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Feeding Poultry for Egg Production

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Feeding Poultry for Egg Production

By C. W. Knox

A well-fed hen—First year production 305 eggs; second year 256 eggs.

AGRICULTURAL EXPERIMENT STATION
IOWA STATE COLLEGE OF AGRICULTURE
AND MECHANIC ARTS

C. F. CURTIS, Director

ANIMAL HUSBANDRY SECTION
Poultry

AMES, IOWA
SUMMARY

1. To secure maximum production, strict attention must be paid not only to proper feeding but to breeding, housing and equipment.

2. Chickens must have the proper kind and amount of feed to produce well.

3. Water or milk is the most important part of the ration.

4. A lack of sufficient water may cause the birds to molt.

5. The best and most economical protein supplement to add to the ration is liquid skimmilk or buttermilk.

6. It is very poor economy not to feed an animal protein supplement (milk products, tankage or meat scraps).

7. Corn is by far the best and most economical energy yielding feed but is usually fed in too great a quantity.

8. The vitamin content of a ration is amply supplied when the ration contains yellow corn, milk and cod liver oil, or when direct sunlight is available.

9. Minerals are sufficiently supplied by ground oyster shells, bone meal and common table salt.

10. Grain and mash feeding is usually best for winter use.

11. Green feed is necessary and can be furnished in the form of cabbages, mangel beets or sprouted oats.
Feeding Poultry for Egg Production*

By C. W. Knox

Altho there is probably no phase of poultry keeping so profitable as the securing of maximum egg production, it is too often true that little thought is given of how to secure high yields. Table I gives some idea of the influence of egg production upon the receipts from the flock.

It will be noted from table I that the income seems to increase out of all proportion to the increase in egg production. There are several reasons for this. It costs as much to raise the poor producers as it does to raise the good ones. Both require the same housing, care and management, altho the poorer eat slightly less feed. A hen producing 60 eggs a year just about pays for her keep, and that is all. The birds that lay more than 60 eggs, virtually place all of the returns above that number into the pockets of the poultryman as clear profit.

Breeding, housing, equipment and feeding must be treated as phases of a single problem to secure maximum results. Only the last of these requirements will be discussed in this circular; the others are reported in detail elsewhere.¹

To secure the highest possible egg production it is absolutely necessary that the layers be given the proper kind and amount of feed. When the poultry keeper goes out to feed his chickens he must take a pail full of feed and a head full of common sense; one is of very little use without the other.

The poultryman must not be afraid of overfeeding because a chicken that eats can only do one of two things, get fat or lay eggs. If she puts on weight she will make an excellent subject for a dinner, if she produces well she will return a good profit to the owner. The poultry keeper loses on those birds which do not eat or are not fed enough.

Success or failure in securing maximum egg production will largely depend upon whether or not the ration is complete in

**TABLE I. RECEIPTS FROM DIFFERENT EGG PRODUCTION GROUPS:**

<table>
<thead>
<tr>
<th>Eggs per bird</th>
<th>Total receipts per bird</th>
<th>Receipts above expenses per bird</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 or less</td>
<td>$2.20</td>
<td>$.17</td>
</tr>
<tr>
<td>61 to 80</td>
<td>2.50</td>
<td>.42</td>
</tr>
<tr>
<td>81 to 100</td>
<td>3.10</td>
<td>.94</td>
</tr>
<tr>
<td>101 to 120</td>
<td>3.70</td>
<td>1.42</td>
</tr>
<tr>
<td>121 to 140</td>
<td>4.60</td>
<td>2.15</td>
</tr>
<tr>
<td>140 and over</td>
<td>5.50</td>
<td>2.70</td>
</tr>
</tbody>
</table>

¹ Straw Loft Poultry House, Extension Bulletin No. 146.
Laying House Equipment, Extension Bulletin No. 147.
A Simple Laying Feeding Program, Experiment Station Bulletin No. 258.

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* Paper No. 22 from Department of Poultry Husbandry.
² New Jersey Experiment Station Bulletin No. 329.
all of its essential parts. A deficiency in kind or amount of any part of the ration will seriously injure the chances of securing the best results. A complete ration should consist of five parts.

