TURKEYS IN MONTANA

BY

MISS H.E. CUSHMAN

AND

DR. HOWARD WELCH

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Montana State College of Agriculture and Mechanic Arts
Extension Service
J. C. Taylor, Director
Cooperative Extension Work in Agriculture and Home Economics
Montana State College of Agriculture and Mechanic Arts and United States
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In recent years rather decided changes have taken place in turkey production in this country. In 1920 the mountain and western states were just beginning to get into the turkey business. Since then they have become turkey producing areas of national importance.

When the census of 1920 was taken, the turkey industry was at its lowest ebb. Poultry scientists had not yet learned how to combat blackhead successfully and turkey growers were being forced out with little hope of returning. This occurred particularly in midwestern and eastern states. Many of these areas are now coming back strong.

Thus the volume of turkeys marketed annually is on the increase and competition is constantly growing keener. Therefore, those who intend to produce turkeys now, must not only like turkeys and know how to grow them, but must also know how to prepare and market the finished product at the lowest possible cost.

It is best for the beginner to start on a small scale and grow into the business. Surveys in this state show that most successful turkey raisers started with one tom and eight to ten hens. The grower must begin at the very foundation of the industry, namely, with the selection of good breeding stock. From the time the stock is selected until the last turkey of the season is killed,
packed, and on the way to market, he must be everlastingly on the job, letting no minor detail that may contribute to ultimate success escape his attention.

Selecting Breeding Stock

Variety—The first step in selecting breeding stock is to choose the variety to be raised. The grower has six standard varieties from which to choose: the Bronze, Narragansett, White Holland, Black, Slate and Bourbon Red. While there are instances where a grower is raising a special variety for special market, in general, however, he is raising them with the idea of marketing collectively with his neighbors, and in this case it is wise to consider the predominating variety of the neighborhood. Uniform shipments are desired. Mixed lots often bring lower prices. A Bourbon Red bird in a Bronze turkey shipment is likely to be given a number two grade, because it is so different in appearance. Bronze turkeys are being raised quite generally in Montana. Among the reasons given by Bronze enthusiasts for their choice, are that the Bronze is heavier and markets to which Montana growers sell have expressed preference for the breed. The following table from the American Standard of Perfection shows comparative weights of different breeds.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Old Tom</th>
<th>Yearling Tom</th>
<th>Young Tom</th>
<th>Hen</th>
<th>Pullet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bronze</td>
<td>36</td>
<td>33</td>
<td>25</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>Narragansett</td>
<td>30</td>
<td>25</td>
<td>20</td>
<td>18</td>
<td>14</td>
</tr>
<tr>
<td>Bourbon Red</td>
<td>30</td>
<td>25</td>
<td>20</td>
<td>18</td>
<td>14</td>
</tr>
<tr>
<td>White Holland</td>
<td>28</td>
<td>24</td>
<td>20</td>
<td>18</td>
<td>14</td>
</tr>
<tr>
<td>Black</td>
<td>27</td>
<td>22</td>
<td>18</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td>Slate</td>
<td>27</td>
<td>22</td>
<td>18</td>
<td>18</td>
<td>12</td>
</tr>
</tbody>
</table>

In the classification used in the preceding table, Young Tom is one year to two years; Old Tom is two years or older; pullet is less than one year, and hen is one year or older.

Type—In selecting the type of bird to be used as foundation stock it usually is cheaper to start with standard bred stock, rather than mongrels, because standard birds not only conform
best to market requirements but also are the only kind that can be sold profitably as breeding stock. Growers are referred to the “American Standard of Perfection” published by the American Poultry Association, which carries, in detail, a description of each variety.

In considering the matter of type it must be remembered that turkeys are raised for meat. The birds that best meet the requirements of the American dining table are those that have length and breadth of back, deep bodies, full breasts and straight keels.

**Early Maturity**—In order to have turkeys ready for the holiday demand, they must be of an early maturing strain. Avoid rangy, long legged stock. Exceptionally heavy birds develop slowly and for this reason, the standard weight bird is preferred.

**Vigor**—Underlying everything else are vigor and vitality which together spell health. Without health the best bred stock is worthless. Therefore, in selecting stock careful attention must be given to the external manifestations of health: sturdy shanks, bright, prominent eyes, glossy feathers having a thrifty appearance, and an alert carriage.

**Age**—The question of breeding stock is debatable. Some prefer pullets, saying that they lay better. Those holding this opinion usually keep yearling toms of proven worth. Others prefer hens because even though they lay fewer eggs, the resulting poults are larger and hardier. In this case the hens are mated to young toms, because of the opinion that young toms are more vigorous and are not so apt to injure females.

**Number of Females to One Male**—The younger and more vigorous the male, the more females he can manage. As a rule a young tom on free range takes 10 to 12 hens, while an old bird will rarely serve more than eight females.

**Law of Inheritance**—There is still another step in establishing a turkey flock, that is the adoption of a definite “breed-improvement-program.” This involves careful study of the individuality of the chosen birds and at least a working knowledge of the laws of heredity which state that “Like begets like.” By capitalizing this law the grower is able to weed out undesirable characteristics and develop desirable ones. For example, a grower
may have strong healthy hens with good color, but a little too long in the legs. In order to reduce the tendency toward long leggedness, he mates them to a tom that really is a bit too short in the legs. In this way he gets offspring that show a blending of both characteristics and are normal in leg length.

