

Feeding For Egg Production

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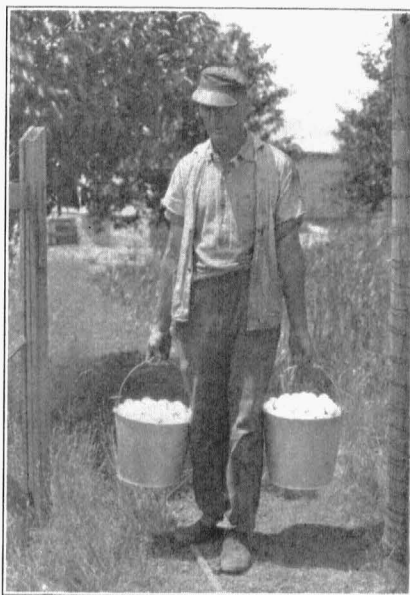


Fig. 1.—Heavy egg production requires correct feeding.

Feeding hens for egg production has for its purpose the efficient transformation of the ordinary poultry food stuffs, chiefly produced on the farm, into eggs. The efficiency of the hen in the production of human food depends upon her inherent ability to lay eggs, coupled with suitable protection and adequate rations. A flock of hens averaging 150 eggs per hen per year is not at all unusual. Such a flock will produce two eggs for every pound of feed consumed or a pound of eggs for every four pounds of feed. For 1926 the flocks of 327 farmers, cooperating with the Missouri College of Agriculture and following its recommendations, secured a production per hen of 130 eggs. The records from these farms

indicate that for every dollar's worth of feed fed to the poultry flock the hens returned over \$2.00 worth of poultry products. To secure these results it is necessary,

- (1) That the hens be liberally fed
- (2) That the food be properly selected
- (3) That the food be fed in correct proportions.

There are two main uses to which food is put. In the first place the body maintenance must be supplied. This necessitates food to supply energy and heat, and also for the continual repair of waste tissue. The hen utilizes her food for this purpose first, then if there remains a surplus it goes toward the laying of eggs. Obviously, then, no eggs may be expected unless a sufficient amount of food is fed so that after maintenance requirements are satisfied there remains a surplus for the production of eggs. It is estimated that nearly three-fourths of the total ration of a laying hen is used for maintenance.

It is not enough, however, merely to feed a liberal ration. The ration should also be properly balanced so that the desired proportions of various nutrients are supplied. A balanced ration for laying hens is a combination of food stuffs in proper proportion to produce the desired results. So far as known the form in which they are fed is not important. Attention, however, should be called to the necessity of keeping the crude fibre in the ration down to a low level (5 to 7%). This is due to the inability of the hen to handle bulky rations. While grains form a large proportion of a hen's diet, one of the first principles of poultry feeding is that the hen cannot be made to lay eggs in large numbers on a strictly grain diet. A protein concentrate usually of animal origin must be added. Trials at the Missouri Agricultural Experiment Station show that on rations consisting of corn 10 parts by weight, oats 5 parts, bran 2 parts, shorts 2 parts, and corn meal 2 parts, the hens seldom laid over 60 eggs per hen per year, but when 1½ pounds of tankage or meat scrap, or its equivalent in milk products, were included, the egg production was more than doubled. To feed a suitable ration is also one of the first steps in disease prevention.

It is a common practice to supplement the whole or cracked grains, commonly referred to as scratch feeds, with a mixture of ground feeds (mash). The proportion of scratch feed to mash varies with the season of the year, the composition of the mash, and the individual feeder. Under average conditions hens should consume at least one-half as much mash as grain, although frequently the proportions are equal. In fact in recent years some have adopted the practice of feeding nothing

but ground feed mixtures. This is known as "the all-mash system of feeding."

In addition to proper proportions of various feed stuffs, hens must be supplied with suitable mineral material. This is indispensable for efficient digestion and the manufacture of egg shell. Succulent material in the form of green food also plays a part in maintaining the health of the flock, and a constant supply of clean fresh water is of equal importance.

Proper attention should be paid to supplying the hen with adequate vitamins. These mysterious essentials are called A, B, C, D, and E, and their recent discovery has clarified the practices of poultry feeding.

