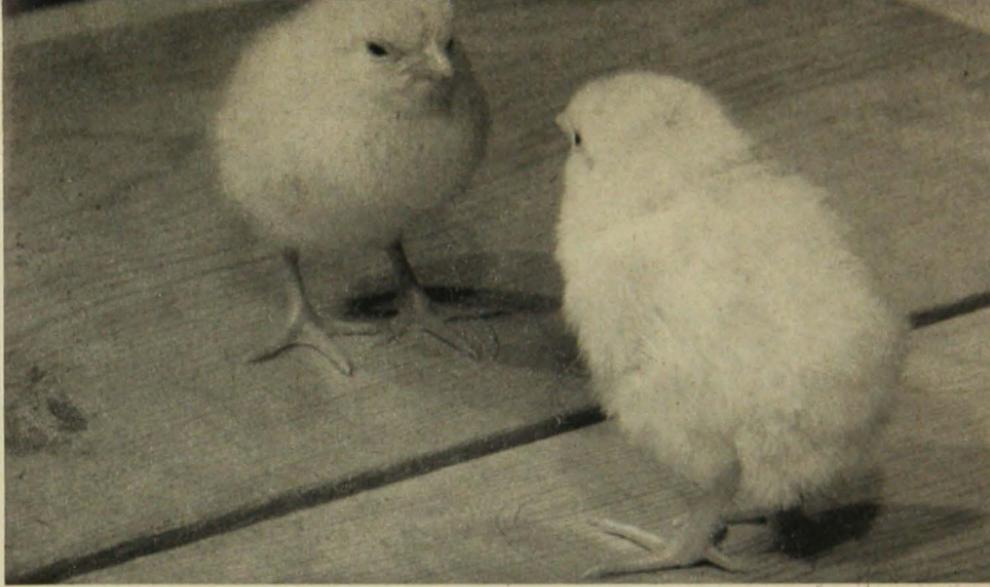


This archival publication may not reflect current scientific knowledge or recommendations.
Current information available from University of Minnesota Extension: <http://www.extension.umn.edu>.

The A B C of Chicks

1. Healthy Chicks
From high-laying flocks, pullorum tested.
2. Early Hatching
It takes 5½ to 6 months to grow a good pullet.
Egg prices are highest in the fall.
Hatch light breeds by April 1.
Hatch heavy breeds by March 15.
3. Ample Space
4. Clean Ground
Away from last year's range and the old flock.
5. A Complete Ration
Plenty of feeders—always kept filled.
6. Clean Feed
Nonwaste feeders.
7. Sexes Separated
As early as sex can be observed.
8. Early Housing
When pullets begin to lay—October 1 at the latest.



BUY CHICKS OF KNOWN QUALITY

On most farms chicks are raised each year for the purpose of replacing all or part of the laying flock. Egg production is as a rule the main source of income and therefore the pullets should be given every opportunity to develop into early and profitable layers. Cockerels are a by-product which may add considerably to the total income, but they should be handled in such a way as not to handicap the growth of the pullets.

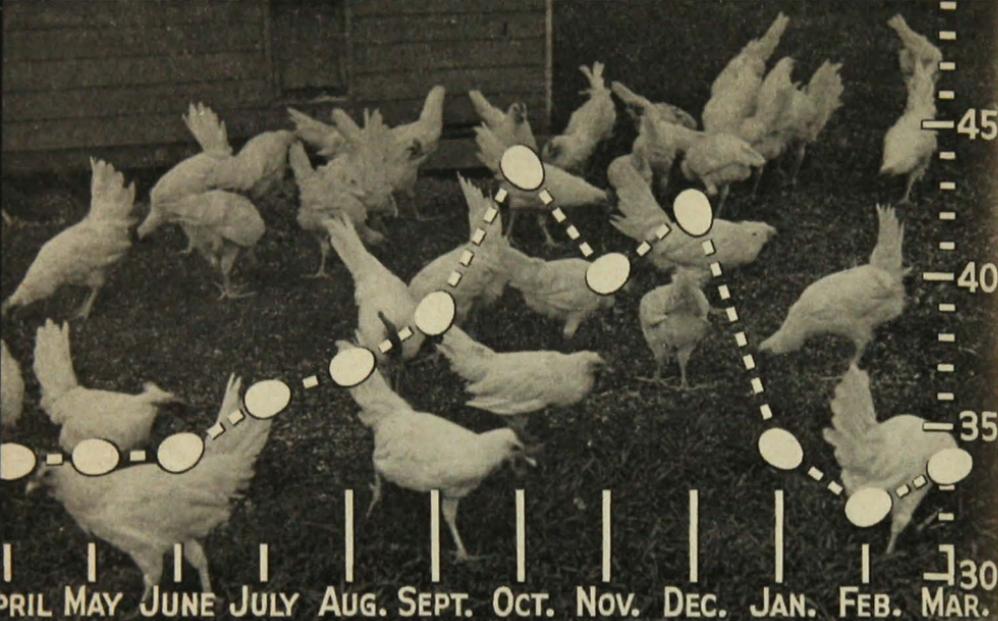
In buying chicks, two main points should be kept in mind: they should come from stock bred for egg production and properly blood tested for pullorum disease.

