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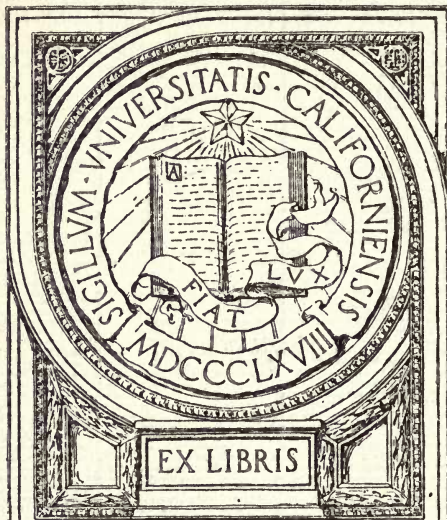
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# PROGRESSIVE POULTRY RAISING





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# PROGRESSIVE POULTRY RAISING

By WILLIAM A. LIPPINCOTT

PROFESSOR OF POULTRY HUSBANDRY  
KANSAS STATE AGRICULTURAL COLLEGE



ARMOUR'S BUREAU OF  
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# *Introduction*

**P**OULTRY has been one of the chief sources of human food the world over, even preceding the days of civilization. In early America nearly every farmer kept a small flock which supplied eggs in season and meat at convenient intervals.

The rapid industrial expansion in the United States which followed the Civil War brought about the development of large cities and the congestion of our people into restricted areas. A natural demand came from them for those healthful and appetizing foods which they had always known, including eggs and poultry along with other perishable farm products.

The story of satisfying this demand is largely the story of artificial refrigeration. The discovery that eggs can be preserved when kept cold, the building of cold storage warehouses to prepare during times of plenty for periods of scarcity, the invention of the refrigerator car, have all played a part in supplying our people with such necessities as eggs and poultry. Armour and Company have played no small part in this service of storing and transporting these foods. Every family now considers eggs a daily necessity, and thanks to modern methods, the supply is daily forthcoming.

This new era in marketing farm produce has had the direct effect of increasing production. Instead of growing enough poultry to supply the family's needs during the egg laying season, the farmer has found it profitable to enlarge this activity which provides such a sure and steady source of income. The average annual farm income from sales of poultry and eggs for all of the farms in the United States is approximately \$100, while many ordinary farms receive \$500 to \$1,000 from this source. The value of all poultry products produced annually in America is now over one billion dollars. While this branch of the farming industry has grown tremendously, there is still room for development without fear of the supply exceeding the demand.

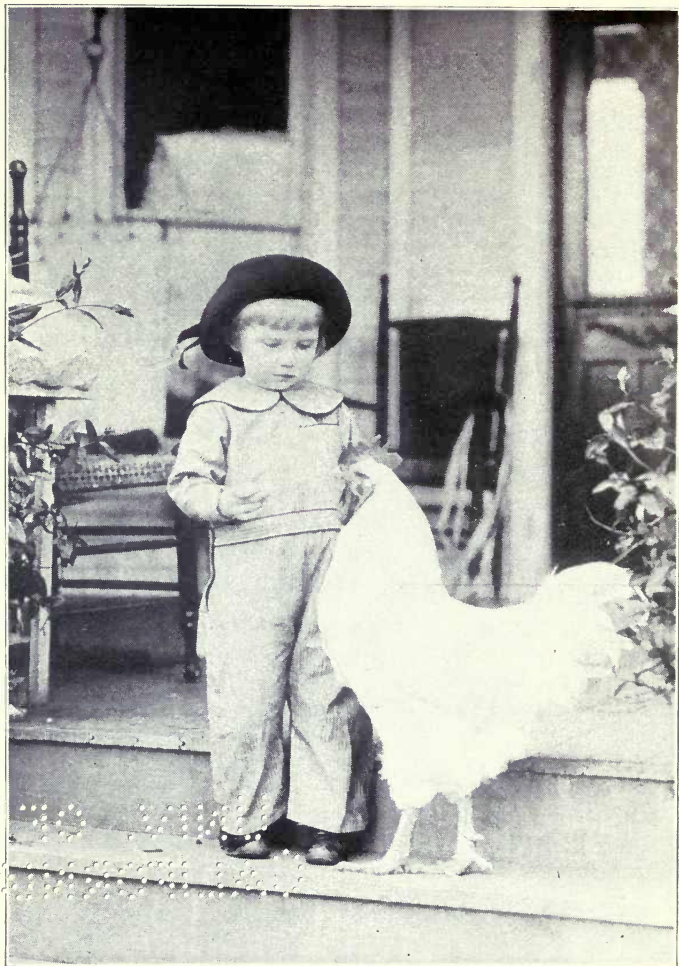
This book has been prepared for, and is being distributed by Armour's Bureau of Agricultural Research and Economics, to foster the production of poultry and poultry products of a kind needed to meet the demand of the consuming public, to supply a higher grade product for the farmers' tables, and to bring a higher return to those engaged in poultry raising whether on a large or small scale.

The author, Wm. A. Lippincott, is Professor of Poultry Husbandry at the Kansas Agricultural College, and a poultry man of International reputation, being Secretary of the International Poultry Instructors and Investigators Association, and the author of one of the most widely used text books on poultry raising.

It is hoped that this booklet will find a permanent place on the shelves of all those interested in progressive poultry raising and that the benefits from it will accrue both to the producer and the distributor.

H. L. BROWN, *Manager*,  
Butter, Cheese, Egg and Poultry Department,  
Armour and Company.

THE  
OF  
COLUMBIA



A Prize White Plymouth Rock.



# Progressive Poultry Raising

William A. Lippincott

*Professor of Poultry Husbandry  
Kansas State Agricultural College*

A FARM without poultry is unusual. In early days a home without it was just as much so. With the growth of the towns and cities, the development of the refrigerator car and of the egg-packing industry, with its cold storage facilities, the town and city dwellers came to depend upon the people of the open country for the production of poultry and eggs.

In the beginning the farmer or his wife simply sold the surplus from the flock which supplied the family needs. This is still largely true, though the size of the flock has grown and the surplus has increased as the prices for poultry products have risen. Fowls have received increasing recognition as a means of marketing waste grains, grasshoppers and other insects.

Unfortunately for consumptive demand the production of poultry and eggs is largely seasonal. The bulk of the year's lay comes between the first of February and the first of August in most states. The poultry crop comes to market between the first of August and the holidays, yet people need these highly perishable products the year round. It is artificial refrigeration which makes it possible for the farmer to sell eggs in April and live poultry in November at prices that are profitable, and for city folks to buy eggs in December and broilers in February at prices which are not prohibitive. The cold storage houses are the cellars of the cities.

The outlet for poultry products has from the first been a steadily increasing one, *and the need today is for more, larger, and better farm flocks*, sheltered in better houses, fed on better rations and given better care. It is the farmers' need as well as the consumers', for the general farm that is understocked on poultry is not fully efficient, because it is failing to utilize and realize on its byproducts. *Worms, weedseeds and windfalls can command good prices when transformed into poultry and eggs.*

## ***Kind of Stock for the Farm***

Except in the case of the strictly meat birds such as the turkey, duck (with the possible exception of the Runner) and goose, the income from the eggs sold constitutes about two-thirds of the income for poultry products, the carcasses sold whether alive or dressed, furnishing the other one-third. The egg is undoubtedly the more profitable of the two products and the farm flock should always be good layers. Having in mind his own home needs, however, the farmer usually wishes stock that furnishes a sizable carcass as well as a good number of eggs. He should also have in mind that quick gains are the cheapest gains with chickens as well as hogs and cattle, and early maturity is an asset to any farm flock.

## ***Breeds and Classes***

There are four classes of chickens that have found favor on general farms. These are the Asiatics which include the Brahmas, Cochins and Langshans; the Mediterraneans which include the Leghorns, Minorcas, Andalusians, Anconas and Spanish; the Americans which include the Plymouth Rocks, Wyandottes, Rhode Island Reds, Dominiques, Buckeyes, and the Javas and the English which include the Orpingtons, Dorkings, Sussex, Cornish and Redcaps.

## PROGRESSIVE POULTRY RAISING

The Asiatic breeds have not been as popular for general farm use of late as they formerly were. They are for the most part large, slow-maturing birds which lay only indifferently and are greatly given to broodiness. The loose, heavy feathers also furnish an ideal refuge for lice and render it more difficult to keep the flock free from parasites.

Of the American breeds the Plymouth Rocks, Wyandottes, and Rhode Island Reds are found in farm flocks with frequency. Members of these breeds are intermediate in size between the Asiatics and the Mediterraneans, giving a carcass of desirable size and quality for marketing or for home use. While the average egg production of these breeds is not so high as in the case of the Leghorns, there are strains and families which are great producers. At the Vineland, N. J., contest a White Plymouth Rock laid 301 eggs during her first laying year and a Barred Plymouth Rock accomplished the feat of producing 501 eggs in two years, these being the highest one-year and two-year records at the contest. *There appears to be no reason why a satisfactory egg production and a sizable carcass should not be found in the same flock.*

Among the English breeds the Orpington is the only one extensively used for the farm flocks. The Orpingtons are quite similar in general characteristics to the American breeds, being a little heavier than the Plymouth Rocks and a little slower in maturing. Like the Plymouth Rocks, they are fair layers of rather light brown eggs.

The Mediterranean breeds are smaller than the English, American and Asiatic breeds and much more active than the latter. Taking the White Leghorn as representative of the class (this variety probably being bred in larger numbers than all the other Mediterraneans combined), the average egg production is larger than for any other class. The Leghorn, however, finds its popularity on specialty farms where eggs are the main cash crop,

## PROGRESSIVE POULTRY RAISING

rather than on general farms. The Leghorn has not proved popular as a general farm fowl largely for two reasons. The first is that as usually bred, they furnish a rather small carcass for table use and second, they are so flighty as to be difficult of control. It is possible, however, to breed Leghorns of good size which are fairly desirable for table use. The fact that they lay a pure white egg which is in demand in certain extreme Eastern and Western markets makes them desirable in those sections.