1. Liquid, as water or milk.
2. A protein concentrate, as milk, tankage, etc.
3. Energy yielding feed, as corn.
4. Vitamins, as cod liver oil.
5. Minerals, as oyster shell, salt and bone meal.

Liquid

Water is the most important part of the ration. All classes of livestock can withstand a lack of feed for a long time but can live without water for only a few days. A chicken is composed of 55.8 percent water and her product, the egg, is made up of 65.7 percent water. Therefore, this part of the ration should receive the attention it merits, but it is often neglected due to the fact that it is readily available and at very little cost.

With laying fowls, especially the heavy producers, a lack of water or liquid of some kind for even a very short time may have very bad results, often causing the birds to molt. This, of course, immediately causes cessation of egg production. Birds drink small quantities at a time but they drink often, so be sure provision is made for them to satisfy their thirst whenever they desire. Frozen milk or water is as bad as a dry fountain.

The common drinking vessel is a very good medium for transmitting most of the contagious poultry diseases. Egg production stops, in the majority of cases, before there are any external symptoms of disease. Therefore all drinking vessels should be kept scrupulously clean and be disinfected often.

Liquid skimmilk or buttermilk is approximately 90 percent water and can be used as the sole liquid.

Fig. 1. The superior value of milk products as protein supplements is shown graphically above. When a milk product was fed, an average production of 111.8 eggs was secured; when a meat product was used, the average fell to 90.7 eggs; and when no protein supplement was fed, average production was only 37.6 eggs.
Protein Concentrates

Protein is used to build up the muscles of the body and to produce the albumen of the egg. The total ration should be composed of at least 10 percent of an animal protein supplement, or the mash part of the ration should contain 20 percent. Some success has been secured by using soybeans with a mineral supplement, but their use is not generally recommended except in small amounts.

The best and most economical protein supplement to add to the ration is liquid skimmilk (sour preferred), or buttermilk. The manufactured products do as well but cost more. The meat products do not give quite so good results, producing fewer and smaller eggs. But any meat protein is vastly superior to no protein supplement at all.

Energy Yielding Feeds

Corn is by far the best and most economical feed in this group. It is readily procurable in practically all districts. The yellow corn is preferred to the white due to its better vitamin content. This carbohydrate part of the ration is seldom neglected. On the other hand, it is often fed far in excess of the bird's needs when not properly supplemented. This over-feeding causes overweight, which entails decreased egg production and must be guarded against. Corn is almost always included in the grain and mash feeds.

Vitamins

The majority of poultry keepers have no serious difficulty in meeting the requirements of the first three essentials, but many fail to meet the last two, vitamins and minerals.

Chickens need three of the four recognized vitamins. They are A, B and D. Vitamin A, the lack of which causes nutritional roup, is plentifully supplied when yellow corn is used in the ration. It is also supplied by such leafy vegetables as cabbage, lettuce and kale. Alfalfa is another good source of this vitamin. Vitamin B is essential for growth and is sufficiently supplied by milk, as well as by leafy vegetables and yeast.

Vitamin D is almost synonymous with cod liver oil and sunlight. This vitamin supplement, produced by cod liver oil, direct sunshine, or ultra-violet light of some kind, has a marked beneficial effect upon mineral metabolism and is a necessary addition to the ration. Like everything else, cod liver oil can be overdone. Being a product that must be bought, cod liver oil increases the cost of the ration. Therefore, whenever it is possible to do so, direct sunshine should be substituted. It gives the same beneficial results.

By direct sunlight is meant that the sun's rays come in direct contact with the chickens, not thru window glass. Glass sub-
stitutes help and should be used wherever possible, but they are not altogether satisfactory during the months of short days and little sunlight.

For this reason, during the winter furnish the laying stock with 1 percent of cod liver oil, by weight, in the mash. This is about 1 pint to 100 pounds of mash, or 1 pint to 50 pounds of mash in a grain and mash ration. When the birds are out on the range the cod liver oil can be discontinued. The best way to add this material is to weigh or measure out the oil and add it to the alfalfa or bran. Mix this and then add it to the rest of the mash.

Another method is to add the cod liver oil to buttermilk and then mix it with the dry feed, thus giving the birds a wet mash. The mash should be fed in a crumbly condition.

**Minerals**

The essential minerals are as important as any other part of the ration for chickens, altho this vital factor often receives but secondary consideration.