The National Poultry Improvement Plan operates in cooperation with the different states to help flock owners know the quality of chicks when buying. It sets up standards of production, sanitation, egg size, and blood testing which flock owners and hatcheries must follow to obtain approval. Cooperation in this program is voluntary. Only flock owners and hatcherymen who place their operations under official supervision are subject to its control, and only those hatcheries may use the official grade names.

The program is divided into two stages—the breeding stages, in which stock is improved by selection or by trap nesting and pedigree breeding; and pullorum disease control, which provides for blood testing of breeding stock with the elimination of reactors.

Practical breeding grades for farm flock owners are two: Minnesota U. S. Approved and Minnesota U. S. Certified. The two top grades, Record of Performance and Register of Merit, require trap nesting and pedigree breeding, and supply pedigreed males for breeders and hatcherymen who are carrying on breeding and improvement work. The practical pullorum stages are Pullorum Controlled and Pullorum Tested.

A list of hatcheries under supervision can be obtained from the Minnesota Poultry Improvement Board, State Office Building, St. Paul.



EARLY HATCH FOR HIGH PRICED EGGS

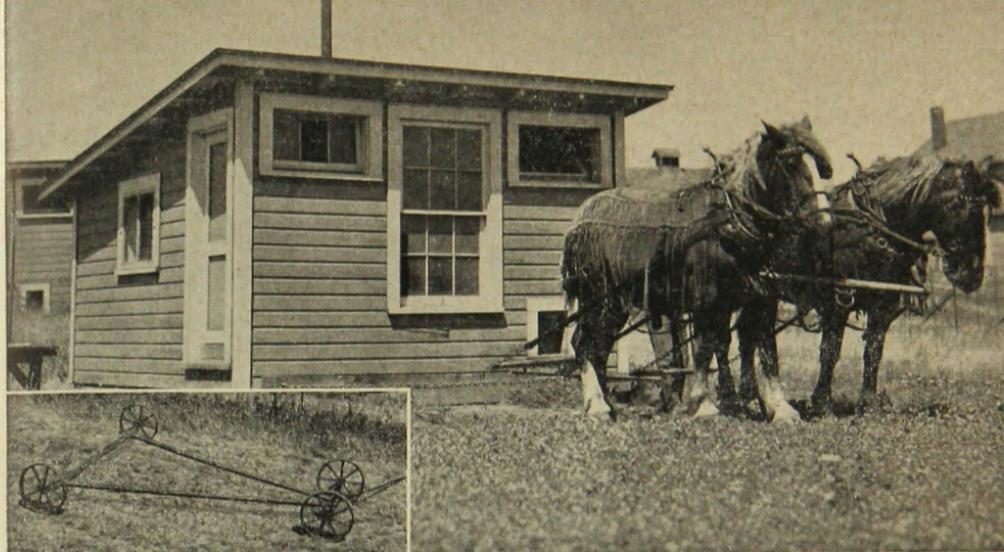
The time of hatch is important. Chicks hatched by the first of April are likely to give the best returns. Broiler prices drop early in the summer. Early-hatched pullets can be brought into lay before egg prices reach their peak in the fall. Chicks hatched before April 1 will, as a rule, reach maturity in a shorter time and will be less subject to disease than those hatched later. Heavy breeds should be hatched by March 15 to allow for their slower rate of growth.