A recent bulletin (No. 338) from the New Jersey Agricultural Experiment Station gives some very interesting figures on the representatives of the various breeds entered in the egg laying contest at Vineland, N. J. The Plymouth Rocks included the Barred, White and Columbian varieties. The Wyandottes were White and Columbians. The Rhode Island Reds were all Single Combs and the Leghorns were mostly Single Comb Whites, with a very few Single Comb Buffs and Blacks. In judging the results of this contest it should be remembered that the figures show the returns from eggs alone and not what the result would be upon marketing the flock after the profitable egg producing period. The numbers of representatives of each breed, the average first-year production, feed consumption and financial returns were as follows:

	Plymouth Rocks	Wyandottes	Rhode Island Reds	Leghorns
Number of Birds.....	170	150	80	600
Number of Eggs per Bird.....	155.0	144.3	150.6	169.7
Per Cent Production.....	42.5	39.5	41.2	46.5
Per Cent of 200-Egg Hens.....	14.7	8.6	11.2	22.8
Weight of Eggs per Bird (lbs.)....	19.73	17.98	19.74	21.36
Average Weight of Birds (lbs.)....	5.94	4.99	5.31	3.49
Feed Consumed per Bird (lbs.)....	89.78	80.34	86.56	76.19
Average Cost of Feed per Bird....	\$2.52	\$2.30	\$2.47	\$2.19
Pounds of Feed to 1 pound of Eggs	4.6	4.6	4.5	3.5
Actual Price per Dozen Eggs.....	\$0.43	\$0.43	\$0.43	\$0.46
Actual Value of Eggs per Bird....	\$5.46	\$5.22	\$5.44	\$6.49
Actual Returns above Feed per Bird	\$2.91	\$2.92	\$2.97	\$4.30



### ***Choosing a Breed***

The choice of the breed or variety is largely one of personal preference after one has decided on the class of birds that will best meet his needs. If a general purpose fowl for the average farm that will produce a good number of eggs and furnish a sizable carcass is looked for, accompanied by fairly quick growth and early maturity, one of the American or English breeds will meet the need. If one looks forward to making eggs the important cash crop, one of the Mediterraneans will probably be chosen. It makes very little difference what particular breed and variety is chosen, the important problem of the progressive poultry raiser being to secure the best breeders possible of the breed and variety selected.

It is not always easy to get hold of good breeding stock, from the farmer's standpoint, though the agencies for helping him in this regard are fortunately increasing rapidly. Laying contests conducted by a number of the State Agricultural Experiment Stations are proving a great help. Many of the other stations are compiling lists of breeders who carefully trap-nest and pedigree their flocks in regard to egg production.

### ***Methods of Breeding***

Characteristics to be desired in a farm flock are in the order of their importance: vigor, high production and uniformity. It is possible to secure these by the use of vigorous pure-bred males from high producing strains with flocks of mixed breeding. In a recent test at the Kansas Agricultural Experiment Station it was possible to increase the average egg production of what was a mongrel flock from 98 to 155 eggs per year and exchange uniformity for a great lack of it by using Barred Plymouth Rock males from trap-nested stock for three successive years. Where White Leghorn males were used for the same length of time, the improvement of egg production was found even more marked. The original mongrel

hen gave an average production of 72 eggs. After grading by the use of pure-bred single comb White Leghorn males for three years the flock average was increased to 192 eggs. The original mongrel flocks were a mixture of red, black and buff. The third generation grades were of pure white. The grade Leghorns, however, were smaller than the grade Plymouth Rocks and not as desirable from the market standpoint.

While it has been proven that a poor-laying mongrel flock containing several types and colors may be made over into a high-producing flock of uniform color that is just as desirable from the market standpoint as pure-breds, within the space of three years, the fact should not be overlooked that a considerable source of profit may come from selling breeding stock. This can only be done satisfactorily where one keeps pure-bred stock. It costs no more to house and feed a pure-bred flock than it does a bunch of mongrels or grades and where stock can be disposed of at satisfactory prices, the pure-bred flock will prove much more profitable.

**Culling** Whether the poultry producer keeps pure-breds or grades, he will increase his profits very materially by culling his flock closely every year. Though the trap nest is the most accurate means of selecting the best layers in the flock, its use is only practicable for those who make poultry breeding a specialty. The trap nest usually has no place on the general farm. On the average, the pullet laying year is more profitable than any other. Yearlings and two-year olds are likely to be kept at an actual loss unless they are carefully culled.

The best time of year in which to do the culling is late July, August and early September. This comes from the fact that the poor layers are usually early molters while the better layers as a general thing do not molt until November or December. As a usual thing therefore the poor producers are the best lookers in the late summer,



**Fig. 1.** Proper way to hold a hen for finding the distance between the pelvic bones.



**Fig. 2.** Showing the way to find the distance from the pelvic bones to the keel. (Courtesy T. S. Townsley, Univ. Mo.)

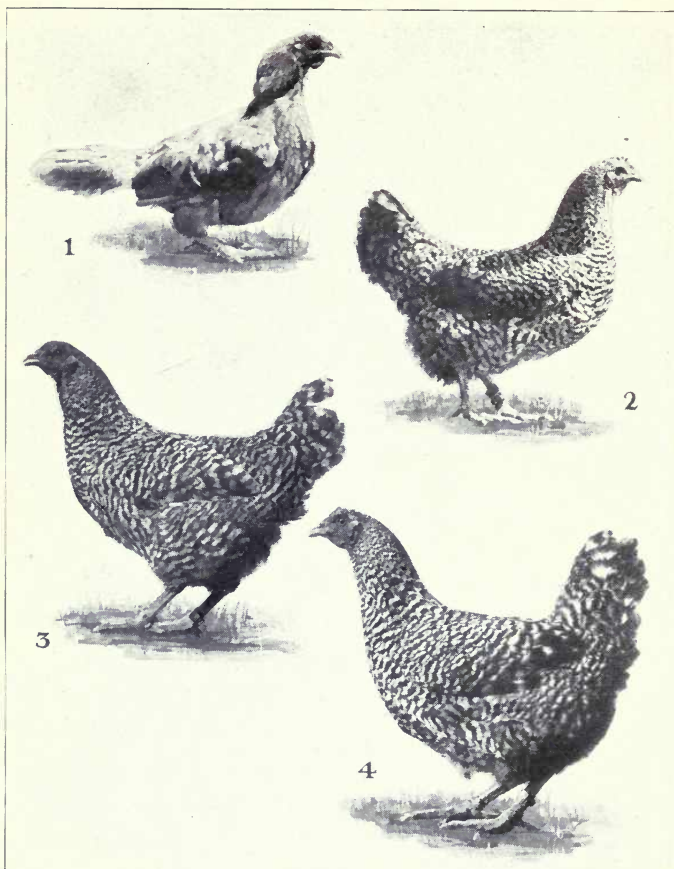


Fig. 1, Kansas 65, a mongrel hen. First year production 100 eggs.

Fig. 2, Kansas 16, a daughter of mongrel hen Kansas 65 and a Barred Plymouth Rock male from a high-laying family. First year production 182 eggs.

Fig. 3, Kansas 616, a daughter of Barred Plymouth Rock grade, Kansas 16, and a Barred Plymouth Rock male from a high-producing family. First year production 203 eggs.

Fig. 4, Kansas 664, a Barred Plymouth Rock grade, daughter of Kansas 616 and a Barred Plymouth Rock male from a trap-nested high-producing family. First year production 248 eggs.

(Courtesy Kans. State Agr. Col.)



while the high layers are likely to appear old and ragged. The body feathers change first and the main wing feathers last. As it requires about six weeks to grow the first new flight feather and two weeks more for each succeeding one and as hens seldom lay while molting, it is possible to estimate fairly closely how long it will be before they will get into laying condition again. This is done by counting the new flight feathers beginning at the elbow and subtracting the number of weeks indicated from 24. To tell the length of time since the hen stopped laying add up the number of new flights. The late molters will usually be birds of good vigor.

A strong constitution is so tremendously important in either the laying or breeding flock that even the late molters should be carefully scrutinized in this regard. Only females which exhibit activity and vitality should be kept over for laying or breeding. All specimens that are scrawny, undersized, weak on the legs, light in weight, excessively fat, or which have deformities such as crooked legs, back or beak, should be eliminated. It is well to dispose of birds that have long toe nails, overhanging eyelids, or any defect which handicaps them in their search for food. The long slender head (crow head) or spindling shanks indicate the lack of thrift and vigor. Such individuals cannot be profitable producers. A bright red comb and wattles indicate a good circulation. The laying hen is a hustler and working all the time. She sings at her work and is usually more gentle and sociable than the non-layer.

In order to lay a large number of eggs a hen must have large organs of digestion and of reproduction. In the live bird these of course cannot be examined. It goes without saying, however, that an individual cannot have a large and well developed digestive and reproductive apparatus unless it also exhibits a capacious body. Capacity is indicated by a long keel (breast bone) and the long deep and wide body.

When a hen is laying the point of the keel (breast bone) moves away from the pelvic bones (lay bones). When the hen is not laying these come closer together and are less pliable. The actual distance is comparative only and varies in different individuals, depending on the size and the breed. When the bird is laying, the pelvic bones (located just below and to either side of the vent) are quite far apart and pliable, whereas in a male bird or a hen that is not laying, they are quite close together. They are also quite thin due to the fact that fat is not deposited in this region. While the hen is laying heavily the skin of the abdomen is soft and pliable in a good layer and the flesh of this region is not firm and hard to the touch as in the case of a non-layer, when considerable masses of fat are likely to be deposited here.

The abdomen should not hang down, indicating a fatty degeneration of the supporting tissues. Neither should it be tucked up, indicating lack of capacity. The latter condition is very frequently found when the keel is short. The vent is large and moist in a good layer.