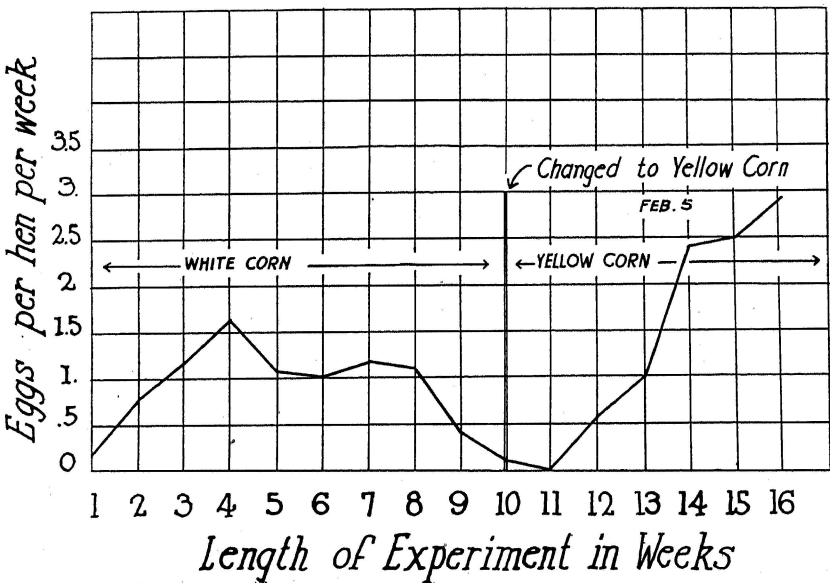


Fig. 2.—Laying hens must be fed vitamin A. This graph pictures the results of an experiment at the Missouri Agricultural Experiment Station, running from Nov. 28 to Mar. 21. Note the rapid increase in egg production after the 10th week, when yellow corn was fed instead of white.

Vitamin A is fat soluble. Its absence in the ration results in poor growth in young chicks and a peculiar eye trouble similar to roup in adult hens. This condition is naturally accompanied with poor egg production. The principle sources of this vitamin are the green leafy parts of plants, yellow corn, yellow carrots, and certain animal fats such as egg yolk, butter fat, and cod liver oil. It is not present in white corn, the white portion of plants, or in most root crops. In fact, most of the common grains such as wheat, oats, kafir, and milo possess little, if any, vitamin A. This emphasizes the importance of including yellow corn

in the ration and explains why beneficial results follow the feeding of green leafy material, such as clover and alfalfa hay in conjunction with rations which would otherwise be low in vitamin A.

Vitamin B is water soluble and is called the antineuritic vitamin. It is widely distributed in practically all feed stuffs, and so far as the, practical phase of poultry feeding is concerned, this vitamin is adequately supplied. It is found in the germs and hulls of grains, green food, fresh vegetables, eggs, milk, and yeast.

Vitamin C is of little concern to the poultry raiser, as its absence from the ration shows no ill effects.

Vitamin D is the anti-rachitic vitamin. The chief sources as a feed are certain animal fats such as cod liver oil and egg yolks. When the hen

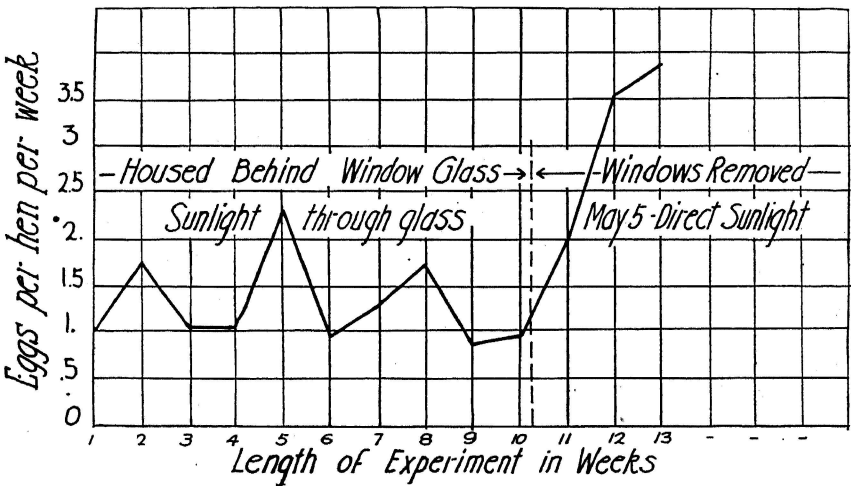


Fig. 3.—Laying hens require direct sunlight. This graph shows the results of another experiment at this Station, running from Feb. 21 to May 23. Note that the windows were removed May 5 and that egg production rapidly increased.