Where Many Fail—Even with good foundation stock many growers fail because of a pernicious habit of selling the early maturing turkeys on the holiday market, keeping the left-overs for the breeding pen. It is a custom that should be outlawed. Before any birds are marketed the breeders should be chosen, banded and held for the coming breeding season. In like manner, if breeding stock is bought, the purchase should be made before the seller has removed the most desirable birds from his flock.

Care and Management

After choosing his foundation stock the grower must know how to handle his birds to get the most out of them.

Fig. 1. A roosting shelter with a north and west wall.

Shelter—While houses generally are unnecessary for adult stock, nevertheless, in Montana it is wise to have some protection for severe weather. A roosting shelter with only a north and west wall and a tight roof is all that is necessary. However, it must be large enough to be unaffected by the body heat of the
birds when roosting. If it is not, the birds are likely to develop roup. Further, the shed must be well enough ventilated to be always dry. Lastly, the shelter must be removed from the chicken quarters in order to avoid disease.

Fig. 2. An open, straw-roofed shed with perches, makes a good shelter.

Winter Feeding—Although turkeys do not need a laying ration prior to breeding season, some feeding attention should be given if early hatching eggs are expected. Consequently, many growers supplement the light morning and evening grain feedings with a dry mash of low-protein content in order that the breeders later will make better use of their laying mash.

The main precaution is to keep birds well fleshed but not over fat, as surplus fat causes infertile eggs.

Feeding During the Breeding Season—As the breeding season approaches the birds should be gradually put on a laying mash which is fed, not only to increase egg production, but also to supply the hen during the early season with the necessary materials for manufacturing hatchable eggs that develop into livable poults.

While there are many good commercial mashes which contain these necessary ingredients, many growers prefer a home mixture. A good mash should contain about 65 per cent to 70 per cent of ground grains, to provide general food requirements and
vitamines A and B which promote growth and protect birds from nutritional roup. It is desirable to include some ground yellow corn which is rich in these vitamines. The mash also should contain about 15 per cent to 20 per cent animal protein to supply growth promoting materials for the embryo and hatching poult. This is provided in the form of a high grade meat scrap, milk or dried milk products.

Minerals also should be included in the ration. Birds fed on mineral-deficient rations produce eggs having poor shell texture, which are low in hatchability and produce poult's with bones deficient in minerals. The minerals needed are phosphates (obtained in bone meal), calcium (found in oyster shell), and chlorides and iodides (provided by an iodized salt). A good mineral mixture is:

- 6.5 lbs. bone meal.
- 2.0 lbs. oyster shell or a similar calcium compound.
- 1.5 lbs. salt or, better still, iodized salt.

The ration should contain some substance rich in vitamine D that takes the place of natural green feed and sunshine. Alfalfa leaves, in a measure, fill this need and can be conveniently fed in racks with wire fronts, but during the season when the sunlight is nearly lacking in ultra violet rays (Fig. 3) alfalfa leaves are not enough. It is best to add tested cod liver oil which is high in vitamine D. About two per cent should be added during the early part of the season. Later this can be cut to one per cent.
The following amounts of the foregoing feeds make the desired mash:

- 20 lbs. yellow corn (ground)
- 30 lbs. mill run
- 20 lbs. ground oats or barley
- 20 lbs. mineral mixture
- 20 lbs. meat scrap
- 2 pts. cod liver oil

As in all turkey feeding, the mash should be put in a sanitary trough. No feed ever should be scattered on the ground because the disease risk is too great.

**Nesting Places and Care of Eggs**—When feeding a laying mash early eggs can be expected so that some provision must be made to locate nests so that eggs can be gathered often to prevent chilling. Knowing the location of the nests also prevents losses from magpies and predatory animals. Many growers who range their turkeys have a corral in which the hens are confined until they have laid for the day. Comfortable boxes or barrels are provided. It is a good idea to camouflage nests with branches and brush if the hens are reticent about using them.

While keeping eggs for incubation they should be held at 50 to 60 degrees to prevent chilling or premature germination. If germination starts and is then checked the germ, if not actually killed, is so weakened that it fails to develop to maturity. Eggs should be turned daily to avoid having “stuck germs.” Probably the most important factor in holding eggs is the time element. A direct relationship exists between age of egg, its hatchability, and the livability of poults. Ten days is about the maximum. Moisture and ventilation also are important. Drafts must be avoided but plenty of fresh air is necessary and the place where eggs are kept must not be too dry, as an egg dried down before incubation is worthless.

**Natural Incubation**

If the flock is so small that it takes longer than ten days to collect enough eggs to fill an incubator; it is a better plan to use natural incubation. This method practically limits the grower to one clutch per hen since using a chicken hen for hatching turkeys is dangerous from the disease standpoint.
Making the Hen a Safe Mother—Even when using the turkey hen the owner must make sure that she is safe for incubation and brooding purposes. A safe mother must be healthy, and free from internal parasites. For methods of controlling parasites see page 33.

In order to be sure that the hen has a real desire to set, she is transferred at night to her prepared nest and allowed to hover dummy eggs for a couple of days before giving her the regular hatching eggs.

![Fig. 4. Showing the proper way to hold a turkey](image)

The Nest—In preparing the nest turkey breeders usually hollow out a place in the ground, and in this case the earth aids in furnishing moisture. Where the nest cannot be so constructed, fresh dirt may be put in the bottom of the nest. In either event the earth is covered with fresh straw and a box or coop is placed over the nest to confine the hen.

