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Poultry Management : A Manual for 4-H Poultry Club Members

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POULTRY MANAGEMENT
A manual for 4-H poultry club members
By O. J. WEISNER

SOUTH DAKOTA STATE COLLEGE
EXTENSION SERVICE
A. E. ANDERSON, DIRECTOR
BROOKINGS, S. D.
Foreword

This circular is written for the purpose of guiding those engaged in the activities of boys' and girls' poultry clubs. It is hoped that it will be of service in encouraging them to conduct their work in a businesslike and systematic way; also that it will be of assistance to poultry club leaders, county extension agents, and other instructors in poultry raising, and in directing the work of 4-H poultry club members.

Acknowledgments

The author wishes to acknowledge the assistance rendered by the following persons in the preparation of this circular:

Prof. W. C. Tully, Head of the Poultry Department.
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Many of the illustrations used in this circular were obtained through the courtesies of the U. S. Department of Agriculture, the International Harvester Company, and the State Agricultural Colleges of Missouri, Nebraska, and Texas.
Selection and Care of Hatching Eggs

The careful selection of eggs for hatching purposes is a very important matter because the kind of eggs incubated determines, to a large extent, the quality of chicks hatched. Fertile eggs of good hatching quality are necessary for good hatches. The male breeders should be placed with the female breeders about one month before eggs for hatching are to be saved. In cold weather the eggs should be gathered frequently to prevent them from becoming excessively chilled. All eggs for hatching should be uniform in shape and size, and sound in shell.

The size of the eggs used for hatching is very important because there is a strong correlation between the size of eggs used and the size of chicks hatched. Furthermore, the continued use of small eggs for hatching purposes would soon lower the constitutional vigor of the laying or breeding stock, as well as decrease the size of eggs shipped to market. The most careful attention therefore should be given to the selection of the eggs for hatching purposes on the basis of size, and it is desirable to use no eggs weighing less than 2 ounces for incubation.

In the case of varieties of chickens that lay white-shelled eggs, all eggs used for incubation should be free from tints. This is an economic factor which has caused trouble in some strains of White Leghorns. In shipping eggs to market there is a tendency for the trade to discriminate against white eggs with tinted ones mixed in with them.

All eggs should be tested for cracked shells. This can be done quite readily by tapping two eggs together. If there is a resonant sound, both eggs are sound in shell; but if there is a dull sound, one of the eggs is cracked and should not be used for incubation.

Eggs for incubation should not be washed because washing opens the pores and makes possible excessive evaporation of the watery content during incubation. If dirt is observed on the shell, clean it off with steel wool or reject the egg. The more careful the selection of eggs for hatching purposes, the better the results.

Only fresh eggs should be set. Eggs deteriorate rather quickly after they are about ten days old while eggs three or more weeks old usually do not hatch at all. Eggs should not be held for incubation longer than ten days. It is not necessary to turn the eggs before the fifth day. A good way to hold hatching eggs is to keep them in egg cartons or containers having regular egg fillers. The simplest way to turn the eggs is to turn the carton from one side to another once each day. Eggs held for incubation should be kept in a cool room at a temperature of between 45 degrees and 55 degrees F and which is free from drafts. Keep hatching eggs away from strong odors such as kerosene, onions or disinfectants.

References for Club Members’ Library:
“Poultry Husbandry”—M. A. Jull.
Farmers’ Bulletin No. 1538—“Incubation and Brooding of Chickens,” U. S. D. A.
Incubation

By incubation is meant the development of the chick in the egg. Two methods are in general use—natural incubation by placing eggs under hens, and artificial incubation by placing eggs in heated machines called incubators. It is very possible that beginners in club work will use the natural method the first year.

Natural Incubation

The lighter or egg breeds such as Leghorns, Minorcas, or Anconas do not usually become broody soon enough for early hatched chicks. Due to their somewhat nervous temperament they do not make dependable setting hens or good mothers. Choose a medium-sized quiet hen of the Wyandotte, Plymouth Rock, Rhode Island, or Orpington breed. An extra large hen is too apt to break the eggs while a small hen can not cover a good setting except in warm weather.

The nest for a setting hen should be at least 12 inches square and deep enough to prevent the chicks getting out of the nest when hatched. If the nest is too deep the hen is liable to break the eggs in returning to the nest. Place a piece of sod, grass side down in the bottom of the nest. This is to supply moisture. Cover with cut straw or alfalfa filling the corners well and rounding the nest so that the eggs will remain in the center.

Dust the hen with louse powder before placing her on the nest unless you are sure she is free from lice. Use sodium fluoride. Do not use blue ointment as, due to its greasy nature, it is liable to affect the hatching of some of the eggs.

Fig. 1.—Homemade egg candler.  
Fig. 2.—Correct holding of eggs when candling.

The hen should be left on the nest at least one day before the eggs are placed under her to make sure that she is ready to stay. If she is to be moved it is best to do it at night handling her carefully to avoid making her nervous. Place the eggs under her at night rather than in the daytime.

The hen should be allowed to leave the nest once each day if she cares to do so. Provide a mixture of corn and oats for feed, also charcoal, grit and a plentiful supply of fresh, clean water.
The eggs should be candled to observe the progress of incubation. If several hens are set and many eggs are tested out, those left may be placed under fewer hens and fresh ones placed under the remaining hens.

The infertile egg will appear perfectly clear before the candle. The dead germ will show as a dark spot or a blood ring which adheres to the shell and does not move when the egg is rotated. The live germ will show a dark spot with dark lines branching out in all directions.

**Artificial Incubation**

The location of the incubator is the first factor to consider. A well-ventilated basement or cave is an ideal place. A room heated by a stove or furnace is undesirable due to temperature changes. Never place an incubator so that the sun shines directly on it.

If the incubator has been used before it must be thoroughly cleaned and disinfected. Details of disinfecting an incubator are taken up under diseases of baby chicks.

If the machine is heated with hot water fill the water pipes and then tilt the incubator to remove the air pockets from the pipes.

The incubator must be set perfectly level. Use a carpenter's level for this purpose.

Operate and regulate the incubator according to the directions provided by the manufacturer. A general rule is to start the incubator at about 101 1/2 and keep at this temperature for the first week, 102 to 102 1/2 the second week, and 103 the third week. During the 21 days of incubation the temperature of the egg chamber will rise gradually due to the heat of the developing embryos in the eggs.

After placing the eggs in the incubator close it up and leave it for 24 hours. This will be sufficient time for the eggs to reach the desired temperature. Never adjust the regulator after eggs are placed in the machine. All temperature changes must be made by the flame (by turning the wick up or down). The eggs should be turned beginning the second day. Experiments show that turning twice daily gives better results than turning only once. Divide the time between turnings equally. The eggs should be cooled at least once daily. The cooling causes the interior contents to contract and allows for a greater intake of oxygen which the embryo needs for development. The eggs should be cooled 20 to 30 minutes each day for the first 15 or 18 days.

Usually eggs are candled on the seventh day to remove infertile eggs, on the fourteenth day to remove dead germs, and on the eighteenth day to remove dead embryos. However, recent investigation seems to point out that the seventh day of incubation is a critical point in the development of the embryo and that candling should be done either before or after this time depending on whether the eggs are white or brown. White eggs may be candled on the fifth day of incubation and brown eggs may be candled on the eighth or ninth day.

In Fig. 3 is a diagram showing the normal evaporation of moisture and enlargement of air cell during incubation.
Observe evaporation and add moisture if in your judgment it is necessary.

Supply added moisture in the incubator on the evening of the eighteenth day. Use moist sand, wet enough to puddle nicely. Place in pie tins if no sand tray is provided with incubator. A thin film of moisture should collect on the inside of the glass door of the incubator.

After the eighteenth day do not open the incubator until the hatch is off unless it is absolutely necessary to remove some shells and to let chicks into the nursery tray. This is to avoid loss of moisture. Tie the thermometer down to the egg tray on the eighteenth day before the hatch comes off. This will prevent it being knocked over by the chicks and will avoid having to open the incubator to read the temperature. Darken the incubator by draping a sack or piece of paper over the glass door, providing there is no second wooden door, to prevent chicks crowding to the light. If the weather is warm and the hatch is heavy, some of the chicks may be let down into the nursery tray if they appear to be crowding. When the hatch is nearly completed, open the ventilators. Watch the temperature.

If the chicks hold their mouths open, it is an indication that they are too warm and need more air. It may be necessary to partially open the incubator door to allow added ventilation. Leave the chicks in the nursery tray until dry and fluffed which will be about 36 hours after the hatch starts. Move chicks to the brooder house in covered chick boxes or a box covered with a blanket to prevent chilling.

The following averages will give information in regard to the number of eggs to set to produce the required number of pullets:

- 300 eggs set.
- 150 chicks hatched.
- 25 per cent mortality up to 6 months.
- 112 chicks remain.
- ½ or 56 are pullets.
- 5 per cent of pullets will be culls.
- 53 good pullets for laying flock.
- 300 divided by 53 equals 5.6 eggs required to be set per pullet.

1. Select hatching eggs of uniform shape and color and weighing not less than 2 ounces each or 24 ounces to the dozen.
2. Do not keep hatching eggs longer than ten days before setting. Store at a temperature of 45 to 55 degrees Fahrenheit.
3. Avoid strong odors such as kerosene, onions, and disinfectants.
4. Eggs which have been shipped or carried a considerable distance should not be set until the following day.
5. Turn eggs before tending the incubator lamp to avoid getting kerosene on the eggs.
6. Do not tamper with the regulator after the eggs are in the machine. Temperature changes must be made with the wick.
7. Hatch the general purpose breeds as early as conditions permit, the lighter or egg breeds may be hatched in April and May.

References for Club Members' Library:

"Poultry Husbandry"—M. A. Jull.
Farmers' Bulletin No. 1524—"Farm Poultry Raising," U. S. D. A.
Farmers' Bulletin No. 1108—"Care of Baby Chicks," U. S. D. A.
Farmers' Bulletin No. 624—"Natural and Artificial Brooding of Chicks," U. S. D. A.

Brooding of Chicks

A good brooder house is an indispensable piece of equipment in raising young chicks. Where poultry is being raised in sufficient quantity to make it profitable, artificial brooding will be practiced. Too much time and labor is involved in brooding chicks with hens. Besides the number brooded in this way is limited. The brooder house enables the poultryman to raise a large number of chicks of one age and size. It is unprofitable to try to raise chicks of different ages in the same pen.

Fig. 5.—A coal stove brooder with brood of chicks. This type of brooder is well adapted for brooding chicks in flocks of from 150 to 550. Note particularly the wire fence which prevents the chicks from going too far from the heat.

A hard coal burning brooder stove of a large size is the most reliable source of heat. Temperature is an important factor during the first two weeks of a chick's life. The brooder stove should be set up and regulated to a temperature of 95 to 100 degrees F at a point 2 inches from the floor at the outer edge of the hover. Use a good thermometer—don't guess. A thermometer can be suspended from the edge of the hover. Maintain this
temperature for the first week, gradually reducing to 88 degrees F at the end of the second week. This temperature should be maintained until the chicks no longer need artificial heat. They will be five to six weeks old by that time depending somewhat on the time the chicks were hatched and the weather conditions.

Encourage chicks to roost as early as possible. When chicks begin to roost, crowding troubles are lessened. To encourage roosting, build a sloping frame about 30 inches in width and the length of one end of the building. Support for this frame can be made by sawing a 10 or 12-inch board 30 inches long diagonally. Cover the frame with inch-mesh poultry netting and use strips of 1x2 or 2x2 for roosts. Space the roosts 5 to 6 inches apart. As the chicks retreat from the heat of the brooder stove they will readily go upon the roosts. Construct the frame so that the chicks will not drop behind it and be kept away from the heat and feed.

Fig. 6.—Moving a colony house to a new location on clean ground.

Allow one foot of floor space in the brooder house for each three chicks. Alfalfa leaves or chopped alfalfa makes excellent litter for the brooder house floor. If alfalfa is not available, chopped straw or chaff may be used. Peat moss and planer shavings are also used but have to be purchased and increase the brooding cost.