is exposed to ultra-violet rays from the sun or certain lamps made for the purpose, the exposure is equivalent in its effect. Absence of this vitamin in the ration results in failure of the bird to utilize its minerals to advantage. In adult hens this is characterized by poor egg production, soft-shelled eggs, and a paralysis frequently resulting in an egg-bound condition.

At the Missouri Agricultural Experiment Station hens not provided with this vitamin and kept housed behind window glass, which filters out the ultra-violet rays, laid very poorly, averaging about one egg per hen per week. By feeding cod liver oil, or by opening the windows of the house so that the direct sunshine might enter, or by exposing the hens to ultra-violet light, the production was increased in two weeks to 4

eggs per hen per week. Even during the winter, in houses with open spaces which permitted the sunlight to enter, hens laid as well as did those kept under similar conditions even though cod liver oil was fed. The hatchability of the eggs is usually low when the ration does not contain vitamin D or the birds are not exposed to direct sunshine.

Certain glass substitutes which allow the ultra-violet rays to enter the house are being used in place of ordinary window glass, but the open-front type of house, such as the Missouri poultry house, seems to permit sunlight to enter in quantity sufficient to supply the necessary ultra-violet light, and in this case the feeding of cod liver oil will not produce positive results. When cod liver oil is used as a source of vitamin D it is fed at the rate of one quart to 100 pounds of mash. Attention should be called to the fact that various oils differ in their vitamin D potency.

The relation of vitamin E to poultry has not yet been determined.

In general, if the ration includes a large proportion of yellow corn, if the grains are supplemented with a protein concentrate of animal source, if shell-making material and fresh water are supplied, and if advantage is taken of every opportunity (especially in winter) to expose the hens to direct sunlight, the poultryman will not greatly err.

SCRATCH FOODS

Scratch foods are whole or cracked grains which usually should constitute from one-half to two-thirds of the total ration. The scratch food furnishes heat, energy, and material for the yolk of the egg.

Scratch grains are comparatively high in carbohydrates and low in protein. The chief point to consider in designing a scratch ration is to remember that not over one-third of the total scratch food should be grain with bulky hulls. This is necessary to keep the amount of crude fibre to a low level as the digestive apparatus of poultry is not provided with facilities for handling roughage to any extent. Too much bulk limits the digestion and should be avoided. Grains when fed in a heavy straw litter, serve to compel the birds to exercise, which is extremely desirable. For this reason many poultrymen prefer to feed cracked grains. (The selection of grains to constitute a scratch food depends upon the relative price.)

Corn.—In Missouri corn should form a large portion of the scratch food. In fact good results may be obtained by feeding as scratch corn alone—provided of course that it is supplemented with a suitable mash. Corn is palatable and digestible. Yellow corn is an excellent source of vitamin A. If yellow corn is not fed the ration should contain clover or alfalfa hay.

For laying hens corn may be fed as corn grits or as shelled corn. When fed on the cob, the hen may not exert sufficient effort to get enough. Green corn should not be fed as it is almost sure to cause digestive disorder. For the same reason chickens should never be fed moldy or musty foods of any kind.

Wheat.—Wheat is one of the most popular poultry foods. However, it is expensive as compared to corn, and has little if any, additional feeding value. Where wheat is used, it will be advisable to mix it with corn rather than feed it as the only scratch food. In fact better results will be obtained if this is done. Frequently a low grade of wheat may be obtained at reasonable prices, and for feeding purposes it is equal to wheat of higher grade. But screenings of low grade are of little value. Weed seeds are undesirable.