In the yellow shanked varieties (all Americans and Mediterraneans except the black varieties), the yellow color, which is by no means limited to the shanks but is found in the skin as well, gradually disappears from the various parts of the body in the following order:

1. The vent.
2. The eye ring.
3. The beak, starting at the base.
4. From the shanks beginning at the toes and leaving the back of the hock the last.

A glance at the latter section will indicate how much the shank is bleached. Loss of color from the shanks indicates that a much longer period of laying has elapsed than loss of color from the other sections named. Generally a bleached shank indicates that there have been fifteen to twenty weeks of heavy production.

When in laying a hen's comb is comparatively large, red and warm to the touch. The wattles are also comparatively large and warm, apparently due to the functioning of the ovary. Therefore if the comb is small, limp and cool to the touch the bird is not laying. Frequently the comb of a non-layer is covered with a white scale-like crust.

The characteristics of high and low producers have been summarized in University of Missouri Extension Circular No. 70, as follows:

***Characteristics of High Layers***      The best producing hens will show all of the following characteristics:

1. Vigor—Strong, healthy, active, gentle and happy.
2. Molt—Not molting before October first.
3. Pigmentation—Shanks and beak pale. Ear lobes showing no yellow.
4. Quality—Skin soft, fine and velvety. Breast bone thin and of fine quality. Pin bones straight and flexible.
5. Laying condition—Abdomen soft and flexible. Vent moist and expanded. Body depth four fingers or more. Width of pin bones at least three fingers.

***Characteristics of Poor Layers***      The poor producers in the flock will show all of the following characteristics at culling time:

1. Vigor—Lazy, inactive, wild, cross.
2. Molt—Beginning to molt in July, August or September.
3. Pigmentation—Shanks and beak prominent yellow; yellow in ear lobes on Mediterranean breeds, such as Leghorns.
4. Quality—Skin thick, dry and coarse. Breast bone thick and blunt on the edge. Pin bones blunt and unyielding.

5. Laying Condition—Abdomen hard. Vent dry and puckered. Body depth less than three fingers. Pin bones less than two fingers apart.

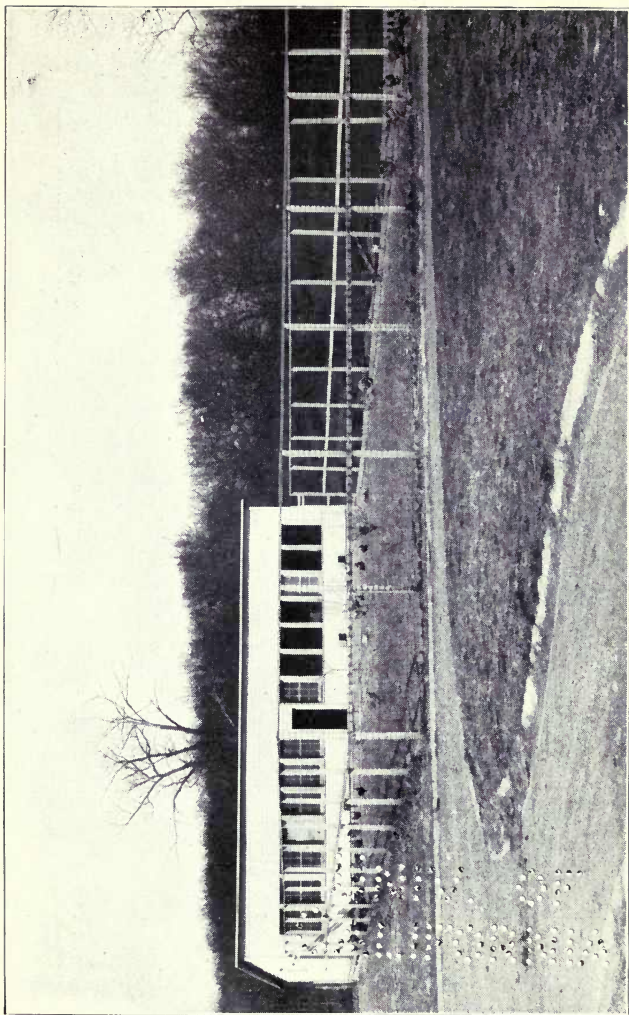
***The Breeding Pen*** Where careful culling is practiced, the most satisfactory type of mating from the standpoint of egg production, is a highly vigorous cockerel from a family of high producers mated with yearling hens which molted late and gave evidence of good vigor and production. This applies whether one is keeping pure-breds or is simply grading up his flock.

The number of females to be mated with one male varies with the class of stock. For the Asiatics it should be eight to ten. For the American and English classes it should be ten to fifteen and for the Mediterraneans may be fifteen to twenty. The hens to be mated should be kept away from other males for at least three weeks prior to the saving of the first eggs for hatching, and should have associated with the males it is desired to breed from, for at least ten days, while two weeks is better.

***Care of Eggs for Hatching*** Successful hatching of eggs in incubators depends fully as much on the vigor and vitality of the parent stock and the care of the eggs before being put into the incubator as upon the incubator itself. Successful hatches can be expected only when the birds in the pens from which the eggs come are enjoying an abundant health. Poor hatches are probably caused more frequently by poor breeding stock than by poor incubators.

Eggs that are being saved for hatching should be of good size and normal in shape and color. The egg starts to develop at a temperature between 68 and 69° F. and should be kept where the temperature is below 65° F. until it is set. A good dry cellar usually furnishes the ideal place. The eggs should be turned over every day or two if they are kept any length of time before hatching. The sooner the eggs are incubated after being laid, the





A good type of an all-round farm poultry house.

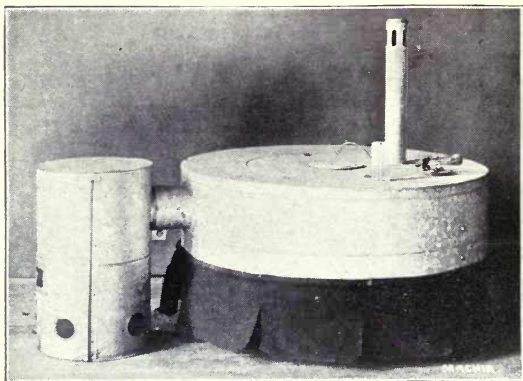


Fig. 1. Oil lamp heated small sized hover.

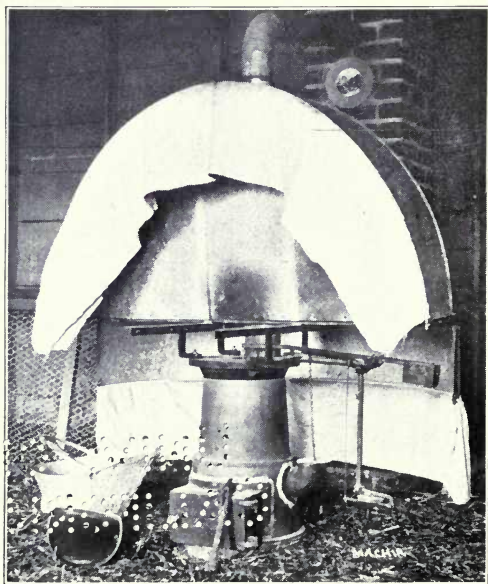


Fig. 2. A coal stove brooder, hover raised.

(Courtesy Ken. State Agr. Col.)

better, though they may usually be kept, if under proper conditions, for a week or even ten days without injury. If for any reason it is desirable to set dirty eggs they should be put into the incubator without washing. The probability of their hatching is better if they are not washed.

***Incubating*** The small incubator is fast replacing the setting hen in most sections of the country and in some sections is in turn being replaced by the mammoth incubator at the customs hatchery. Buying day-old chicks or having the eggs from the farm incubated at a hatchery is gaining in popularity.

The small lamp-heated incubator will continue to be used on most farms for a good many years to come, however. In purchasing an incubator it usually pays not to depend on the very cheapest makes. The difference in cost between a poor machine and a good one is small in comparison with the loss that may be caused by an inefficient hatcher. The machine should be set up in some room that is fairly uniform in temperature. This is most likely to be a cellar. It should be so located that the sun cannot strike it at any time of day and should be made perfectly level by the aid of an ordinary carpenter's level.

In the case of used machines care should always be taken thoroughly to disinfect with a 3 per cent solution of any of the coal tar stock dips. If a spray pump is not available the work can easily be done by dipping a whisk broom in the disinfectant and flirting into the interior of the machine, making sure that the thermometer, regulator and the sides, top, bottom and all the trays are thoroughly drenched.

Directions for operating each make of machine are usually sent out by the manufacturers. While the directions vary somewhat for different makes, it is the intention of the manufacturer to give the directions which will bring the best results for his particular make of machine and they should, therefore, be followed unless some reason for varying from them is found.

## PROGRESSIVE POULTRY RAISING

At the beginning of every season it is a safe precaution to test the thermometer and make sure it is registering accurately. This may be done by borrowing a physician's thermometer, heating some water to a temperature of about 106° F. and moving the bulbs of the physician's and the incubator thermometers back and forth through the water together. If they agree, it is safe to assume that the incubator thermometer is all right. If they disagree, it will be the best plan to invest in a new thermometer. Not infrequently a thermometer which registers perfectly one season may be found to be very inaccurate the following season.

It is the general practice to start the machine at a temperature of about 102° and carry it at that temperature during the first week. The second and third week it is allowed to run as near 103° F. as possible and during the hatch is likely to go to 104° F., which is a good temperature for bringing the chicks out. It should never be allowed to go above 105° F., which is the danger point.

In all localities except where the climate is very humid, it will help the hatches to introduce moisture into the machine. The most convenient way of doing this is to place large shallow galvanized iron trays below the egg trays. These should be filled with sand and the sand kept puddled with water. Where provision is made for the chicks to drop down into the Nursery below, the moisture pans should be removed on the 18th day.