The number of chicks needed has to be considered. It is desirable to replace the entire flock in most average-size flocks, or in any flock where it is not practical to separate old hens and pullets. To permit rigid culling before pullets are housed, it is necessary to allow three straight-run chicks for each pullet to be housed. One-half as many chicks will be needed if bought as sexed pullets. Straight-run chicks cost less than sexed pullets, but pullets will grow more uniformly where not mixed with cockerels. As a general rule, the cockerels in a flock of straight-run chicks may be expected to help pay the cost of raising pullets.

Crossbred chicks have gained considerable popularity because of their rapid early growth. Their chief advantage is in production of broilers, because egg production is not increased accordingly. Where light and heavy breeds are crossed, there is the disadvantage that the resulting cream color of the eggs may bring a lower price than would either brown or white eggs.

Buying started chicks is almost certain to increase the cost of raising the flock. Chicks started in batteries are more susceptible to coccidiosis and are more likely to develop cannibalism than those started on the floor.

It is always well to buy chicks as close to home as the desired quality can be obtained. Long-distance shipping multiplies the danger of disease.



SANITATION IS CHEAP INSURANCE

The chief diseases of chicks are spread by means of the droppings, the accumulations of one year being a serious source of disease for the next year's chicks. This makes it very necessary to raise each year's crop of chicks entirely separate from the old flock and old yards, to provide a range not used by poultry for at least a year previous, and to be sure there is no drainage from contaminated land. Heavily shaded yards must be left free of chicks for even longer periods in order to be safe, since they are less exposed to the germ-killing action of the sun. Movable shade shelters furnish the necessary shade for feeders and fountains, thus insuring that chicks will eat all they need for steady growth regardless of weather conditions.

Portable brooder houses make it possible to move chicks to clean range. However, in large flocks it is sometimes economical to use a permanent brooder house. In either case, up to the time chicks can be moved to range, they may need more room and a chance to get outdoors. A wire-floored range shelter set alongside the brooder house will serve this purpose. The shelter can also be used for roosting on the range for the rest of the summer.

These shelters are cheap to construct and easy to move, and furnish better conditions in hot weather than does the brooder house. More rapid growth, faster feathering, and less trouble with summer colds are almost a certainty where shelters are used on range.

Deep litter for brooder houses is relatively new. Instead of removing litter and replacing it with fresh every few days, the old litter is left and new is added as needed. If care is taken to keep litter stirred up and to remove wet litter that accumulates around the waterers, the deep litter promotes dryness and, therefore, good health.

Hydrated lime mixed with the litter at the rate of one pound for every 10 square feet of floor also promotes dryness. Sprinkled over the fresh litter and raked in, it helps to prevent the litter from matting.



BROODER AND MANAGEMENT IMPORTANT

Any brooder that regulates accurately can be used. Electric and gas brooders are preferred by many because of their ease of operation and regulation. Whatever the type of brooder, it must be the right size for the flock and for the house. A brooder for 350 chicks is the size needed for a 12- by 14-foot brooder house. Better results are obtained where broods are not larger than 350 chicks.

With coal and oil brooders, the temperature at the outside edge of the hover at the height of the chicks' backs should be about 90° F. at the start. The temperature under gas and electric hovers should start somewhat higher, up to 102° F.

Gas and electric brooders heat the floor underneath the hover but not the room. Therefore, always lay a sheet of $\frac{3}{4}$ -in. insulation board on the floor under the hover to provide extra insulation. Also, place the feeders and waterers so that they extend well under the hover for a few days or until the chicks run in and out freely. Otherwise some chicks may not get enough to eat and drink.

The brooder stove should always be set up and operated several days before the chicks arrive. This practice will avoid much grief from difficulty in getting the stove regulated after the chicks arrive. To guard against chicks wandering too far away from the heat, set up a circle of fine chicken netting around the hover for the first few days. If this netting is placed where the temperature is about 75° F., the chicks will run no risk of being chilled. At the same time, they will have sufficient choice of temperature for comfort.

Reduce the temperature under the hover a few degrees each week until heat can be discontinued at about six weeks. Better growth and feathering will result if the room is kept quite cool except for the area under the hover. This hardening off is very important.