Oats.—The value of oats in a poultry ration depends largely upon their quality. Light oats are undesirable. Heavy oats may constitute one third of the scratch food. Their use in a ration depends upon their availability, quality, and the price. Oat meal is an excellent poultry food, but where the hull is left in, the digestive tract may become filled up with indigestible material, occupying space needed by other foods, thus resulting in poor production.

Other Grains.—Grains such as barley, cane, milo or kafir, may be used as portions of the scratch food to the extent of one-third to one-half of the total scratch food, the remainder of the scratch food, of course, being corn. Rye should not be fed as it is unpalatable for poultry.

MASH

A mash is a combination of ground feeds. It should be composed of mill by-products and animal by-products. It should constitute from one-third to one-half of the total ration. The feeding of mash is important. Mash affords a convenient way of introducing a protein concentrate which is necessary to afford the proper balance. Frequently the mill by-products are cheaper than the scratch food ingredients. Mash when fed dry is never over-eaten.

The chief feature in designing a mash, aside from palatability and composition, is to have the proper mechanical make-up. It should not be too bulky, too pasty or too concentrated. To afford proper bulk and to keep the amount of crude fibre within reasonable limits, at least one-fourth and not over two-fifths of the mash should be bran, or bran and alfalfa combined. To afford proper balance at least one-fifth of the mash should be some animal protein concentrate, such as meat scrap or tankage. The other ingredients may be shorts and cornmeal.

Bran.—Bran is the outside hull of wheat. It is bulky and when fed keeps the digestive tract in a laxative condition. It is high in ash. It is,

however, low in digestibility, its chief value in the ration being that it gives the mash the proper mechanical make-up.

Middlings.—Middlings, frequently called shorts or shipstuff, is also generally found in poultry mashes. It is less bulky than bran, and its nutrients are more digestible. A mash too high in middlings is pasty. When fed it should be mixed with bran. It may constitute from one-fourth to one-third the total mash.

Wheat Feed, Mixed Feed or Mill Run.—Wheat feed, mixed feed, or mill run, may be considered as a mixture of bran and shorts.

Cornmeal.—Cornmeal is frequently used as a mash ingredient. When the scratch food is largely corn it may be eliminated from the mash. Cornmeal must be handled with discretion. It is liable to pack

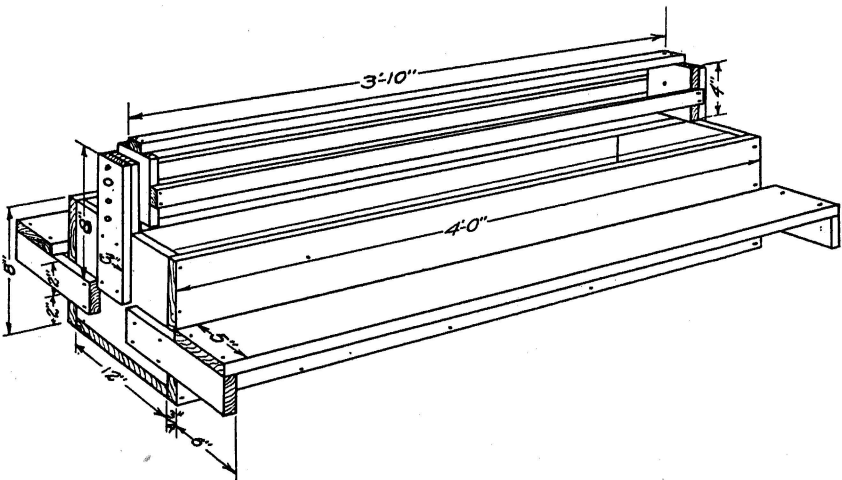


Fig. 4.—A good feed hopper for feeding dry mash. The reel turns freely and the hens cannot roost on it.

and heat and mold unless mixed with some bulky material. Soured or musty feeds should never be fed to poultry. The danger of its becoming sour has resulted in many mashes being recommended which contain no cornmeal. Clean, sweet cornmeal is a desirable mash ingredient.

Ground Oats.—Ground oats if low in fibre may be considered a substitute for middlings.