It is customary to turn the eggs at least twice a day until the 18th day and to cool them once. The turning may be done by removing a few eggs from one end of the tray, rolling the eggs in the tray and then replacing those taken out. This turning largely prevents the difficulty known as "stuck germs" which refers to the fact that as the egg loses its moisture, the developing chick occasionally adheres to the shell. A stuck germ seldom, if ever, hatches.



The cooling of the eggs is accomplished by taking the tray out of the machine and placing it on a table or, where the regulator does not interfere, on top of the machine. The eggs should be allowed to cool until they feel cool though not stone cold, to some sensitive part of the body such as the lips or the eyelid.

It is customary to test the eggs twice during the incubation period, usually about the seventh and fourteenth days, so that the infertile and dead-germ eggs may be removed. The exact time of testing is really immaterial. Some incubator operators prefer to make the test on the 10th and 18th days. The testing should always be done, however, so that the infertile eggs may be made use of by feeding to other chicks or the laying stock and the dead-germ eggs destroyed before they begin to putrefy in the machine.

After the 18th day the incubator should be closed and kept closed until the hatch is well over unless some very unusual circumstance makes it desirable to open it. After the hatch is well over which will be usually the 20th day for Mediterranean breeds and the 21st for the heavier breeds the chicks should be left in the incubator without feeding for at least thirty-six hours.

A very large chick loss by inexperienced poultry raisers would be avoided if they did not make the mistake of feeding the chicks too soon after hatching. At the time the chick breaks its way out of the shell nearly half of the original yolk of the egg is still in the digestive tract undigested. It usually takes at least thirty-six hours for the digestion and absorption of this material. If the chicks are fed before this material fully absorbs it is quite likely to prove fatal owing to its fermentation and putrefaction.

***Time of Hatching*** March and early April is the time to hatch chicks of the heavier breeds where winter eggs are looked for from the pullets. This means that they must be set in February and March. The eggs of the

Mediterranean breeds should be set in March and the first three weeks of April so that they will be out in April and early May. Chicks hatched earlier or later may do well but the chances are against it. Chicks hatched too early are likely to go into a molt in the fall and not lay till spring. Late hatched pullets are likely not to come into laying until cold weather sets in, in which case they also are not likely to lay much before spring.

**Farm** There are two types of brooders which usually meet the farm poultry raisers' needs. These are the small  
**Brooders** oil heated Colony Brooder and the large coal heated Colony Brooder. The first usually has a capacity from fifty to seventy-five chicks while the latter will brood from 400 to 600 and even more. So far as the care of the heater is concerned it is little or no more work to attend a coal stove brooder which will care for several hundred chicks than it is a small oil heated brooder. Where chicks are raised in any considerable numbers, it will take very much less labor to take care of them in comparatively large groups than in small flocks, and where they have a good range and fresh ground, they will do nearly, if not quite, as well.

In buying a brooder of either type, there are certain things that one should look out for. An oil-heated brooder should have lamps with bowls large enough to contain a forty-eight-hour supply of oil. In windy, stormy weather unless one has the brooder in an unusually well protected place, it is sometimes difficult to get the lamp lit and the heater door closed, before the wind puts the lamp out. At such times, it is highly desirable to let the lamp burn another day before opening up the heater box. With the small oil-heated brooders, one should also be very sure that arrangement has been made to give the chicks a constant supply of fresh air when they are under the hover. Young and old stock both are highly sensitive to the lack of ventilation.

While the larger coal-heated brooders usually do not interfere with proper ventilation, the small hovers with the cover curtains reaching clear to the floor are frequently very defective in this regard. With insufficient ventilation, one can only expect dopy, unthrifty chicks. With the coal-heated brooder, the main thing to look out for is a fire box large enough to carry fire and keep up the temperature over night. This type of Colony brooder particularly meets the needs of those persons who wish to rear 250 to 300 pullets or to buy perhaps 600 or 700 baby chicks at one time.

A used brooder should be thoroughly disinfected before the chicks are put under it. In any case, the brooder should be heated up until it gives a temperature of about 100° under the hover and run two or three days to make sure that it can maintain that temperature.

It is a good thing to take the chicks from the incubator and put them under the hover, at night, as they seem to become accustomed to the hover and return to it when chilly, more quickly than when they are first put under it in day light. Some sort of litter should always be scattered under the hover and over the floor surrounding it. The material used when the chicks are first put out should be digestible, such as mealed alfalfa, bran, or the shatterings from alfalfa or clover hay. The reason for this is that not infrequently before the chicks have learned to distinguish between the different kinds of feed, they get to eating the litter. In the case of sand, gravel, chaff or chopped straw which are all highly indigestible, their crops become impacted and a large death loss results.

With brooder chicks the main effort should be to keep them comfortable. As a general rule it will be found that where a temperature of 100° F. is given at first it can be reduced 4 or 5° a week until the chicks are well feathered out. If the weather is over warm it may be reduced even faster. If it turns cold, it is frequently necessary to increase the heat again. It is

always well to furnish plenty of heat for if the chicks are too warm, they will move out from under the hover. If on the other hand, they are too cold, they are likely to bunch and pile up resulting in the smothering of some chicks and more or less injury to all. A chick that has been thoroughly chilled probably never regains its full thrift and vitality.

### ***Feeding Chicks***

The secret of the successful feeding of little chicks insofar as there is any secret, lies in four things. The first is in not feeding too soon. The second is to feed sparingly, giving a little at a time and often; the third is to feed only grains which are absolutely free of must and mold, and the fourth is to furnish those ingredients which supply their growing needs.

Chicks should not be removed from the incubator until they show by their actions that they are quite hungry. This is never sooner than thirty-six hours after hatching and is frequently forty-eight or even seventy-two. The reason for this is that when the chicks are fed before all of the yolk material which is taken into the digestive tract just before hatching is fully absorbed and digested, it sours and causes scours, usually followed by a loss of chicks.

It must be remembered that when the little chicks are put in brooders, they are left largely to their own resources. There is no mother hen to keep them alert and interested in picking up their food a bit at a time. The tendency, particularly with the beginner, is usually to overfeed rendering the chicks dull, listless and highly susceptible to the many ills to which they are heir. For the first two weeks after they come from the incubator the chicks should be fed at least five times a day, and never more at one time than they will clean up fairly readily.

The grains used must be sweet. Whenever a new supply is gotten, either by purchase, or from a bin, it



should be carefully inspected by burying the nose in a double handful to see whether there is any musty or moldy taint. One may almost as well feed poison to chicks as to feed grains that have heated or musted in the bin. Much of the so-called white diarrhea found in the Central and Western States is not a contagious disease at all but a condition caused by one of two things; feeding too soon after the chicks are hatched or feeding grain that is not perfectly sweet.

In furnishing the chicks with the proper ingredients for growth, it has been found that sour milk when used in connection with the grains usually available in most sections of the country, comes as near being what the chick needs as anything that can be found. This is emphasized in the following outline taken from Bulletin No. 96 of the Storrs Agricultural Experiment Station:

### ***Sour Milk the First Feed***

“On removing from the incubator take each chick individually and dip its beak in sour milk in order to make sure that milk is the first food taken into its system. Be sure that the chick swallows two or three times before passing it on to the box or basket in which it is to be carried to the brooder. Extensive experiments have shown that milk is a quickly and easily digested food and that it has a most favorable influence in promoting growth and in reducing mortality from all causes. It has been the practice at this station not to give the chicks any water to drink until they are eight or ten weeks old, provided they are given all the milk they will consume. This method insures the consumption of milk by all the chicks whereas, if both water and milk are available, some of the chicks are likely to drink only water. For best results sour milk should be fed in a thickened condition but before the curd has separated from the whey. The chicks seem to like it best in this condition and will consume more than if it is not yet thickened or if separation has taken place.

"Practical considerations may prevent feeding the milk in this ideal condition. In the first place thick milk does not readily feed down in a drinking fountain and fountains are often preferred to open drinking pans. Furthermore, it may not always be possible to get milk in just the same condition every day so that uniform souring can be allowed to take place before feeding. In avoiding these difficulties it is better to feed the milk before it has thickened than to wait until it has separated. Chicks apparently do not relish the clear whey which always remains at the top, but if one follows the natural inclination to pour it off, a lot of valuable food will be lost.

"In many cases, especially where milk is produced on the farm, it may be more desirable to feed sweet milk than to wait for it to sour. In deciding this, as with many other problems, the poultryman must be governed by his own particular conditions. In all our experiments we have obtained substantially equal results with sweet and sour milk. The only reason for advocating sour milk is that the chicks seem to prefer it. The lactic acid in sour milk is not at all a necessary factor in milk feeding.

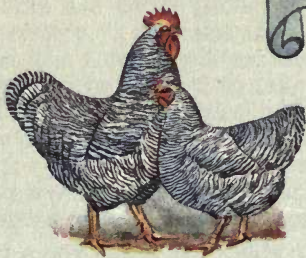
"Part of the beneficial effect of the milk seems to come from the fact that it induces the chicks to consume larger quantities of grain and mash than will chicks of the same age when not given milk. For this reason, if for no other, a supply of milk should be kept constantly available from the time the chicks are placed in the brooder and for just as long as it can be obtained at a reasonable price.