There are a number of types of coops in use in the state. Their main requirements are that they shall be roomy (at least two to
four feet wide and four feet high as shown in Figs. 5 and 6) and so made that they may be used later to brood the young turkey poults for at least three or four weeks.

Fig. 6. Types of coops in common use in Montana.

**Artificial Incubation**

More and more growers are turning from natural to artificial incubation, not only because more eggs can be set at once and handled with less labor, but because broody hens can be "broken up" quickly and induced to lay a second clutch. Further, by artificial methods the danger of hatching eggs in the presence of disease germs is avoided.
Almost any good incubator can be adjusted to hatch turkey eggs. With the bulb of the thermometer resting on a live egg, it should register:

- 101 1/2 to 102 for the first week
- 102 to 102 1/2 for the second week
- 102 1/2 to 103 for the third week
- 103 to 103 1/2 for the fourth week

When turkey eggs are hatched artificially the operator must recognize that he is handling thick shelled eggs which require more moisture and ventilation than chicken eggs. Therefore, he must cool longer and add more moisture. Intermittent adding of moisture does not take the place of an even supply, for eggs unduly dried become gelatinous and can not supply food to the growing embryo.

**Natural and Artificial Brooding**

In both natural and artificial brooding practically the same principles are observed. The method used depends upon existing conditions. The main advantage of natural brooding is that so little equipment is needed and the poultts have a mother that will teach them to eat and follow them afield. But where the business is conducted on a large scale the artificial method is more economical. Further, it is the only method that can be employed where the parent stock are blackhead carriers.

**Feeding**—Regardless of the method of brooding, poultts are fed and handled alike. To avoid digestive troubles, no feed should be given for about 72 hours which is the length of time it takes for the absorption of the yolk which is taken into the body at hatching. The feed must contain growth promoting ingredients, and it must be provided in small quantities so as not to “stall” the poultts. It should be given about five times a day so that the young birds do not remain hungry for long periods of time. Poultts should be fed amounts that may be cleaned up in 10 or 15 minutes.

The growth promoting ingredients in the poultts’ feed are practically the same as those prescribed on page 7 for the breeding stock. The yellow corn meal containing vitamine A is especially essential. Also, cod liver oil with vitamine D which prevents rickets and assists in mineral assimilation, is more necessary for poultts than for adult stock. The following is a suggested ration:
A. **Scratch Feed**—(1) To be fed until six weeks old, equal parts by weight; cracked wheat, cracked corn and steel cut oats or cracked wheat and cracked corn where the oats are not available. (2) To be fed after six weeks old: whole wheat or a mixture of whole grains.

B. **Mash**

(1) With corn (preferred):
- 40 lbs. ground yellow corn
- 20 lbs. ground wheat
- 5 lbs. mill run
- 5 lbs. ground barley
- 10 lbs. ground oats
- 10 lbs. meat scrap
- 10 lbs. mineral mixture
- 2 lbs. cod liver oil

(2) Without corn:
- 40 lbs. ground barley
- 15 lbs. ground oats
- 5 lbs. mill run
- 20 lbs. ground wheat
- 10 lbs. meat scrap
- 10 lbs. mineral mixture
- 2 lbs. cod liver oil

The mineral mixture referred to is the same as that described on page 8.

Where a plentiful supply of milk is not available at all times, the meat scrap should be increased to 15 pounds or else 5 pounds of dried milk product should be added during the first six weeks.

In preparing small amounts use one tablespoonful of cod liver oil to a quart of mash.

For more information on feeding poult's see Table 2.

In poult feeding the same precaution for sanitation should be observed as was mentioned for adult stock, that is, never feed on the ground. Until the birds are old enough to use a non-wasting hopper it is a good idea to feed on a paper which should be removed and burned after each feeding.

Few accurate feeding experiments have been carried on. The Nebraska Experiment Station has done some work of this kind and the following table of results will serve as a feeding guide and an indication of how much feed is required to grow a poult to maturity. (Table 3).