In order to give just consideration to the mineral supplement, the poultry feeder must know what, when and how to use it. Common salt should not be overlooked, for poultry need it.

Chickens apparently require no iodine in their rations. Supplements of phosphorous and lime are absolutely required in order to secure maximum egg production and high hatchability. Lime can be furnished thru oyster shells or limestone (95 percent calcium), altho the former is preferred due to its stability of analysis.

A mineral mixture should contain the elements just mentioned and for general use should be simple, inexpensive and the ingredients available in all localities. A mineral mixture that seems to meet these requirements is given below. This mixture is only for supplementing the rations given in this bulletin and is not for promiscuous usage.

<table>
<thead>
<tr>
<th>Name</th>
<th>Calcium</th>
<th>Phosphorous</th>
<th>Sodium</th>
<th>Chlorine</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground raw bone meal</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground oyster shell</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common table salt</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charcoal</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TABLE II. COMPARISON OF MINERAL CONTENT OF SOME FEEDS—PARTS PER 100 LBS.**

<table>
<thead>
<tr>
<th>Name</th>
<th>Calcium</th>
<th>Phosphorous</th>
<th>Sodium</th>
<th>Chlorine</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>.012</td>
<td>.260</td>
<td>.026</td>
<td>.063</td>
<td>.361</td>
</tr>
<tr>
<td>Oats</td>
<td>.102</td>
<td>.395</td>
<td>.168</td>
<td>.070</td>
<td>.735</td>
</tr>
<tr>
<td>Wheat</td>
<td>.050</td>
<td>.373</td>
<td>.031</td>
<td>.084</td>
<td>.538</td>
</tr>
<tr>
<td>Wheat Bran</td>
<td>.125</td>
<td>.110</td>
<td>.201</td>
<td>.090</td>
<td>1.526</td>
</tr>
<tr>
<td>Wheat Middlings</td>
<td>.096</td>
<td>.876</td>
<td>.165</td>
<td>.025</td>
<td>1.152</td>
</tr>
<tr>
<td>Gluten Feed</td>
<td>.247</td>
<td>.542</td>
<td>.424</td>
<td>.090</td>
<td>1.303</td>
</tr>
<tr>
<td>Tankage</td>
<td>.584</td>
<td>1.078</td>
<td>.422</td>
<td>.378</td>
<td>2.462</td>
</tr>
<tr>
<td>Skimmilk</td>
<td>.128</td>
<td>.094</td>
<td>.047</td>
<td>.091</td>
<td>.360</td>
</tr>
</tbody>
</table>

Mineral composition of a 5 lb. hen laying 120 eggs:

|                  | 1.308   | 1.540   | .188   | 2.260    | 5.296 |

Mineral composition of 70 lbs. mixed feed without mineral supplement:

|                  | .084    | .326    | .101   | .070     | .581  |

* Estimated yearly feed consumption 70 lbs.
In addition, it is advisable to allow the birds free access to hoppers of grit and shell. Grains contain a fair amount of some minerals but are vastly deficient in the ones used in the mineral mixture given here. Table II shows what minerals each feed contains.

Altho grains alone do not supply a sufficient amount of the previously mentioned minerals for laying birds, they do supply all other minerals needed for the maintenance of body functions and egg production. Such minerals as sulphur, iron, copper and many others are adequately supplied in the poultry ration.

**Grain and Mash Feeding**

The two methods of feeding are: the scratch and mash, and all-mash. The former method makes use of the whole grains supplemented by mash (ground feed). The latter method known as the all-mash system uses coarsely ground feed.

In the first method, the grains must first be considered. Most grains can be grown in Iowa and are therefore cheaper to use than imported products.

Corn when carefully incorporated into the ration is one of the best feeds. The flock owner must realize that while it is a good plan to provide energy feeds for the birds too much corn can easily be given, altho more can be fed in cold weather than in warm. Corn is rich in oil, is much relished by poultry and is probably preferred by them to all other grains. Corn is deficient in minerals but yellow corn has a fairly good content of some vitamins.

Oats of good quality are of greater value as a poultry feed than is generally supposed. Oats are a trifle high in crude fiber content, carrying 11 percent, are rather deficient in vitamins but are fair in minerals. The oat kernel or berry (with hull removed) is excellent for feeding purposes, being low in fiber and highly digestible. Oats and corn are very good grains to feed together, and the prudent poultry keeper never tries to get along without them.