### ***Feeding Practice***

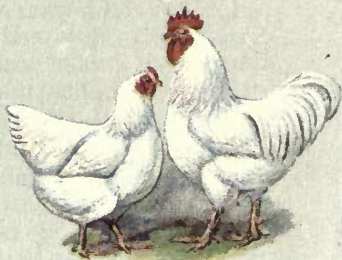
"The first day's rations should consist of fine chick feed in which has been mixed a large percentage of fine grit. It may even be well to give clear grit for the first feed. If coarse sand is used on the floor it will take the place of commercial grit. The chicks will learn to eat grit just as readily as they will pick up grain. Under no circumstances should the early feeding

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# Standard B



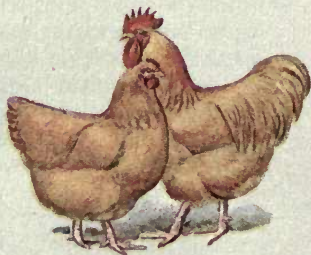
BARRED ROCK



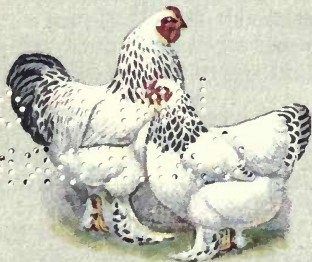
WHITE ROCK



EMBDEN GEESE



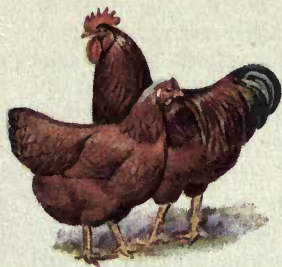
BUFF ORPINGTON



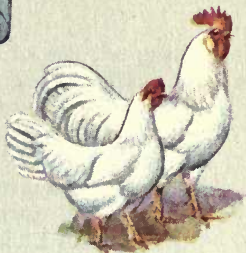
LIGHT BRAHMA



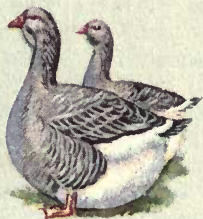
# eds of Poultry



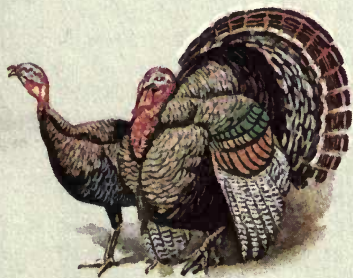
RHODE ISLAND RED



WHITE LEGHORN



TOULOUSE GEES



BRONZE TURKEY



WHITE WYANDOTTE

TO THE  
MEMBERS OF THE  
COMMISSION

of grit be omitted for without it the chick can not make use of the hard food which it is to be given. After two or three days the proportion of grit may be reduced and after the first week it may be hopper fed if desired, in order to prevent waste.

"As soon as the chicks learn to eat the grain it should be scattered in a litter where they will have to work for all they get. Feed them sparingly four or five times daily and make them exercise. It is very easy to over-feed young chicks. They should be kept always hungry for more. Let the digestive organs gradually work up to their maximum capacity during the first two or three weeks, after which time the chicks may safely be fed all they will consume.

"Beginning with the third day wheat bran should be constantly available. Bran is a mild laxative and in this connection probably has some value. More important, however, is the fact that it is bulky. The consumption of bran insures a considerable distension of the digestive tract, putting it in shape for the work that it will soon be compelled to do. Bran satisfies the chick's craving for something to eat without calling upon the digestive system to assimilate a lot of nutrients which it is not yet prepared to handle. Another important point to remember is that bran is rich in mineral matter except lime. In particular it contains a large amount of phosphorus and this is very important for the formation of bone. The building of bone also requires lime in some form. This may be furnished by using grit that contains a considerable amount of lime or by feeding fine ground oyster shells in hoppers where the chicks can get them as desired.

"During the second week feed the grain three or four times daily and substitute chick mash for the wheat bran. When the chicks are about six weeks old, the chick feed may gradually be replaced by intermediate or scratch

## PROGRESSIVE POULTRY RAISING

feed and the number of feedings reduced to three daily. Also the chick mash may be replaced by the regular laying mash.

"Make all changes of feed gradually. If changed suddenly from all chick feed to all scratch feed, the chicks will probably eat very little of the new feed and in consequence will receive an undesirable set-back in growth."

The feeding formulas which have been used by the Storrs Agricultural Experiment Station for several years are as follows:

### CHICK FEED

Cracked Wheat.....	15 lbs.
Fine Cracked Corn.....	15 lbs.
Pinhead Oats.....	10 lbs.
Broken Rice.....	3 lbs.
Fine Charcoal.....	2 lbs.

### DRY MASH

Wheat Bran.....	20 lbs.
Corn Meal.....	10 lbs.
Sifted Ground Oats.....	10 lbs.
Low Grade Flour.....	10 lbs.
Beef or Fish Scrap.....	10 lbs.

At six weeks of age the chick feed was gradually replaced by scratch feed and the chick mash by the regular laying mash. The formula for each of these is given:

### SCRATCH FEED

Cracked Corn.....	200 lbs.
Wheat.....	200 lbs.

### LAYING MASH

Corn Meal.....	100 lbs.
Wheat Bran.....	100 lbs.
Ground Oats.....	100 lbs.
Flour Middlings.....	100 lbs.
Beef or Fish Scrap.....	100 lbs.



### ***Green Food***

For the best growth and development of chicks another factor is also necessary, namely, green food in some form. This may consist of mangels, table beets, sprouted oats, lettuce, lawn clippings, or other things which are available at different seasons. The feeding of green food should begin early—chicks will eat it as soon as the third or fourth day. If mangels are used they should be cut fine and scattered a little at a time where all the chicks may have a chance to get a taste. As soon as they learn to eat them well the mangels may be sliced and hung on finish nails on the wall. The chicks cannot get too much green food and they should have access to a bountiful supply at all times.

### ***Separate the Sexes***

As soon as the sexes can be distinguished they should be separated. Unless the cockerels are to be sold as breeders, they should be penned up and heavily fed until they are large enough to be disposed of as broilers weighing  $1\frac{1}{2}$  to  $2\frac{1}{2}$  pounds. They will never come nearer to returning a profit that at the broiler age. In some sections where good prices for capons prevail it may pay to caponize the cockerels and grow them out for the holiday market. In most cases, however, the room can be used to better advantage in developing pullets.

### ***Location of the Poultry House***

When the chicks are well feathered out and all danger of their needing further heat is past, they should be given quarters supplied with perches so located that they can have abundant range. Whether it is to be used for old or young stock, the poultry house should be located where the drainage is good and there is an abundance of shade near by. Although the chicken originally came from a very hot country, it was a jungle-dwelling fowl unable to

survive the burning sun without the protection of trees and shrubs. Its need of this kind of protection has not changed and the poultry house should be very close to the orchard or woodlot. If the chicken house is to be dry, as it must be to give good results, it must be located where the drainage is good either naturally or because of tiling.

### ***Essentials of a Good Hen House***

There are four essentials of a good chicken house. When these are taken care of, it makes little difference what style or type the house is. These four essentials are dryness, ventilation without drafts, sunlight and plenty of room.

The domestic fowl is very much more dependent upon its breathing apparatus to regulate the body temperature through evaporation than is true of the other farm animals. It also depends upon its lungs and air sacks to a large extent, to get rid of the excess moisture of the body. Whenever a chicken is forced to breath damp air, it is at a physical disadvantage and it is uncomfortable. It is only the comfortable chick that will thrive and the comfortable hen that will lay many eggs.

One of the means of keeping a hen house dry is to furnish plenty of ventilation. Chickens, however, are sensitive to drafts and take cold easily and this ventilation should be furnished in such a way that the birds are never in a direct draft. Pound for pound, fowls use a very great deal more oxygen from the air than do horses, cattle, sheep and swine. An insufficient supply of fresh air is more quickly injurious to them than to any other class of farm animals.

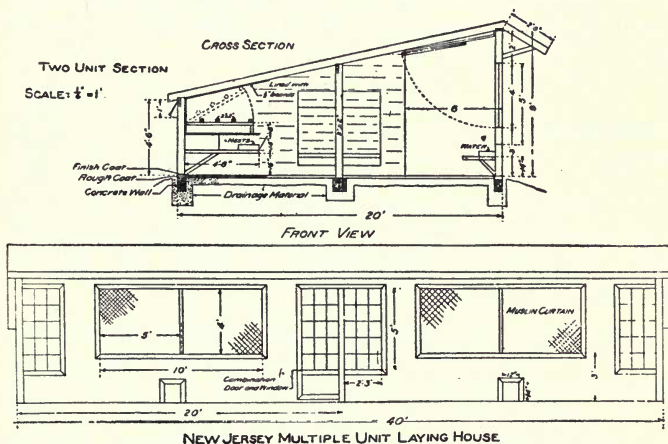
Plenty of sun shining into the house is also an aid in keeping it dry. Sunlight also makes the house more cheerful and attractive and the hens more comfortable.

## PROGRESSIVE POULTRY RAISING

It is further the best natural disinfectant that we have and is a great preventive of disease. A common fault of farm hen houses is that they are too dark.

The chicken house may be dry, well ventilated without drafts and have window space sufficient to admit plenty of sunlight and still give bad results if too many individuals are crowded into a given house. For the older birds the best results will usually be secured if from  $3\frac{1}{2}$  to 4 square feet of floor space per bird is allowed.

As a usual thing, the net returns from a flock of 100 laying hens kept in a house 20x20 will be greater than from 200 hens kept in the same house taken year in and year out. In years when the windows are open and the birds can be out of doors most of the time, the results from the crowded house might not be so bad,



but in ordinary years, the winter egg production, which is the most profitable production, would be very seriously interfered with.

Plans of a very successful laying house, taken from the New Jersey Agricultural Experiment Station Bulletin 325, are shown on page 29 which give the arrangement of perches, nests, watering devices and feed hoppers. In all those sections where it is not unusually dry, it would be advisable to put in a layer of coarse crushed rock below the cement floor in order to keep out the moisture that is constantly working up through the ground and, unless prevented, through the floor into the hen house. Proper construction of the floor of the hen house is one of the most important items.

Attention is also called to the ventilator at the rear of the house behind the dropping boards which allows for a summer ventilation. The space immediately behind and above the dropping boards is fixed so that the draft cannot strike the birds when at roost but will pass above or below them.

### ***Care of the House***

Good results from the flock depend to a marked degree upon the care of the building that houses them. The house that is not cleaned and thoroughly sprayed at intervals is almost sure to harbor mites and lice and to be filthy as well. Filth provides a great place, not only for the breeding of mites, but for the development of disease germs.