During the brooding period it is essential to have an adequate and daily supply of green feed. While any succulent greens will do, such as onion tops or dandelions, alfalfa or sweet clover is best. Where the poult's are brooded on bare lots gathered greens must be supplied and these should be cut quite fine for the first few weeks.
<table>
<thead>
<tr>
<th>Age</th>
<th>Temperature and Housing</th>
<th>Scratch Grain</th>
<th>Dry Mash</th>
<th>Milk</th>
<th>Green Feed</th>
<th>Other things</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poults up to 60 or 72 hrs.</td>
<td>Artificial Brooding</td>
<td>None</td>
<td>None</td>
<td>Slight Amount</td>
<td>None</td>
<td>Not more than 100 in a group. Provide guard for stove to prevent chilling.</td>
</tr>
<tr>
<td>1st feeding day</td>
<td>98° - 100°</td>
<td>None</td>
<td>*About 1 oz. to 100 poults every 5 times daily</td>
<td>Ad lib.</td>
<td>None</td>
<td>Darken room an hour during day to give poults a chance to rest.</td>
</tr>
<tr>
<td>From first feeding day to end of 1st week</td>
<td>98° Lower to 95°</td>
<td>Morning Not more than 2 oz. per 100 poults</td>
<td>Same as first day gradually increasing amount of feed or give water they will clean up in 15 minutes.</td>
<td>Ad lib.</td>
<td>Ad lib.</td>
<td>Darken room an hour each day for rest period. Get them out of doors as soon as possible. If ground is not absolutely new use wire floor porch or freshly gravelled runs.</td>
</tr>
<tr>
<td>2nd week</td>
<td>95° Lower to 90°</td>
<td>Same as first week</td>
<td>Same as first week</td>
<td>Ad lib.</td>
<td>Ad lib.</td>
<td>Still confine to sanded yards or wire floor porches.</td>
</tr>
<tr>
<td>3rd week to 7th wk.</td>
<td>85°</td>
<td>Same as first week</td>
<td>Dry mash before them all the while</td>
<td>Ad lib.</td>
<td>Ad lib.</td>
<td>Same as second week.</td>
</tr>
<tr>
<td>7th to fattening time</td>
<td>Take heat away when backs are covered with true feathers</td>
<td>Same as 3rd to 7th week</td>
<td>**Mash before them at all times but reduce meat scrap 5%</td>
<td>Ad lib.</td>
<td>Ad lib.</td>
<td>When heat is removed prepare portable roost coop. Range birds on clean ground, provide shade where they may rest during heat of the day.</td>
</tr>
<tr>
<td>Fattening period</td>
<td>Mixture rich in fattening material before them at all times</td>
<td>Ad lib.</td>
<td>Ad lib.</td>
<td>Keep cooped until 9 or 10 A.M. or until they have eaten so that tendency to range is lessened.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*1 egg to 25 poults or clabbered milk may be added to make crumbly mash.

**If mash is discontinued still feed mineral mixture in self-feeder.
TABLE 3—TURKEY FEED CONSUMPTION RECORD (NOT INCLUDING GREEN FEED)
Lot GX—98 poulets

<table>
<thead>
<tr>
<th>Period</th>
<th>Infertile hen eggs</th>
<th>Chick scratch</th>
<th>Dry mash</th>
<th>Skim milk</th>
<th>Green feed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pounds</td>
<td>Pounds</td>
<td>Pounds</td>
<td></td>
</tr>
<tr>
<td>May 13-19 inclusive</td>
<td>25</td>
<td>.25</td>
<td>6.8</td>
<td>95</td>
<td>ad lib.—not weighed</td>
</tr>
<tr>
<td>May 20-26 inclusive</td>
<td>30</td>
<td>1.6</td>
<td>16.2</td>
<td>70</td>
<td>ad lib.—not weighed</td>
</tr>
<tr>
<td>May 27-June 2 inclusive</td>
<td>4</td>
<td>1.9</td>
<td>30.0</td>
<td>100</td>
<td>ad lib.—not weighed</td>
</tr>
<tr>
<td>June 3-9 inclusive</td>
<td></td>
<td>2.0</td>
<td>41.2</td>
<td>99</td>
<td>ad lib.—not weighed</td>
</tr>
<tr>
<td>June 10-July 8 inclusive</td>
<td></td>
<td>11.0</td>
<td>330.0</td>
<td>304</td>
<td>ad lib.—not weighed</td>
</tr>
<tr>
<td>July 9-Aug. 5 inclusive</td>
<td></td>
<td></td>
<td>560.0</td>
<td>376</td>
<td>ad lib.—not weighed</td>
</tr>
<tr>
<td>Aug. 6-Sept. 2 inclusive</td>
<td></td>
<td></td>
<td>706.0</td>
<td>328</td>
<td>ad lib.—not weighed</td>
</tr>
<tr>
<td>September 3-30 inclusive</td>
<td></td>
<td></td>
<td>1040.0</td>
<td>1334</td>
<td>ad lib.—not weighed</td>
</tr>
<tr>
<td>Oct. 1-Oct. 28 inclusive</td>
<td>401.0</td>
<td>564.0</td>
<td>56</td>
<td></td>
<td>ad lib.—not weighed</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3294.2</td>
<td>2762</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total weight of 93 surviving turkeys on October 28 was 1143.2 pounds.
Management—The type of coop that has been used successfully in Montana for natural brooding already has been described. The main thing to remember in using these coops is to keep them dry and sanitary. Moving once a day is advisable. It is best to get the poults out of the coops as soon as they are feathered over their backs or can be weaned, because crowding in brood coops lowers vitality and makes mineral assimilation faulty and crooked breasts may result.

In artificial brooding the tendency has been to brood too many birds in one group. There should not be more than 100 poults in one group. These can be well cared for under a 52 inch hover in a portable 10 ft. x 12 ft. house. If the house is stationary 12 ft. x 14 ft. is more desirable. But with a stationary house alternate graved yards, graved runs, or wire floored sun porches are necessary to avoid contaminated ground (Fig. 5).

The artificial brooder house always should be sanitary and dry, therefore, it is well to have the floor immediately surrounding the hover elevated by a hardware cloth (⅛-inch mesh screen) platform. Through the use of a platform of this kind the sleeping ring is kept strictly dry and sanitary. The drinking fountains also should be elevated on a hardware cloth base.
Care Until Fattening Time

The success of the mature bird at marketing time largely depends upon the treatment of the growing stock. A profit cannot be realized if turkeys have to shift for themselves after weaning or after the time the artificial heat is removed. Although the birds may roost out of doors, a cheap shelter (Fig. 8) will save losses from predatory animals and many times pay for the expense of building it. The birds also need some supplementary feed during the growing period even if they are gleaning grain fields and are on unrestricted range. A light grain feeding or a growing mash supplied in self feeders near their shelter is sufficient. A mineral mixture should be supplied during the growing period, either in a dry mash or in separate hoppers.