Barley is an excellent feed and is usually eaten readily, but as a general rule 10 percent of the grain ration or 20 percent of the mash should be the maximum amount used. When barley is added to the mash, the oats should be reduced in proportion. Both feeds are high in crude fiber so it is not advisable to include too high a percentage of oats and barley with the scratch grain.

Wheat is a good poultry feed. It is low in fiber, 2.2 percent, deficient in vitamins, and fair in minerals. Next to corn, wheat is probably the most palatable grain, but its price governs the economy of using it. When the price of wheat per 100 pounds
is not in excess of 20 percent over the price of corn, wheat should make up a good percentage of the scratch ration.

Rye is little relished by the fowls, and 5 percent should be the maximum amount of this feed used in the total ration. An exclusive ration of rye will produce bowel trouble, and this grain should be used sparingly, if at all.

The common Iowa grains are all that are necessary for the grain feeding of poultry. No set rule can be given as to the proper proportions of the various grains to be used, for this depends upon the breed, the weather and the rate of production. All that it is necessary to remember is that feeds like corn produce fat while oats reduce the accumulation of fat, and that the proportions can be changed to meet the results desired. As a general rule in the winter time one-fourth of the grain ration should be fed in the morning and three-fourths at night. As hot weather approaches the morning feed can be gradually reduced until it has been eliminated and the entire grain feed given at night, thus eliminating some of the feeds that would heat the birds during the warm weather.

Laying hens should be in fair flesh for there is nothing that reduces egg production more than to allow the birds to produce beyond the feed consumed. Far more birds molt prematurely than naturally, which is largely a result of a lack of feed.

In addition to the grain, a mash should be before the birds at all times. This should be given in a self-feeding hopper. Allow one foot of hopper space for every 10 birds. A mash hopper should be so constructed as to avoid the wasting of feed and to prevent the feed from bridging. Provision should also be made for preventing the birds from roosting on top and contaminating the feed with their droppings.

It is not the shape, size or color of the mash hopper that brings the eggs, it's the feed in the hopper which the birds can reach. An empty mash hopper is worth as much in the parlor as it is in the poultry house. so be sure that there is feed in it and that it feeds down properly. A hopper that stands up off the floor, so the birds cannot scratch litter into it, is advisable. If a hopper is not available, place the mash in troughs, making provision to keep the birds from scratching out the feed.

Mashes are ground grains or a combination of ground grains and mill feeds in connection with some high protein feed such as tankage, meat seraps or dried milk. Much too often, the opinion prevails that ground grains alone will form a mash; and the sooner this idea is dispelled the better will be the poultry profits.

Grains alone, whether whole or ground, will produce but few eggs, for grains are lacking in the qualities that constitute a

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3 Laying House Equipment, Extension Bulletin No. 147.
complete ration. A hen is no wizard, she cannot produce the finished product unless she is supplied with the proper raw materials. Grains are limited in the properties that produce the white of eggs, and the production of the flock will be limited to the amount of white-producing material in the feed. The white of an egg is almost a pure protein substance and to produce it calls for feed high in protein. For this reason by-products of the packing industry or milk in some form are depended upon as additions to the mash.

Various formulas for mash have been used and while general rules can be given, they may be altered somewhat to depend on the breed; the heavier breeds require less corn than the lighter ones. It should also be remembered that no one ration will fit all conditions and that many different formulas are successful.

Of the mill feeds added to the ground grains, bran has been generally used because it is bulky, generally fairly low in price and on sale at every feed store. Bran is rather high in crude fiber and is somewhat laxative. It has probably been given too high a place in mash feeds but can be used to advantage whenever its price is in line with oats.

Middlings are superior to bran, being lower in fiber and containing a greater amount of digestible nutrients. They are more palatable to the birds than bran, and the more palatable the mash the greater the consumption. Therefore, palatability should be an important item in making up the mash.

Gluten meal, a by-product of the starch factories, is fairly economical when purchased on a protein basis, and it can often be used to advantage. It is high in protein, containing more than four times as much as corn.