The chicken house should be thoroughly cleaned out and the floor, walls, ceiling and fixtures thoroughly drenched with some powerful disinfectant at least twice a year, preferably the early spring and in the fall. A three per cent solution of a coal tar stock dip will serve. Besides these thorough cleanings, the litter kept in the house

should be removed and replaced with fresh whenever it becomes so broken up that grain thrown out to the birds does not disappear so that the birds have to scratch it out to find it.

It has been found that on commercial poultry plants where fowls are kept in quite large numbers, the artificial lighting of the houses, morning and evening, proves profitable during the winter. Giving the hens 12 hours of light increases egg production at the season when prices are high. It apparently does not increase the yearly production. For ordinary farm flocks, however, it would hardly pay.

**Yards** Whenever it is at all possible, the fowls should be fenced out of the places where they are not wanted rather than into yards. Free range is the ideal chicken yard, for it usually furnishes cheap feed and good health. For the general farm, the practice of fencing the chickens out of the door yard and garden and away from the granary and giving them the run of the farm is growing. Where, for any reason, it is necessary to confine the birds, the larger the yards can be made the better. Whenever they are so small that the chickens keep them bare of greenness, the flock is in danger of a bad epidemic of disease. Such yards and the bare areas around the house when the chickens are on range, should be turned over at least once a year (twice a year is better), and seeded down to some quick growing crop. It is only by such means that the soil can be kept sweet and free from disease.

It is highly important that the pullets be put into the laying house early. They should be in winter quarters long before they begin to lay. When they are neglected and are not moved into the permanent laying house until after they begin to lay, they are very likely to be thrown into a molt which will in turn seriously interfere with their winter egg production.



## Feeding Laying Hens

Contrary to the general belief, there is no one ration which is better than all the rest and which is a guarantee of egg production. As much depends upon how a ration is fed as upon what the ration contains. The following ration taken from the Purdue University Agricultural Experiment Station Bulletin No. 218 has been widely used and has given most excellent results. It has the very great advantage of being quite simple.

### GRAIN

Corn.....	10 lbs.
Wheat.....	10 lbs.
Oats.....	5 lbs.

### MASH

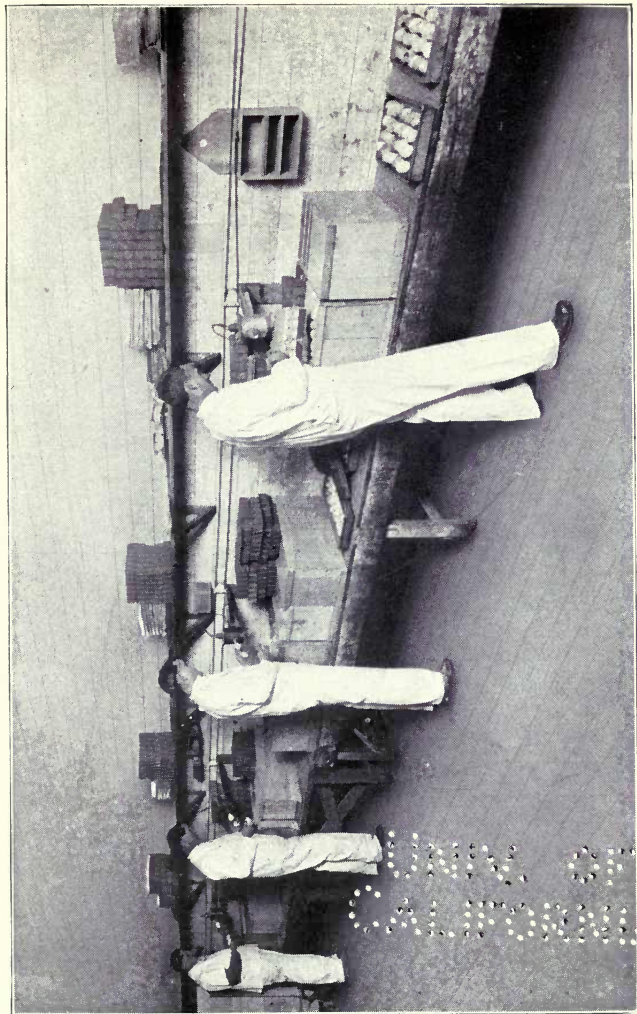
Bran.....	5 lbs.
Shorts.....	5 lbs.
Meat Scraps.....	3.5 lbs.

Where there is plenty of skim milk available, it may be used to replace the meat scrap, if given as a drink. The following routine in feeding laying hens taken from Lippincott's Poultry Production has proved successful in a large number of cases:

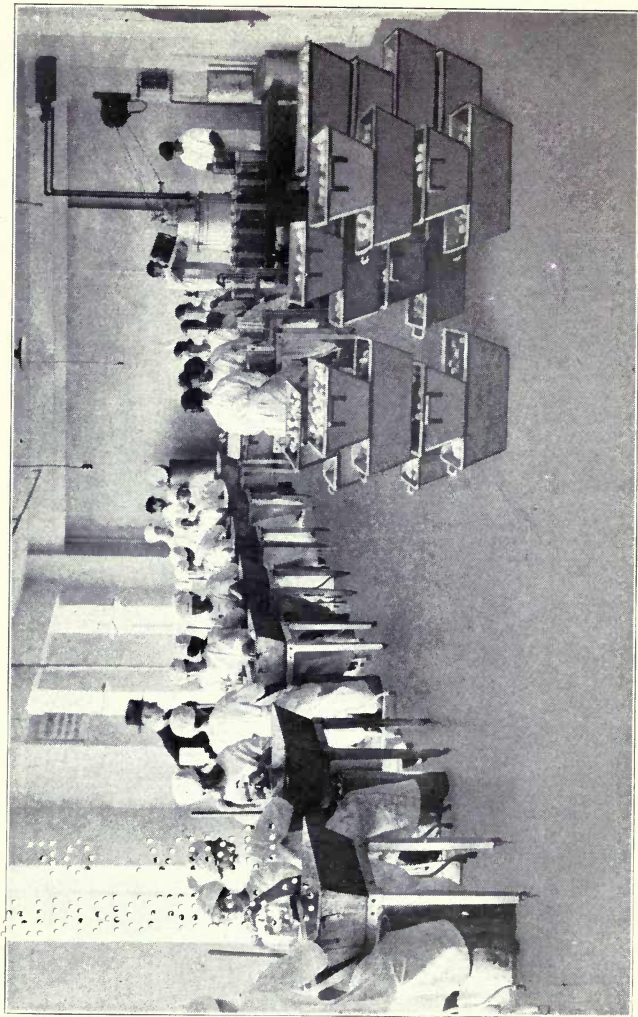
"In the morning give a light feed of grain, soon after the birds leave the perch. This should be scattered in a deep litter of straw to every part of the pen so that the birds will be compelled to scratch vigorously for some hours in order to search it all out. Fresh water should be supplied in the morning.

"At noon as much succulence as the birds will clean up in twenty minutes to half an hour should be supplied. Fresh water should be given and the dry mash hopper opened.

"Two to three hours before the birds go to roost they should be given a full feed of grain thrown in the litter.



Grading eggs. The "Firsts" go into storage. The small or dirty ones are broken out and frozen or desiccated.



An egg breaking room is necessary in connection with every egg candling and packing establishment, in order that cracked, undersized or dirty eggs may be broken and preserved by freezing. Standardized products are thus made possible.

It is essential to the best results that the birds go to roost with full crops, and this feeding should not be stinted. An examination of the crops of the birds should now and then be made after they are on the perch to ascertain whether they are well filled.

"It is better to overdo the matter of evening feeding a little than to slight it. If a little grain is left in the litter, it will be eagerly scratched out in the morning. Great care should be taken, however, to so feed that the straw is scratched absolutely free of grain at least once a day. In following this particular routine this should be the condition at noon. The really skilled feeder is the one who so handles the ration that he constantly piques the appetite of his fowls so that they will consume large amounts of feed with relish, yet never gives quite all they would like to consume. As noted in other connections, of the two evils, 'overfeeding' or 'underfeeding' to a slight degree, the latter is preferable. It limits production slightly, by not furnishing quite all the raw material that could be made over into a finished product, but it keeps the appetite keen and the body in good working order. Overfeeding, on the other hand, cloyes the appetite and clogs the system, thereby limiting production even more than in the first case.

"Unless the weather is quite cool, fresh water should be supplied at the time of the evening feeding. In the event of freezing weather, the water pan should be emptied."

In the Purdue University Agricultural Experiment Station ration given above it is assumed that they will consume 25 pounds of the grain while eating  $13\frac{1}{2}$  pounds of the dry mash where meat scrap is used. Where meat scrap is not used, they will consume 25 pounds of grain to 10 pounds of dry mash and drink 50 to 60 pounds of skim milk.



## PROGRESSIVE POULTRY RAISING

Another ration originating at the Cornell Station and fed with excellent success is as follows:

### GRAIN

Wheat.....	3 parts
Corn or Kafir.....	2 parts
Oats.....	1 part

### DRY MASH

Corn Meal.....	60 lbs.
Wheat Middlings or Shorts.....	60 lbs.
Meat Scrap.....	50 lbs.
Wheat Bran.....	30 lbs.
Linseed Oil Meal.....	10 lbs.
Alfalfa Meal.....	10 lbs.
Salt.....	1 lb.

This ration may also be fed according to the routine outlined above.

### ***Fattening for Slaughter***

While the final finishing for slaughter is done in the feed lot in the case of most of the farm animals, this does not hold true for poultry. Instead

it is done at the packing house by means of milk feeding in crates, because birds that are properly fattened on the farm are so tender that they cannot stand the handling necessary for shipment without bruising. These bruises develop into highly colored green and blue patches that spoil the appearance of the carcass and interfere with its sale. The fattening process also has a peculiar effect on the bones, rendering them so chalky and brittle that it is almost impossible to ship finished stock without breaking legs and wings.