GIVE CHICKS ROOM TO GROW

Probably no mistake is more common than putting too many chicks in the brooder house. Excessive losses, uneven growth, and cannibalism must be expected if the house contains too many chicks for its size.

The brooder house must provide ample room and offer a wide range of temperature to suit the varying needs of the chicks. Experiments show that chicks thrive in temperatures almost as low as freezing if they have a heated hover to which to run. A 12- \times 14-foot brooder house will take care of 350 chicks. A house much smaller than that provides no cool places where chicks can escape from the heat.

Overcrowding becomes more serious as the chicks grow. Cockerels should be removed when heat is discontinued, or, in heavy breeds, as soon as the sex can be determined. This will provide the necessary space for both pullets and cockerels.

Selling cockerels at broiler weight is, as a general rule, more profitable than keeping them to heavier weights. Leghorn cockerels should be sold at not more than 2 $\frac{1}{4}$ pounds, since it takes about the same amount of feed to put on the third pound of gain as it does to make the first two.

Chicks are frequently crowded when sexed pullets are bought, on the theory that available brooder house space will be used to greater advantage. More often than not, this practice results in crowding. If the house is filled to capacity with pullet chicks, it is necessary to move half of them to extra quarters as soon as the heat is no longer needed. Otherwise growth will be retarded, and during the hot summer weather, the birds are likely to be greatly overheated when roosting. The wire range shelter is ideal for summer housing when extra space is needed.



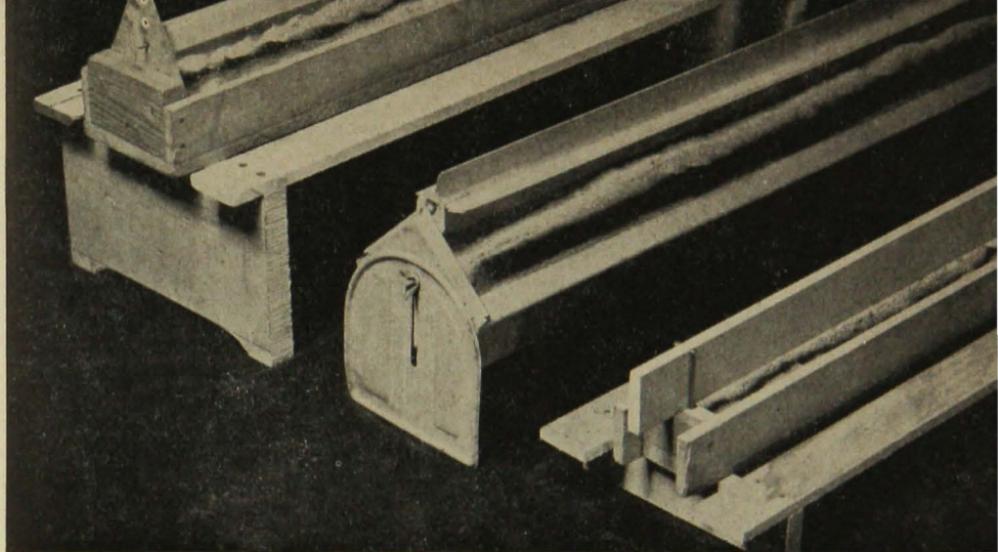
LOW-COST EQUIPMENT SATISFACTORY

Feeders and fountains should be nonwasting and should be built so that feed and water cannot be fouled with litter and droppings. Such equipment should be inexpensive so plenty of it can be provided at all times, insuring that chicks can eat and drink at will. Such provision will promote rapid, even growth and, at the same time, help to prevent cannibalism.

Troughs, feeding from both sides, are economical and easy to care for. To reduce labor they may be used even for water and milk after the first few weeks. Suitable galvanized troughs are on the market, and cheaper ones can be made at home. A starting feeder, shown on page 9, is made of three laths with a fourth one extending lengthwise on top of the trough. This will serve during the first two weeks. The next six weeks one may use a trough with a 1" x 4" bottom, lath sides, and an adjustable 1" x 1" reel suspended in galvanized end pieces. Wasting of feed can be prevented if feeders are filled not more than $\frac{2}{3}$ full and if the reel is always set so that chicks must reach down into the feeder instead of being able to reach across under the reel. Place feeders on stands at the beginning to keep feed clean and to save floor space. Move feeders and fountains daily.