Hardware cloth two meshes to the inch nailed on frames made of 1x4 makes a very good brooder house floor covering. It is sanitary and prevents much of the loss from crowding. No litter is necessary when hardware cloth is used to cover the brooder house floor.

Exposure to direct sunlight for 45 minutes a day is sufficient to prevent leg weakness. One per cent cod liver oil in the ration is a substitute.

Blue prints of the South Dakota type brooder house may be obtained from the Department of Agricultural Engineering, State College, Brookings, for a small charge.
POULTRY MANAGEMENT

Range Care of Young Stock

For the growing range, select a clean piece of ground which has not been used for poultry the previous year, preferably sown to alfalfa. The corner of an alfalfa field is ideal for summer range. A summer range should provide plenty of shade, ample green feed and be of sufficient size to admit of plenty of exercise. If ground seeded to alfalfa is not available, it may be seeded to oats and rape. The oats should be sown very thick, using 4 to 5 bushels of oats to the acre and 12 to 16 pounds of rape. Rape is a plant belonging to the cabbage family and provides great quantities of succulent, green feed that compares favorably with alfalfa.

Fig. 7.—Artificial shade for use on range.
—Courtesy Nebraska Extension Service.

Construct a large mash hopper with a water tight roof that can be used out of doors, thus conserving space in the brooder house. Small hoppers which need filling several times daily require too much time and may be neglected.

A constant supply of a well balanced growing ration is necessary to develop the pullets. Remember that feeding for egg production is a continuous process from the time the chicks receive their first feed and does not begin in October or November when the pullets are expected to begin laying.

Segregate the cockerels as soon as they can be distinguished from the pullets. The pullets will make better growth when the cockerels are removed. It will give them more room for roosting space in the colony house or brooder house. Provide 35 lineal feet of roosting space for 100 pullets up to four months of age and 50 lineal feet after that age.

Watch for and control lice and mites.

Selection of Pullets for Winter Layers

Pullets to Discard:

The pullets that mature late and have not been strong and vigorous during the growing season will not be profitable winter layers. Pullets
that require more than seven weeks to feather over the back are slow developers and will be slow in beginning to lay. Lack of vitality is usually indicated by the following points:

**Head**—Long and thin—crow-like.
**Beak**—Long, thin and sharp pointed; excessive length from eye to the end of the beak.
**Eye**—Sunken and dull.
**Face**—Pale.
**Comb**—Pale and shrunken sometimes hard and covered with whitish scales.
**Legs**—Long and thin, usually set close together. Hock joints nearly touching, giving a weak appearance.
**Body**—Narrow across back. Pelvic bones very close together. Abdominal capacity small with muscles tightly drawn.

General Appearance—Feathers dull and usually ruffled, eyes dull, appearance listless, first to go to roost and last to leave poultry house in the morning.

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**Pullets to Keep:**

The ones that are strong and vigorous from the first, feather quickly, and mature early. Early hatched pullets are best.

**Head**—Medium in size, well shaped.
**Beak**—Rather short, heavy at base, well shaped.
**Eye**—Bright, full and prominent.
**Face**—Good healthy color.
**Comb**—Good shape and well developed.
**Legs**—Strong, good distance between.
**Body**—Broad across back, well developed breast and abdominal space.

General Appearance—Bright silky plumage, bright intelligent eyes, good healthy color in face and comb, full of vigor, active.
Marking:

Mark all pullets to determine age, otherwise it is impossible to tell whether the bird is a pullet or hen after maturing. A chick punch or harness punch in the web of the foot makes a good mark, for instance, the first year punch the web between the first and second toes of the right foot; the second year between the second and third toes of the right foot; the third year leave unmarked; the fourth year begin on the left foot the same as the right and continue thus from year to year.

After the cockerels are separated from the pullets, those that are to be marketed as broilers should be fed a ration containing only 10 per cent of meat and bone meal which will produce fattening. If skimmed milk is available feed all the birds will drink, both to pullets and cockerels.

References:
"Poultry Husbandry"—M. A. Jull.
Farmers' Bulletin No. 1538—"Incubation and Brooding of Chicks."
Farmers' Bulletin No. 1524—"Farm Poultry Raising."

Feeding Baby Chicks

By Prof. W. C. Tully

Baby chicks should be put under the hover of the brooder when they are from 24 to 36 hours of age and given their first feed at this time. Contrary to general ideas chicks will not be injured by feeding before this time, but on the other hand no advantage is to be gained by feeding before the 24 to 36 hour age.

Chick rations are as numerous as the varieties of chicks themselves, but either a good commercial ration should be used, or a ration formulated by your state experiment station. Do not mix up some cornmeal, oatmeal, and perhaps a little hardboiled egg, and call it a chick mash.

The chick ration used and recommended by South Dakota State College is a mash and grain ration, which we prefer to an all-mash ration.

The mash part of this ration is made up of the following ingredients, expressed in pounds per 100 pounds of mixture:

- 32 ground yellow corn
- 15 wheat bran
- 15 wheat middlings
- 15 oatmeal
- 15 meat and bone scraps
- 5 dried buttermilk
- 1 steamed bone meal
- 1 common salt
- 1 cod liver oil (1lb equals 1 pint)

If the ration is made up just as recommended and thoroughly mixed, it will give as good results as any ration you can buy. Only three changes are justified. First, if some liquid skimmed milk or buttermilk is available the dried buttermilk may be omitted from the mash; second, if sufficient liquid milk is available so that it is in front of the chicks at all times, the meat and bone scraps can be reduced to 5 per cent, but if this is done be sure to increase the steamed bone meal to 3 per cent; third, ground barley may be substituted for ground yellow corn if 5 per cent of alfalfa leaf meal is added to the mash.

Only a cod liver oil tested for vitamin D potency should be used and the cod liver oil will mix with least difficulty with wheat bran. Mix the bran and oil thoroughly by hand, and then thoroughly mix this with the remaining mash ingredients. Cod liver oil must be supplied as long as the chicks are confined. As soon as they are allowed access to direct sunlight, (not through window glass) the cod liver oil may be omitted from the ration. This will usually be when chicks are from two to three weeks of age, but of course depends on the season and weather conditions.
The mash ration is fed for the first few days in shallow hoppers which may be made of lath. Keep the mash in front of chicks all the time as there is no danger whatever of chicks over eating if correct ration is fed. Provide plenty of mash hopper space, 2 inches for each chick. Two hundred and fifty chicks is the maximum number to start in a 10x12 brooder house and for this number 5 mash hoppers, 4 feet long will be needed.

When the chicks are a few days old they can feed from regular size chick mash hoppers. These are described in the chapter entitled “Poultry Equipment.”

Provide plenty of water fountains and keep a supply of clean water or milk, or both, in front of the chicks at all times. Use pure water, do not dope it up with pills or concoctions which are supposed to prevent and cure all manner of incurable diseases. Keep water and milk fountains clean, they should be thoroughly scrubbed out every day. It makes no difference whether liquid milk is fed sweet or sour. Either will give excellent results. Milk may safely be fed in galvanized containers, but as a safety factor when using a galvanized milk container the first time allow sour milk to stand in it for 24 hours and then throw the milk away.

The grain ration which is fed with the above mash ration is started when the chicks are eight to ten days old and is made of the following ingredients:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finely cracked yellow corn</td>
<td>40%</td>
</tr>
<tr>
<td>Cracked wheat</td>
<td>40%</td>
</tr>
<tr>
<td>Steel cut oats</td>
<td>20%</td>
</tr>
</tbody>
</table>

This grain mixture is also fed in hoppers, never on the ground or floor. Provide one hopper of grain to every three of mash and leave the grain, like the mash, in front of the chicks at all times.

Chick size oyster shell, or chick size limestone grit should be available in hoppers at all times.

When chicks are eight weeks of age two changes are made in the starting mash given above in order to make it into a growing mash. First, the meat and bone scraps are reduced to 10 per cent. Second, ground oats, preferably with most of the hulls sifted out, are substituted for the oatmeal.

In the grain ration, at the same time, the finely cracked yellow corn can be replaced with intermediate cracked yellow corn, the cracked wheat to whole wheat, and the steel cut oats may be omitted or replaced by not more than 10 per cent of whole oats.

When the chicks reach the age of eight or ten weeks do not make the common mistake of thinking that they can then get along without the mash ration. The mash part of the ration contains essential animal protein and minerals, as well as part of the vitamin supply, and to feed chicks on a grain ration alone from this time on, with the idea in mind of saving a little money, is very poor economy. A liberal supply of both growing mash and grain as well as plenty of pure water should be in front of the chicks at all times till they are mature and ready for the change to the laying mash.

Wisconsin All-Mash Chick Starter

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 lb yellow cornmeal</td>
<td>80%</td>
</tr>
<tr>
<td>5 lb raw bone meal</td>
<td>5%</td>
</tr>
<tr>
<td>1 lb fine salt</td>
<td>1%</td>
</tr>
<tr>
<td>20 lb wheat middlings</td>
<td>20%</td>
</tr>
<tr>
<td>5 lb pearl grits (granular lime-stone)</td>
<td>5%</td>
</tr>
</tbody>
</table>

and only skimmed milk to drink
Where a supply of skimmed milk is not available, add 30 lb of skimmed milk powder to the 110 lb of other ingredients.

References:
"Poultry Husbandry"—M. A. Jull.
Farmers' Bulletin No. 1524—"Farm Poultry Raising," U. S. D. A.
Farmers' Bulletin No. 1108—"Care of Baby Chicks," U. S. D. A.
Farmers' Bulletin No. 1538—"Incubation and Brooding of Chickens," U. S. D. A.

The Growing Ration

The growing ration differs from the starting ration only slightly. Meat and bone meal may be substituted for the dry milk and ground oats is substituted for the oat meal or hulless oats. A good growing ration would consist of the following:

- 32 pounds of yellow corn meal
- 15 pounds of wheat middlings
- 15 pounds of wheat bran
- 15 pounds of ground oats
- 20 pounds of meat and bone meal
- 1 pound of fine sifted salt
- 1 pound of steamed bone meal

The grain ration to be fed in addition to the growing ration should consist of the following:

- 200 pounds of cracked yellow corn
- 100 pounds of whole wheat

The grain ration may be changed slightly to use other home grown grains. After the chicks reach an age of eight weeks the following ration may be used:

- 500 pounds of coarsely cracked yellow corn
- 200 pounds of whole wheat
- 200 pounds of barley or speltz
- 100 pounds of good heavy oats

Feeding Hens for Egg Production

The egg is produced from surplus body material only. The body maintenance requires considerable protein and fat to build and repair muscle tissue and produce energy. These body requirements must be taken care of first, and a surplus built up before the hen is able to produce eggs.

With the knowledge that surplus body material must be stored up before egg production is possible, the next question arising is: Of what elements should this surplus be composed to enable most efficient egg production? First, we must analyze an egg and the hen's body to see what elements it is composed of, and then feed a ration that contains these elements in the right proportion.

Analysis shows that the egg consists of the following substances:

- water 65.9 per cent
- protein 12.83 per cent
- fat 10.59 per cent
- mineral (shell) 10.68 per cent

The hen's body consists of like substances in different ratio as follows:

- water 55.8 per cent
- protein 21.6 per cent
- fat 17.0 per cent
- mineral 3.8 per cent

Analysis of the egg and the hen's body shows us what substances are required for a balanced ration for laying hens. The water is cheap, but care must be exercised to keep a constant supply. The mineral is supplied in oyster shell. The fat is found in abundance in grains such as corn, barley, speltz, wheat, and oats, Analysis of the grain shows that it is lack-
Fig. 9.—Eggs can not be produced unless the feed contains the material from which eggs are made.

—Courtesy International Harvester Co.

ings in protein content for poultry feeding. The protein is very essential. Protein forms the white of the egg.

Our next problem is to add the amount of protein the grains lack, for experiment has proved that the white of the egg must be present in the right amount before the egg is formed. This is done by feeding an egg mash consisting of ground grains and mill and animal by-products selected in proportion to their protein content to balance the ration. The virtue of the mash is not in the grinding, but it is due to the fact that we can select certain protein carriers to make up the mash and thus offset the lack of protein in the grains.