Alfalfa Meal.—Alfalfa meal is frequently found in commercial poultry mashes. Well cured alfalfa or clover hay is an excellent source of vitamin A and is frequently kept in racks of suitable size before the hens during the winter. Pea green alfalfa leaf meal is preferred to ground alfalfa hay which runs much higher in fibre. Used in mashes alfalfa leaf

meal may be substituted for bran and may constitute 10 per cent of the total mash.

Salt.—Salt should constitute one per cent of the mash. It should be well mixed with the mash because if consumed in large quantities it may poison the chickens.

NITROGENOUS FEEDS

Grains and grain by-products are low in protein and will not enable the hen to lay efficiently. It is necessary to supply additional protein in concentrated form to balance the ration. The most successful protein concentrates come from animal sources. It is poor economy not to feed some animal protein concentrate. Increased returns more than make up for the additional expense. The common forms of "animal foods" for poultry are skimmilk, meat scrap, or tankage. Bugs and worms are rich in protein but it is a mistake to depend upon this source because the supply scarcely ever equals the needs of the flock. The regular supply of animal food should by no means be reduced during the insect season. Many flocks cease laying and molt early in the summer because the ration lacks animal protein. At the Missouri Agricultural Experiment Station it has been found that the presence in the ration of any of the above mentioned animal foods will increase the number of eggs laid by the hen from 5 to 6 dozen eggs per year as compared with the same ration containing no animal food. For each pound of meat scrap or tankage or its equivalent in skimmilk (2 gallons) an extra dozen eggs was obtained. The cost of feeding the hen was slightly increased but the profits per hen were materially increased. For every dollar invested in meat scrap or tankage the extra eggs produced were worth \$4 to \$7.

Meat Scrap.—Meat scrap is a by-product from the packing house. It should not be confused with table scraps. It contains from 50 to 60 per cent protein, the price usually being dependent upon its protein analysis. It is a cooked product which has been dried and granulated. The best way of feeding it is to mix in the mash, using one pound to each 4 pounds of other ingredients. Fine meat scrap is less apt to be picked from the mash.

Tankage.—Tankage is a product similar to meat scrap. It is not as popular as a poultry food, although it is being used with equally satisfactory results. It usually contains a little more protein and less minerals. It has a less attractive odor and is cheaper than meat scrap. Meat scrap or tankage should be rejected as a poultry food if they contain over 4 per cent fibre.

Skimmilk or Buttermilk.—Skimmilk and buttermilk have practically the same feeding value. They may be used as a substitute for meat

scrap or tankage. The daily allowance for 100 hens should be $3\frac{1}{2}$ to 4 gallons. In the winter it may not be possible to get the hens to drink the necessary amount, and in this case the mash should contain meat scrap or tankage. This is also especially desirable where the milk supply is uncertain and limited. Unless the hens drink the desired amount it should be considered as a supplement to the meat scrap or tankage rather than a substitute. In feeding milk, the pans require frequent cleaning to maintain sanitary conditions.

Dried Milk.—Dried buttermilk or skimmed milk may also be used as a substitute for meat scrap or tankage. They are lower in protein and more expensive. One pound of either is practically the equivalent of 3 pounds of semi-solid buttermilk or 10 pounds of liquid milk.

Semi-Solid or Condensed Buttermilk.—Semi-solid or condensed buttermilk is also used as a substitute for milk. It is usually diluted with water to the consistency of milk. In some cases it is fed without dilution.

Fish Scraps.—Fish scraps are dried products similar in feeding value to meat scrap and tankage and may be substituted for either.

Protein Concentrates From Vegetable Origin.—Such vegetable protein concentrates as cottonseed meal, soybean meal, oil meal and gluten meal are frequently found in poultry mashes. Experiments at the Missouri Agricultural Experiment Station indicate that cottonseed and soybean meal may be used as a complete or partial substitute for animal protein concentrates. It was not until recently that this was believed to be possible. Earlier experiments failed to produce satisfactory results. This was due to failure to bolster up the vegetable protein with suitable minerals. At the Missouri Agricultural Experiment Station, when a mash containing 30 per cent of either soybean meal or cottonseed meal was supplemented with 4 per cent bone meal and 1 per cent salt, the results compared favorably with those obtained with the use of animal protein concentrates. Due to the lower protein content however it is necessary to use a larger quantity in the mash.