Fattening

A turkey will not fatten until its growth is complete. When that time arrives the turkeys should be discouraged from wandering too far, and should be put on a fattening ration. Since turkeys cannot be successfully crate fattened it is best to confine them
for a while each morning in their roosting shelters or corrals so that they will put on an extra feed before being released. This method requires at least a month for finishing.

A fattening ration may be prepared from any common grains rich in carbohydrates such as a mixture of wheat, barley and well matured corn. But since the growers of Montana have made a national reputation with their white-carcass-wheat-fattened birds, it is wise to use only a limited amount of corn in the ration.

**Preparing for Market**

When marketing time arrives, the turkeys must be gone over carefully. After selecting the breeders, all birds showing lack of finish are "cut back" leaving only the well fleshed ones that are not "pinny" to be shut up for killing. To look for finish the feathers are parted over the hips and along the breast. In unfinished birds the skin in these regions has a bluish cast and the bones are prominent.

**Starving**—The birds that are selected for killing should be kept off feed for 18 to 24 hours so that there is no material left in the crop or digestive tract. "Croppy" birds are rejected. They will not even grade number two since they not only start to decompose in shipment and are termed "green turkeys," but also cause spoilage among adjacent birds. Water may be given during the first part of the starvation period as this aids in washing out the digestive tract.

![Fig. 9. Sticking knife.](image)

**Killing**—Since the bulk of Montana turkeys are exported, dry picking is necessary. In order to facilitate dry picking the operator should provide himself with the necessary equipment; a killing knife, a weighted blood cup and a beam from which the bird can be suspended so that its head comes about to the operator's elbow (See Figs. 9 and 10).
The practice of locking wings to prevent fluttering should never be followed, since a broken wing is sure to occur during the death struggle. Birds with broken wings grade No. 2.

**Bleeding**—The first step in killing is to cut the juglar vein (Fig. 11) to insure maximum bleeding. If free bleeding does not occur a blotchy carcass is the result. It is a common failing not to go far enough back with the knife, but this can be avoided if the operator first makes a careful examination of the mouth. Back of the cleft in the palate the veins can be seen as an indistinct blue line, like the veins on the back of one's hands.

![Blood cup](image)

Fig. 10. Blood cup.

**Sticking**—As soon as free bleeding occurs the knife is turned and thrust into the rear lobe of the brain. The thrust may go up through the cleft in the rear of the mouth, through the edge of the eye or the fleshy part of the face just so it finally reaches the nerve center controlling feather ends (Fig. 12). If the "stick" is correct the main tail immediately contracts with a shiver only to fan-out in utter relaxation the next moment.

**Picking**—First fasten the blood cup into the lower jaw so that the bird is weighted down and protected from spattering blood during the picking. The first feathers to be removed are the main tail feathers and then primary and secondary wing feathers. These are taken out with a twisting upward pull. Then pick the back and body feathers. The goal in dressing is to have the bird completely picked without tearing or bruising the flesh.

**Cooling**—After the bird is absolutely clean picked, the clot of
blood removed from the mouth and the material from the vent, it must be cooled but not frozen for 24 hours so that the body heat is removed. A poorly cooled or frozen bird is worse than a "croppy" bird. It is always a reject.

**Packing**--While most of the Montana dressed birds are sold through county cooperative associations where the packing is taken care of by the organization, methods of packing should be mentioned for those who are making individual shipments. Most of the associations side pack the number one birds in cottonwood boxes. Pack two layers of birds in a box and six birds in a layer with parchment paper between, over and under the birds. Do not line the boxes as this cuts off ventilation (Fig 13). The number two birds, however, are often barrel packed (Fig. 14). Birds packed at home should be head-wrapped (Figs. 15 and 16).

**Cooperative Marketing**

While many growers have special markets within the state and others ship individually to the outside, the cooperative associations have an important place in the turkey marketing of the state. Through them it has been possible to get rid of a state surplus, thereby establishing better prices; to build a na-
Fig. 12. The brain (D) must be pierced to loosen feathers. To reach the brain the knife may be inserted at the edge of the eye (A), just in front of the eye (B) or in the cleft in roof of mouth (C). The spinal cord (E) connects with the brain.
tional reputation through state grades and brand, and to build up the industry in general by making it possible for more people in business on a small scale to make it a success.

State Grades—Although the county associations have their own separate forms of organization, they are closely affiliated. In 1924 they adopted state grades which have been used ever

![Diagram](image-url)

**Fig. 13.** The proper box pack, showing the relative position of backs (A) and breasts (B).
since by the majority of the shipping associations. The state grades are as follows:

No. 1 Young Toms: Tom turkeys less than one year old, weighing 12 pounds or over, dry picked clean, with the exception of 10 or less primary wing coverts, fat, well bled, straight, free of disease, feed, tears, or bruises.

No. 1 Old Toms: Toms more than one year old, weighing 16 pounds or more, dry picked clean, with the exception of 10 or less primary wing coverts, fat, well bled, straight, free of disease, feed, tears or bruises.  
No. 1 Young Hens: Hen turkeys under one year old, weigh-
ing eight pounds or over, dry picked clean, with the exception of 10 or less primary wing coverts, fat, well bled, straight, free of disease, feed, tears or bruises.