Place all fountains on wire platforms so that chicks cannot reach damp spots that are sure to surround the fountains. Such spots are ideal breeding places for disease. On range, large barrel waterers that need be filled but once daily will prove effective labor-savers. They can be hauled to and from the range on skids or wheels.

Feeders for different ages: first two weeks, at least one 4-foot feed trough for each 100 chicks; two to ten weeks, two 4-foot feeders for each 100 chicks; ten weeks to maturity, two 5-foot feeders for each 100 birds.



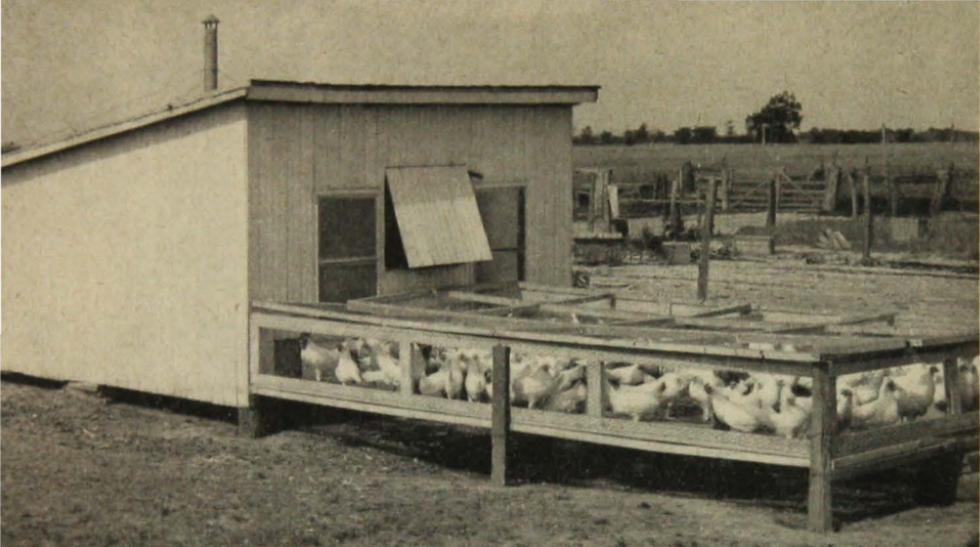
CHICKS NEED TRAINING

Chicks seem to have but two instincts—to wander about investigating their surroundings and to peep when they get into trouble. Everything else has to be learned, and meanwhile the wise poultryman tries to protect them from harm. Feed is put into feeders, but should also be placed on egg case flats where they are sure to find it. The wire fence around the hover serves only to keep them from being chilled while they learn the “ins” and “outs” of the hover. As soon as they move in and out freely the wire can be removed.

For no apparent cause, chicks have a tendency to huddle together, especially at night. For safety, make them form a ring around the outside of the hover, with no piling up at any point. Some poultrymen reduce such crowding by darkening the windows and pushing the chicks around in a circle. Others burn a dim light hung at the center of the room all night. Not only does this reduce crowding, but it permits chicks to get feed and water whenever they wish. If they persist in piling up, look for and correct any cause, such as drafts.

Crowding in the corners of the brooder house is a frequent source of loss. To avoid this, round off the corners with triangular pieces of wire netting, so arranged that chicks cannot fly over them.

At six weeks of age, chicks should be going on the roosts at night. Many serious cases of roup have been traced to overheating, due to crowding in the corners at night in warm weather. Chicks of a heavy breed often have to be placed on the roosts each night until they form the habit of going up by themselves. A sloping platform with wire netting beneath the roosts helps greatly in teaching chicks to use the roosts. When chicks use top roosts regularly, raise platform to a level position.



CANNIBALISM

Chicks very readily develop the habit of "picking," especially in a period of confinement during bad weather. Once started, it may reappear in a more serious form after the pullets are in the laying house.

Not all of the different causes of cannibalism are known, nor are there cures that are effective in all cases. Crowding is an almost sure cause of this trouble. Other apparent causes are overheating and too dry air; insufficient feeder space or waterers; damp, soggy litter; or any other condition which limits activity. Picking is particularly likely to start just as the new pin feathers become noticeable, but it may begin at any time. If any chicks are picked till bleeding starts, the habit may spread quickly among the rest of the chicks. It is important, therefore, to keep on the lookout and to remove injured chicks.