Egg Mash

The following formula mixed thoroughly will give good results:

- 100 lbs. fine ground yellow corn
- 100 lbs. fine ground oats
- 100 lbs. meat and bone meal
- 100 lbs. wheat bran
- 100 lbs. wheat middlings (or 200 lbs. ground wheat in place of bran and middlings).
- 5 lbs. fine granulated salt.
Fig. 10.—Hens fed on grain alone plus what they can scratch for themselves are not getting enough animal protein (meat and milk) which is necessary for profitable egg production.—Courtesy International Harvester Co.

Or the following formula using some barley will be satisfactory.

- 100 lbs. ground yellow corn
- 100 lbs. wheat shorts (middl'gs)
- 50 lbs. ground oats (heavy)
- 25 lbs. dried buttermilk
- 5 lbs. common salt
- 100 lbs. wheat bran
- 50 lbs. ground barley
- 75 lbs. meat and bone meal
- 25 lbs. alfalfa meal
This mixture is fed dry in a self-feeding hopper and kept before birds at all times, summer and winter.

Milk in any form is a good protein carrier and may be used to replace some of the meat and bone meal in the mash. About three gallons per day is required for 100 hens. When used in this amount, the meat and bone meal can be reduced to 50 pounds with 400 pounds of other ingredients, or to about 10 per cent. Do not feed less than 10 per cent of meat and bone meal in the mash.

Following are the data from a feeding experiment which show the value of meat scrap in the mash:

"Two lots of pullets from the same source and of the same age were fed on different rations, the only difference being that lot 1 received a mash with 20 per cent of meat scrap and lot 2 a mash with no meat scrap. The average yearly egg production of lot 1 was 179 eggs per hen, and of lot 2, 57 eggs per hen, or a difference of 122 eggs. After all feed was paid for, lot 1 returned a labor income of $2.47 per hen for the year, and pen 2 returned a labor income of $3.35 per hen. These figures are the average for a period of three years. The difference of 20 per cent of meat scrap made a difference of $2.12 per hen on the labor income or amount received for eggs above feed cost." (Experiment Station, Purdue University.)

Within reason the mash ration containing the greater amount of animal protein (meat or milk) will produce the most eggs on the fewest pounds of mash consumed. When the price of eggs drops the margin of profit is smaller and more efficient production is necessary, and it is then more than at times of higher prices that it is necessary to feed a high protein ration. It is false economy to feed less than 10 per cent of meat scrap or meat and bone meal at any time. A hen will eat about 2 ounces of mash per day. On this basis 100 hens will consume about 12½ pounds of mash daily.

A diagram of a home made mash hopper is given in the topic on "home made equipment." Provide 1 lineal foot of hopper feeding space for each 8 hens in the flock, or 12 lineal feet per 100 hens, feeding from both sides.

Scratch Grain

The grain mixture is scattered in the litter on the floor and the hens get exercise in scratching for it, hence the name scratch grain. Some poultrymen say 50 per cent of its value is in the scratch. Several scratch grain mixtures are used with equally good results.

Scratch Rations—
1. Equal parts corn (whole or coarse cracked) and wheat.
2. 2 parts corn, 2 parts wheat, 1 part heavy oats.
3. 5 parts corn, 2 parts wheat, 2 parts barley or speltz, 1 part oats.

On a yearly basis, laying hens will consume about equal parts of grain and mash. This is not a hard and fast rule for every month. The grains supply heat, energy, and fat, hence more of it should be consumed in cold months than in warm. Each 100 hens will require from 12 to 14 pounds of scratch grain per day in winter months. If given all the grain they will eat, they will consume less mash and may become too fat. Feed only one-third of the daily allowance of grain in the late forenoon, the other two-thirds just before going to roost. Remember its mission is to produce heat, and if the birds go to roost with a crop full of whole grain, this will digest during the night and keep them warm.

Green Feed

Do not forget the green feed as it is extremely important. The green feed provides succulence, keeps the digestive tract in a healthful condition, whets up the appetite, and carries a supply of Vitamins A and D.
If Vitamin A is absent it is likely to cause an eye disease known as nutritional roup. Absence of Vitamin D interferes with the utilization of the minerals in feeds and may be the cause of leg weakness and soft shelled eggs. Alfalfa leaves or good leafy second cutting alfalfa hay, sprouted oats, mangels, beets, carrots, or raw potatoes serve as green feed during the winter months. Provide charcoal and grit in small wall type hoppers.

References for Club Members' Library:
“Poultry Husbandry”—M. A. Jull.
Experiment Station Bulletin 242 “Results of Poultry Feeding Experiments,” South Dakota State College, Brookings, S. Dak.
Farmers’ Bulletin No. 1524—“Farm Poultry Raising,” U. S. D. A.
Farmers’ Bulletin No. 1067—“Feeding Hens for Egg Production,” U. S. D. A.

Feeding Market Poultry

Chickens to be marketed will usually bring better returns if first fattened for from 7 to 14 days. Fattening is primarily to improve the quality of the lean meat rather than to add fatty tissue. Old hens are usually in good flesh, but all young stock is more growthy and may be profitably fattened before marketing.

Pen fattening and crate fattening are the two methods commonly employed in this country. Pen fattening is generally practiced on farms; crate fattening, while it may be done easily on the farm, is largely confined to commercial fattening plants.

The essentials of pen fattening are quiet surroundings and plenty of soft feed given at regular intervals, usually three times a day. Feed sparingly the first two or three days and then gradually allow the birds all they will eat in a half hour period, never leaving unfinished feed before them.

Soft feed is always used for fattening as limited exercise for the birds demands a feed that can be quickly and easily digested. Two suitable fattening rations are as follows:

<table>
<thead>
<tr>
<th>Number 1</th>
<th>Number 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parts</td>
<td>Parts</td>
</tr>
<tr>
<td>by weight</td>
<td>by weight</td>
</tr>
<tr>
<td>Cornmeal</td>
<td>6</td>
</tr>
<tr>
<td>Ground oats, without hulls</td>
<td>2</td>
</tr>
<tr>
<td>Middlings</td>
<td>1 1/2</td>
</tr>
<tr>
<td>Meat scraps</td>
<td>1/2</td>
</tr>
</tbody>
</table>

Both of these rations are used with buttermilk or skim milk, using one quart of milk to one pound of mash, thoroughly mixed.

The question may arise with producers as to whether it would pay them to crate fatten their poultry before shipping it alive to market. As a general rule this does not pay unless the birds are in poor condition. It is more practicable to kill and dress fattened poultry before marketing it and thus save the shrinkage, which is especially heavy on shipments of live poultry which have been fattened.

References for Club Members' Library:
“Poultry Husbandry”—M. A. Jull.
“Marketing Poultry and Produce,”—Benjamin.
Farmers’ Bulletin No. 1541—“Feeding Chickens,”—U. S. D. A.
Farmers’ Bulletin No. 1377—“Marketing Poultry,” U. S. D. A.
Remodeling the Poultry House and Getting It Ready for Winter

By Prof. R. L. Patty

Along about harvest time each year we begin to think about cleaning up the old poultry houses and fixing them up for winter. It is impossible to remodel most old poultry houses and ventilate them so they will provide fresh air and at the same time control the frost and moisture on the walls as well as can be done when a new poultry house is built exactly according to a plan. But there are some simple things that can be done for the poultry house that will make it much more comfortable for birds in winter.

The Straw Loft

There is probably nothing that can be done to make the old poultry house more comfortable than to put in a straw loft overhead. It was a common mistake in years past to build the poultry house much higher than it should have been. If a straw loft is built straight across overhead just high enough to be well out of the way so that it is not necessary to stoop while moving around in the house, the overhead will be reduced and

Fig. 11.—Diagram showing methods of remodeling shed, semimonitor, and gable roof houses.
a proper temperature can be maintained. The amount of frost that will gather on the walls will be reduced to a minimum. The straw loft should be made of good, clean straw and loose poles or slats. The reason for leaving the slats or poles loose is to make it handier for putting in and taking out the straw. The thickness of the layer of straw should be anywhere from eight to twelve inches after it has settled. This will depend upon the amount of room in the loft.

**Ventilation**

The most comfortable poultry house is one that is built with warm side walls and provided with a definite supply of air through ventilators. The ventilators should always provide for a supply of fresh air without a draft. At present the shutter-ventilator is found to be most satisfactory from the experiments conducted. Shutter-ventilators are similar to window openings in that they are provided with slats for breaking up the wind that may blow directly against them. They are placed on one side of the house only to prevent drafts. Curtains of muslin or burlap should be provided for dropping down over the shutters for very extreme conditions at night. Usually the shutter-ventilators may be left open.

Shutter-ventilators are much more reliable for ventilation than muslin curtains. A stretched muslin curtain is a treacherous ventilator and con-
trary to the recommendations of the many who have never actually tested them, they should not be depended upon for ventilation. Tests with air-meters have shown that when there is no wind there is seldom any air passing through a muslin curtain, especially after a little dust settles on it. In remodeling the old poultry house then, a shutter-ventilator can often be put in in place of one sash or an old window. For a good warm house, 1 square foot of shutter-ventilator should be provided for 44 square feet of floor space in the house. A diagram of a shutter-ventilator is given below. More information about ventilation and construction of poultry houses is given in Extension Circular No. 295.

Fig. 13.—Improved poultry house equipped with dropping boards. Note deep litter, electric lights, water pans, and general sanity conditions.

Dropping Boards Are an Aid in Floor Sanitation

The floor space for birds can be increased by constructing dropping boards. Besides, it is not sanitary to allow hens to scratch on the floor in the droppings. Many common poultry diseases are spread through infected droppings. Allow 4 square feet of floor space for each hen in the flock.

Dropping boards should be 3½ feet off the floor and placed in the back part of the house. Have the boards level and run the short way of the roosting alcove to make them easier to clean with a hoe. The boards
should extend 6 inches beyond the front roost. The roosts should be 8 inches above the dropping boards. The roosts should be 12 inches apart from center to center. Four or five rows of roosts should be the maximum. Eight to ten inches of roosting space should be allowed per bird.

The Roosting Alcove.

A modern improvement that is most important and not hard to make is an alcove for the birds to roost in. The plan is that of sealing up all around the roost except in front so that no draft can reach the birds while on the roost. The writer believes this is of greatest importance. Chickens will thrive in quite cold weather providing the air is still. In order to make a protected alcove of this kind it is necessary to seal up underneath the rafters and on the studding back of the roost with a good grade of matched lumber. Ship lap will do nicely for this if it is of good grade. The ends of each alcove should be built tight and of the same kind of lumber. This means that if the roost is more than 8 feet long, a partition should be put in at a distance of 8 feet all along the roost. This partition does not extend clear across the house but just well across the roost to break any movement of air lengthwise along the roost. The next important thing is to have a horizontal dropping board under the roosts which is described above. It is made of the same good tight lumber so that no draft can reach the birds from below.

References:

S. Dak. Extension Circular No. 295—"The South Dakota Poultry House."
University of Missouri College of Agriculture Circular No. 101—"The Missouri Poultry House."

Sanitation and Diseases

Poultry diseases are the greatest enemy of the poultry industry and cause immense losses each year. A large amount of this loss can be prevented by sanitation.

Sanitation means to keep things clean, to be hygienic. Cleanliness, sunlight, fresh air, and reliable disinfectants are the important factors in sanitation.

Germs Cause Disease

The most important discovery that has been made in connection with sanitation is the fact that contagious and infectious diseases are caused by very small organisms commonly known as germs. Contagious and infectious diseases do not spring up spontaneously; they must be carried to the flock in some manner by a visible or invisible carrier. The life cycle of the germ is just as definite and complete as that of the fowl that it attacks.

The most important factor as a disease carrier in the flock is a sick bird. A dead bird allowed to decay around the premises is also dangerous. A bird that appears healthy but carries infection is a menace as a spreader of disease. Infected premises (feed and water troughs, lots, runs, roosts, soil, etc.), contaminated water, and feed are things that should be watched with daily regularity.