No. 1 Old Hens: Hen turkeys over one year old, weighing eight pounds or over, dry picked clean, with the exception of 10 or less primary wing coverts, fat, well bled, straight, free of disease, feed, tears or bruises.

No. 2’s: Any turkey not coming up to the requirements of No. 1’s in its class as to weight, crooked breast, bruised, torn, thin, broken wings or legs, croppy, poorly bled, blue, pinny or carelessly picked, but still fit for a holiday dinner. No. 2’s shall be graded as follows when packed for shipment:

Light Hens: All hen turkeys under weight, slightly bruised, torn, broken wings or legs, head cut off, poorly bled and showing medium high quality.
Medium Young Toms: Young toms under weight, slightly bruised, torn, broken wings or legs, head cut off, poorly bled and showing medium high quality.

Medium C. B.'s: Turkeys coming up to grade except for crooked breasts.

No. 2 Old Toms: Old toms not good enough to qualify as No. 1 Old Toms.

No. 2 Mixed: All turkeys that come in the No. 2 grade, that are of questionable quality, poorly bled, blue, very croppy, badly torn, crooked breasted, free from disease and fit for table use.

Culls: Culls shall not be accepted by any association using this brand. They consist of birds that are perceptibly diseased, emaciated or which for any other reason are unfit for table use.

State Brand—In 1925 the state brand was adopted. It is the profile of a turkey with the words “Montana Poultry” across the outlined bird. In order to protect the brand it has been registered and its use is limited to those associations that comply with rules and regulations of the affiliated county units. When an association desires to use the brand, application is made to a county already using it and that county sends an official grader to the applying county to supervise an entire shipment. If the grading is considered satisfactory the use of the brand is granted after proper financial adjustments with the “brand” committee.

While affiliation with marketing associations is entirely optional, it is a matter that is worth considering, for it not only is a means of gaining greater recognition from distant markets, but also is a means of reducing shipping costs.

Cost and Profit Factors

Although high prices usually prevail during the holidays, this is not always true. Therefore, to continually make a profit the grower must thoroughly understand the underlying economic principles of the business. A well finished bird at Christmas is not the whole story. Rather the important thing is to know how costs can be kept under probable receipts.

Overhead—The first step in insuring profit is keeping down overhead costs. Although it is desirable for the grower to have the best stock he can afford, it is not reasonable to buy high
Fig. 16. Wrapping the heads gives dressed turkeys a better appearance on the market, but it must be done properly.
priced show stock for the purpose of producing turkey meat. In like manner it is unwise to invest heavily in incubators and brooders where the unit is too small to justify them.

State surveys show that where the stock and ground are clean, the one making the greatest profit per hen, outside the specialized turkey grower, is the rancher who merely includes turkeys in a diversified farming "set up", who keeps only one tom and from 10 to 12 hens, who hatches and broods naturally and who uses the turkeys to glean grain fields in the fall. Labor cost is held down to the minimum under this system of production.

**Eggs per Hen**—The next place to watch for leaks is in the production of hatching eggs. The hen that lays few eggs does not pay interest on the money invested in her.

**Poults per Hen**—The number of poults per hen is another profit determining factor. Every time an egg fails to hatch, instead of simply losing 50c, the average cost of an egg, the potential gross income, from $4 to $4.50 per mature bird, also is lost.

**Per Cent of Poults Reared**—Likewise, ultimate profit is directly proportional to the percentage of poults reared to maturity.

**Per Cent of Mature Stock Sold as No. 1**—Probably the greatest leak of all occurs in the failure to make matured birds qualify for number one grade. The spread between No. 1 and No. 2 birds is so great (some years 15c to 20c) that No. 2's cannot be marketed profitably. Consequently, it is money well expended to hold and feed a bird until it is prime.

**Marketing**—For the average person with a small flock and no special market, it is highly advisable to affiliate with a collective selling agency, for through it the individual gets all the advantages of carlot shipments. This means a lowering of marketing costs.

**Disease**—Through this discussion health and freedom from disease in turkeys have been referred to repeatedly. Planning comes to nothing and profits turn to losses if the grower lacks a clear idea of how to avoid disease or how to combat it if it does appear. Therefore, the rest of this bulletin is devoted to a discussion of parasites and disease.
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When turkey raising was an incidental side line instead of a money making industry, little or no attention to sanitation or disease prevention was considered necessary. Losses that occurred were attributed to bad weather or bad luck. There were only a few turkeys on the farm, only local breeding stock was used, the birds had unlimited range, and heavy losses from disease seldom occurred.

Now breeding stock is shipped in from other states, much money is invested in equipment, hatching is done earlier and an effort is made to market a twenty pound bird instead of a ten pound bird. Two hundred birds cannot be allowed to run all over the ranch, so they are confined to certain pastures or even pens.

All of this means that the turkey of today is more of a hot house product, that feeding, management, housing, sanitation and disease prevention are now a very definite part of turkey production.

Shipping in fancy breeding stock also may mean shipping in fancy diseases. Forcing the turkeys for rapid growth and early maturity means possible nutritional diseases. The maintenance of turkeys year after year on the same ground means losses from parasites, etc., etc. The turkey grower, therefore, must be able to recognize some of the well known turkey ailments and he should know something about their control.