MINERAL FEEDS

The common mineral feeds are flint grit, soft limestone rock, and oyster shell, and granulated bone. The function of grit is to assist the hen in grinding and mixing the feed. For this purpose the harder the grit the better. Soft limestone rock and oyster shell furnish shell-making material. The comparative value of soft limestone rock and oyster shell depends upon the analysis of the rock. It should run over 95 per cent calcium carbonate and should have an extremely low magnesium content. Grit and shell-making material should be kept before the hens all the time. The hens require three times as much mineral matter when laying and,

unless it is supplied, egg production will be reduced or even completely checked. It is a mistake to neglect this cheapest of poultry foods.

SUCCULENCE

Under certain conditions green food is essential in the diet of laying hens. Where grains other than yellow corn constitute the major portion of the ration green leafy material is necessary as a source of vitamin A. These green leaves, like yellow corn, also furnish the yellow pigment found in egg yolks. It is also thought that hens fed small quantities of bulky material are less liable to develop digestive disorders. Where yellow corn is fed and bran is used in the poultry mash there is little to be gained by feeding green feed.

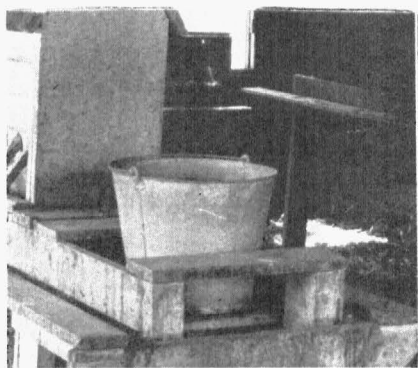


Fig. 5.—The water stand should be about 18 inches high, so that no litter can be scratched into the water.

So far as possible green food should be grown on the poultry runs. In winter it may be supplied by feeding cabbage, sprouted oats and clover, soybean or alfalfa hay. Frequently a heavy stand of rye or wheat may be harvested daily in winter and given hens that are kept enclosed. Ensilage chopped fine is also occasionally used for succulence. Sowing of the yards to wheat, also furnishes green food in the fall and spring. This may be followed in summer with seasonable crops provided grass runs are not available.

WATER

Failure to supply clean, fresh water will decrease egg production materially. Hens must have water. The egg is 65 per cent water. The more eggs a hen lays the more water she requires. The warmer the weather the more she will consume. If this important point is neglected not only will

the production be less in number, but the eggs will be smaller in size. Ovarian troubles or digestive disorder may result from a shortage of water.

A drinking stand 18 inches high upon which the container may be kept will assist in keeping the water clean. The drinking utensils must be kept clean and in case of outbreaks of cold or other diseases the water should be colored a claret red with potassium permanganate.

RATIONS

The following is suggested as a daily winter ration for 100 hens:

Scratch Food	Mash
Yellow corn (shelled or cracked) 10 lbs.	Bran 2 lbs.
Oats, wheat, kafir, or milo..... 5 lbs.	Shorts..... 2 lbs.
	Yellow cornmeal 2 lbs.
	Meat scrap or tannage 1½ lbs.

Another mash may be used:

Bran.....	3 lbs.
Shorts.....	3 lbs.
Meat scrap or tannage.....	1½ lbs.

Grit, oyster shell, or soft limestone rock, finely crushed and clean water should be available at all times.

Slight changes may be made in the suggested rations with satisfactory results. This is desirable if the rations may be made more economical without sacrificing efficiency. Frequently shorts contain so much bran that they really are practically a mixture of bran and shorts in which case a good mash can be made by using 400 pounds of shorts, 200 pounds corn meal, 150 pounds of meat scrap or tannage, and 7 pounds of salt. Shorts if low in bran content may be substituted for the cornmeal; ground oats if low in fibre may be substituted for the bran, shorts and cornmeal. Ground wheat or wheat and corn (equal parts by weight) ground together make an excellent base for a mash, and where home grinding is done, may be cheaper than other mash materials. Dried buttermilk may be substituted for the tannage or meat scrap—one pound of meat scrap has the same protein content as 1¾ pounds of dried buttermilk. Three to four gallons of sour skimmilk may be substituted for 1½ pounds meat scrap. Corn alone may be used as a satisfactory scratch food; usually a variety is considered more desirable. Any change, however, must be gradual, otherwise the change may result in reduced egg production and possibly a partial molt.