Three things to know—There are three very important factors that should be kept in mind by the poultryman when considering diseases, namely:

1. A cause.
2. A susceptible bird.
3. A connecting link between the two.
A moderate understanding of these three things would cut the losses from disease to a minimum.

Nearly all diseases of poultry are taken into the body through the mouth, either with the feed or water. If the droppings are allowed to stay on the floor of the house where the poultry is fed, any disease germs, worms, or worm eggs are picked up with the feed and soon a number of birds are affected. Install a dropping board and keep things clean.

Fig. 14.—Unimproved poultry house, unsanitary.

The Connecting Link

The poultryman may never be able to reduce the cause of disease or to lessen the susceptibility of his birds to disease; but he can break the connecting link between the two by:

1. Quarantine.
2. Burning or burying dead birds.
3. Thoroughly cleaning and disinfecting infected premises.

A quarantine will prevent the spread of disease. Birds carrying an infectious disease should never run at large; if they do they spread disease to the rest of the flock and contaminate the premises. Another factor is that birds dying of disease may not be found and destroyed promptly. If the sick birds are confined to a small lot, the owner has a chance to destroy the infection after the disease has run its course by cleaning and disinfecting. Breeding stock shipped in or birds returned from shows, should never be placed with a healthy flock until they have passed a satis-
factory quarantine period of 3 weeks to 30 days. A few rods of poultry fence and a shelter are all that are required for a quarantine pen.

Proper Disposal of Dead Birds—All birds dying should be promptly disposed of. Burning is by far the safest method. Unless the carcass is buried 4 feet deep and covered with quick lime there is danger of burrowing animals bringing the contagion to the surface.

Cleaning and Disinfecting—Cleaning and disinfecting the infected premises is the third important point in breaking the connecting link. Clean thoroughly, scrub the houses and equipment with hot lye water using a 1 pound can of lye to 30 gallons of water. Burn useless litter and remove droppings to land that is to be plowed. Apply only reliable disinfectant such as creolin, or compound solution of cresol, using a 5 per cent solution which means 12 tablespoonfuls of the concentrated disinfectant to 1 gallon of water. Apply boiling hot if possible.

Fire may be used as a disinfectant. There are several makes of “fire-guns” on the market, made especially for disinfecting poultry houses and equipment. The firegun is in reality a large blow torch and throws a heat of 1800 to 2000 degrees. The fire method is efficient in penetrating all cracks and crevices and is more successful in disinfecting soil.

However, time and expense would prohibit the disinfecting of large areas of soil and for this reason brooder houses should be moved to clean ground each year. Chicks raised on clean ground and kept there by a good poultry fence until they are 20 to 24 weeks old will have built up considerable natural resistance to common chick diseases and worm infestation.

Do not overlook the importance of a balanced ration at all times as good feeding is a big factor in maintaining good health.

Watch for and control lice, mites, and worms, as these parasites weaken the birds, thus making them more susceptible to disease.

Prevention of disease by sanitation is much more successful than the treatment of sick birds after they have become infected.

Symptoms of all poultry diseases are very similar. Space in this circular will not permit a detailed discussion of the cause, symptoms, and control of the numerous poultry diseases.

References for Club Members’ Library:
Farmers’ Bulletin No. 1652—“Diseases and Parasites of Poultry,” U. S. D. A.

Culling the Flock

The flock must be fed a balanced ration for a period of four weeks before culling is attempted.

Why Cull?
1. To increase egg production.
2. To eliminate as much disease as possible.
3. To get rid of old hens.
4. To lessen the need of a breeding pen.

Time to Cull:
From July to October. If one has handled many birds the culling may be done as late as December, but the beginner is liable to make too many mistakes so late in the year. The old hen, and the poorest producer will lay during April, May, and June for that is the natural laying season of birds. By July they will have stopped laying and begun to molt which makes it easy to recognize them. By culling out the poor producers and using good breeding males with the good hens that
are left, one can quickly increase not only the production of eggs but the vitality of the young chicks.

Culling may be done at any time during the day, but it is not wise to do it at night for too many things may be overlooked.

**Hens to Discard:**

Those with:
1. Long narrow head with sharp pointed or crooked beak.
2. Deep set or dull eyes (if the appearance of the flock is to be considered discard the hen with eyes of the wrong color).
3. Pale comb and face.
4. Long, thin legs, long toes, and toenails.
5. Bumble foot, scaly leg, frozen toes.
7. Narrow back.
8. Curved, sharp pointed, or very heavy pelvic bones with narrow space between.
9. Small abdominal capacity or large abdominal capacity with hard muscles and fat.
10. Small, dry, wrinkled, or puckered vent.

**Hens to Keep:**

Those with:
1. Good shaped head, with short, well shaped beak.
2. Bright, prominent eye of a reddish bay color in most common breeds.
3. Full warm red comb, or if not laying, the comb and face will still show good color.
4. Strong, legs, short nails, strong toes.
5. Feet free from disease.
6. Late molter—September, October, November.
7. Broad, full back.
8. Straight, flexible pelvic bones, with wide space between.
9. Large abdominal capacity with soft pliable fat.
10. Large, moist, light colored vent.

Note: If the yellow skinned variety, the legs, beak, and vent will show little, if any yellow color.

**References:**

"Poultry Husbandry"—M. A. Jull.
"Culling Poultry"—Circular No. 147, Kansas Station, Agricultural College, Manhattan, Kansas.
"Breeding and Culling by Head Points"—H. H. Steup.
Selection of Breeding Stock

Procuring Males for Breeding Pen

At the beginning of the second year project, one of the first problems that confronts you will be, "Where can I get the best male bird for my breeding pen?"

If you have one of the heavy meat breeds, one male should be provided for each 8 to 12 females to insure good fertility; in the general purpose breeds, one to 10 or 15 females; in the light or egg breeds, one for 20 to 25 females.

It is often said that the male bird is worth half the flock. He is worth at least that much and more depending upon his quality and his potency, that is, his ability to pass his good qualities on to his progeny. It is surprising the improvement that can be made on an average or mediocre flock of poultry by the use of a good male bird.

There is one main factor which adds much value to the male bird. In the order of Aves, which is the biological classification including all feathered tribes, there is a law known as "A sex-limited factor." This law is a provision of nature whereby certain characteristics can be transmitted only from opposite sexes. High egg production, or the egg laying strain for instance, can only be transmitted from mother to son and in turn from father to daughter. The sex limiting factor limits the mother from
transmitting the ability of high egg production direct to her daughter. The egg laying strain then can be passed on only through the male bird. It will now be readily seen why so much value is placed upon the male bird, and also why it is very important to produce male birds from hens of known high egg production. Poultry breeders select hens of good type and color, and place them on trapnest record. In this way, they can select the hens of known highest egg production and save the male birds hatched from their eggs. In selecting a male bird, try to get one of good type and from a high egg producing flock as a bird of this kind will do your flock a great deal of good, in the way of improving the egg production.

Prof. J. P. Lippincott, when with Kansas State College, bought 10 mongrel farm hens to try out a high-production bred male of the Tancred strain. Here are the results:

<table>
<thead>
<tr>
<th>Year</th>
<th>Mongrel Hens</th>
<th>Tancred Hens</th>
</tr>
</thead>
<tbody>
<tr>
<td>1914</td>
<td>Ave. 72 eggs, mated to Tancred male</td>
<td>Ave. 156 eggs, mated to Tancred male</td>
</tr>
<tr>
<td>1915</td>
<td>Half Tancred</td>
<td>Ave. 156 eggs, mated to Tancred male</td>
</tr>
<tr>
<td>1916</td>
<td>Three-quarter Tancred</td>
<td>Ave. 189 eggs</td>
</tr>
</tbody>
</table>

Thus the average egg production was raised 117 eggs per hen per year in a period of three years by the use of a male bird from a high producing strain.

When attending fairs and poultry shows, become acquainted with the breeders of the birds winning prizes in the variety and breed that you are raising. Oftentimes it is possible in this way to find a well bred male bird for sale at reasonable price, and you have the advantage of seeing the bird before purchasing, and of learning something of the history of the flock from which he descended.

Be sure your male bird is of standard weight for the breed. By using a male bird of standard weight, your broilers will gain weight much more rapidly than when a small underweight male is used. The pullets will also reach maturity at an earlier date and consequently come into production.
Fig. 19.—A good producer. Note refined head, keen eye, deep and long body.

earlier and stand up under it longer. Standard weight is important.

In selecting a male bird after first obtaining type, standard weight, and freeness from disqualifications, look next for physical vigor. The male bird should show outstanding vigor and masculinity, as shown by a healthy development of comb and wattles. He should be proud, alert, active, and noisy.

By all means see that the male bird stands on straight strong legs that are set a good distance apart. Never use a bird in the breeding pen of either sex that tends to be knock-kneed. It is an evidence of weak constitution and slow development.

Examine the wing. The primary or main flight feathers should be of good width and nicely bowed. Beware of the straight, long, narrow wing feathers as well as twisted feathers. Both are evidence of slow maturity.

Above all do not forget physical vigor, for without it all else is useless. Possibly no other work offers so good an opportunity for increasing the profits of most poultry flocks as a careful selection for vigor. Too much
importance cannot be given this subject. Vigor means rapid growth of chicks, less disease, more eggs, and as a consequence, more profit. Remember the offspring of scrubs are never better than their ancestors and usually worse. The careful selection of the male bird is the foundation of flock improvement.

**Selection of Breeding Females**

After successfully completing the first year's program in junior poultry club work, the member should have some good pullets from which to select a breeding pen.

It may seem contrary to the theory held by some poultrymen, also to the teachings set forth in some textbooks, to advocate the use of pullets in the breeding pen. It is a very good opportunity to prove or disprove the theory that hatching eggs produced by pullets will not hatch well or produce strong, vigorous chicks.

This experience should prove valuable for the club member. Various experiment stations find that hatching eggs produced by pullets which have been properly fed and cared for, and well matured, and that are in good production, hatch well and produce strong, vigorous chicks that do well.

Where no trapnesting is carried on, no individual record will be available and all that can be done is to select from the flock the best individuals to be used as breeders. In this case also the birds must be selected which show every evidence of being strong and healthy, and which are possessed of good constitutional vigor so far as this can be determined from external indications.

Breed type is next in importance to physical vigor, for without careful selection in regard to type, there will be no chance of improvement on the present flock. The poultryman must have an ideal body type in mind and hew to the line in selecting breeders. After careful individual inspection by handling birds and placing the desirable ones in the breeding pen, they
should be observed carefully as they stand naturally or walk about the pen and any individual not conforming nicely to the ideal type should be removed. Breed type is best observed while the bird stands naturally and can not be determined by handling. There is no consistent reason why good breed quality and heavy production should not be found in the same individual.

Body conformation, conducive to egg laying ability, should be considered next, as greater profit resulting from greater egg production is our ultimate aim.

The body of the heavy producing hen must be large in order to contain large organs or machinery with which a large amount of food is to be transformed into eggs. The back of a good producer will be found to be flat, and broad, carrying the breadth well out to the extremity of the pelvic bones. Do not use a bird in the breeding pen that has a back that tapers rapidly to a point at the tail, the body forming a wedge. Body depth is important for high production. The body from the back to the point of the keel or breast bone should be deep, growing still deeper as the lower end of the keel bone is approached. Avoid an extremely crooked or twisted keel bone in all breeding stock.

Do not hatch from pullets that have not begun to lay before February 1. The more eggs they have laid before that date, the better breeders they will be, as winter egg production is one of the main aims.

Good poultry pays because:
- It produces more eggs and meat.
- It costs no more to feed.
- It is in greater demand.
- It is more satisfactory.

References:

"Poultry Husbandry"—M. A. Jull.
Farmers' Bulletin No. 1524—"Farm Poultry Raising," U. S. D. A.
Farmers' Bulletin No. 1116—"Selection and Care of Breeding Stock," U. S. D. A.
Fig. 22.—Knock-kneed male bird. Lacks vigor and is undesirable as a breeder.