**Blackhead**

Blackhead is an infectious disease of turkeys, rarely affecting chickens and other birds. Acutely infectious, with a high mortality, in the half-grown poult, and chronic with a long course and low mortality, in the adult birds. The dark discoloration of the head from which the disease takes its name, is not a very common symptom. The young birds get “droopy”, thin, and weak, usually show a yellow or bright yellow-green diarrhea, and die in a few days. The older birds, usually those that withstood an attack the previous summer, slowly get thinner and weaker, have a bright
yellow streaked diarrhea, and may live a month or more after they are visibly ailing.

Post-mortem examination shows the characteristic circular or oval gray-green spots on the liver and the enlarged ceca. This disease might be confused with tuberculosis but hardly with any other disease. (Circular No. 117 of the Montana Experiment Station describes this disease more in detail than is possible here.)

There is no specific treatment for affected birds, no definite preventive, and there is not much hope for a bunch of turkeys that have had losses from blackhead. Since the disease is of the lower intestine and liver, the discharges from the bowel spread infection everywhere. About the only way to save any birds when blackhead appears, is to avoid feeding them in one place continuously, spread them out on pasture as much as possible, and in every way endeavor to avoid contaminated food and water. Poults at about six weeks seem to be most susceptible, and losses usually are heaviest at that age. Blackhead is introduced into communities, and spread from ranch to ranch by breeding stock, which, though infected with the disease and spreading infection daily, are sufficiently hardy to resist it. These so called “carriers” of infection cannot be recognized as diseased except by the yellow diarrheal discharge. Purchasers of breeding stock must be continually alert to avoid buying infected breeding birds and thus infect their ranch.

Tuberculosis

Tuberculosis is a common disease of chickens, and occasionally affects turkeys. The disease has not been noticed affecting a large percentage of a flock of turkeys as in chickens. The emaciated body, the long drawn out sickness, and the typical “spotted liver” make the disease relatively easy to recognize. Observations on tuberculosis in turkeys indicate that most of the tuberculosis turkeys found on dressing the birds at Thanksgiving and Christmas, are those that have picked up the infection from infected chickens. In our experience it has not been necessary for any turkey grower to dispose of his entire flock and start over, as nearly always is the case when this disease appears in flocks of chickens. Furthermore, most of the tuberculosis turkeys sent to us had been sold on the market as fat turkeys, indicating that the presence of tuberculosis did not seriously affect
the general health of the bird. It is a disease that is far less im-
portant among turkeys than among chickens.

The tuberculosis liver has many large, rounded, prominent
yellow-white nodules, and should not be easily confused with a
blackhead liver. The blackhead lesions are depressed, discolored,
diseased areas of liver tissue, while those of tuberculosis are
growths or nodules easily loosened from the liver and clearly
not a part of it.

**Roup**

Although in chickens, roup assumes many forms with vary-
ing symptoms, in turkeys roup is usually an infectious, catarrhal
cold. The symptoms are first only the discharging nostrils and
eyes, with more or less sneezing and wheezing. Later some of
the birds may develop swollen heads, the side of the face, usually
under or near the eye, bulging outward. This swelling which is
at first soft, may close the eye, distort the face, and later becomes
quite hard. Birds in this condition get weak and thin and some
may die, though usually the loss is not heavy.

The cause of this type of roup is not always clear. It often
clearly originates from close contact with roupy chickens. Many
times it is traceable to over-crowding or poor ventilation in a
poultry house, and occasionally it seems to result directly from
lowered vitality and poor feeding.

Prevention of roup, therefore, is largely a matter of proper
feeding and management. Turkeys and chickens must not be
housed together, and if the turkeys roost in a house, it must be
ample in size and adequately ventilated. Parasites, poor feeding,
or other causes that might debilitate the birds, must be avoided
or corrected. Though the use of various disinfectants in the drink-
ning water has been recommended, it is doubtful if this practice
gets any tangible results.

Treatment of affected birds consists of providing drainage
for the swollen cavities of the face and head. The bulging swel-
ling so frequently occurring below the eye should be opened with
a knife, the mucous contents forced out, and the cavity swabbed
out with argyrol solution (10%-15%) or with iodine. The nos-
trils should be cleaned, and if a small syringe is available, the
nostrils and mouth can be flushed out with a mild disinfectant. A
warm salt solution (1 teaspoon of salt to a pint of water) is recom-
mended for this purpose.

**Vaccination**—Since roup apparently is due to a variety of
causes, commercial vaccines have not given favorable results. In
our experience, commercial roup vaccines, either as a preventive
or a cure, have not been successful.

**Coccidiosis**

Coccidiosis is an infestation of the intestine with a minute
organism known as coccidia, and though causing some trouble
with chickens, it has never been reported in Montana among tur-
keys. If it does occur here at all, it is unimportant. Other states
report trouble with coccidiosis in turkeys, but so far, this disease
has caused no trouble in Montana.

**Cholera**

We have observed only one case of cholera in turkeys and,
except for this, no turkeys affected with cholera have been sent
in to the Montana Experiment Station laboratory or reported in
the field. Apparently, for the time being, turkey growers in this
state do not need to consider cholera as a possible cause of loss.

**Limberneck**

Limberneck is an acute poisoning caused from eating de-
composed or spoiled meat or other food material. It is very much
more common in chickens than in turkeys, and often takes all the
birds in a flock. It is variously described as ptomaine poisoning,
botulism, food poisoning, etc. The term limberneck is taken from
the tendency toward paralysis of the neck in the poisoned birds.
The birds may become paralyzed completely, or in their legs, or
neck or wings only. Death usually occurs in a day or less, and a
large percentage of the flock is usually affected.