Oilmeal is another feed rich in protein. It can be used to advantage in the winter time when 5 percent of the mash can be composed of it. Using more than 5 percent of oilmeal results in a sticky mash that is not relished by the birds.

Vegetable proteins, such as soybeans, oilmeal, etc., are not entirely satisfactory and should only be used in limited amounts. Meat or milk products should be extensively used as the protein supplement. Tankage, meat meal, meat and bone, or any milk product varies greatly in composition and only the best should be used. None should be used which shows mold or is lumpy. Spoiled meat is very dangerous to fowls and should never be fed.

Some firms are putting out a special poultry meat product containing a higher percentage of bone than does the ordinary kind. When this can be secured at a price a little above ordinary tankage, it is preferred by many poultrymen. Experiments have not justified the higher prices asked for meat scraps over the more common and cheaper by-products of the packing plants.
Dried buttermilk or dried skimmilk is now being carried quite generally in many stores and often can be used with profit. It keeps well, is concentrated and gives results above what we should expect from its protein analysis.

All of these suggestions regarding the ration and its supplements should be kept in mind when compounding a satisfactory ration.

Any of the following rations will give good results.

**RATIONS:**

**No. 1. Scratch grain**
- 200 lbs. Yellow corn
- 100 lbs. Oats

**No. 2.**
- 300 lbs. Yellow corn
- 100 lbs. Oats
- 100 lbs. Wheat

**No. 3.**
- 400 lbs. Yellow corn
- 100 lbs. Oats
- 100 lbs. Barley
- 200 lbs. Wheat

**No. 4.**
- 400 lbs. Yellow corn
- 100 lbs. Oats
- 100 lbs. Barley

**No. 5.**
- 350 lbs. Ground yellow corn
- 200 lbs. Ground oats
- 140 lbs. Flour middlings
- 100 lbs. Meat and bone
- 80 lbs. Dried buttermilk
- 30 lbs. Ground oyster shell
- 20 lbs. Charcoal
- 10 lbs. Salt
- 70 lbs. Alfalfa meal

* Any of the scratch feeds can be used with any of the mashes, the more complex mixtures are preferred.

** When liquid buttermilk or skimmilk is fed it can take the place of the dried buttermilk or 50 percent of the meat products. Also 5 percent of the mineral mixture listed on page 6 should be added to mashes 1, 2, 3 and 4.
The ration fed at this station, which helped to produce 300-egg hens, is the No. 1 grain feed and No. 5 mash, fed equal parts of each.

The following ratio between mash and grain consumption should be maintained for profitable egg production. The ratio is given for various times of the year because birds need more grain in cold weather than during warm weather.

**RATIO**

<table>
<thead>
<tr>
<th></th>
<th>Grain</th>
<th>Mash</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter</td>
<td>2 parts</td>
<td>1 part</td>
</tr>
<tr>
<td>Spring</td>
<td>1 1/2 ''</td>
<td>1 ''</td>
</tr>
<tr>
<td>Summer</td>
<td>1 ''</td>
<td>1 ''</td>
</tr>
<tr>
<td>Fall</td>
<td>1 ''</td>
<td>1 1/2 ''</td>
</tr>
</tbody>
</table>

During extreme cold weather, the hens may not eat as much mash as they should. In that case, a warm moist mash given at noon will bring the mash consumption up to its proper amount. Moist mashes should be used with caution on the heavier breeds, if strong hatching eggs are desired the following spring.

From October 1 to May 1, it is profitable to give the birds
nothing but milk to drink, and from May 1 to October 1, they should have their choice between water and milk. Many farmers are getting as much for their skimmilk when marketed thru laying hens as their neighbors are getting for their whole milk.

When hens that have to depend on tankage or meat meal for their main source of protein, or meat forming feeds, are compared with those that also have milk, we find the milk fed birds outlay those fed tankage by about 25 percent during cold weather. When eggs are selling at 50 cents a dozen, every egg counts and there is no feed so beneficial for laying hens or pullets as milk. Milk can truly be said to be the foundation of good poultry feeding, being very palatable, highly digestible, and rich in qualities that the ordinary ration usually lacks.