It is a good practice to have a sunporch or range shelter where the chicks can get outside whenever the weather permits. See that feeders are never allowed to become empty and that the litter is kept dry and fluffy to induce scratching. If trouble starts, it can sometimes be checked by frequent feeding, stirring up the litter and the mash, and hanging up bundles of alfalfa. Feeding, no doubt, plays some part in causing and controlling this vice. Feeding oats with the hulls has been one practice that has proven an effective control measure. They should be pulverized at first but by about six weeks they can be fed coarse-ground or whole.

Adding salt, up to about 4 per cent of the mash, for a few days or until the picking stops sometimes gives excellent results.

It should be kept in mind that whatever control measures are taken, they should be begun as soon as the vice is noticed. Otherwise it soon becomes a habit. Debeaking is a successful last resort which is practiced in many large flocks to avoid risk of loss.



COMPLETE RATION NEEDED FOR GROWTH

Rapid, even growth is the most economical. The chicks should be fed good rations regularly throughout the growing period.

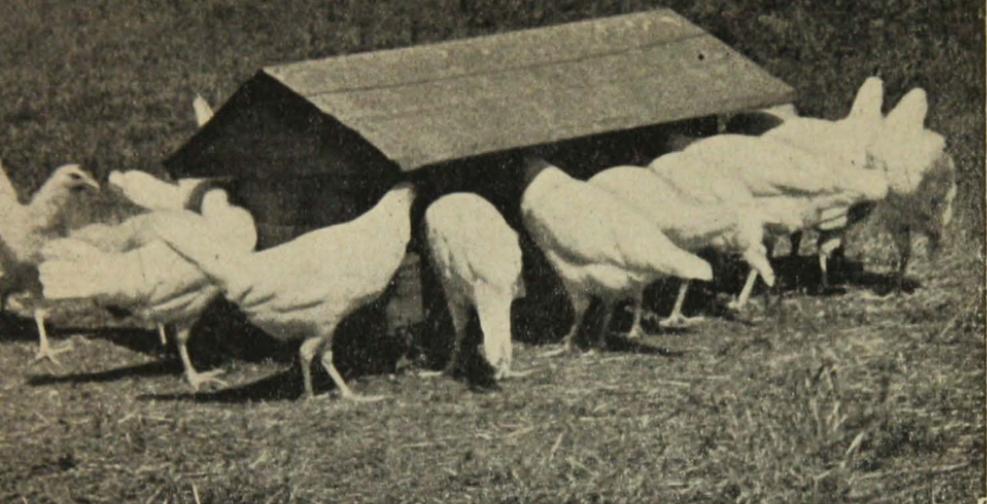
The following mixtures are suitable for home mixing.

CHICK MASHES*

Starter mash	Grower mashes	
	Poor range	Good range
Lbs.	Lbs.	Lbs.
310	325	365
100	100	100
200	200	200
100	100	100
50	50	25
75	75	75
125	125	125
30	15
10	10	10
1.5
1001.5	1000	1000

* Add 2 ounces manganese sulfate mixed with the salt per 1,000 pounds of mash.

These rations make use of commonly available feeds. Experience has shown that changes can be made to meet local or temporary shortages. Soybean oil meal may replace part of the animal protein feeds, such as meat scrap, fish meal, and milk products, if such a change is necessary or cheaper and if the substitutions meet certain mineral and vitamin needs. Any mixture of three or more grains or their by-products can be used, except that if no yellow corn is used, more alfalfa usually should be added.



HOW TO FEED

Have starter mash available when chicks are put into brooder house.

For the first day or two, scatter feed on egg case flats or on corrugated paper. Use the starter mash as long as chicks are indoors. Start grower mash when chicks go on range.

Start feeding grain to the chicks at about 6 to 8 weeks (cracked corn, wheat, and pinhead oats are good). Whole oats and corn may be fed free-choice after 12 to 14 weeks. Wheat, barley, and millet may also be used.

After the second day, use one 4-foot hopper for each 100 chicks. Increase space until 10 to 12 weeks, when there should be one 5-foot feeder for each 50 chicks. Double the feeder space when grain is fed free-choice.