Mites and Lice

Much harm is done to young poultry each year by lice and mites, for birds infested by these parasites cannot make a normal growth. Infestation of these parasites also greatly reduces the natural resistance of the bird to disease. If chicks are hatched in incubators and raised on clean ground and in clean brooder houses, they may escape these pests until placed in the poultry house that has not been properly cleaned.

Poultry lice and mites differ widely in their habits and characteristics. Lice have large biting mouth parts. They do not suck blood but eat the scales of skin and the scaly part at the base of the feathers. Lice stay on the body of the birds at all times. Mites are blood sucking insects and hide in the poultry house during the daytime and come out at night and suck blood from the fowl. Mites rarely stay on the birds during the daytime.

There are two main classes of lice, namely, head lice and body lice.
Head Lice

The head louse causes much trouble in all kinds of young poultry and should be carefully watched. This species of lice rarely goes below the hackle or neck feathers. They go to the eye and nose for moisture. Eggs are laid on the small feathers around the eyes and under the beak. The head of the louse is buried deep in the skin while the body extends straight outward and may easily be seen on the young birds near the comb. In goslings and young turkeys, especially, head lice cause a heavy death loss.

Treatment.

A small quantity of lard or sweet oil will get rid of this louse. Care should be taken to use only a small quantity or the growth of the bird will be retarded or death may occur. Dip the tip of the finger in melted lard, rub well around the comb, back of each ear, and under the jaw. If sweet oil is used apply with a sewing machine or bicycle oil can and apply sparingly.

Body Lice

Look under the wings, on the skin below the vent and between the quills of the wing feathers for body lice. They irritate poultry to a great extent and in the case of young stock cause bowel trouble as well as other diseases.

Treatment.

There are several treatments for body lice, namely:

1. Sodium fluoride in the powder form.
2. Sodium fluoride used as a dip.
3. Blue ointment.
4. Nicotine sulphate or Black Leaf 40.

Saponified sodium fluoride is now on the market. This preparation contains powdered soap. It is more effective and at the same time does not burn the skin of the birds, nor the hands and nostrils of the poultryman. The powder is commonly applied by what is called the pinch method. Place the powder in a bowl, take a liberal pinch between the thumb and four fingers and distribute it among the feathers next to the skin, being careful to deposit a complete ring of the powder all around the vent and all around the neck. The lice go to the vent and eye for moisture, thus the lice will be forced to come in contact with the powder which kills them.

When used as a dip two level tablespoons or one ounce of sodium fluoride is required for each gallon of water. The water should be warmed to a temperature of 100 to 105 degrees and soft water is preferable. Dipping is not satisfactory unless it is done in the forenoon of a very warm day which will allow the birds to dry thoroughly before going to roost. In dipping be sure that the feathers are thoroughly wet. Place the thumb and index finger over the nostrils of the bird and dip the head, holding it under for three or four seconds. Change the water frequently enough to keep it reasonably clean. Stock dip is not suitable for this use.

Blue ointment usually is mixed with vaseline, using equal parts of each. Place a quantity of the mixture about the size of a small garden pea on the skin under the vent. Do not use blue ointment for delousing a hen setting on eggs as it may injure the hatch.

Nicotine sulphate or Black Leaf 40 has recently been found effective in treatment of body lice of poultry. The solution is placed in an ordinary oil can like any of those used to lubricate farm machinery. A narrow but continuous ribbon or stream of the solution is applied to the upper side of the poultry roosts about one-half hour before the birds go to roost. The
heat of the fowl's body causes the fumes of the nicotine sulphate to rise and penetrate the feathers which kills the lice. A second application must be applied within 10 days for the purpose of killing young lice which may have hatched after the first treatment. The fumes do not seem to have much effect on louse eggs which may be on the feathers. For best results with this treatment it is necessary for the poultryman to visit the poultry house after dark and place all birds on the roosts. Birds roosting in the nests, on the feed hoppers or other places in the poultry house not treated, would be carriers of lice and would quickly reinfest the flock. This treatment has a distinct advantage in that all birds do not need to be handled.

Fig. 22.—Fowl with scaly leg.

Mites

To combat mites an application of insecticide must be made in the poultry house or brooder house. First, thoroughly clean the house to be treated. Remove all loose equipment. Paint or spray the dropping boards, roosts, the poultry house walls immediately back of the roosts and the nests with carbolineum or wood preserver. One application of this material will rid the house of mites for one year. Three parts of waste motor oil and one part kerosene can also be used but is not as lasting and must be.
repeated every two to three weeks during the warm months. It is usually neglected and for this reason generally proves unsatisfactory.

Look for mites in the poultry house early in the spring. They may be detected by a greyish scale found at the point where the roosts rest on the cross member, or by holding a lighted match at this point mites will be driven out if present. Mites multiply very rapidly in warm weather and by waging war on them early in the spring the trouble is greatly lessened in the summer. Mites are very hardy and may live in a poultry house for six months to a year without food.

Another species of mite causing trouble in poultry is the scaly leg mite. This mite works under the scales of the feet and shanks of the bird, causing a pus to form which hardens, forcing the scales outward, making the bird's foot look rough and in many cases causing the scales to come off entirely.

Treatment for this mite is very simple. Nail a gallon pail to the poultry house wall at a convenient height to work. Fill the pail with three parts waste motor oil and one part kerosene. Catch the birds and dip their feet and shanks in the solution up to the feathers. Do not get the oil above the line of feather growth as it will cause them to come out. Presence of the scaly leg mite is an indication of a shiftless poultryman.

Depluming mites or scabies are not found as far north as South Dakota.

References:
Circular No. 14—"Poultry Mites and Lice," U.S. D. A.
Bulletin No. 957—"Important Poultry Diseases," U. S. D. A.
Farmers' Bulletin No. 801—"Mites and Lice on Poultry," U. S. D. A.

How to Show Poultry

To those who are exhibiting for the first time there comes many a question in regard to the selection of the birds to be shown and the preparations to be made after they have been chosen. The birds chosen must conform as nearly as possible to the standard for that breed if they are to be among those to win a prize. The exhibitor should think of the prize, not as so much money or as a much desired article, but as the sign of an achievement—a piece of work well done.

Selection

The first selection should be made when the chicks are quite young, for in practically all flocks there are a few outstanding chicks that make a more rapid growth and show more vitality than others. These should have special feed and care until one can tell to a certain extent whether they have the proper form and color. If there is no special difference or if it is not easy to separate them from the others, make the best of the situation by caring for all as though they were to be show birds. When one thinks only of the show bird many times the others are neglected.

At least one month before the show (two months if possible) make the selection when the birds are on range. This gives one the opportunity to see the type, vigor, color, and general appearance. Study a good bird, or a picture of a good bird of the breed you are raising, and try to keep the general characteristics in mind.

Pictures and descriptions of all the standard breeds may be found in the American Standard of Perfection, which is the book used by the poultry judges. This book is published by the American Poultry Association at Fort Wayne, Indiana. The club leader may be able to get the description of the breed you are raising.

When you have selected the birds, catch each one and examine it carefully for such details as comb, wattles, earlobes, surface color, under
color, eye color, shape and color of beak, feet and shanks, stubs (feathers on the shanks and feet where there should be none) crooked breast bone or any other general defects that can be found by handling. No one bird is apt to reach perfection, but the one with the least number of defects is the one to select, providing it has health, vigor and a good general appearance.

Preparation

In looking over the birds in a show or in watching them while the judge is working, it is easy to see that some are much more easily handled than others. This is due to early training.

Training:

Begin to train the birds early so they will allow you to handle them without becoming excited and nervous. This may be easily done by placing each bird in a show coop or crate for a short time each day. Putting them in and taking them out carefully and quietly will tame them quickly. Stroke the wattles, neck, and head, handle the feet and shanks, spread each wing and examine the feathers so the birds will know what to expect.

Sometimes a bird that is easily handled will win over a better bird that is wild and excitable. Do not leave them in the coops too long each day for they are liable to get out of condition, which will make them unfit for the show.

Preparations for Show:

Birds exhibited should be clean as cleanliness is an important factor in show condition. White, part white and buff birds should be washed if their feathers are soiled; or if they are selected early and are confined, and the floor covered with deep clean straw (10 to 12 inches) they may clean their feathers. Only the head, feet, and shanks of dark birds need cleaning unless the feathers are very badly soiled.

If you have never before washed a bird, it would be best to begin on one that is not going to be shown, as the first attempt at washing is not always successful and the appearance of a really good bird may be spoiled. Temperature:

In cool weather the washing should be done in a room having a temperature between 70 and 80 degrees F.
Time:
If possible do the washing the day before shipping. It is best to do it early in the day in order to give the birds plenty of time to dry before night.

Coops:
Have the exhibition coops ready with cloth or paper covering the top, both sides and one end to prevent all drafts. Put a thin layer of clean straw, hay or shavings in the bottom of each coop.

Tubs and Water:
Arrange three or four tubs at the right height for you to work easily, then fill each about two-thirds full of clean, soft water. The first two tubs of water should be quite warm, 100 to 105 degrees F. If hard water is used it should first be cleansed as in laundering clothes.

Soap:
A good white toilet soap or a high grade white laundry soap will be found satisfactory. Dissolve in hot water until a soap jelly is formed. Put enough soap in the first tub to form a floating suds.

Washing:
Wash the face, comb, feet, and shanks by scrubbing gently with a soft brush (a nail brush is very good) using plenty of soap and water. In washing the feet be sure to remove the dirt from under the scales. Next, wet the feathers to the skin before applying enough of the dissolved soap to make a good lather.

Rubbing:
Be sure to rub the lather with the feathers instead of against them or they may be broken. A soft cloth or sponge may be used, but it is generally easier to use the hands.
When you think the feathers are clean, wash out the lather. Give a second washing if necessary.
Remove as much of the soap as possible in the first tub, then rinse in the second. Any soap that may be left in the feathers will give a stringy or matted appearance, and that is the reason for the third and fourth tubs of rinsing water. Be sure to have the water reach the base of the feathers.

Changing the Water:
Not more than five or six birds should be washed in the same water. The first tub may be emptied and refilled to serve as the fourth if the water in the other tubs is not too cool. Not even that in the fourth should be cold or the birds will become chilled.

Drying:
When thoroughly rinsed, pat the feathers with a coarse towel or cloth to take up the surplus moisture. Do not have the room so warm that the feathers dry too quickly or they will curl instead of being soft and fluffy.
When thoroughly dry, rub a small amount of vaseline or sweet oil on the comb, wattles, ear lobes, beak, and shanks. This will bring out the true color and give a fine appearance. CAUTION: Do not get the oil on the feathers or use enough so that the bird will get it on its own feathers, as it will soil them by collecting dirt.

Shanks:
If any dirt remains under the scales of the feet and the shanks, it may be removed with a stiff wire hairpin, the point of a nut pick, or a hardwood stick whittled to a point.

Shipping:
If the birds are worth sending to the show, they should have a good crate with a thin layer of clean straw or hay at the bottom. The crate should so protect the birds that the feathers will not be broken, especially
the tail feathers. A thin cloth should protect them from dirt and dust from above if a slatted top is used. Close the coop securely.

**Feed:**

Fasten a tin can or feed cup securely in one corner. Do not put water in the coop as it will slop out and wet the feathers which will allow them to collect dust. If shipping a long distance, fasten a mangel beet, carrot, or potato in one corner to provide moisture.

**Address:**

Put your Return Address as well as the address where the show is to be held in a prominent place on the coop, then trust that you have made a good selection and enjoy the show, whether you win a prize or not.

**References:**


Farmers’ Bulletin No. 1115—“Selection and Preparation of Fowls for Exhibit,” U. S. D. A.