Often the questions are asked as to whether milk should be
fed sweet or sour and what the relative value of skimmilk is as compared to buttermilk. Milk should always be fed sour for three good reasons, any one of which is sufficient. Hens will consume more sour milk than they will sweet; sour milk has a slightly laxative effect which is conducive to health, particularly during the winter period; and the lactic acid in sour milk presents an unfavorable medium for the development of many disease germs, such as white diarrhea or cholera, or parasitic infections such as coccidiosis. Repeated tests show very little, if any, difference in feed value between skimmilk and buttermilk.

Milk can be purchased in paste or dried form. When buying milk in such forms, figure the cost on the basis of the milk solids contained. Paste milk runs from 20 to 28 pounds of solids to every 100 pounds, and dried buttermilk runs from 90 to 92 pounds. Our work here shows that milk solids are equal pound for pound, whether in the liquid, paste or dried form.

**Green Feed**

Succulent feeds in some form are a necessary supplement to the ration during the winter and early spring, as they contain good amounts of minerals and vitamins. Succulent feeds are also laxative and have a regulatory effect upon the birds.

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*Fig. 4. In order to produce eggs, a hen must be fed a ration which will enable her to do so. This hen produced more than 300 eggs in a year. She was fed grain ration No. 1 and mash ration No. 5.*
Of all green feeds, cabbage can be easily placed first. It is rich in minerals and vitamins but is hard to keep for any length of time. Germinated oats are also a good green feed. In order to germinate oats successfully in the winter it is necessary to have a warm basement or other situation favorable to germination. For equipment, five candy or butter tubs are sufficient. All except one of the tubs should have holes bored in their bottoms. Soak the oats in the tub without holes for 12 hours, then remove them to one of the other tubs. From then on, they must be turned at least twice daily to prevent heating and mold. As each bucket becomes filled, it is placed upon the other thus squeezing the oats dry and helping to prevent mold. When the sprouts are $\frac{1}{4}$ to $\frac{1}{2}$ inch long they are ready for use.

Alfalfa hay or alfalfa leaf meal is also a good green feed. The hay can be fed in racks made by placing wire in front of two 2 x 4 inch studs. Feed the hens all they will eat. Alfalfa leaf meal may be fed in the mash to the extent of about 5 percent of the ration.

Mangels are greatly relished by birds. They are succulent and may be easily stored in a small space. In feeding mangels, split them lengthwise and impale them on a nail which has had its head filed off.

It is not advisable to feed silage to chickens as digestive disorders might result.

Any changes in feed or methods of feeding should be made gradually. The lighter breeds are more sensitive than the heavier ones, but sudden changes are apt to affect any bird. Take a week to accomplish such a change.

The All-Mash Method of Feeding

The all-mash method of feeding laying hens has become very popular within the last year or two. There are several reasons for feeding an all-mash ration.

An all-mash ration is sanitary, as the feed does not come in contact with the floor, litter, feces or feet of the birds. The all-mash method is simple, no particular skill is needed, much less labor in feeding is required, and the poultry keeper is certain that each bird gets a balanced ration.

Any of the scratch and mash rations already mentioned can be used. To make an all-mash ration of them simply grind the grain and mix it thoroly with the mash. The following all-mash rations have also proved successful.

1. Coarsely ground corn 30 lbs.
   Coarsely ground wheat 20 lbs.
   Finely ground oats 20 lbs.
   Wheat bran 10 lbs.
   Wheat middlings 10 lbs.
   *Tankage 10 lbs.
   Mineral mixture 10 lbs.

* If milk is given, five pounds of tankage need not be fed.
2. Coarsely ground corn  65 lbs.
Wheat middlings         20 lbs.
*Tankage                10 lbs.
Mineral mixture         10 lbs.

These mashes must be supplemented with minerals, vitamins and green feed the same as with the scratch and mash rations.

The all-mash ration is completely fed in self-feeding hoppers. It should be available to the birds at all times.

One objection to the all-mash ration is that it is not coarse enough for winter use. During the long winter nights, the laying hens need whole grains that will nourish them more substantially thru these long periods. For this reason, the grain and mash ration is preferred at this station.

It is true that no amount of intelligent feeding will produce results if the birds are of a poor laying strain, but the reverse is also true, that you cannot get the production from well bred birds without judicious feeding. It is very important that the ration should be complete in all essentials in order to secure the maximum production and profits.

* If milk is given, five pounds of tankage need not be fed.