METHOD OF FEEDING

The practice of poultry feeding while governed largely by circumstances, should as far as possible be reduced to regular routine. Regularity, both as to time and amounts is one of the keynotes of success. The hens very soon learn when to expect their daily feed, and if they are disappointed the effect may be noticed in the egg basket. The poultryman should learn the characteristic needs of his flock and cater as far as possible to its desires. He should attend to his duties in a quiet manner, avoiding any unusual action which might frighten the hens or cause them to become excited. He should gain their confidence and make them feel that he is their friend. The occasional feeding of grain from the hand will very soon create pets and the extra time spent will be paid in full by better returns and more satisfaction in a task well done.

The grain portion of the ration should constitute approximately two-thirds of the total ration. These rations are designed with that proportion in mind. A bird should, of course, be allowed to eat all that it desires. The ration should be liberal at all times. Many of the hens molt prematurely in summer because they are not well fed. The best practice is to feed all the hens will eat at all times. The object in feeding hens is to get them to consume the greatest amount of food possible. The habits of a hen are quite largely developed by her food supply. If she is hungry she will steal, and few yard fences will keep her confined. She will roost near where she eats.

A well fed hen is easily confined and it is the well fed hen that returns the greatest profits. The good poultry feeder is the one who can keep his birds active and have them consume large quantities of food. Such skill not only results in the liberal consumption of food but is accomplished without getting the birds off feed. A good general rule is to let the birds get slightly hungry once a day, and then fill them good and full at least once each day. A bird's appetite varies from day to day and month to month. Weather conditions greatly influence the consumption of food. Birds in heavy laying condition have better appetites. These are points which the feeder himself must learn by observation. The consumption of grain is easily accomplished because grains are the more palatable. The method of proportioning the scratch food, however, greatly influences the consumption of mash. In winter the daily grain allowance is approximately 15 pounds for 100 hens. The morning feed should be not over 5 pounds. This should be buried in a heavy straw litter. Feeding a small amount of grain in the morning accomplishes two purposes. It keeps the birds exercising which is of extreme importance and it also encourages the consumption of mash which is equally essential. In winter it may be advisable to make extra visits to the

poultry house and scatter a few handfuls of grain to keep the birds active. In summer it may be advisable to eliminate the morning grain feed entirely. At any rate the grain consumed during the summer months should not be more than two-thirds of that fed in winter. Usually the appetites of the hens will regulate the changes in summer feeding.

At night the hens should be given all the grain they will consume just before going to roost. This will vary but will be approximately 10 to 11 pounds daily for 100 hens. During the long winter nights it is important that this be fed just before the birds go to roost so that digestion may be carried on as long during the night as possible.

Mash.—Should constitute from one-third to one-half the entire ration. The production of eggs is dependent upon the amount of mash consumed. It should be fed dry in hoppers where the birds have access to it all the time. It is important that liberal feeding space for mash be provided. There should be one linear foot of mash hopper for each five to seven hens. For 100 hens a mash hopper which feeds from both sides should be 8 feet long. The advantages of dry mash feeding are that it saves labor, there is no danger of the hens over-eating, and food is always available so that each hen gets her share. The amount actually consumed is dependent upon the amount of grain fed, and the appetites of the birds. A great deal depends upon the previous history of the hens. If dry fed as pullets they take readily to the dry mash when in the laying house. Usually in the heavy laying season the feeder experiences no difficulty in getting the hens to eat enough of the mash. In winter and during the hot summer months it will probably be desirable to feed a moist crumbly mash at noon each day. The extra consumption may afford just the extra nourishment necessary to enable the bird to produce eggs. Where wet mash is fed it should be fed only in such amounts that it is readily cleaned up. The more mash the birds eat the more eggs they will lay. The daily allowance for 100 hens is $7\frac{1}{2}$ pounds. If they will eat more one should not limit them.