**Judging Poultry**

Practically every county in the state offers poultry club members chances to exhibit their birds at some time during the year. The county fairs usually have a class for 4-H poultry exhibits. At the state fair held at Huron in September there is a special class for 4-H poultry exhibits. Oftentimes there is an organized poultry association in the county and though there may be no county fair held, the association poultry show usually offers premiums for 4-H club poultry. In connection with fairs and poultry shows there is oftentimes provision made for a 4-H club poultry judging contest. All club members should strive to learn all they possibly can about judging poultry. The knowledge of judging will greatly help the club member to select prize-winning birds from his own flock. To gain a thorough knowledge of judging poultry, it will be necessary to have access to a copy of the “Standard of Perfection.” The book contains numerous illustrations showing the correct body type of the males and females of our domesticated birds.

To obtain the fundamental principles of judging poultry, the club member should familiarize himself with the nomenclature of fowls and the glossary of technical terms. The nomenclature describes and points out in detail the various sections of the body of the bird. The glossary of technical terms may be classed as a dictionary of terms used in description of poultry. It will be necessary to have a working knowledge of the glossary in order to use good judgement in placing the bird and especially in giving reasons for placing. The scale of points for the class of birds which you will expect to judge and the cutting for defects will help a great deal to place a value on certain defects.

The following factors named in their order of importance should be given careful consideration in judging poultry.

1. Physical vigor.
2. Breed type.
3. Standard weight
5. Feather color or color pattern.
Physical vigor, which of course includes health, is placed first. Without physical vigor the bird would not be able to give good egg production or hatchability of strong chicks from the eggs produced. In the case of a male bird, his use in the breeding pen would not be considered. Next in importance is breed type. If the bird does not have the body weight and body type of the breed to which it belongs, it would not be considered for use in the breeding pen and of course would not score very high in exhibition judging. Body conformation is important from the standpoint of egg production or in the case of the male bird, the production of progeny which would have the body conformation, allowing for sufficient capacity for long distance production. The feather color or color pattern would come last. A bird belonging to a particular variety of any breed must have the feather markings common to that variety.

All judging in 4-H club contests will be done by the comparison method. The score card is not used except in the case of a tie or very close competition. In all standard 4-H judging contests the classes will consist of four birds each. In taking birds from the exhibition coops for detailed examination always remove them head first, and when returning them to the coop, the same rule applies. This is to avoid breaking of wing feathers or other injury to a valuable bird by rough handling. Examine the bird in detail for disqualifications such as wrong color of ear lobe, type of comb foreign to the breed, stubs on the feet and shanks, crooked backs, and split wings. Keep in mind also description of the color pattern for the variety, standard weights, etc. In the chapter in the “Standard of Perfection” entitled “Cutting for Defects” values are given for crooked breast, feathers off-color, crooked toes, and such minor defects.
When entering a contest and before handling the birds, walk before the coops and look the birds over comparing them from the standpoint of breed type and body conformation. It will take only a little practice to immediately select the bird which you will place first. The bird which you will select in this manner would be the one that you would choose if you were purchasing one of the four for your breeding pen. Then, by comparison, place the other birds second, third, and fourth. Use caution, do not be misled by a minor point in judging. A common mistake by juniors in judging contests is to place entirely too much weight on the comb and wattles of a male bird. Keep in mind that in the scale of points the entire comb rates only six points. Also, the fact that in cutting for defects too many or too few points on single combs are cut only one-half point each. Wattles are rated only two points for shape in the scale of points.

Keeping in mind the value of each section of the bird as you are judging will help you a great deal in comparing the perfections and defects of one bird as against those of another.

Utility Judging

In poultry judging contests there usually will be one or more utility classes of birds. The utility classes are judged from the standpoint of egg production. The points given in the topic "Culling Hens for Egg Production" are the points to use in judging for utility. The contestant should keep in mind comparative body sizes of the different breeds and also that the spread between the pelvic bones and breast bones will be in proportion. Judge the birds and give reasons for placing on the following points: loss of yellow pigment, general appearance of wear on the feathers, physical vigor and health, body capacity, quality, and present indications of production.

In all standard 4-H poultry judging contests, reasons are asked for on at least two classes. A working knowledge of the glossary of terms and the scale of points in cutting for defects will enable the club member to give reasons which are logical and concise.

References for Club Members' Library:

Home Made Equipment

The handy club member will be able to make the greater part of the equipment necessary to care for his poultry. If one were to buy all of the equipment that is necessary, the overhead would be so great that unless exceptionally good results were obtained no profit would be made.

Chick mash hoppers may be constructed using 3-inch boards for sides and a 4-inch board for the bottom. This type of hopper can be made any length depending on lumber available. The end pieces should be about 8 inches high which will allow for suspending a reel which will keep the chicks out of the mash. It may be necessary to use pieces of 1x4 or 2x4 as a step along side of the hopper when the chicks are quite young. As the chicks grow, larger mash hoppers should be constructed, using 4-inch, 5-inch, and 6-inch lumber for the sides and correspondingly increased dimensions in other lumber required for the bottom, ends, and reel. Fig. 25 shows several types of chick mash hoppers with reels. Mash hoppers with water-tight roofs should be constructed for use on the growing range. Fig. 26 shows a type of mash hopper suitable for this purpose.
**Watering Fountains**

One of the big problems is to keep a supply of fresh clean water at all times. For small chicks a convenient watering fountain may be made using a gallon sirup pail and a pie tin. Punch six or eight holes in the sides of the pail just below the upper edge. Fill the pail with water, turn the pie tin over the top, hold firmly in place and invert. Be sure that the holes are not too far from the top of the pail or they will come above the edge of the pie tin causing it to overflow and waste the water. These fountains are easily cleaned and disinfected. As larger fountains are required, they will have to be purchased.

**Mash Hoppers for the Laying Flock**

There are numerous types and styles of mash hoppers for use in the laying house. The open trough type protected by a reel and which holds sufficient quantity to last for about two days has been found very satis-
factory. The mash being visible in the open hopper encourages greater consumption of mash. Also, the fact that it is fresh, being replenished frequently, encourages greater consumption of mash with correspondingly greater egg production. The hopper should be long enough to afford plenty of feeding space for the flock. A hopper which allows the hens to eat from both sides should be one foot long for every eight birds in the flock. The wall type of mash hopper is generally unsatisfactory, because it allows feeding from one side only and usually clogs up due to bridging of the mash. The mash hopper should be raised about 20 inches from the floor. This prevents the hens scratching litter into the mash and also conserves valuable floor space. Fig 28 shows a very satisfactory indoor mash hopper for the laying house.

Crate for Catching Birds

A catching crate is a great convenience in poultry work, and every up-to-date poultryman should have one. The sketch (Fig 29) is self-explanatory. A bottom is not required in the crate, unless it is to be used in moving birds. The birds are removed through the opening in the center of
CATCHING CRATE

Heavy canvas with full length opening at center.

18" close mesh wire.

Fig. 29.—A handy catching crate.

the canvas top. The crate is placed outside the poultry house, before the hen runway; or it may be used at an ordinary doorway by suspending a canvas or blanket from the top of the door frame to the top of the crate. If the crate is constructed larger than 2½x4 feet it does not prove as satisfactory, as the distance required to reach for the birds becomes too great. Four old inner tubes slit open and tacked on overlapping each other about 3 inches will serve as good as a canvas top.

Material required for construction of catching crate:
4 pieces 1x4, 4 feet long.
4 pieces 1x4, 2½ feet long.
8 pieces 1x4, 20 inches long.
1 piece 1x12, 3 feet long.
1 piece heavy canvas, 36 inches by 4 feet.
11 lineal feet 18 inch close mesh chicken wire.
1 lb 6D box nails.
½ lb chicken fence staples.
1 box double point tacks.

A catching hook, as shown in Fig. 30 is a handy article to have in the poultry house for the purpose of catching one or two individual birds. This hook is made by fastening a piece of heavy wire to the end of a broom handle or stout stick about that length. It is not advisable to use this type of catcher when the entire flock is to be handled.

Fig. 30 shows another effective chicken catcher. Take a hoop 1 foot in diameter, if for young chicks, or larger for grown fowls. Fasten it securely to a handle about 4 feet in length. Fasten a bag of thin, strong cloth, or weave a mesh bag to the hoop.
Fig. 30.—Catching net and hook.

Fig. 31.—Fattening crate. May also be used as broody coop. —Courtesy Missouri Extension Service.
Broody Coops

A broody coop is a necessary piece of equipment to enable the poultryman to break up broody hens efficiently and get them back into egg production. If broody hens are allowed to sit in the nest over night, it is much more difficult to break them up. By placing them in the broody coop as soon as the broodiness is detected and feeding plenty of good laying mash and giving skim milk or water to drink, they will soon come back into egg production. The floor of the broody coop must be constructed with slats spaced about an inch apart or large mesh hardware cloth. With this type of floor and the coop being raised above the floor or ground, it prevents the broody hen from conserving heat when she sits and this fact discourages broodiness. The broody coop should be divided, otherwise valuable hens may be injured or killed by fighting when two or more are placed in a single coop. Fig. 31 will suggest to the club member how to construct a broody coop for use in the poultry house or outdoors.

![Fig. 31](image)

Equipment for Cleaning the Dropping Boards

A scraper as shown in Fig. 32 will be found a time saving piece of equipment in cleaning the dropping boards. A box constructed about 2 feet in width, 12 inches to 16 inches in depth and 3 feet to 4 feet long mounted on runners made of 2x2 will be found convenient to remove the droppings from the poultry house. By attaching heavy wire or rope to the box it may be drawn along the floor at the edge of the dropping board and the droppings scraped into it.

A Screen Platform

A platform constructed of 1x4 or 2x4 and covered with hardware cloth, two meshes to the inch, is a practical piece of equipment on which to place water fountains used on the growing range out of doors. The frame on which the wire is tacked should be constructed so that chicks cannot get under it. As there is always some water spilled around a drinking fountain and coccidia thrive in moist soil, this an added prevention of an outbreak of the disease. The size of the screen platform will depend on the type of water fountain used. A practical size is 2 feet wide and 3 feet long.

All junior poultry club members should have shipping coops for their birds that they are planning to enter in the fall and winter shows. These coops should be made of half-inch lumber as this will be strong enough and
Fig. 33.—Practical nest arrangement. Easily cleaned.

lighter than if made of inch lumber. A shipping coop should be boarded up solid to within 6 or 8 inches from the top on the two sides. The remainder can consists of slats nailed $\frac{3}{4}$ to 1 inch apart. The two ends should be boarded all the way to the top. The top should consist of slats which will give added ventilation. In extremely cold weather, the slatted part of the crate should be covered with muslin to give added protection to the bird. Dimensions for shipping crates are as follows:
Fig. 34.—Handy mash scoop for filling small feeders made from gallon oil can.

Single bird: 12 inches wide 18 inches long 24 inches high.
Pair of birds: 12 inches wide 24 inches long 24 inches high.
Trio of birds: 18 inches wide 24 inches long 24 inches high.
Exhibition pen: 24 inches wide 24 inches long 24 inches high.

Nests

The far-sighted poultryman will save himself a lot of labor by constructing nests which are easily cleaned. The battery type of nests which are shown in Fig. 33 are attached to the wall by a pair of strap hinges. The wall of the poultry house serves as the back of the nests. To clean, the nests are pulled away from the wall and by shaking slightly the nesting material, and all dirt drops out at the rear. The club member who is handy with a saw and hammer by following the diagram, can construct practical nests.

Fig. 35.—Satisfactory water stand.
—Courtesy Missouri Extension Service.
Fig. 36.—A convenient way of supplying water to birds on range.
—Courtesy Missouri Extension Service.

Feed Scoops

A number of small feed scoops will be found to be very handy during the season when young chicks are being fed. It is difficult to fill the small mash hoppers with a bucket or half-bushel measure without spilling feed. By cutting a 1-gallon oil can using a pair of tin shears as indicated by the dotted line in Fig. 34 and turning back the rough edge, a convenient feed scoop can be made.

References for Club Members' Library:
Farmers' Bulletin No. 682—"A Simple Trap Nest for Poultry," U. S. D. A.
Circular No. 151—"Poultry Equipment Made at Home," University of Missouri, College of Agriculture, Columbia, Missouri.

Caponizing

A capon is an unsexed or castrated male chicken.

