they really don't know whether they do or not. There are plenty of farmers' wives who supply

the table from the production of the poultry yard, and yet these very farmers often say that poultry don't pay. It is a very small vocation to them. They rather raise something larger—raise a lot of hogs, and don't know that if the food consumed by them, if sold, would often bring more than do the hogs. It is the same with their cows, all because they do not keep an account with the hogs or cows. Both of these animals can be made to turn in a fair profit if properly managed, and if the farmers kept a true account with everything on the farm they would raise less of this or that, or improve on their methods of handling.

By all means keep an account with the hens, and then if they don't pay just wake up and make them pay.

A COLD STORAGE HOUSE.

The house can be any desired size. A house, or rather ice box, 8x12x12 feet, will hold about thirty five

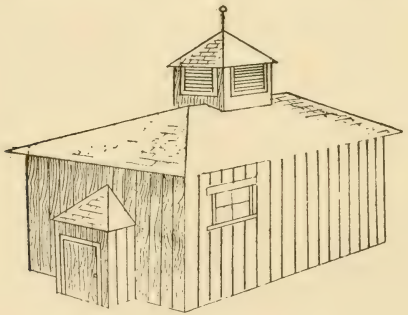


Fig. 1—Cold Storage House.

tons of ice. No house should be built that does not hold at least thirty tons of ice. The larger the bulk the slower it will melt. The cold room should be in the north end of the house, away from the sun. The outside studding should be 2x6 inches. The inside and outside sheathing should be foot wide hemlock boards nailed on horizontally. The six-inch space between should be filled in with sawdust. Now the most important part is the outside sheathing. Nail 2x4 studding edgewise against the outside sheathing of hemlock boards, perpendicularly, every two feet apart and weatherboard on these, leaving a four-inch space at the

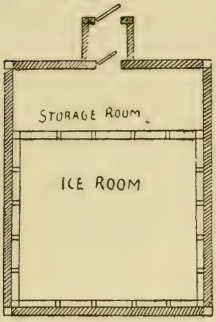
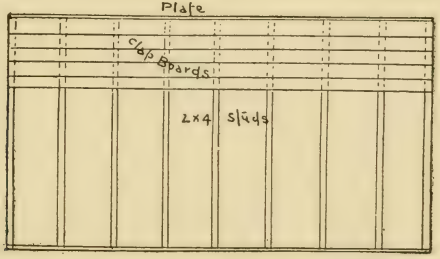


Fig.2—Ground Plan.



Section of side, showing how weather boards should be put on.

bottom, next the ground, and also at the top, under the eaves. See cut. Thus we have a four-inch air-space between the outside and inside sheathing. The sun

shining on the outside weatherboards will heat the air on the inside and cause it to rise, while cooler air will come in at the bottom, thus not only causing the real sides of the house to be always away from the sun, but also actually make it cooler on account of the circulation of air.

The foundation can be of brick. It should be at least two feet below the surface of the ground. The sill should be bedded in mortar and the inside sheathing come down below or to the first row of brick, so that the air can not come in there. It will not do to pack ice against brick or stone, therefore the brick wall should be furrowed off by 2x4 inch joist and boarded up on the inside. This four-inch space should also be filled in with sawdust. The cool or storage room can be four or more feet wide. The partition between the cool room and ice should be filled in with sawdust also, using 2x4 inch joist. The cool room should be ceiled a little below the plate. The cool room will be a little cooler in summer than a cool cellar, and if it is desirable to make it cooler yet, then an ice box will have to be built at the top, next the ceiling.

The Foundation.

This ice box should be some six or eight inches smaller all around than the room is and about eighteen inches or two feet deep. It should be suspended from the ceiling and six inches from it. The ceiling of the cool room should be made double. The bottom of the ice box should be 2x4 in. joist run crosswise of box and turned on edge. They should be about two inches apart. A drip pan should be suspended under the box and some six inches below the bottom joist to catch the water from the ice. Do not make the pan any larger than the inside

The Ice Box.

of ice box. A small pipe running from one end of pan can carry off the water. Cold air goes down, and by leaving the spaces around the ice box the cold air will have plenty of room to move in. The ice box can be filled directly from the ice chamber by having a door in the partition between the cold room and ice chamber. This door should be double, the same as the partition, and the space between the boards made into an air chamber by closing up the top and bottom of door and lining with building paper. This cool room can now be made just as cold as is wanted by putting in more or less ice. This is the same principle that is employed in regular butchers' ice boxes. Such a room would be too cold to keep eggs in, for they should not be kept at a temperature below 40 degrees.

Such a house as we have described can be used in many ways on a farm. It can be made any size desired. It can be used for cold storage for fruit, thus holding them for higher prices. Shelves can be arranged along the sides to set small articles upon. Meat, butter, etc., can be kept for any length of time therein. It can be built comparatively cheap and will repay for itself in one season.

Yet another way to build a cool room is to keep the ice in the center and use a space all around it for a cool room, yet where the ice-box is used the cool room should be all together. The object should be to have the cool room just as small as possible, thus it will require less ice to keep it cool.

The cool room should be ventilated and kept dry and sweet. Whitewash the sides and use plenty of air-slaked lime. The floor of the ice part should be filled in with six inches of sawdust, for if the bottom is not built properly the ice will not keep. If the ground

under the ice part does not have a naturally good drainage then a drain will have to be put in. For an ordinary sized house build a double roof or A-shaped, with ventilators in gable ends, and above this roof, some ten inches, build another roof of cheap lumber. It will pay, for it will keep the house very much cooler.

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