A good green pasture of alfalfa, clover, rape, or similar greens is an excellent source of cheap feed as long as the grain stays green and tender. When such pasture is no longer available, change the ration as indicated on page 11 in order to be sure the pullets are getting a ration that will support the best possible growth.

The mixtures on page 11 may be changed as follows:

When possible, replace 25 pounds meat scrap with 25 pounds fish meal. More meat scrap and less soybean oil meal may be used.

Defluorinated rock phosphate may be substituted for bone meal.

Reduce alfalfa one-half if dehydrated meal is used.

When liquid skim milk is given as the only drink, the dried milk and all but 25 pounds of meat scrap and 25 pounds of soybean meal may be omitted. When both milk and water are fed free-choice, the dried milk may be left out and the soybean meal and meat scrap reduced to 50 pounds each. Add one pound of bone meal for each 5 pounds of meat scrap omitted.



RATE OF GROWTH WILL VARY

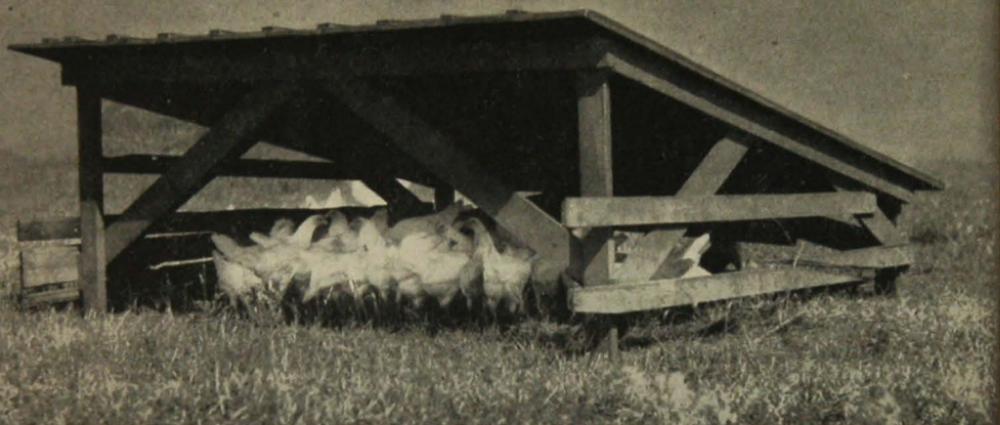
Different flocks and different breeds will vary in their rate of growth.

RATES OF GROWTH AND FEED CONSUMPTION (Determined at Cornell University)

Age	Leghorns Pullets and Cockerels		American Breeds Pullets and Cockerels	
	Average weight	Average total feed	Average weight	Average total feed
Weeks	Pounds	Pounds	Pounds	Pounds
4	0.44	1.03	0.44	0.98
8	1.21	3.59	1.42	4.13
12	2.03	7.93	2.47	9.22
		Pullets		Pullets
16	2.39	11.66	3.04	14.57
20	2.99	16.12	3.73	19.99
24	3.36	21.07	4.27	25.89

Up to two pounds weight, the feed requirement per pound of gain is about the same for Leghorn cockerels as for American-breed cockerels. From that time on, the feed cost per pound of gain increases for the Leghorns, so that it takes 50 per cent more feed to carry Leghorn cockerels to 4½ pounds weight than it does for American-breed cockerels.

Sale of Leghorn cockerels at 2¼ pounds or less puts them on the market at the peak of their condition, thus improving the chances of receiving the best price. Heavy breeds may in some seasons be profitably held for roaster weights of 4½ pounds and up.



PULLETS DEMAND SPECIAL CARE

The pullets raised each year represent the chief source of poultry income for the following egg year. If pullets are not well enough grown and quickly matured, they will be slow in coming into lay. If crowded in their brooder houses, they will develop more slowly and are likely to be more subject to colds and other respiratory troubles.

Feeding according to their changing needs is of the greatest importance. During the first few weeks the chicks need large amounts of protein. For this reason, the mash makes up the principal part of the starting ration. As the chicks grow older, feed a larger proportion of grain, increasing it gradually, and feed the grain free-choice from 12 to 14 weeks on. At five months the scratch consumption should be about 15 pounds per 100 pullets. This allows the pullets to attain their full body weight, complete their adult coat of feathers, and develop a deep yellow in beaks and shanks—conditions indicating good preparation for a winter of heavy laying. A winter molt is less likely if this rule is followed. Furthermore, pullets will probably lay full-sized eggs in a shorter time than if allowed to lay before their bodies are full grown.

