CIRCULAR E-336 JANUARY, 1937

Grow Healthy Chicks and Pullets

FEEDING AND MANAGING THE CHICKS

THIS WAY

Figure 1.—Only well-bred chicks provided with a clean range and proper management will produce profitable pullets.

OR THIS

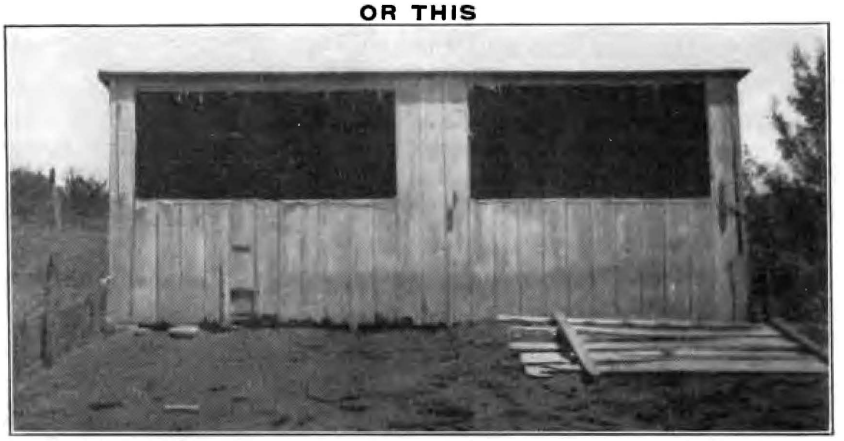

Figure 2.—This lot has been used for poultry for years. What chance does a baby chick have on such bare and heavily contaminated soil?

Photo courtesy O. A. Hanke

VIRGINIA AGRICULTURAL AND MECHANICAL COLLEGE AND POLYTECHNIC INSTITUTE
AND THE UNITED STATES DEPARTMENT OF AGRICULTURE, COOPERATING
EXTENSION DIVISION, JNO. R. HUTCHESON, DIRECTOR
BLACKSBURG, VIRGINIA

Grow Healthy Chicks and Pullets*

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Each year, particularly in fall and winter, numerous reports are received of disease and parasite conditions in Virginia poultry flocks. It is well-known that the great majority of poultry diseases cannot be cured by medicine, yet almost all of them can be prevented. *Experienced poultrymen know that the success of any year's poultry business depends, to a very great extent, on having a good healthy crop of well-bred and well-developed pullets to house in the fall.* Herein is the value of the Grow Healthy Chick and Pullet Plan.

No less an authority than Dr. L. F. Rettger of Yale University, who has spent a lifetime in studying poultry diseases, says that in controlling poultry diseases "sanitation is going to be the longer route, but a much more satisfactory one."

Prevention of poultry diseases and parasites depends on two things: (1) The adoption of a definite sanitation program; (2) Carrying this plan to completion.

The six points which good poultrymen everywhere regard as essential in growing healthy chicks, the females of which will develop into money-making egg producers, are as follows:

1. **Clean Chicks.**—Chicks should be obtained from parent stock which has been carefully culled for health, vigor, and production, and tested for pullorum disease (incorrectly called bacillary white diarrhea).

2. **Early Hatched Chicks.**—Chicks hatched in March or April have a tremendous advantage over those started in May or later.

3. **Clean Brooder House.**—The brooder house should be thoroughly scrubbed with boiling lye water and then when dry, disinfected with an approved disinfectant. Clean litter is required.

4. **Clean Range.**—Chicks should be raised on green range that has not been used for any poultry for the previous two years.

5. **Clean Feed.**—All feed should be given only in clean hoppers or feeders, never on the ground or floor.

6. **Clean Management.**—Take every precaution to avoid bringing in any kind of disease from outside sources.

In a Grow Healthy Pullet Campaign in six Indiana counties in 1935, those who followed the four recommended practices lost only 9.4 percent of chicks started. Those who did not use "clean chicks" lost 20 percent, and those that used neither "clean chicks" nor "clean ground" lost 19 percent. Table 1 shows these results in more detail; it warrants careful study.

*Based partly on Connecticut Experiment Station Bulletin 93, Revised Edition, December 1926; and on North Dakota Agricultural Extension Circular 91, February, 1930.

Table 1.