The only thing that can be done is to shut up the flock at
once in a poultry house until the food is found that is making the
trouble. Spoiled canned foods, spoiled meat or fish, access to the
carcass of a dead animal, etc., are the usual causes of loss from
limberneck.

**Fungus Infection of Crop**

For several years we have had occasional specimens of tur-
keys sent to us which were suffering from a fungus disease of
the throat, gullet, and crop. Yellowish cone-shaped fungus growths are found thickly scattered over the inside surface of the crop. In advanced cases ulcers and fungus masses are of considerable size.

Nothing is known as to the cause, treatment, or effective prevention of this disease. So far, no serious losses have occurred. The reported cases have been from all parts of the State. In this disease, it would seem that a disinfectant in the drinking water might be of some benefit.

Tapeworm

Among the internal parasites, the tapeworms cause more tangible loss than all of the other worms combined. Half-grown turkeys, when infested with tapeworms, are stunted, weakly, drooping specimens that rarely reach maturity. Although internal parasites may be suspected from the emaciated and weakened condition of the poult, a real diagnosis can be made only by opening the intestine to its full length, with scissors. Tapeworms usually are found attached to the intestinal wall, and are flat, white, segmented worms about an eighth of an inch wide and two to three inches long. When turkeys are seriously infested with tapeworms, there may be fifty or seventy-five worms in the intestine.

Since the life cycle of the tapeworm is not known, prevention consists mainly of sanitation, feeding only in troughs, avoiding overcrowding, using new pastures as often as possible, etc.

Treatment—The most effective agent for the removal of tapeworms is Kamala, a reddish powder that can be obtained through any druggist. Though this drug is practically “fool-proof” when used on chickens, it has to be used with caution with turkeys. Five to ten grains of Kamala for a half grown turkey should remove the parasites and not cause any loss, but if the turkeys should be unusually weakened by the parasites, or should they have blackhead, or any other disease, there may be heavy losses following the use of Kamala. Though we have administered fifteen grains of Kamala to each bird in large flocks, with the removal of thousands of tapeworms, and without the loss of a single bird, yet losses have occurred on this dosage. It would be
advisable to try the effect of a ten-grain capsule of Kamala on a few birds first, and note the results. Although we can safely mix Kamala with feed for chickens, the drug had best be given to turkeys in individual doses, either in capsules or in tablets.

Until we know more about the tapeworm and its habits, it will be difficult to make any definite suggestions as to prevention. We cannot say, at present, how long a pasture or pen will remain infective, but if tapeworms make serious trouble, year after year, on a ranch, turkey raising should be discontinued for a year, at least, in the hope that the eggs and larval worms may die out.

**Roundworms**

The common roundworm, Ascaria, may at times become so numerous in the intestines of the turkey as to seriously impair its health. In our experience, however, this parasite is not so injurious to turkeys as the tapeworm.

As is the case with tapeworms, no exact diagnosis of roundworm parasitism can be made without opening the intestine and examining the contents. This worm can hardly be overlooked, as it is two to three inches long, round, firm, white, and sharply pointed at either end. It is not attached to the intestinal wall, and as a rule, does not occur in large numbers.

Tobacco, or nicotine, seems to be the best all-around treatment for the Ascaris worm.

A very satisfactory method of administering nicotine is the nicotine sulphate capsule, obtainable through any druggist. A capsule can be given to each turkey with very little trouble, and the removal of the worms is usually quite complete.

Tobacco dust fed at the rate of 2 pounds to the 100 pounds of feed, and continued for ten days or so, also will quite effectively remove roundworms, but our experience with the nicotine sulphate capsule has been such that we prefer this treatment.

**External Parasites**

Most turkeys have more or less body lice, the common pale, flat lice with which all poultry breeders are familiar. Probably they do not harm the mature turkey very much, though the turkeys would be much more comfortable without them. But when the lice get on the young turkeys, as they invariably do, there is
likely to be considerable loss. A few lice on a very small poult may kill it in a few days. For this reason it is necessary to keep the breeding stock as nearly free from these parasites as possible. Any reliable louse powder, well applied, will be satisfactory. We prefer Sodium Fluoride, applied by the familiar “pinch” system, but any good treatment is better than none. There is no rule or set method or time of year, when this should be done, but the mature turkeys should be free from lice by the time the young turkeys are hatched.

Mites occasionally affect turkeys as they do chickens. Mites do not stay on the birds during the day, but live on the roosts, and the treatment is applied to the roosts rather than to the birds. Waste crank case oil, applied liberally to the roosts with a white-wash brush or large paint brush, will kill most of the mites. Obviously, this cannot be done, and is probably unnecessary, when the turkeys roost on trees, fences and buildings.

General Suggestions

In general most of the turkey diseases can be avoided if they are kept to themselves and not allowed to run with chickens. If it is a question of which flock to shut up, the chickens will do better in confinement than will the turkeys. It is much better to confine the chickens to a yard or pen, and let the turkeys have the range, if it is not possible to let both flocks have separate range.

Where turkeys are confined or semi-confined special attention must be given to sanitation and management to avoid ground contaminated with infectious diseases and parasites. Therefore, unless the turkey grower can provide double yards that are gravelled or moveable equipment that can be changed to clean ground two or three times in the growing season, it is preferable to run them on unlimited range with frequent moving of the roosting quarters.