Provide a constant supply of feed and water in a place where the birds can eat in comfort regardless of weather conditions. A shade shelter such as the one pictured above costs little, can be moved easily, and offers a welcome protection to pullets on the range. Moving the shelter every few days, even a short distance, will help control disease. A nearby corn field may be used to advantage where such shelters are not available.

If pullets are to be vaccinated for pox, it should be done at the time they are moved to range, or at least by 12 weeks.



SORTING AND EARLY HOUSING PAY

A flock of pullets that reach their full adult weight before starting to lay may be expected to pay best as hens. Such development will usually require from five to six months, even with the light breeds.

At this time, pullets should be as big as hens, uniform in size, fully feathered, and showing good body weight. If a yellow-skinned breed, they should have deep yellow coloring in beak and shanks.

Before housing, they will need a careful culling. In every flock there will be some pullets that are not worth keeping and that should be sent to market. Such pullets are those that have failed to reach the full size and development so necessary for good results. They may be pale or unthrifty, or much smaller than the average of the flock. Those to be kept may well be moved to the laying quarters as they mature, leaving some of the slower-maturing ones to enjoy the free use of the range a little longer. Under no condition should pullets be penned with old hens. Neither hens nor pullets will lay as well as those penned and fed separately according to their needs. Extra eggs will soon pay the cost of a partition to separate the pullets from the old flock. Unless this can be done, it is better to keep only pullets.

Regardless of the age of the birds, when they start laying they should be put into their winter quarters without delay. To leave them on range after an appreciable number have started to lay is to invite large losses later on from a winter molt or from a production drop at the time of housing.

CONTENTED PULLETS LAY MORE EGGS

Pullets should be housed for the winter by October 1 at the latest, even though they have not begun to lay. In northern Minnesota or in a rainy, cold season they will do better if housed earlier than this. This means that poultry houses must be ready for use on short notice. Houses that are permanently insulated and that have the necessary equipment always kept in good condition can be made ready for the pullets quickly with the least possible labor. Too often pullets are delayed for weeks in laying profitable fall eggs because the pressure of fall work prevents getting their house ready.

When pullets are placed in the laying house they need time and favorable conditions to settle down for their job of winter laying. They will get at this job in earnest in a shorter time if undisturbed. Letting them out on nice days only delays egg production. Delays will be caused if carpenter work and other "fixing" have to be done after the birds are housed. Keep the windows open as much as possible during the first few weeks so that the change from range conditions is not too sudden.

Pullets in the laying house need the same amount of feeder space as they required on range—one 5-foot feeder feeding from both sides for each 50 pullets. Keep feeders filled and water always available. Grain twice a day will keep the birds busy and contented. At this time they need about 15 pounds of scratch feed daily per 100 pullets.

Pullets will usually use the roosts in the laying house if they have been roosting while in their range houses. However, take no chances. Put them on the roosts at night if they fail to go by themselves.

A moist mash once daily provides a splendid means of keeping the pullets eating. If lights are used, begin as soon as pullets are housed.

All these practices, if followed carefully, are effective in preventing fall colds which are often sources of heavy loss when pullets are first placed in winter quarters.

This bulletin has been prepared to cover the main principles of caring for chicks to maturity. Further information on special problems can be obtained from the following bulletins:

- Extension Bulletin 198, Brooder Houses
- Extension Bulletin 163, Equipment for Chicks
- Extension Bulletin 154, Timely Truths About Poultry Troubles
- Extension Bulletin 121, Poultry Housing
- Extension Pamphlet 40, Round Top Brooder House
- Extension Pamphlet 123, Spot the Loafer Hen

UNIVERSITY FARM, ST. PAUL 1, MINNESOTA

Cooperative Extension Work in Agriculture and Home Economics, University of Minnesota, Agricultural Extension Division and United States Department of Agriculture Cooperating, Paul E. Miller, Director. Published in furtherance of Agricultural Extension Acts of May 8 and June 30, 1914.