EXERCISE

The success of egg production depends largely upon the activity of the birds. Leghorns excel in egg production largely because they keep themselves physically fit. The inactive hen is a poor producer. Some hens naturally exercise; others need to be compelled to exercise. The heavier breeds are inclined to inactivity, and in a short time become too fat to lay. It is impossible to get a laying hen too fat to lay so long as she keeps laying. A hen must have a surplus of fat before she will start laying. To produce eggs taxes the capacity of the digestive tract. However, the non-laying hen with an accumulation of fat due to lack of exercise is in

no condition to lay eggs. The circulation of blood to the ovary is restricted. This interferes with the normal functioning of the ovary and reduces egg production. Exercise can be encouraged by not over-feeding in the morning, and by feeding grain in a heavy straw litter. The skill of the poultry feeder is taxed by his ability to compel the birds to exercise. If underfed, the birds are extremely eager for the next grain feed. The digging of holes in the litter in their search for food, and the musical notes of content and comfort are indications of correct conditions.

FEEDING HENS ON THE FARM

The farm flock presents special problems of feeding not encountered by the special poultry enterprise. The same general principles apply, although perhaps slight changes in the routine may be advisable. During cold weather it is advisable to keep the flock confined. At no time should hens be fed on bare yards, especially in winter. The farmer and poultry man alike should remember that cold feet and egg production do not go together and the birds should be protected from cold floors by a heavy straw litter. Where it is desired to allow the hens to scavenge for waste they may be kept confined to the poultry house until noon, so they will have access to the dry mash. They can then be turned loose for the day, receiving of course all the grain at night they will consume. To depend too much upon the scavenger activities of the hen results in damage to crops, and invariably brings poor egg production. Hens compelled to scratch for a living use up so much energy that little surplus for egg production remains. It is folly not to feed the hens well all the time. The best plan is to feed liberally each day, a practice which will result in production and not lessen the hen's value as a scavenger.

USE OF ARTIFICIAL LIGHTING

Artificial lighting of the poultry house is becoming a general practice. The short days of winter do not afford the hen sufficient time to consume the food necessary to keep herself warm and have a surplus for egg production. Also the time between night and morning feedings is so long that the hen's crop cannot hold enough feed to carry her through the long night interval. Artificial lighting will enable the hen to consume more feed. Some people light the poultry house so that the time spent on the roost is about the same as in spring, using light either in the morning or evening. A practical plan is the evening lunch. Grain is placed in troughs and the poultry house lighted for one-half hour, 8 p. m. to 8:30 p. m., during which time the hens fill up. It is not considered wise to use lights with late molting hens until after January 1, but with early molt-

ing hens and pullets lighting may be practical from November 1 to March 1. The brighter the lights, the better.

FALL FEEDING

During the summer the grain ration should be reduced so that the hen consumes as much mash as grain. With the approach of winter the hens should be fed more grain until eventually the grain ration amounts to approximately 15 pounds daily for 100 hens. This increase in grain is necessary to conform with the requirements of the hen when her body requires more heat-producing food. The mash for 100 hens should be $7\frac{1}{2}$ pounds daily throughout the year.

GENERAL INFORMATION

Hens eat from five to eight pounds of feed a month, or 60 to 80 pounds in a year. The daily food eaten by a hen is from three to four ounces. The daily ration for 100 hens is from 20 to 25 pounds.

A hen will drink about 7 pounds of milk a month. One hundred hens drink about 3 to 4 gallons of milk daily. Where milk is fed the hens should consume one pound of milk for every pound of feed.

A hen consumes about 5 pounds of grit and oyster shell in one year.

Essentials of Successful Poultry Feeding

1. Feed liberally all the birds will consume.
2. Feed grain and mash in proper proportions.
3. Feed animal food such as meat scrap, tankage or skimmilk.
4. Provide succulence.
5. Provide clean, fresh water.
6. Provide hard grit and soft limestone rock or oyster shell.
7. Compel the birds to exercise.
8. Give them regular attention.