While the final finishing must be done at the packing house, it pays to send the birds to market in good flesh. In the case of mature birds, it is a good plan to pen them up and feed all the corn they will eat for a period of two weeks prior to sale or shipment.



### ***Producing Good Eggs***

While it is possible to keep a *good* egg, that is produced in March and April, *good* until mid-winter, a *good* egg cannot be made from a poor one. During the spring months before the hot weather sets in most of the eggs marketed arrive in fairly good condition but with the onset of warm weather the situation is much changed and eggs reach the packing house in considerable numbers that are not only not fit for storage but are actually unfit for use as food at all.

The Bureau of Animal Industry has carried on investigations which show that the following simple precautions taken during the very hot weather resulted in the marketing of eggs which graded 97 per cent first class. These results were reported in Bulletin No. 160 of the Animal Industry Department, U. S. Department of Agriculture.

1. Infertile eggs were produced by keeping the males from the laying flock. As has already been suggested, this may be accomplished by disposing of the cockerels as broilers before they reach the breeding age, or by caponizing.

2. The hens were furnished plenty of roomy, clean nests.

3. The eggs were gathered twice daily.

4. They were kept in a cellar that was cool, dry and free from odors.

5. The eggs were taken to market twice a week, being carefully protected from the sun on the way to town.

6. The eggs that were small, dirty, misshapen or found in stolen nests were kept for home use.

### ***Diseases***

In dealing with poultry diseases, preventive rather than curative measures should be depended upon. The flock that is well bred from the standpoint of vigor, is reasonably well fed and given a comfortable house and run on land that is sodded or grows a crop each year, is not likely to give much difficulty from diseases. As a usual

thing it will be found easiest and the least expensive to isolate individual ailing birds and except in the case of slight ailments which quickly recover, kill and burn them. Where one is so unfortunate as to have an epidemic make its appearance, the veterinarian should be called or fowls that are just coming down with the disease should be shipped to the State Experiment Station for examination and diagnosis.

### ***Lice and Mites***

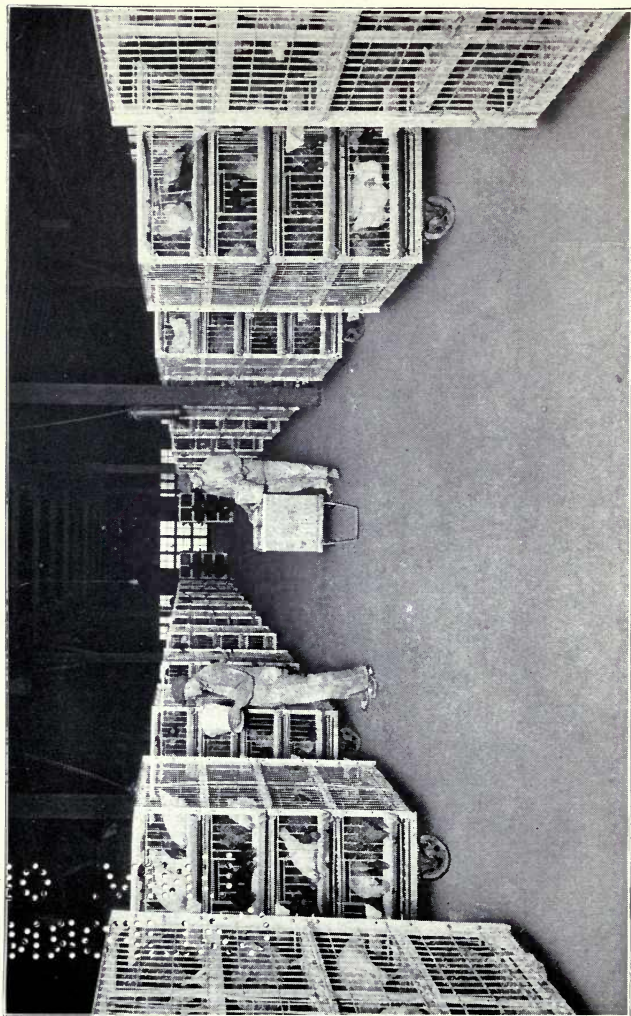
In the control of lice sodium fluorid is nearly 100 per cent efficient. It is easily the best louse killer to be obtained. It can usually be secured from the local drug store and comes in the form of a white powder. It may be applied in two forms, as a dust or as a dip. Where applied as a dust, small pinches of it should be worked into the feathers on the head, neck, back, breast, under the wings and below the vent. During the warm weather it is very much quicker and much more effective to dip the fowls. The solution is colorless and does not stain the feathers. Where the dipping is done on a warm, quiet, sunny day the birds dry out quickly and no ill effects follow.

The following is quoted from Farmers' Bulletin 801 of the U. S. Department of Agriculture:

"In using the dipping method all that is necessary is a supply of tepid water and a tub. If two persons are to dip at the same time it is advisable to use a large tub. The water should be measured into the tub and three-fourths to one ounce of commercial or two-thirds of an ounce of chemically pure sodium fluorid added to each gallon of water. It is readily dissolved by stirring. The tub should be filled to within 6 or 8 inches of the top, and as the amount of solution is lowered through dipping numbers of fowls, water with the proper proportion of sodium fluorid dissolved should be added from time to time.



Be friendly with your flocks, but feed little chicks separately from the grown birds.



Fattening chickens by milk-feeding in crates at an Armour plant.

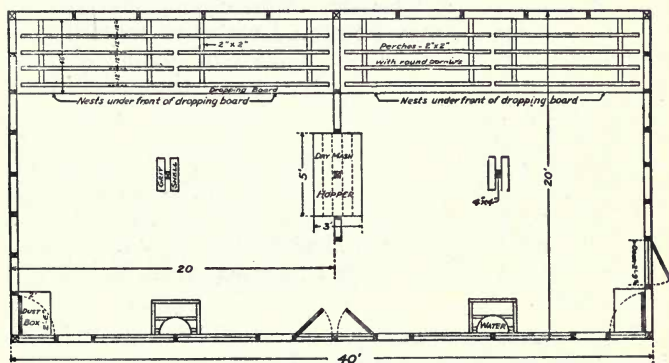


## PROGRESSIVE POULTRY RAISING

"In dipping the fowls it is best to hold the wings over the back with the left hand and quickly submerge the fowl in the solution, leaving the head out while the feathers are thoroughly ruffled with the other hand so as to allow the solution to penetrate to the skin on different parts of the bird. The head is then ducked once or twice, the bird is lifted out of the bath and allowed to drain a few seconds and is then released.

"It is not necessary to keep the fowl under the water longer than 20 to 30 seconds and the head only an instant."

Mites can be controlled by spraying thoroughly the interior of the hen house and all the fixtures with a mixture of kerosene and crude oil in the proportion of 1 to 3. As a usual thing, one thorough application will completely eradicate the mites of the infested house but to make sure, it is advisable to make a second spraying a month after the first.



NEW JERSEY MULTIPLE UNIT LAYING HOUSE  
FLOOR PLAN - TWO UNIT SECTION

SCALE  $\frac{1}{8}$ " = 1'

(SEE PAGE 29)

Floor plan of an excellent poultry house.

(Courtesy N. J. Agr. Expt. Sta.)

## Turkeys

OF THE six varieties of turkeys recognized in America the Bronze is by far the most widely bred. It is also the largest and is usually the most desirable for market purposes in spite of its dark feathers. The standard weight of the young tom is 25 pounds, yearling, 33 pounds and adult 36 pounds. The standard weight of the young female is 16 pounds and the mature female 20 pounds. Next in popularity comes the variety known as the White Holland, which is a somewhat smaller bird. The standard weights for the males of different ages is 20, 24 and 28 pounds and for the females 14 and 18 pounds.

It is unnecessary to provide a house for turkeys though it is the part of wisdom to have a shed handy into which they may be driven on extremely stormy nights. As a usual thing they will do better roosting out in the open even in quite severe weather. Where only a small flock is kept 15 females may be mated with one male if he is unquestionably vigorous. If a flock of about 25 or 30 is kept, two males will be needed but they should not be allowed to run with the flock at one time. One should be allowed to run with the flock one day and the other the next. The reason for this is that where both are allowed to mingle with the flock at the same time, they will fight until one of them becomes boss, after which he will do most of the mating and the flock will be very little better off so far as the fertility is concerned than if it had a single male.

When one experiences difficulty with having the laying hens hide out their nests during the hatching season, this can usually be overcome by shutting the birds in a pasture or better still, the orchard, until they are through laying, when they may be let out for exercise. They may be driven in at night-fall if there are suitable roosting quarters, or allowed to roost out all night and driven in

in the morning. The latter is not difficult to do where one has been following the practice of giving a morning feed.

During the winter the birds should be fed twice a day on equal part of oats, wheat and corn. Something in the line of green feed should be given and also feed of animal origin such as meat scrap, high grade tankage or sour milk.

As a usual thing it is the best plan to raise the poults with their natural mothers or with chicken hens. Turkey hens are the most satisfactory mothers for poults but where it is desirable to break up the broody turkey hens and get them to laying again, chicken hens may be used. Turkey hens will ordinarily cover fifteen to seventeen eggs while chicken hens of the middle weight breeds will take care of seven to nine. Whether turkey or chicken hens are used the nests should be made on the ground and lined with straw. The setting hen should always be carefully dusted with sodium fluorid so that she will certainly be louse free at the time of bringing off the hatch.

For brooding young poults plenty of exercise and dryness are the two great essentials. The coop used for the mother hen should be weather tight, though allowing for ventilation. It should also be movable so that it can be shifted about from place to place. Where the poults are on range they will usually need little, if any, feeding. When the conditions are such that they cannot be out on the range some attention must be given to their feeding. The following is a method outlined in Farmers' Bulletin No. 791 of the United States Department of Agriculture, "For the first two days after hatching, poults require no feed, the yolk of the egg which they absorb before breaking out of the shell being sufficient to maintain them for that length of time. Access to clean drinking water and a little coarse sand and green feed to pick at, is all that is needed until the third

day. Beginning with the third day, the poults should be fed according to the quantity of natural feed they are able to pick up outside the coop. They should always be hungry. To feed all they will clean up several times a day removes the cause of searching for food, so little exercise is taken and indigestion is sure to result. When natural feed is scarce, or when the poults have to be kept from ranging outside, they should be fed lightly about five times a day. If allowed to run outside the coop where they can find insects, seeds, and green feed, they need not be fed oftener than two or three times a day.

Successful turkey raisers use many different kinds of feed, some of the most common being as follows:

1. Hard-boiled egg chopped fine and corn-bread crumbs for the first week, and then whole wheat and hulled oats.
2. Stale bread, soaked in milk and squeezed dry, for the first few days and then common chick feed.
3. Clabbered milk seasoned with salt and pepper, corn-bread crumbs.
4. Equal parts "pinhead" oats, whole wheat, and cracked corn.
5. Cracked wheat.
6. Corn meal and wheat bran mixed in the proportion of three to one and baked into bread.
7. Bran or middlings one-half, cracked Egyptian corn one-quarter, wheat and hulled oats one-quarter.

In addition to the above, skimmed milk and buttermilk are quite often fed, with excellent results. A good plan is to keep the milk in front of the poults during the morning and water during the afternoon. If grit and green feed cannot be picked up outside the coop, they must be provided in some other way. Chopped onion tops, lettuce leaves, dandelion leaves and alfalfa make excellent green feed. Grit can be furnished in the form of coarse sand.



In getting the turkeys ready for market it is a good thing to begin feeding a little night and morning about the middle of September. The feed should be very light at first and the amount gradually increased until about ten days before marketing when they should be given all they will consume three times a day. In the beginning equal parts of wheat, oats and corn may be given but the proportion of corn should be gradually increased until the last of October when they should be fed on corn alone. As a usual thing results are not satisfactory where the birds are confined during the fattening period.

## Ducks

DUCKS like turkeys are looked upon as meat producing birds. While the Runner duck is quite well known for its laying propensities, it is the only one of the several varieties that can be looked upon as an egg producer. Among the meat breeds the Pekin stands pre-eminent. Where these birds are given proper attention they may be marketed at ten to twelve weeks weighing five to six pounds. They can be raised with success on general farms but the duck business has tended very rapidly to be concentrated on intensive duck farms of large size. A house similar to the one required for chickens is desired. The essential of the duck house is that it shall be dry and have fresh air with freedom from drafts. The floor of the house should be kept well bedded with straw and cleaned out as soon as the straw becomes matted and damp. Dry feet while in the house at night seems to be a necessity for egg production. Ducks make their nests on the floor of the house by burrowing the straw. The number of ducks per house should be one for every 6 feet of floor space for breeders, though fattening and young ducks may be kept closer. A mesh fence 18 inches high will hold most ducks and a 2-foot one all of those commonly raised as most of them cannot fly.

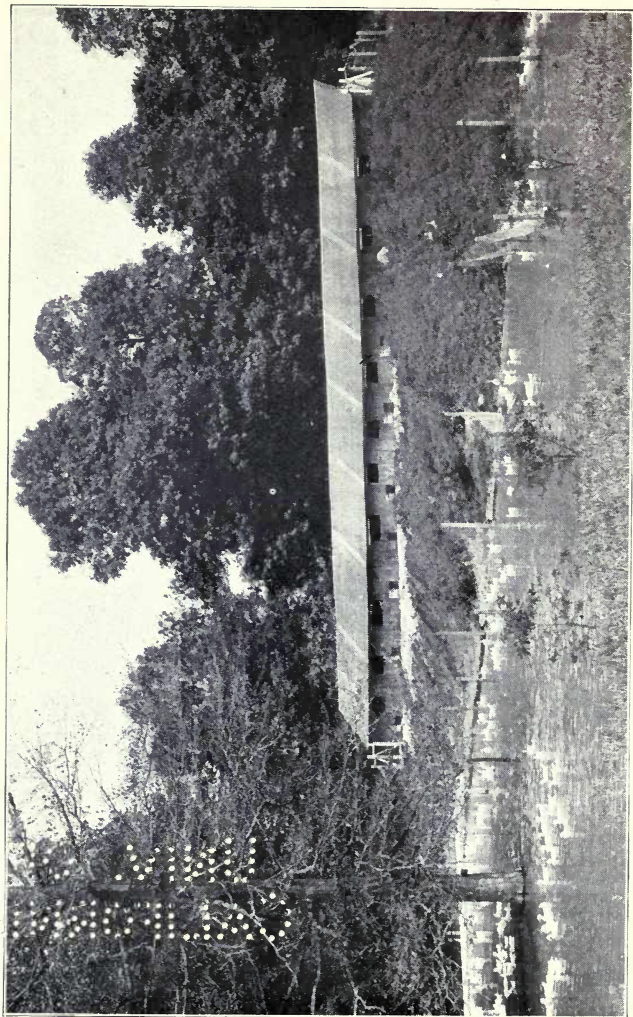
At the beginning of the breeding season one drake should be allowed for five or six ducks. The number of males should be reduced to one for every seven about March 1st and then one for every nine or ten about April 1st. The number of drakes should always be decreased when they begin to worry the ducks.

The desire to incubate their own eggs has been bred out of many strains of ducks, particularly the Pekin. For this reason the egg must be hatched in incubators or under hens. Duck eggs should be gathered daily,



Give the chickens a free range, fencing them out of places where they are not wanted.





Duck house and pond on an Indiana poultry farm.

kept in a cool place and turned daily. They should be set as soon as possible after laying as they do not keep as well as hens' eggs. In incubating duck eggs artificially, they are handled about the same as hens' eggs except that the temperature should be held at  $102^{\circ}$  for the first three weeks and more moisture supplied in the machine. They may be tested for fertility on the fourth or fifth day. Ducks take very kindly to artificial brooding and are in fact usually easier to handle than chicks. The incubation period is twenty-eight to thirty days for all varieties except the Muscoog, in which case it is thirty-five days.

Where they are to be sold as green ducks at ten to twelve weeks, the young ducks are usually not allowed to range but are fed heavily from the first. The brooder temperature should be about  $95^{\circ}$  to start with but is reduced more rapidly than for chicks, usually being brought down  $10^{\circ}$  the first week and reduced even more rapidly thereafter. Ducklings should not be fed for at least thirty-six hours after hatching. The ration for the first week may consist of equal parts of bran, corn meal, middlings and 5 per cent of sand in it to serve as grit. This should be given to them five times daily, care being taken that no more is fed than will be completely cleaned up. After the third day 5 per cent of sifted meat scrap should be added and green food in the form of chopped lettuce, alfalfa or clover fed freely. After the first week the number of feedings may be reduced to four and the ration, two parts wheat bran, one part wheat middlings, one part corn meal and one-half part meat scrap with 5 per cent sharp sand, may be given. In addition all the green food they will consume should be furnished. At about eight weeks of age the young ducks should be confined in a cool, shady place and fed for three weeks on a fattening ration which may consist of equal parts of wheat, bran, middlings, corn meal, to which is added 10 per cent of meat scrap and 5



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per cent sharp sand and all the green food they will consume. Birds saved for breeding should not be pushed for growth but they should be kept in a shady, grassy pasture and light feeding of two parts wheat bran, one part corn meal and one part ground oats may be given twice a day. With all ducks, young and old, fresh water should be kept before them at all times and the drinking dishes should be deep enough so that the nostrils may be cleansed. Along about the first of November these birds should be given access to a mash consisting of two parts wheat bran, one part middlings, one part corn meal and one part meat scrap. This ration should be continued throughout the breeding season.

## Geese

THE Toulouse and Embden geese are by far the most popular breeds for farm raising. The Toulouse, which is gray in color, is the larger of the two, the young gander weighing 20 pounds and the young goose 16 pounds. The adult gander weighs 26 pounds and the adult goose 20 pounds. The Embdens are white geese weighing 18 and 16 pounds for the young gander and goose respectively while the adult male and female weigh 20 and 18 pounds, if up to standard weight.

Except in the most extreme weather no shelter is necessary for geese. When some protection is necessary usually a shed intended primarily for some other purpose will be available. Geese should not be used for breeding purposes until they are coming two years old though the ganders may be used the first season and for several seasons thereafter. For best results not more than two geese should be mated to one gander. While goose eggs may be artificially hatched and brooded, it is usually found more satisfactory to hatch them under hens. Hens used for hatching eggs should be carefully dusted with sodium fluorid and given good care during the hatching period as this lasts from 28 to 30 days. Whether eggs are put in incubators or under hens they should be sprinkled with warm water every day during the first week. The first goslings should not be hatched until the grass is green. When they are about due to hatch if hens are used the eggs should be carefully watched and the first goslings taken out as soon as they hatch and wrapped in a woolen cloth and kept in a warm place. They should be kept away from the nest until the youngest goslings are several hours old, when they may be given back to the hen. If this is not done the hen is likely to become restless and leave the nest with the older goslings before the late ones are strong enough.

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They should be closely confined with their mother until they are three or four days old, after which they may be allowed liberty with their mother in a grassy pasture.

Goslings should be fed carefully for the first week or ten days after which they secure most of their food if allowed to run in a good pasture. The rations fed by different raisers are numerous but all agree in feeding only a mash. This may consist of corn meal to which is added 10 per cent of meat scrap, or five parts corn meal, five parts shorts and one part meat scrap. Either of these rations should be moistened to a crumbling consistency with milk or water. As a usual thing mature geese will be self-maintaining if kept on a good pasture. In case of drought or during the winter, however, they should be fed such bulky feed as mangels, turnips or steamed clover supplemented by the mash of equal parts corn meal, bran and ground oats. For both young and old stock there ought always to be an abundance of drinking water handy to the place of feed. Ground bone or charcoal should always be available. Geese intended for breeding purposes usually do better on pasture than in the feeding lot with other stock, as in the latter case they are likely to get too fat.

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