Advantages of Caponizing

Early hatched chicks usually make a good return as broilers, but later hatches come at a time when the market is crowded and the price down. These later chicks are the ones which can be carried over to advantage as capons and placed on a winter market with profit.

Capon grow to a larger size than cockerels, as a general rule. Besides the extra size and weight which is attained, the birds sell at a premium due to decided improvement in quality of meat. The advantages secured in raising capons are due largely to the more docile habits which they acquire. This permits their being raised on the same range as pullets without interfering with the growth of the pullet flock.

Capon can be induced to hover chicks, but commercially this is not practiced to any extent. It has been frequently done, however, on a small scale.
BREEDS FOR CAPONS

Good capons will result only from the castrating of well bred cockerels. Inferior stock, small and low vitality, will never make choice capons. The caponizing of the light breeds, such as Leghorns or Anconas will meet with little success, as they never attain sufficient size to make choice capons for market. For home consumption cockerels of the light breeds may be caaponized. The American breeds make excellent capons, and the English and Asiatics excel as producers of flesh. It is doubtful, though if the average farmer should breed with the sole purpose of producing meat. It will usually prove more profitable to breed a type suited to egg production and to regard the capons as a side issue. However, where one intends to breed especially for prime capons, egg production can be sacrificed to get heavier muscle development and larger birds.

Cross breeding for capon production has met with excellent results. Cornish males are very commonly used, owing to the remarkable development of breast and thigh. These, bred to females of the Brahmas, Orpingtons, or American breeds, produce excellent cockerels for caaponizing. Care must be taken, however, to breed the most desirable individuals of each breed, and the cross bred pullets should never be used as breeders. They should be sold as broilers. This cross breeding pertains to specialized capon production only.

INSTRUMENTS

The selection of good, reliable instruments is the first requirement for success in the caaponizing operation. The essentials are a good knife, dilaters, a tearing hook, and removers. It must be remembered that these instruments are finely made and should receive good care to insure the best results from their use.

1. The knife should be one of good material which will retain a keen cutting edge. The shape preferred is one with a sharp tapering point and the knife should have a handle sufficiently large to permit a firm hold of the instrument.

2. The dilater is used to open the incision. Care should be taken to secure one which is not clumsy and too severe. One which can be opened to varying widths and lock there is preferable.

3. The tearing hook is not so important as its use is limited to the tearing of the membranous tissues.

4. The remover should be so designed that too large an incision is not required. It should be well made and of a type that will quickly envelop the testicle and remove it entirely, leaving no bruised or cut tissue adhering. This is the most important instrument and care should be taken in the selection of one which is reliable.

WHEN TO OPERATE

The important factor in securing best results is to have the birds at the right stage of development at the time of operation. This is not a matter of age or weight, but is rather a stage of sexual development. This varies in the heavy breeds between the ages of 6 and 12 weeks. In the light breeds, the operation must be performed while the cockerels are much younger. The indication for this time determination is the fact that the testicle starts to grow and develop at the same time the comb and wattles start to show development. The proper stage is just as the chicks start to show sexual development and as the comb commences to grow. At this time, the testicle is at its best size and stage for removal. It should be
Fig. 37.—Showing method of holding cockerel on caponizing table.

about the size of a large, plump grain of wheat, or a little larger. There is a period of from ten days to three weeks in which the operation can be made successfully. After that time the birds are harder to "work" and more slips and deaths result.

Preparation for Operation

Birds should be starved for at least 24 hours before the operation. This is to reduce the bulk of the intestines and leave more room for working and less obstruction to the vision. Water need not be withheld longer than 5 to 6 hours before operating.

A board about 2½ feet long and 10 inches wide placed upon a barrel makes a handy operating table. Select some sheltered place outdoors, but where the sun shines brightly. The sunlight is needed to furnish light for the operation. Procure a shallow pan in which the instruments can be placed. Use only clean, tepid water. No smelly disinfectant is needed.

Method of Holding the Bird

The bird is held securely in place on the board by rubber straps cut from an old inner tube. The straps should be 1 inch wide and about 18 inches long. The diagram will give a general idea of the shape of the strap. It is cut so that a slip noose can be made in one end to go round the wings or legs, the other end having a series of holes punched to fasten on a small nail driven in either end of the operating board.
In cutting the rubber straps see that the double or vulcanized strip in the tube forms the head or upper edge of the slip noose. This reinforcement will prevent tearing.

This method is simple, quick, and humane as the rubber is elastic, and being broader, does not cut like a string. No clumsy weights are needed.

Two boards and two sets of straps will increase the operating speed. While one bird is being operated on, the helper can be placing another on the second board.

The board being loose on top of the barrel it can be turned or tilted to get the best light on the work.

There is a twofold purpose in using this method of securing the bird. The cockerel is held to prevent struggling, and the stretching removes the muscles of the thighs from the seat of the operation.

The Operation

After the bird is secured a few feathers are plucked off immediately in front of the hip joint, leaving a space about an inch or an inch and a half square.

By manipulation, the location of the last two ribs can be discovered. The incision is made between these two, starting at a point slightly lower than the point of the hip joint and extending down for about an inch.

On determining the location of the ribs, draw the skin slightly to the rear, press the nail of the forefinger between the ribs, and insert the blade along side the nail. Press down hard and draw toward you, forcing the blade clear through in the one attempt. This saves time and causes less bleeding. Insert the dilater, opening the incision up to a convenient size.

The omentum, a thin membrane, still hides the organs. This is torn away with the tearing hook. When this step is completed, the organs of the abdominal section lie clearly in view. If the bird has been well starved, the intestines will occupy but a small space and will not hide the other organs.

The testicles, small organs, yellow in color, lie along the vertabrae or backbone, at a point slightly forward of where the incision is made. The spermatic artery lies along back of the testicles. Care must be taken to avoid severing this, as it will cause immediate death.

Gently press the intestines down with the probe, if necessary, until the testicle is brought to view. Insert the remover, closed, and carefully manipulate the organ into the opening of the remover, being careful not to pinch the artery in so doing. Twist the remover around once completely before attempting to remove the testicle. This severs the tissue connecting it to the large artery. In removing, twist a couple more times and when the testicle is drawn about an inch above the incision, cut the cord.

Remove the spreaders, turn the bird over, and repeat the operation. It is possible to remove both organs from the one side, but in practice there is less danger in performing the operation from both sides, the sec-
ond incision causing less pain and often requiring less time than attempt­
ing to remove both from one side.

Birds not surviving the operation usually die on the table. These should be bled and picked immediately as they will be good for table use. It is good practice to begin on a dead bird. The location of the organs can be learned more easily in this way. Mark all birds caponized by leg band or toe punch to prevent slips from being confused with breeding males later on, and to prevent young capons being killed for broilers.

Care and Feeding of Capons

Care After Operation:
The young capons should not be housed in large numbers for the first week or ten days. Put them in coops of not more than 10 or 12 birds to­gether to prevent crowding. Care must be exercised in starting to feed, as the birds have been on a starvation diet and are very hungry. They should have a light feed of moist mash, consisting of bran and ground oats moistened with sour milk or buttermilk. This feed can be given im­mediately following the operation. This system of feeding should be adopt­ed for a couple days, gradually bringing the birds back to their regular feed. Provide plenty of water immediately following the operation.

Wind Puffs:
A condition known as wind puffs is likely to develop a few days after the operation. This is nothing serious and results from air accumulating under the skin. If the puff does not disappear in a week to 10 days it can be remedied by puncturing the skin with a pair of shears, or a clean small knife blade after the incision between the ribs heals.

Caponized birds require an abundant range in order to grow and develop a large frame capable of carrying a heavy fleshing. If possible, put them out in a colony house on free range and feed the same as the growing flock.

The capon season is from Christmas to Easter. Previous to killing, confine the birds to crates and finish with a soft feed. This softens the fleshing and adds fat. Capons make excellent roasters, having a finer flavor and being more tender than cockerels. A good crate fattening ration can be made up of equal parts or 40-60 proportion of low grade flour and finely ground yellow corn. This is mixed to the consistency of a pancake batter by adding milk and fed twice a day. Small quantities must be fed at first in order to accustom the birds to the ration. It can be gradually increased until at the end of the fattening period, which ranges from 14 to 21 days, the birds are being fed all they will consume at each feeding.

Dressing:
Capons should be dry picked or semi-scalded and picked clean.

References for Club Members' Library:
Farmers' Bulletin No. 849—"Caponizing," U. S. D. A.

Marketing

By A. M. Eberle

The poultry and egg income for South Dakota in 1929 was $20,757,000. While this does not seem so large when compared to the United States poultry and egg income of $782,055,000 for that year, it is important to this state as it is a source of revenue the year around and many farmers use the income of this enterprise to take care of their current needs. Mar­keting, therefore, is very important, because any improvement that can be made so that the price of either poultry or eggs would be raised to the producer would mean an increase of many additional dollars to one of our important sources of income.
Marketing Eggs

According to the Bureau of Crops and Market estimates, the big commercial poultry farms in the east furnish, each year, more and more of the fresh eggs that enter the channels of trade. These concerns know markets, consumer demand and how to sell quality eggs on grade. Western producers will need to follow these same practices if they expect to compete with them successfully. The easiest way to increase an income without increasing expenses is to add to the profits by raising products of high quality.

Studies of egg marketing have revealed the presence of many wastes. Many of these wastes are due to methods of handling eggs on the farm and while on the way to the consumer. The producer suffers in lower prices for his products because of his handling and marketing methods.

**Grades:**

Most large wholesale markets buy eggs on grade. The New York market classifies them as; nearby white extras, pacific coast extras, and the western mixed colors, extras and firsts. The extras must all be of large and uniform size, perfectly clean, with chalk-white shells not tinted in the least, and only a few days old. The firsts must be clean and of uniform color, but need not run so large. By nearby whites is meant eggs that are produced close to New York. Pacific coast extras refers to eggs produced on the Pacific coast. They have established a reputation for quality eggs through their production and marketing practices. Western mixed colors are the eggs coming from the middle west.

The classification on other markets includes; extra hennery whites, extra hennery brown, first hennery whites, first hennery brown, first hennery mixed, seconds, thirds, dirties.

No dirty eggs should be shipped to market, for they lower the selling price of the whole shipment. Careful grading of eggs according to size...
always pays, those abnormally large or small should be consumed at home. White and brown eggs should not be shipped in the same case. A higher price is always paid for a uniform color.

The Bureau of Agricultural Economics of the United States Department of Agriculture has outlined specifications of egg standards and grades. These standards have not been entirely accepted by the trade as yet, but will likely be the recognized standards as time goes on. A placard showing these grades and specifications can be secured by writing the Department at Washington, D. C. Each club secretary should secure a copy for every member of the club.

Methods of Marketing

In many sections of South Dakota eggs are bought on grade, but the common practice is for producers to take them to their local merchants and turn them in for groceries. This method does not give the producer of quality eggs all that they are worth and gives the inefficient producer more than his eggs are worth. In other words it encourages the inefficient producer to remain inefficient and in the long run hurts the whole industry in the state. The merchant dispose of the eggs in “case run” lots. That means he sells them with no guarantee as to size or quality. The purchaser has to buy them low enough so that he can sort and grade and throw out all the cracked and dirty ones and still make a profit.

Other methods of selling are to sell direct to the consumer, to ship to a commission firm, or to sell through a cooperative egg and poultry association.

Selling direct to the consumer insures a larger revenue, as all expense of commission and extra handling is eliminated. This market, however, is usually limited and requires a supply of quality eggs at all times in order to maintain it. A very satisfactory way is to supply hotels, restaurants and clubs, as they usually contract for the entire output and are willing to pay a good price.
Shipping direct to a commission merchant at New York or Chicago, has been practiced for some time by members of the Poultry Department of State College and they found that graded eggs netted them a greater return over local prices in every month but March, April and May. This method of marketing is discussed in bulletin number 243, “Marketing of Poultry Products” issued by South Dakota State College and copies can be secured by writing for them.