Practices followed	Number flocks	Number chicks started	Number chicks lost	Percent lost
All practices followed	164	61,841	5,871	9.4
All but "clean chicks"	71	26,146	5,244	20
All but "clean ground"	209	85,008	12,582	15
All but "clean chicks" and "clean ground"	137	52,016	9,936	19
All others	129	50,966	7,347	14.4
All flocks	710	275,977	40,980	14.8

Even though mortality is of great importance, this fact *is of much greater importance*: If the Grow Healthy Chick Plan is followed in detail, the birds *that live will be far better pullets and cockerels.* Well-bred and well-developed, healthy pullets are the only kind that make money.

Point One—"Clean Chicks"

At this time pullorum disease is the only one that is definitely known to be transmitted directly, or inherited, from hen to chick. Because this disease is highly infectious, a very few chicks that have inherited the disease can soon infect many others in the brood. In severe cases, mortalities ranging from 20 to 40 percent are common. There is absolutely no cure for this disease. Neither can it be prevented by putting "pink pills" or anything else in the chicks' drinking water. If a chick contracts the disease, only one of two things can happen: either it dies; or it recovers and becomes a carrier of the disease to infect future generations.

Pullorum disease can be detected in adult birds, or in the adult carriers, by the blood serum agglutination test. In Virginia, breeding stock is tested by the State Division of Markets. Chicks from flocks which have been tested for pullorum disease, and the carriers or reactors removed, and which flocks in addition have been vigorously culled by competent inspectors for standard and production qualities, and for vigor, are sold as Virginia State Certified Chicks. This year over 325,000 breeding birds are being tested and culled. U. S. Record of Performance pullorum tested chicks are now being sold in Virginia. U. S. Approved, pullorum tested chicks may be sold starting in 1937.

Even though pullorum disease has been known for many years, it still causes an annual loss in the United States of $8,000,000. This loss is almost entirely preventable. Do not buy chicks unless they come from flocks which have been tested for pullorum disease.

Caution: Many chicks are advertised as being from tested flocks when this is not the case. Buy only from a reliable breeder or hatcheryman.

According to the Federal census, on January 1, 1935 the average number of chicks on the 175,948 farms in Virginia reporting chickens was 49. Most of these, of course, would be mature females, with only a few males. Therefore, the average farm flock in this state is small. Owners of these small flocks, in which cases fewer than 100 chicks are started each spring, will probably use natural brooding methods. In such cases, it is difficult to control pullorum dis-

ease, unless experience has been had in using the rapid or whole blood test for pullorum disease. While this method, as used, is not as efficient as the tube test, it may have a definite place in some flocks to aid in reducing the tremendous annual loss caused by this disease alone.

Point Two—"Hatch Chicks Early"

Over 50 percent of the year's supply of eggs is produced in March, April, May, and June. Eggs are then comparatively cheap. Eggs are highest in fall because of reduced supply. This is due, in part at least, to the fact that so many chicks of poor breeding are hatched too late and do not get proper management during the growing season. The result is that average pullets do not lay until the spring following the year they were hatched.

Better than average producers avoid this situation by hatching or buying chicks early. Well-bred and well-managed Leghorns take about 180 days, and dual purpose breeds, i.e., Plymouth Rocks, Rhode Island Reds, etc., approximately 200 days to come into egg production after they have been hatched. October is a good month to have pullets commence laying. Counting back from October 15, 180 days for Leghorns, and 200 days for the others, Leghorns should be hatched not later than April 15 and dual purpose birds not later than April 1. In addition to hatching early to get pullets mature in proper season, early hatched chicks get a good start before hot weather. They are less subject to disease and parasites. They definitely do better.

Starting chicks this early usually necessitates a brooder house and artificial rearing. When 100 or more chicks are to be brooded, the artificial method is far superior to the old-fashioned "mother-hen" method that our fathers and grandfathers used. If 40 pullets are wanted, 100 chicks would be the minimum number to start. Do not make the serious mistake of trying to raise chicks of different ages together in a brooder house. Thousands of producers have found from sad experience that such a plan gives very poor results. Why not profit from their mistakes?

Point Three—"Clean Brooder House"

The movable colony brooder house is best for raising chicks. The Poultry Department of V. P. I., or your county agent, will supply a free blue-print of a 10×12 foot or a 12×14 foot brooder house. Some of the ready-built brooder houses can be recommended, but it is usually cheaper to build your own. Materials for a 10×12 house will cost about $40, depending on the locality, but a well-built house will last ten years. The cost per year, exclusive of interest, is therefore only $4.

To be safe, a new brooder house should be disinfected with one of the approved disinfectants discussed later in this circular.

In using a brooder house which has been used before, the following suggestions have been shown by very definite experimental work, as well as by experiences of thousands of successful poultry raisers, to be required in avoiding losses from disease and parasites. They are essential in producing healthy chicks:

1. Thoroughly scrape and clean the house.

2. Repeat number 1, if you are not sure that the house is as clean as it can be made.

3. Scrub the house thoroughly with creosol solution, or with boiling lye water. The creosol solution is made by using 3 to 5 parts of liquid creosolis compound, U. S. P. to 100 parts of hot water. For the lye solution, use 1 lb. of lye to 10 to 15 gallons of water. It is essential to have the water boiling. A thorough job of scrubbing the house with one of these solutions is even more important than the disinfecting.

4. Leave the house to dry for two or three days.

5. Be sure that all equipment used in the house is also thoroughly cleaned and disinfected. Cleaning the house and not the equipment would be largely a waste of time.

6. Thoroughly disinfect the house and all equipment with one of the approved disinfectants.

7. Then, *and not before,* move the house to *clean ground.*

Proper litter for the brooder house floor is very important. Dry shavings, short cut straw, alfalfa or other hay leaves, are suitable. Peat moss is excellent but it should not be used for several weeks without changing, as some manufacturers recommend. Until recently it has been too expensive; in many localities it still is.

The brooder house should be swept out and the litter changed twice weekly or at least every five days, during the first eight weeks of brooding. This is a lot of work but well worth while in preventing disease outbreaks, coccidiosis in particular. This disease costs Virginia poultrymen thousands of dollars every year. The common practice of not changing litter as long as it remains dry should be entirely discouraged. After the chicks are eight weeks old, changing the litter weekly should be sufficient, depending on the number of chicks using the house and on the weather conditions.

Approved Disinfectants

Bichloride of mercury (corrosive sublimate) 7.3 grain tablets: 8 tablets to each gallon of water, or 64 tablets (1 ounce) to each 8 gallons of water.

Bichloride of mercury, powdered form: 1 ounce to 8 gallons of water. Dissolve with hot water, or by using a like amount of ammonium chloride added to the solution.

(Bichloride of mercury must be handled carefully because it is very poisonous but not offensive, making it particularly dangerous to children or animals).

Liquor creosolis compound, U. S. P.: 1 part to 50 parts of water.

Crude carbolic acid: 2 parts to 50 parts of water.

(The above disinfectants should not be used with whitewash, as it will weaken the disinfectant. These disinfectants should be made up with rain water or soft water to get satisfactory results.)

Several commercial disinfectants sell at 10 or 20 times their actual value. The liquor creosolis compound, U. S. P., or creosol disinfectant, one dilution of which is sometimes called "sheep dip," will give as good results as any. It is the most economical for practical use.

Point Four—"Clean Range"

Green range is considered clean for chick raising when no chicks or any other poultry have been allowed to use it for at least two years. No poultry droppings should have been spread on the ground during the same length of time. Ground on which young or old poultry ran either last year or the year before probably will be contaminated with worm eggs, coccidiosis, tuberculosis, or other diseases, and is therefore not safe to use. Moving the brooder house to ground which is clean may mean having the house some little distance from the home. On far too many of our Virginia farms, the "chicken raiser" is the lady of the house, but even so, it is essential to give the chicks a chance by raising them on clean ground. Commercial poultry producers who make their livelihood from their poultry products know that *they could not continue in business if clean range were not used.*

Figure 3.—Cheap range shelter made of wire and bags.

On the majority of Virginia farms, the hens have the run of the farm. Either the laying hens or the chicks must be confined, unless the latter are so far away from the hens that mixing of the young and old stock never occurs. One-inch mesh woven wire chicken netting is not expensive, and its use may often save a good part of the flock of young chicks, not only by confining them to clean range, but by keeping them away from their natural enemies that often eat or kill them. The yard for the chicks need not be very large, provided it is changed frequently. The brooder house and chicks should be moved to clean range at least once a month, after they are six weeks old. The ground around the brooder house must not get contaminated. It should be kept in sod if at all possible; bare ground is much more likely to become contaminated. The plan in the diagram may be used for the first five or six weeks only; then the house should be moved.

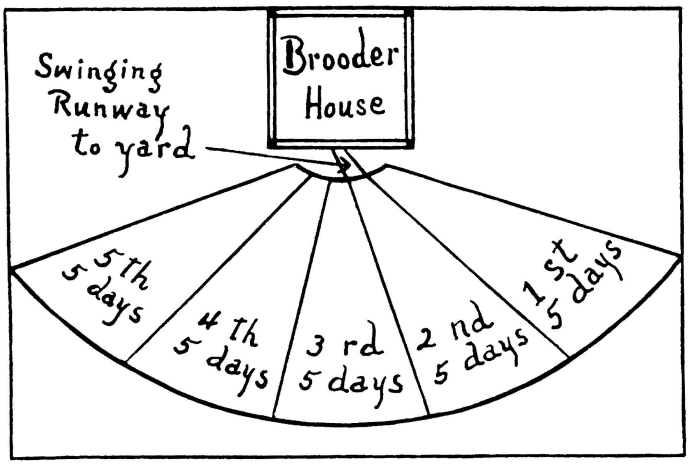

Figure 4.—Chicks may be confined two weeks, then given a clean yard every five days by moving the fence. Note the fan-shaped yard and swinging runway. (From Connecticut Bulletin No. 93, Revised Edition.)

A very desirable location for the brooder house would be on an alfalfa or bluegrass field which is beside a cornfield. Alfalfa is the best range known for chicks; bluegrass is second choice. The corn will furnish very necessary shade for the chicks during the hot days of summer. In sections of the state where corn is not commonly grown, enough should be planted especially to supply shade for the chicks. They will not hurt the corn after it is a foot or more high.

Point Five—"Clean Feed"

All feed given to the chicks should be fed only in clean hoppers or troughs. Never put feed on the ground or floor, except for the first two or three days when chicks are sometimes fed on clean papers or cardboard. Thereafter chicks will be able to eat from the smallest size hoppers, which may be easily made from lath. Clean feed is one of the important points in preventing disease, and prevention is worth more than carloads of medicines and quack remedies. Feed a balanced ration. The days of starting chicks on hard-boiled eggs, bread crumbs, etc., are over. Information on feeding will be found in following sections.

Point Six—"Clean Management"

Take every precaution to avoid bringing in disease to the chicks from outside sources. On most farms the *old hens will be the greatest source of danger.* Under "clean chicks," the carriers of pullorum disease were discussed. Similarly, hens seemingly healthy may carry coccidiosis, intestinal parasites, and many other diseases. Herein is the very great importance of keeping the young stock separated from the old hens *throughout the entire growing season.* It will be of little use to grow the chicks on clean range for eight weeks, though it will help in preventing round-worms, and then let them have the run of the farm with the other hens the rest of the summer. If one person has to care for both the chicks and the old hens, a disinfecting mat placed where the boots or rubbers can be well disinfected before going into the brooder house or on to the new chick range

may save a serious outbreak of disease. A bag soaked in the creosolis disinfectant previously mentioned, lying in a pan, will serve as a mat. Don't worry if neighbors make fun of this precaution — you will have better and healthier chicks than they will.

When chicks are out on range, locating the water containers and feed boxes at the fence line will greatly reduce the number of trips into the chick range. The water and feed hoppers must be moved very frequently, however, as it is around them that the range becomes contaminated more quickly than at any other place.

Feeding and Managing Chicks and Growing Stock

Well-bred chicks, and proper feeding and management go hand in hand with the Grow Healthy Chick Plan to develop healthy, well-developed pullets.

How Many Chicks?

Laying hens should not be kept more than two years, except in the case of individual birds that have been trapnested and pedigreed. A good ratio is 60 percent pullets in the flock and 40 percent hens. Working on such a basis, we must raise enough pullets each year to replace 60 percent of the laying flock.

Not more than 300 chicks should be started in a 10×12 foot brooder house and better results will be obtained when only 200 or 250 are started.

What Quality of Chicks?

In buying chicks buy the best obtainable. One should remember that chicks from stock bred for high egg production cannot be secured for the price of ordinary ones. Be sure, of course, to get chicks from stock which has been tested for pullorum disease; but in addition, buy chicks that have back of them definite breeding for egg production.

Statistics for a long period show that it takes, on the average, about the value of 80 eggs to properly feed a laying hen for one year. The average production per year of Virginia layers is approximately 80 eggs. Improper feeding methods cheapen feed costs only a little and may result in a very small profit over feed for these average hens, but when stock replacement and housing costs are added, average hens actually lose money for their owners. Profit eggs are the eggs salable after feed and other costs have been paid. The following table is worth careful study:

Yearly Profits from 100 Hens Under Different Rates of Egg Production.

Average number of hens	Average Production per hen	Profit eggs over feed cost	Value of profit eggs*
100	80	0	0.00
100	90	1000	$20.75
100	100	2000	41.50
100	125	4500	93.75
100	150	7000	145.75
100	200	12,000	250.00

*Eggs are figured at an average price of 25 cents per dozen. The higher the production per bird, the more eggs are produced in fall and winter, the season of highest prices. This increases the average annual price for eggs. Average production per year has a tremendous effect on profits in poultry raising.

If "average" chicks from an "average" flock sell, for example, at eight cents each, and half the matured chicks are pullets that lay only an average of 80 eggs

each year, the profit will be negligible. If, on the other hand, chicks which sell at 12 to 15 cents each, develop pullets that will lay 150 eggs each year on an average, under identical feeding and management, they will return a profit over feed cost of 70 eggs each per year. At an average price of 20 or 25 cents per dozen for eggs, this latter class of stock would be worth several times the usual selling price. Well-bred stock is so essential to profits in the poultry business that every purchaser would be much better off to purchase fewer chicks, if necessary, but to get the very best available from an egg production standpoint.

Brooder House Management

The thorough cleaning and disinfecting of the brooder house have been described in the "Grow Healthy Chicks" section. Other items of brooder management are treated here. Be sure the brooder stove is large enough. Too much heat can be easily avoided by proper ventilation, but if on a cold night the stove will not give enough heat, chicks even three or four weeks old may pile up and cause losses. In addition, chicks will not make proper growth unless they are suitably heated. The advertised capacity of brooder stoves and hovers is almost always double the practical figures: for example, if a stove to brood 250 chicks is wanted, the 500 chick size, as advertised, will be the correct size. This stove has a 52-inch hover. Be sure to buy a good brooder stove; a few dollars saved in the purchase price of this piece of equipment can be lost many times over in improper operating results.

Unless electricity is available, coal-burning brooder stoves, a few of the more recent oil-burning stoves (the old wick type is not satisfactory), or one of the regulated wood-burning stoves will be found most satisfactory. Local fuel cost will usually be the deciding factor. Cost of brooding is only a small part of total chick raising costs and expensive chicks and feed should not be risked with inferior brooding equipment. For example, brooding chicks with a wood-burning heater which cannot be regulated, and where the temperature is 75 one hour and 110 an hour or so later, is nothing but a gamble. Chicks are sometimes brooded this way, but the results secured, if at all satisfactory, are secured not because of the methods used but in spite of them.

Additional information on brooding and operating costs of various electric, coal, and wood brooders is available in Virginia Agricultural Experiment Station Bulletin 306, recently printed.

The brooder stove should be started two days, at the very least one day, before the chicks are to be put in, to see that it is operating properly. The temperature for the first two weeks, taken with the thermometer hanging from the edge of the hover so that the bulb is two inches from the floor should be 95 to 100 degrees. Have a good thermometer and don't guess at the temperature. Another thermometer on the wall of the house and five feet from the floor will indicate the correct room temperature. It should not read more than 75 degrees at any time. It is very difficult to keep the proper room temperature and at the same time keep the hover temperature right. In most brooder houses the room temperature will be 85 to 90 degrees, which is far too high and indicates a lack of proper ventilation. Proper moisture should be supplied in the brooder house by keeping a pan of water on top of the stove at all times. While poor feathering is caused chiefly by breeding or lack of the proper ration, too dry an atmosphere — and most houses are far too dry — will often be one factor in causing poor feathering and dry, brittle feathers.

At the end of the second week of brooding, reduce the temperature to 90, or at least three or four degrees from the 95 previously used. Each week, thereafter, reduce the brooder temperature further by three or four degrees until heat can be discontinued.

The length of time to continue heat in the brooder house varies so much that no definite rule can be set. Dual-purpose chicks started April 15 will usually need heat for at least six weeks, depending to a great extent on outside temperatures. Warm days and cool nights are dangerous to successful brooding operations; it is better to keep the brooder stove going very slowly during the day, supplying plenty of ventilation, than to build a fresh fire every night. Chicks started earlier than April 15 will require heat for eight weeks.

During the first few days of brooding, the chicks should be confined to the vicinity of the stove and hover by means of a roll of tarpaper or wire netting about one foot high and circling the hover at a distance of about two feet from the edge of the hover. Enlarge the circle a little each day, using more of the roll of tarpaper or wire, until about the fourth or fifth day, when the guard may be dispensed with, as by this time the chicks will know where to go when they want heat. After this time the chicks should be prevented from huddling in the corners of the brooder house by rounding these off with hardware cloth. In case the chicks do pile up in the corners, the hardware cloth allows air circulation and the birds will not be smothered.

Feeding the Chicks

Baby chicks should be put under the hover of the brooder when they are 24 hours old and given their first feed at that time. Contrary to old ideas, chicks will not be injured by feeding before this time, but no advantage is to be gained by it. Do not wait until the chicks are 60 or 72 hours of age before feeding them.

Chick rations and methods of feeding are as numerous as the varieties of chicks themselves; but a ration formulated by your state experiment station, or a good commercial feed, will give good results. Dual purpose chicks will use about 2.4 pounds of mash and 1.2 pounds of grain each up to eight weeks; up to 19 weeks of age, one chick will use on the average 8.25 pounds of mash and 8 pounds of grain, a total of 16.25 pounds. The starting mash will be used for the first eight weeks. Since it seldom pays to mix less than 500 pounds of mash, it will be as economical to feed fewer than 150 chicks a good commercial starter. The following rations will give equally satisfactory growth at a considerable saving in feed cost over most commercial feeds. The rations must be used exactly as directed, however; changes may result in decidedly inferior growth.

The basic principle to be remembered in feeding chicks is to get them all to eat as soon as possible, and still not waste feed. Usually they are fed on papers, cardboards, or other flat *clean* surfaces for the first two or three days only. To prevent feed wasting — husky day-old chicks can scratch just as well as older ones — it may be advisable to feed the chicks four or five times daily, but only for the first few days. Chicks will not be injured by overfeeding. After the first few days the mash should be available in hoppers at all times. Chicks are injured and their growth retarded by underfeeding but not by overfeeding.

Either the all mash ration or the grain and mash combination may be used; both give good results. If grain is fed, start feeding small amounts twice daily from the first; or wait until the chicks are a week or ten days old, when it may be put in hoppers and left in front of the chicks at all times, as with feeding mash.

Cod liver oil may be omitted from the mash as soon as the chicks are outside every day.

Whether grain is fed or not, the mash used is the same.

Provide adequate hopper space. Each chick should have two inches of mash hopper space. This requires six hoppers four feet long for 250 chicks.

Green feed should be provided after the first week. A good range is the best way of supplying this. Have plenty of clean water before the chicks at all times. Hard granite or mica grit, and chick size oyster shell should be available at all times.

Clean the water fountains thoroughly every day. Clean and disinfect the feed hoppers at least once a week.

Chicks raised with the old hen should be fed and managed exactly as above except for the suggestions relative to the brooder house. The brood coop should be kept clean and dry and moved a few feet to clean range twice a week.

If dried milk sells for more than six cents per pound, it should be used only during the starting period. After eight weeks, replace the dried milk in the mash with an equal amount of meat scrap, fish meal, or one of the vegetable protein concentrates.

All-mash	*% or lbs.*
Ground yellow corn	36
Wheat bran	10
Wheat middlings	15
Pulverized oats (1)	10
Alfalfa leaf meal	5
Meat scrap or fish meal, or equal parts of each (2)	15
Dried milk (3)	5
Ground limestone	2
Salt	1
Tested cod liver oil	1
Total	100

Grain Ration

2 parts finely cracked yellow corn
1 part cracked wheat

(1) Pulverized oats are ground in a hammer mill. An ordinary burr mill will not grind oats finely enough for a starting mash. Oatmeal may be substituted for the first 8 weeks. After that its use is too expensive.

(2) Five pounds of the meat scrap or fish meal may be replaced by soybean oil meal or by peanut meal.

(3) Dried skimmilk and dried buttermilk are of equal value. The dried milk may be omitted only if a sufficient supply of liquid skimmilk or buttermilk is available so that it may be left in front of the chicks at all times.

Management During the Growing Period

Continue to feed a balanced ration through the entire growing period. Too many poultry raisers fail in this essential, with the result that their pullets are a month or more later than they should be in coming into production in the fall. Between eight weeks and maturity, a Barred Plymouth Rock, for example, will use between 25 and 28 pounds of total feed; half of this will be mash. About 20 percent of the mash is animal protein, usually meat scrap, the most expensive part of the ration. Feeding three pounds of meat scrap in the growing mash will add about seven or eight cents to the feed cost, but will mature most birds a month earlier. In that month, a good pullet should lay 12 to 18 eggs worth a total of 30 to 45 cents. Investing eight cents for a return of 45 cents is good business management.