Ten rules for improving market quality of eggs:
1. Keep healthy vigorous stock and give it good care.
2. Provide plenty of clean nests.
3. Produce infertile eggs.
4. Gather eggs at least twice daily.
5. Keep eggs in cool place.
6. Use unmarketable eggs at home.
7. Market eggs twice a week or oftener in summer if possible.
8. Grade eggs for uniformity of size, shape and color.
10. Build up a reputation for quality product.

Marketing Poultry

Market Classes:
The following market classes are in common use:
- Broilers.—Immature chickens, usually young males, weighing from \(\frac{3}{4}\) to 2\(\frac{1}{2}\) pounds.
- Fryers.—Immature chickens, which as a rule, weigh from 2\(\frac{1}{2}\) to 3\(\frac{1}{2}\) pounds.
- Stags.—Young males which have matured to some extent and have begun to get hard in flesh.
- Springs or springers.—Term commonly used to designate all young stock hatched during the preceding spring and early summer.
- Capons.—Unsexed male chickens. Usually marketed at an age of 7 to 10 months, weighing from 5 to 10 pounds. The heavier capons bring a higher price than the lighter ones. Slips are birds which have been caponized but not successfully.
- Fowls.—Mature females and are usually divided into several classes according to weight.

Marketing:
Most poultry is sold alive to local dealers or shipped in crates to commission houses. A very small percentage is killed and dressed by producers. This is because the average farmer is not an expert in dressing poultry and does not have proper facilities. The practice of dressing turkeys, however, is common. They seem to lend themselves to this practice better than chickens and the increase in price of dressed over live turkeys has been an incentive to learn how to dress them.

Direct to local dealer:
The greater percentage of poultry is sold direct to the local dealer. The farmer finds this an easy method to dispose of his product. He can take a crate on the side of his car when going to town and thus save a special trip. The local dealer will accept any number. He in return usually has connections with a larger produce house. These big houses send their trucks daily or twice a week over the territory and gather the supplies from their dealers.

Shipments direct:
Some producers consign shipments of live poultry direct to a commission house. This practice was quite popular a few years ago. The ex-
tra express charge, and the crates needed have made this method expen­sive, as compared to selling direct to a local dealer, and so very little poul­try is marketed this way at the present time.

**General Suggestions:**

Where poultry is shipped alive by express standard coops should be used. They should be light as possible and still have strength, to save shipping charges. A coop commonly used for express shipments is 3 feet long by 2 feet wide and 12 inches high. The height depends upon the kind of fowl to be shipped. A coop of these dimensions will accomodate from 14 to 16 small fowl. A higher coop should be used for geese and turkeys.

In cooping poultry for shipment, the birds should be graded so that those of uniform color, size and grade will be togeth­er. Culls, cripples, and sick birds should never be mixed with the stock of better quality.

In most markets, certain days of the week are more favorable for the sale of poultry than others. The producer should learn which days of the week are most favorable, and arrange his shipments so they will arrive on those days. Never have live poultry arrive late Saturday afternoon, for the birds may be held over until Monday before being weighed.

The amount of feed put into the coop before shipment should depend upon the distance to market. Poultry should not arrive on the market with their crops full. They are usually subject to a deduction in weight or sell for a lower price when in this condition.

It is not always advantageous to make shipments either of live or dressed poultry to a large distant market in preference to selling locally. A study of the different markets should be made by comparing prices for corresponding days, taking into consideration the added shipping charge and any other extra expense.

**References:**

- Statistics and Charts of the Poultry and Egg Industry— Bureau of Agricultural Eco­nomics, U. S. D. A.
- Farmers' Bulletin No. 1377—“Marketing Poultry,” U. S. D. A.
- South Dakota Bulletin No. 243—“Marketing of Poultry Products.”
- Beginnings of Cooperative Poultry and Egg Marketing—Bureau of Agricultural Eco­nomics, U. S. D. A.
- Leaflet No. 64—“Construction and Packing of an Egg Case,” U. S. D. A.

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**Killing and Dressing Poultry for Market**

It is important that poultry to be dressed for market have empty crops when killed. This not only improves the appearance but the keeping qual­ity also. No solid food should be fed for 24 hours before slaughtering but plenty of water should be given during this period to help empty the in­testines. Poultry that has been dry picked brings a premium on most markets, the reason for this being that dry picked poultry has a nicer ap­pearance and keeps better in cold storage. When scalding is not properly done, the outer skin is partially cooked which causes it to loosen. Birds that have been scalded do not keep as well in cold storage.

The dry picking method is used by most produce houses and the club member should learn how to do it. The bird is hung head down by looping a cord around both legs or by using a wire shackle which holds the legs apart. The feet of the bird should be about on a level with the eye of the operator. The head is grasped in the left hand, the mouth opened and the jugular vein in the throat just below the base of the skull is cut with one slash of a sharp, narrow, stiff bladed knife. By exercising care in making the cut, free bleeding is induced and a well bled carcass is obtained. Poorly bled poultry shows dark blood-filled veins in the neck and on the breast.
and wings or reddened areas of the skin which not only gives a less pleasing appearance but causes it to spoil more quickly. The illustration in Fig. 41 shows the correct location for making the cut across the jugular veins. This cut is made from the left to the right side of the neck of the bird when the bird is hung with the back away from the operator. The next step consists of hanging a weighted cup called a blood cup in the angle of the lower part of the beak of the bird by means of a hook. This cup catches the blood and its weight serves to hold the bird more quietly in position and to prevent the blood from being scattered around. The cup should weigh about two pounds for chickens and a heavier cup used for dressing turkeys. Sometimes a weight only is used when a cup is not available.

As soon as the cut has been made for bleeding, the point of the knife is immediately plunged through the median groove in the roof of the mouth and into the brain. The portion of the brain marked with an “x” in the diagram Fig. 42 shows the correct point that the knife should enter the brain. If the portion of the brain marked No. 2 in the diagram is pierced, the feathers will not be loosened. A little practice will serve in locating the correct spot. When the brain is pierced, the bird gives a

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**Fig. 41.**—This illustration shows the head of the bird with lower jaw removed, also the proper place to sever the jugular vein for good bleeding.

**Fig. 42.**—There are 3 parts to the brain. The third or last cavity, marked X is the part that contains the nerve center that controls the muscles. When this nerve center is destroyed, death occurs instantly and the feathers are loosened. Too many make the mistake of sticking the knife too high in the head and not back and low enough to pierce the proper section.
“squawk” or “gulp” and a “quiver” which means that the operation has been successful. The bird should be picked quickly as the feathers are harder to remove when the muscles begin to set. The large tail feathers are removed first by a twisting jerk. Then the large wing feathers. The feathers from the breast, back and sides are removed next. These are followed by the smaller feathers from the thighs, legs, and neck. The small feathers on the wing are picked last.

In dry picking, care must be taken to pull with the slant of the feathers rather than against them which will prevent skin tears. Too much attention should not be given to the pin feathers the first time over as it will be necessary to go over the entire body and remove the pin feathers later. This rapid removal of the bulk of the feathers is commonly known as “roughing.” Dry picking is more difficult than scald picking and requires considerable skill and practice to secure speed and the best results. However, where a considerable number of birds are to be dressed, it will pay to use this method.

Thorough bleeding is necessary when the scald method is used also. The bird should be stunned by a blow on the back of the head with a short club before scalding. The bird is allowed to hang until it is thoroughly bled out. It is then held by the head and feet and plunged into a tank of water which is heated to about 190 degrees F. The bird is soused around to permit the water to penetrate the feathers to the skin but should be scalded only long enough to make the feathers pull easily. Further scalding partially cooks the skin. It is difficult to secure exactly the right amount of scalding. When the wings of the bird begin to move out or drop away from the bird, it is an indication that they have been sufficiently scalded. The bird is then removed from the water, suspended by the legs, or held on a bench and the feathers are removed as rapidly as possible. It is important that the carcasses be thoroughly dried before they are packed or damage from mould is very likely to occur.

A modified method of scald picking known as the “slack-scald” or “semi-scald” method is being used by some produce houses. In this method...
the birds are stuck and bled, the large tail and wing feathers removed, and they are then plunged in water which is maintained at a temperature of 130 degrees F. They are kept in this water from ¼ of a minute to 1 minute depending upon the class of poultry. The feathers are then picked off instead of being rubbed off as is done with scalded poultry. This method of picking produces a nice appearing carcass but requires too much equipment for the average producer.

All birds must be thoroughly cooled but not frozen before packing. They should not be cooled in water. They should be hung on a rack so that one carcass does not touch another and at a temperature of 34 degrees to 35 degrees F until the animal heat is entirely removed. If dressed birds are subjected to a freezing temperature before the animal heat is removed, the outer surface will freeze and not allow the animal heat to escape which will cause spoiling. Birds treated in this manner arrive on the market showing green areas and oftentimes in a slimy condition. Birds in this condition are known as "green-struck," are inedible, and must be condemned.

The majority of markets want birds clean picked. However, some prefer to have the feathers left on the last joint of the wing, popularly called the "fan-trim." Unless dressing directions are received from the packers or commission firm, it is best to pick all birds clean. Birds packed for shipment need not be singed. Where birds are dressed for a local market and are to be singed, do not use newspaper for this purpose as it dis­colors the skin. The flame from a kerosene or gasoline stove is most sat­isfactory.

Finishing

Remove the blood clot from the throat and mouth with the finger or a large stiff feather. If the clot is not removed, it will spoil the appearance of other carcasses in the same pack and may decompose and injure the flavor of the flesh. Small paper bags secured with string or rubber bands make a quick, practical head wrap for birds that are to be shipped. Do not wrap the head until cool and the blood has stopped dripping.

Packing

Use a barrel or box to pack birds for shipment. First, line the container with clean wrapping paper. The feet should be brushed or cleaned with a damp cloth. Pack closely to keep the birds from shifting about or they will become bruised. Do not attempt to dress poultry for shipment in warm weather unless you can pack in ice. The producer should ship only in cold weather unless the distance is short.

Important points to remember in dressing and marketing poultry:
1. Poultry should be fattened or at least in good condition.
2. Starve fully 24 hours before killing.
3. Give poultry plenty of fresh water before killing.
4. Bleed thoroughly.
5. Pick clean.
6. Remove blood clot.
7. Wrap head.
8. Pack tightly.
9. Ship only in cool weather unless ice is used.
10. Work for a high standard grade.
11. Raise standard bred poultry.
12. Study your shipping facilities and determine when shipments made on different trains or routes will arrive on the market. Never have shipments arrive on the market Saturday afternoon. Find out which
days are best on your market and plan your shipments accordingly.

References for Club Members' Library:
"Poultry Husbandry"—M. A. Jull.
"Marketing Poultry Products"—Benjamin.
Miscellaneous Circular 42—"How to Pick Chickens," U. S. D. A.

Fig. 44.—Gravity light switch.

**Artificial Lights**

The use of artificial lights on the laying flock is well beyond the experimental stage. They are being used extensively on large commercial egg farms.

Artificial illumination is among the outstanding discoveries in poultry equipment in recent years. The use of lights may not increase the yearly production but will materially increase the fall and winter production which adds greatly to the profit.

There are numerous systems of lighting used. The most popular system is the use of lights from 4 a.m. until daylight. This practice does not require a dimming system. The dim lights are used to enable the birds to get back on the roost and require more elaborate equipment and more attention by the poultryman. Lanterns, gas lanterns, and electric lights are used for this work. The electric lights are by far the most preferable as the fire hazard is greatly lessened and the electric lights require much less attention.

The lighting unit should consist of a 25 watt Mazda lamp with a cone shaped reflector 16 inches in diameter and 4 inches high with aluminum bronze reflecting surface. The lights should be installed at a height of 6 feet from the floor and midway between the south wall and the edge of the dropping boards.

The diagram in Fig 44 will suggest to the club members how an alarm clock may be used to turn on the lights.

The use of lights can be abused. The day must not be lengthened to more than 13 or 14 hours. The feeding program must also correspond to the lengthened day as the purpose of lights is to aid the hen to consume more feed.

One extra egg per day will pay for the electricity used for a flock of 100 hens.

References for Club Members' Library: