

TURKEYS *in* MONTANA

By

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and

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Turkeys In Montana

By

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Marked changes have taken place in the turkey industry during recent years. When the mountain states began raising turkeys in numbers about 1920, the business was exceedingly profitable. Turkey production was at its lowest ebb nationally. Many sections of the country had been forced out of the business because of disease, thus those who could grow turkeys were very fortunate.

Since 1920 scientists have discovered how to control blackhead. This alone has altered the industry, because any section of the country can now raise turkeys with the blackhead risk removed. Also during recent years many commercial hatcheries have begun to specialize in poults. This accepted practice makes it possible for any one to start extensive turkey raising at relatively low costs.

Consequently the man who grows turkeys today, enters into a highly competitive industry. In order to realize a profit he must not only employ efficient, proven practices in raising his birds, but also must market his product wisely. For methods of marketing the reader is referred to Montana Extension Service Bulletin No. 150, "Marketing Montana's Turkey Crop."

While there is a constantly increasing number of growers who purchase their day-old poults from commercial hatcheries, there will always be a great number of people who will keep a breeding pen of one tom and from 8 to 10 hens and rear the young by "natural methods." Therefore, a bulletin for general Montana use would be incomplete without space given to this phase of the industry.

Selecting Breeding Stock

Variety—The grower has six standard varieties from which to choose: Bronze, Narragansett, White Holland, Black, Slate and Bourbon Red. While there are instances where a grower is raising birds for a special market, generally turkeys are marketed collectively. In which case it is wise to consider the predominating variety of the community, because uniformity of variety tends toward greater uniformity of the finished product. Whichever variety is chosen, standard weights should be maintained.

TABLE 1—COMPARATIVE WEIGHTS OF DIFFERENT VARIETIES

Variety	Old Tom	Yearling Tom	Young Tom	Hen	Pullet
Bronze	36	33	25	20	16
Narragansett.....	33	30	23	18	14
Bourbon Red	33	30	23	18	14
White Holland.....	33	30	23	18	14
Black	33	30	23	18	14
Slate	33	30	23	18	14

(In the classification of the preceding table, a "young tom" is less than one year; "yearling 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 foundation stock, it usually is more profitable to start with standard bred stock, rather than mongrels, because standard birds not only conform best to market requirements but also are the only ones that can be sold profitably as breeding stock. Growers are referred to the "American Standard of Perfection," published by the American Poultry association, for a detailed description of each variety.

In considering type it must be remembered that turkeys are raised for meat. The birds which meet consumer demands are compactly built and have deep bodies, full breasts and straight keels.

Early Maturity—In order to have turkeys of this type which finish economically for the holiday season they must be from an early maturing strain. Avoid rangy, long-legged stock. Exceptionally heavy birds develop slowly and move slower on the market, for this reason a standard weight is preferred to over-weight birds. The more recently developed "Broad Breasted" type has been especially bred for early maturity.

Vigor—Underlying everything is vigor and vitality which spells health. Without health birds are worthless. Therefore, in selecting breeding 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—Breeding stock age is a debatable question. Some prefer pullets, saying that they lay better. Those of this opinion usually use yearling toms of proven worth. Others prefer hens. Even though the hens lay fewer eggs, the growers maintain that the resulting poults are larger and hardier. In this case the hens are mated to young toms, since 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 8 females.

Law of Inheritance—In establishing a turkey flock, a definite breed-improvement program should be followed. This involves a study of the individuality of birds as well as a working knowledge of the laws of heredity, the law of "like begets like." By capitalizing on 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 long in the legs. In order to reduce the tendency toward legginess, the hens are mated to a tom that is short in the legs. In this way the offspring 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 destructive habit of selling the early maturing turkeys on the holiday market and keeping the left-overs for the breeding pen. This custom should be outlawed. Before any birds are marketed the breeders should be chosen, banded, and held for the coming season. Likewise 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.

Shelter—While houses generally are unnecessary for adult stock, 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 suffices. However, it must be large enough to be unaffected by the body heat of the birds when roosting, otherwise roup may develop. Further, the shed must be well enough ventilated to be always dry. Lastly the shelter must be removed from the chicken quarters to avoid disease.

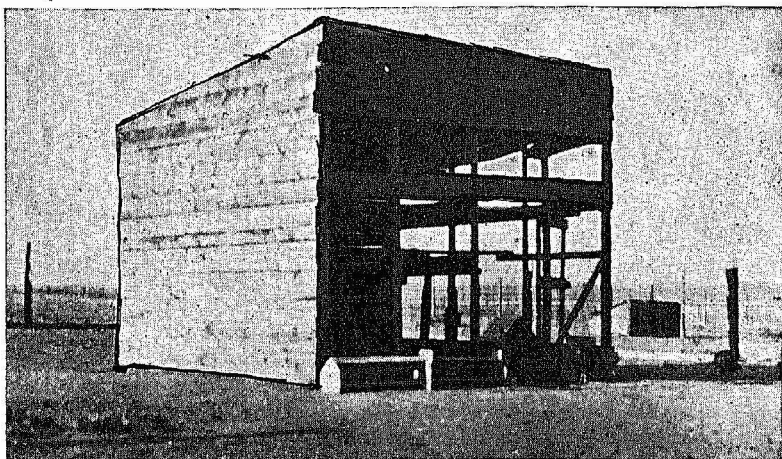


Fig. 1—A roosting shelter with a north and west wall.

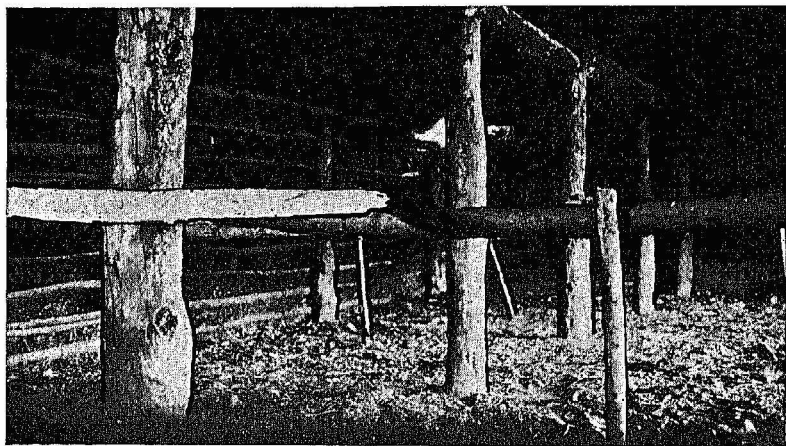


Fig. 2—An open, straw-roofed shed with perches, makes a good shelter.

Winter feeding—Although turkeys do not need a laying ration prior to the breeding season, some feeding attention should be given if early hatching eggs are expected. Consequently, many growers supplement the morning and evening grain feeding with a dry mash of low-protein content, not only to keep the breeders from getting too fat but also to keep them familiar with mash-eating.

About 26 pounds of feed per hen and 52 pounds of feed per male is

required during this holding period. To insure hatchability, it is necessary to feed alfalfa hay or meal to supply the vitamin E or antisterility vitamin.

Feeding during the breeding season—The breeders should be put on laying ration a month prior to the time the first eggs are expected. If eggs

are desired earlier than the normal laying period, morning lights are found to accelerate the hen's reproductive system. A lantern with a bright pan for a reflector may be hung in the roosting quarters.

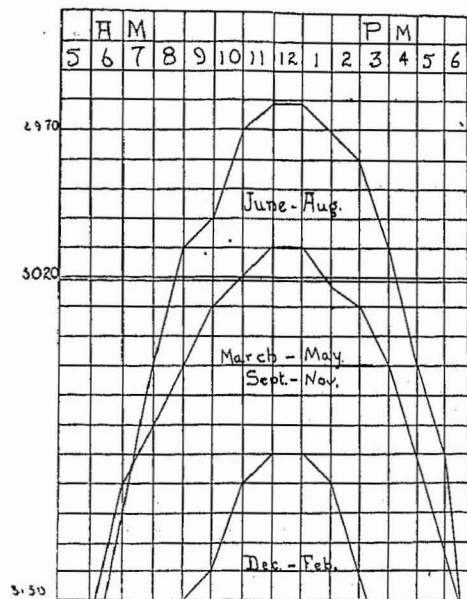


Fig. 3—Sunlight is valuable, but the long light wave lengths during the noon hours of winter days do not protect birds from rickets. When the waves are longer than 3020 they do not protect.

A laying ration must contain all the elements necessary for the production of hatchable eggs and livable poults. Whether commercial or home mixed, the ration must contain adequate amounts of animal protein, vitamins and minerals as well as the carbohydrates and fats contained in home grown grains. The easiest way of supplying this is with a mash kept before them at all times, grain fed in troughs and an abundance of green feed. Where green feed is not available alfalfa-leaf meal and cod liver oil must be substituted.

*LAYING RATION I

Where plenty of green feed is available

Mash	Scratch		
Ground yellow corn.....	20 pounds	Yellow corn	40 pounds
Ground wheat	15 pounds	Wheat	40 pounds
Ground oats	20 pounds	Heavy oats or barley.....	20 pounds
Meat scrap	20 pounds	Total	100 pounds
Bran	12 pounds		
Ground oyster shell.....	7 pounds		
Dried milk	5 pounds		
Salt.....	1 pound		
Total	100 pounds		

Where there is a lack of green feed, or during those months when the sunlight lacks in ultra violet rays (see Fig. 3), the following ration has proven satisfactory.

* LAYING RATION II

Mash	Scratch
Ground yellow corn or barley..... 27 pounds	Yellow corn or barley..... 40 pounds
Middlings or ground wheat..... 20 pounds	Heavy oats..... 38 pounds
Bran 12 pounds	Wheat 20 pounds
Alfalfa leaf meal..... 9 pounds	Cod liver oil 2 pounds
Meat scrap (50% protein)..... 8 pounds	
Dried milk 8 pounds	
Fish meal 8 pounds	
Ground oyster shell..... 7 pounds	
Salt 1 pound	
	Total 100 pounds
Total 100 pounds	

* Rations used at the Range Livestock Experiment Station, Miles City, Montana.

As in all turkey feeding, the mash should be put in a sanitary trough. Feed should never be scattered on the ground. The disease risk is too great.

Nesting places and care of eggs—When feeding a laying mash for early eggs, provision must be made to locate nests where 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 the day's lay is completed. Comfortable boxes or barrels camouflaged with branches or brush make satisfactory nests.

While keeping eggs for incubation they should be held between 35° to 50° to prevent chilling or premature germination. Eggs should be turned daily to avoid having "stuck germs." Probably the most important factor in holding eggs is the time element. There is a direct ratio between the age of egg, hatchability, and livability of poults. Ten days is about the maximum. Moisture and ventilation are also important. Drafts must be avoided but plenty of fresh air is necessary. Further, eggs must not be kept too dry, as an egg dried down before incubation does not hatch.



Fig. 4—Showing the proper way to hold a turkey.

Natural Incubation

With small flocks where it takes longer than 10 days to collect enough eggs to fill an incubator, many growers prefer to use natural incubation. This method practically limits the grower to one clutch per hen, since using chicken hens for hatching turkeys is dangerous from the disease standpoint.

Making the hen a safe mother—Even when using a turkey hen, she must be made safe for incubation and brooding purposes; that is, freed from external and internal parasites. For methods of controlling parasites see pages 29 and 30.

In order to be sure that the hen wants to set, transfer her at night to her prepared nest and allow her to hover dummy eggs for a couple of days before giving her the hatching eggs.

The Nest—The moisture problem is diminished when the nest is placed directly on the ground. Where the nest cannot be so constructed, fresh dirt may be put in the bottom of the nest. In either event the earth should be covered with fresh straw and a box or coop 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 2 to 4 feet wide and 4 feet high as shown in Figs. 5 and 6) and arranged to brood the poults for at least three or four weeks after hatching.

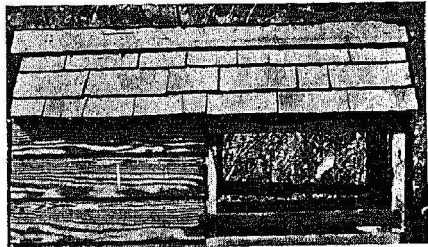


Fig. 5—A desirable type of coop.

Artificial Incubation

Many growers are turning from natural to artificial incubation, not only because more eggs can be set at once and handled with less labor, but also because the broody hens can be "broken-up" quickly and induced to lay a second clutch. Further by artificial methods the danger of hatching in the presence of disease is avoided.

The first consideration in artificial incubation is the machine. Each manufacturer supplies a set of directions for operating his particular incubator. In so far as possible these directions should be followed. However, there are certain rules to be applied to all turkey incubation. First is temperature. It has been found that best results are obtained within temperature range of 100° to 102° with the center of the thermometer bulb level with the tops of the turkey eggs. Furthermore present experiments point to a better livability of poults when the temperature is held at 100°.

Then there is the consideration of humidity. The shell of a turkey egg is thicker than a chicken egg hence more moisture is required. Constant humidity maintained throughout the hatch is more desirable than intermittent

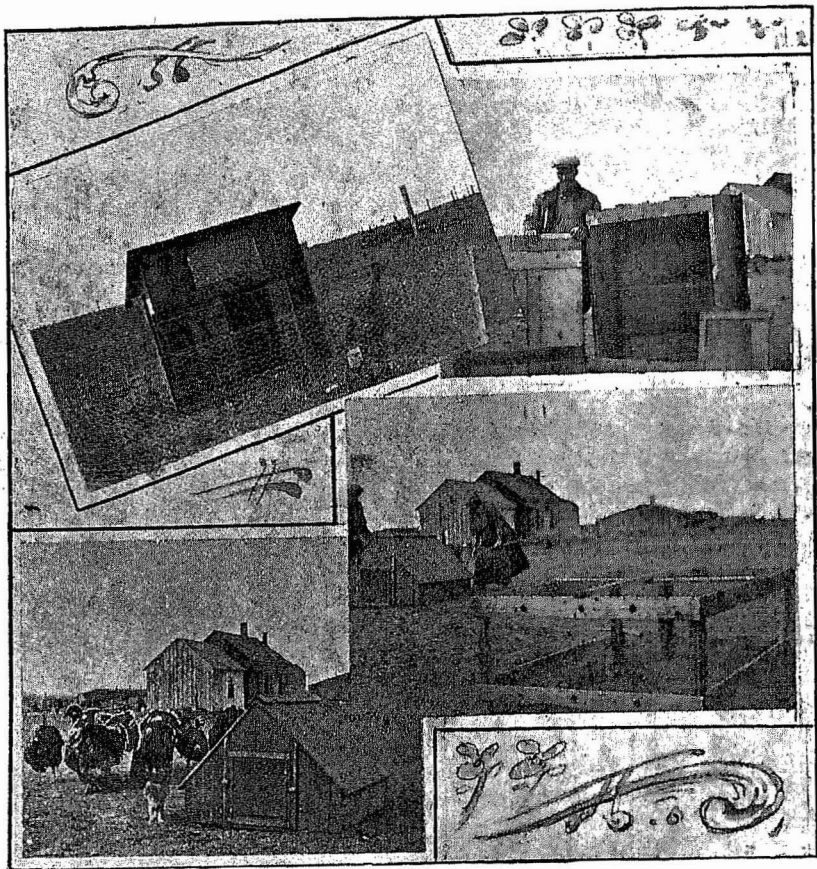


Fig. 6—Types of coops in common use in Montana.

adding of moisture. Around 60 percent humidity is recommended up to the 24th day. After that, maintain it at 70 per cent. The rate of evaporation is also a guide to moisture. During the first week the eggs will lose from 2 to 3 per cent; after 12 days the loss is from 4 to 6 per cent; after 18 days 6 to 9 percent and from 9 to 12 per cent after the 24th day.

Brooding

In both natural and artificial brooding practically the same principles are observed. The main advantages of natural brooding are: simplicity of equipment and a mother that will teach the poults to eat and follow them afield. But where the business is conducted on a large scale the artificial method is more economical. Furthermore, it is the only method that can be employed where the parent stock are blackhead carriers.

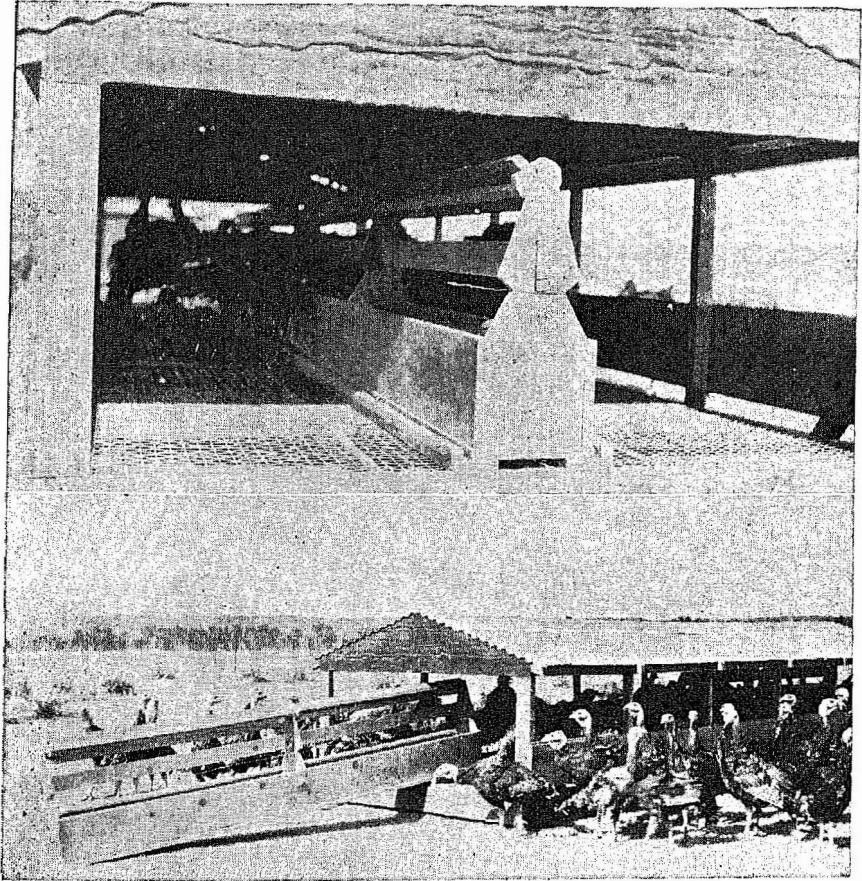


Fig. 7—Type of outdoor feeder used successfully at the U. S. Range Station, Miles City.

Feeding—(for either natural or artificial methods of brooding). The main difference between chick and poult feeding is that poults require a much higher per cent of protein (from 24 to 26 per cent); also poults can manage crude fibre better than chicks, in fact they need a certain amount. For this reason rations call for finely ground oats, hulls included. Also poults have greater vitamin D requirements than chicks. Two per cent cod liver oil or equivalent is needed in all turkey starting rations.

The method of feeding poults is similar to chicks. Although many are of the opinion that feed should be withheld for 24 hours to avoid digestive troubles, just as many state that poults are ready for feed as soon as they are removed from the incubator.

TABLE 2

Age of Turkeys Months—Weeks	Average Weight of Toms and Hens in pounds	Lbs. gain in Wt. for each week. Average for Toms and Hens.	Lbs. of feed consumed for each week			Total feed for each week	Cumulative feed requirements for each successive week	Lbs. of feed required to produce one pound of gain in Wt. for each week
			Starting Mash	Growing Mash	Grain			
(Initial weight)	.12							
1st	.20	.08	.08			.08		1.00
2nd	.40	.20	.24			.24	.32	1.20
3rd	.61	.21	.30			.30	.62	1.42
4th	.85	.24	.40			.40	1.02	1.67
1st Month Total	.85	.73	1.02			1.02	1.02 Av.	1.89
5th	1.15	.30	.56			.56	1.58	1.87
6th	1.53	.38	.76			.76	2.34	2.00
7th	1.99	.46	.76	.25		1.01	3.35	2.19
8th	2.51	.52	.94	.30		1.24	4.59	2.38
2nd Month Total	2.51	1.66	3.02	.55		3.57	4.59 Av.	2.15
9th	3.06	.55	.95	.58		1.53	6.12	2.78
10th	3.66	.60	.92	.65	.15	1.72	7.84	2.87
11th	4.31	.65	.88	.89	.20	1.97	9.81	3.03
12th	5.01	.70	.91	1.13	.22	2.26	12.07	3.23
3rd Month Total	5.01	2.50	3.66	3.25	.57	7.48	12.07 Av.	2.99
13th	5.77	.76	.65	1.62	.25	2.52	14.59	3.31
14th	6.57	.80	.80	2.18	.30	2.78	17.37	3.47
15th	7.40	.83	.270	2.70	.35	3.05	20.42	3.67
16th	8.27	.87		2.85	.40	3.25	23.67	3.73
4th Month Total	8.27	3.26	.95	9.35	1.30	11.60	23.67 Av.	3.55
17th	9.17	.90		2.72	.70	3.42	27.09	3.80
18th	10.10	.93		2.52	1.08	3.60	30.69	3.87
19th	11.05	.95		2.28	1.52	3.80	34.49	4.00
20th	12.01	.96		2.00	2.00	4.00	38.49	4.17
5th Month Total	12.01	3.74		9.52	5.30	14.82	38.49 Av.	3.96
21st	12.91	.90		1.68	2.52	4.20	42.69	4.67
22nd	13.76	.85		1.76	2.64	4.40	47.09	5.18
23rd	14.56	.80		1.84	2.76	4.60	51.69	5.75
24th	15.19	.63		1.92	2.88	4.80	56.49	7.62
6th Month Total	15.19	3.18		7.20	10.80	18.00	56.49 Av.	5.66
25th	15.74	.55		2.00	2.95	4.95	61.44	9.00
26th	16.24	.50		2.00	3.10	5.10	66.54	10.20
27th	16.69	.45		2.00	3.15	5.15	71.69	11.44
28th	17.09	.40		2.00	3.20	5.20	76.89	13.00
7th Month Total	17.09	1.90		8.00	12.40	20.40	76.89 Av.	10.73
Total for 7 Months	17.09		8.65	37.87	30.37	76.89	76.89 Av.	4.34

One of the main essentials in the first feeding is the necessity for all poults to eat. Many follow the practice of dipping each poult's beak into milk to make sure it has had some nourishment. Some put bright colored marbles on top of the mash. When picking at the marbles, the poults get feed in spite of themselves.

While the birds must never go hungry, many operators prefer frequent feeding to leaving the feed before them for the first few days to avoid "stalling." In order to provide adequate feeding space, 2 to 2½ linear inches of feeder space is allowed for each poult. The space is doubled at 4 weeks and again at 8 weeks.

Two starting mashes are included in this bulletin; one containing 26 per cent protein where no milk is available. The other contains 19 per cent protein and therefore is cheaper, to be fed where milk is before the poults at all times and where the birds are receiving an adequate supply of green feeds.

During the first 8 weeks the poults will consume about 3 to 5 pounds of feed per bird.

No. 1 Starting Mash

Bran	12 pounds	
Finely ground oats (including hulls)	12 pounds	
Middlings or shorts.....	12 pounds	
Ground yellow corn	18 pounds	
Dried milk	17 pounds	
Meat scrap (50% protein).....	13 pounds	} or all meat scrap
Fish meal	7 pounds	
Alfalfa leaf meal.....	6 pounds	
Tested cod liver oil.....	2 pounds	
Salt	1 pound	
Total	100 pounds	

No. 2 Starting Mash

Yellow corn meal.....	45 pounds
Middlings or shorts.....	15 pounds
Bran	15 pounds
Meat scrap (50% protein)....	12 pounds
Fish meal (65% protein)	5 pounds
Alfalfa leaf meal.....	5 pounds
Tested cod liver oil.....	2 pounds
Salt	1 pound
Total	100 pounds

At 8 weeks the poults are gradually changed to a growing mash which is lower in protein. No change is necessary thereafter. Both grains and mash are before them. The birds balance their own ration. As they approach maturity more grain and less mash is consumed. At about the 26th week, when the average turkey completes its growth, the birds are eating over 50 per cent more grain than mash.

During the growing stage it is essential to range birds on alfalfa. This practice cuts feed costs over 10 per cent. Without an unlimited supply of green feed for the period from 8 to 24 or 26 weeks the birds will consume from 36 to 40 pounds of mash and from 24 to 28 pounds of grain. Thus with average feed prices at least \$1.00 per bird could be saved by having adequate green range for the birds during their growing period.

TABLE 3—TURKEY FEEDING AND MANAGEMENT CHART

Age	Brooder Temperature	Scratch Grain	Dry Mash	Milk	Green Feed	Other Things
Poults up to 24 hours	98° - 100°	None	None	Slight Amount	None	Not more than 250 in a group. Provide guard for stove to prevent chilling.
1st feeding day	98° - 100°	None	*About 1 oz. to 100 poults 5 times daily	All they want	None	
From first feeding day to end of 1st week	98° Lower to 95°	Morning Not more than 2 oz. per 100 poults Evening All they will clean up in 20 minutes	Same as first day gradually increasing amount of feed or give what they will clean up in 15 minutes	All they want	All they want	Get them out of doors as soon as possible. If ground is not absolutely new use wire or slat floor porch or freshly graveled runs.
2nd week	95° Lower to 90°	Same as first week	Dry mash before them all the while	All they want	All they want	Still confine to sanded yards or wire or slat floor porches.
3rd week to 7th week	85°	Same as first week	Dry mash before them all the while	All they want	All they want	Same as second week.
7th week to fattening time	Take heat away when backs are covered with true feathers	Same as 3rd to 7th week	Mash before them all the time	All they want	All they want	When heat is removed prepare portable roost coop. Range birds on clean ground, provide shade where they may rest during heat of the day.
Fattening period		Mixture rich in fattening material before them at all times		All they want	All they want	Keep cooped until 9 or 10 A. M. or until they have eaten so that tendency to range is lessened.

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

GROWING MASHES

Complete Ration	or	Simplified ration for use when good green range is available.	
Bran	12 pounds	Bran	10 pounds
Shorts or middlings.....	12 pounds	Shorts or middlings	20 pounds
Ground oats (hulls included).....	12 pounds	Ground oats	10 pounds
Ground yellow corn.....	34 pounds	Ground barley or corn.....	20 pounds
Alfalfa leaf meal.....	6 pounds	Ground yellow corn.....	20 pounds
Meat scrap	13 pounds	Meat scrap	19 pounds
Dried milk	10 pounds	Salt	1 pound
Salt	1 pound		
Total	100 pounds	Total	100 pounds

Supplements required for both mashers are (1) water to drink (2) scratch grain—one of the common grains or a mixture of two or more.

For a detailed description of the amounts of feed consumed and expected gains occurring from hatching time until maturity, the table prepared by L. E. Cline, Nevada State college is here included. These findings tally with the work done at the U. S. Range Livestock Experiment Station at Miles City, Montana and also follow the figures gathered on 2200 turkeys raised by the Smith-Hughes Agricultural students in this state.

Feeding Difficulties—While diseases are taken up in a separate chapter and handled by the Veterinary Science department at Montana State college, it is essential to point out certain conditions under the head of feeding which may appear to be diseases but which are in fact merely nutritional, or feeding disturbances.

Rickets—or a vitamin D lack occurs where there is insufficient cod liver oil or other guaranteed fish oils, sun-light, or green feed to aid in proper bone calcification. Slight cases of vitamin D lack is one of the causes for crooked breasts. Poults severely affected with rickets often stagger about stiff legged or sit down on their hock joints.

Most rations contain enough calcium and phosphorus for proper bone calcification but may lack the vitamin D content. This vitamin assists in making the bone building materials available to the blood stream. As stated before 2 per cent cod liver oil or substitute should be added to all poult rations up to 6 or 8 weeks. Then one per cent should be added for the rest of the growing period. However, it should be discontinued at least a month before the date of slaughtering to avoid any possible fishy taste to the meat.

Percosis, or slipped tendon at the hock joints or enlarged hock joints may occur where there is an over supply of phosphorus or a lack of manganese. This might be the result of adding too much bone meal or other calcium phosphorus bearing materials. Also the condition is the result of feeding a ration deficient in an antiperosis factor. Wheat bran and grey middlings seem to supply this factor. These grain products contain minute amounts of

manganese which aid in perosis prevention. Also, perosis may be the result of over crowding or overheating.

A Vitamin G lack produces a peculiar type of paralysis. The birds' toes curl in and often the leg muscles become flabby and withered. Vitamin G occurs chiefly in milk and milk products and alfalfa meal, therefore, the trouble rarely occurs where the poults have some form of milk in the diet.

Management for the 1st Eight Weeks

A. **With Natural Methods**—The coop has already been described. The main thing to keep in mind is keeping the coops dry and sanitary. Moving once a day is advisable. It is best to remove poults from the coops and wean them as soon as the poults are feathered over their back since crowding usually causes lowered vitality and faulty mineral assimilation which in turn results in crooked breasts.

B. **With Artificial Methods: The House**—Not over 225 to 250 poults should be brooded in a unit, since at least 1 square foot of floor space should be allotted to each poult. Thus the single unit brooder house should be about 14 x 16 feet. A shed roof house 7 feet high at the front and 5 feet at the rear makes a convenient house. If the house is portable a wooden floor is necessary. The house may be built on skids.

House equipment—for the first two weeks gravel on top of the board floor which is changed at least weekly makes an excellent floor covering. From the third to eighth week coarse straw may be used. The straw should be changed every other day. This would mean 17 changes or about one ton or less of straw.

The stove—Any good brooder stove may be used which gives a constant and reliable source of heat. The main requisite is adequate size. Where a hover is used with the stove it should have a 56 to 60 inch hover. During the first week of the poult's life a temperature of 95° to 100° is required 3 inches from the floor at the edge of the hover. This should be lowered gradually, about 5° a week, until a temperature of 75° to 80° is reached and then at the eighth week the heat can be entirely removed.

Roosts—During the first two weeks, until the poults become "hover-wise," a wire guard is placed about them at night. Further, to prevent crowding all the corners of the room should be rounded with wire mesh. Then at the end of two weeks, low, flat 2 inch roosts, slightly tilted, may be placed ladder fashion at the rear of the brooder house. The front roost is placed 6 inches from the floor and each of the others slightly higher than the one in front of it, and about 8½ inches from center to center. For 225 to 250 poults, 5 roosts the length of the house will be sufficient.

Drinking Fountains and Feeders—should always be placed on wire platforms. It is surprising the amount of filth that accumulates about these receptacles. Furthermore, to insure even growth the poults need plenty of space for feeding and drinking (1 linear foot to each 5 poults for the first four weeks, and twice the space, or 2 linear feet per poult for the fourth to eighth week period).

Sanitation is the cornerstone of turkey success. They cannot be raised on the same ground with chickens. If the brooder house cannot be moved to entirely clean ground each year, either a sun porch must be provided, or an enclosure made before the brooder house where the top dirt has been scraped off and the spot covered with clean sand and gravel. As in the brooder house, all drinking fountains and feed hoppers must be placed on wire frames.

Management and Care During the Growing Season

During this period, the management of all turkey young stock is identical whether brooded by the natural or artificial method. The birds should be weaned at 8 weeks (at the same age artificial heat is removed) and the old stock marketed if possible. No profit is made by holding over adult stock after the breeding season unless of exceptional breeding value. At the same time the presence of adults with young stock is a constant risk and source of disease.

The Range—Wherever possible the growing stock should be grown on an alfalfa or an equivalent range. Successful turkey growers of the state

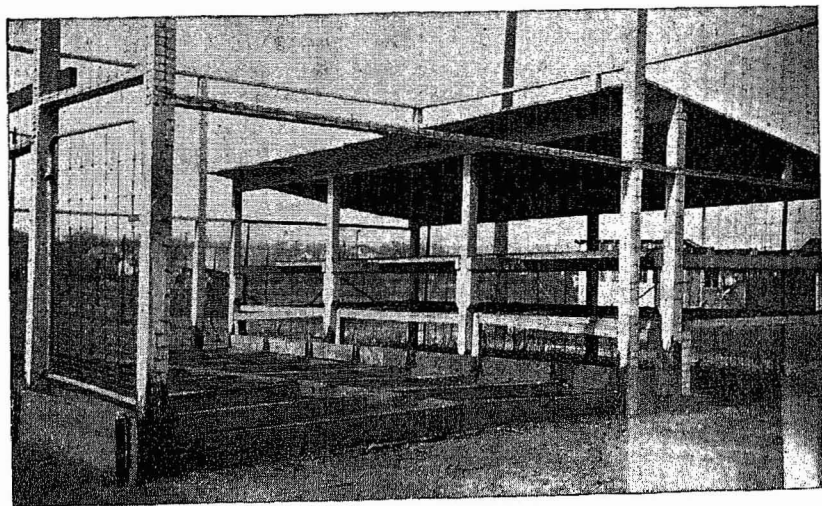


Fig. 8—A good shelter may be provided at low cost. (Courtesy of Nebraska Station).

mainly follow two methods on range. They may have permanent roosts with wire under them, near the alfalfa field. After ranging the birds during the day they are returned to the roosts at night, (to get greater use of the alfalfa many put up temporary four-foot fences which are changed every few weeks). The other method is to put the entire outfit on wheels and take it about the range. The latter custom is followed especially where 400 or more birds are being handled on a good livestock range. When using this latter plan the caretaker usually lives in a tent beside the birds, which are roosted on the running gears of wagons inside a very temporary corral.

Whenever birds are roosted outside, in large numbers, it is well to have a lantern burning. This keeps away owls and predatory animals and saves stampeding of the birds when strange noises occur.

As in the brooding period, sanitation is of utmost importance. If the birds are not moved frequently, all drinking fountains and feed hoppers should be placed on wire platforms. Under no consideration is feed ever scattered on the ground.

Fattening

Turkeys, as a rule, will not fatten until completely grown. As previously stated, most flocks balance their own ration, if both growing mash and whole grains are kept in feeders before them at all times. During the finishing period they will consume less mash and more grain (see table 2). However, especially with late hatched poults, a more rapid finish can be made by whetting appetites, hence causing more feed to be consumed. Some growers give extra feeding of moist mash (not wet) at noon. Others find soaking alfalfa leaves and whole barley over night and then adding enough mash to take up the moisture makes a tasty tidbit.

Whatever method is used to put on flesh, growers must bear in mind the fact that the mountain states have won a national reputation on their white-carcassed, wheat fattened birds, therefore, it is wise to use yellow corn sparingly, (never more than 20 to 25 per cent).

Preparing for Market

Since there are three major marketing dates, the Thanksgiving occurring in early November; the Christmas, in early December; and the freezer pool, the middle of January; there is never a need to kill unfinished birds.

Before the first selling date, the flock should be carefully examined. First, select and mark the birds to be kept for breeding purposes, (that is, if breeders are to be retained). Then shut up for "starving" only those entirely ready for market. "Cut back" the rest for the next marketing date or until ready.

A bird is finished when its pin feathers are grown out and the carcass is covered with fat. To look for finish part the feathers over the hips and along the breast. In unfinished birds the skin in these sections has a bluish cast and the bones are prominent. A bird with more than two "green" main tail feathers is not finished.

Starving—Before killing, birds should be kept off feed for 15 to 18 hours so there is no material left in the crop or digestive tract. "Cropy" birds are rejected since they not only start to decompose in shipment and are termed "green turkeys," but also cause adjacent birds to spoil. Water should be given during the fasting period as this aids in washing out the digestive tract.

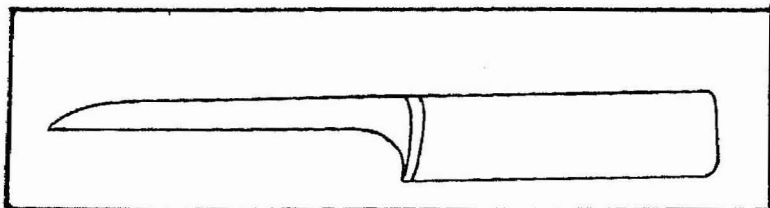


Fig. 9—Sticking knife.

Killing—Since the bulk of Montana turkeys are exported, dry picking is necessary. Dry picking is made easier if the operator has the proper 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. 10 and 11).

Wings must never be locked to prevent fluttering, since a broken wing is sure to occur. Birds with broken wings are graded down.

Bleeding—The first step in killing is to cut the jugular vein (Fig. 12) to insure maximum bleeding. If free bleeding does not occur a blotchy carcass is the result. It is a common failing not to cut far enough back. This can be avoided if the operator first makes a careful examination of the mouth. Back of the cleft in the palate two veins can be seen as distinct blue lines like the veins on the back of a human hand.

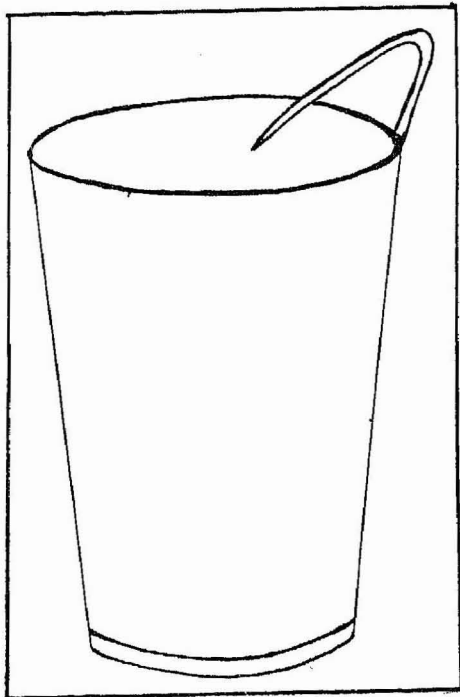
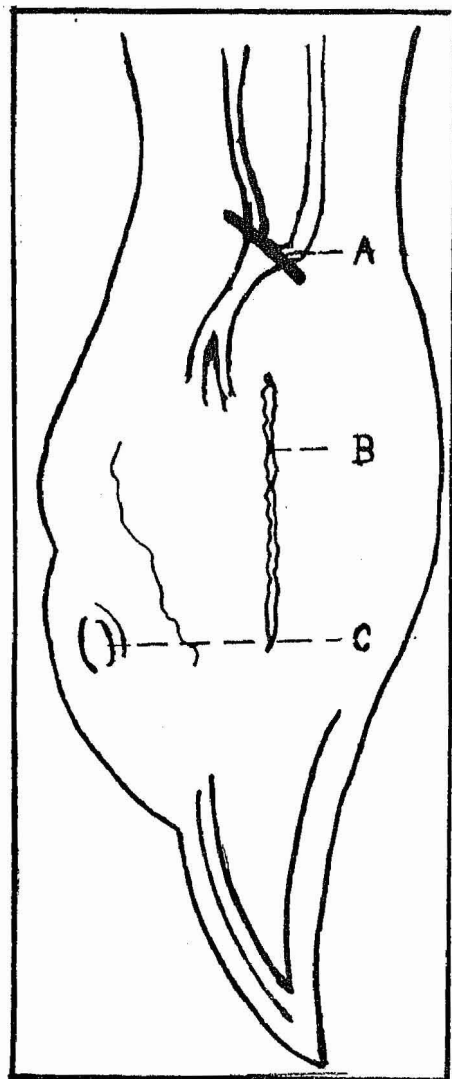


Fig. 10—Blood cup.

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 roof of the mouth, through the edge of the eye or the fleshy part



of the face. The idea is to reach the nerve center controlling feather ends (Fig. 11). If the "stick" is correct the main tail immediately contracts with a shiver only to fan out relaxed the next moment.

Picking—First, fasten the blood cup into the lower jaw so that the bird is weighted down and protected from the spattering blood during the picking. Main tail feathers are the first removed 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. Even the "fan feathers" must be removed from the wings in order to have a bird completely dressed.

Cooling—After the bird is 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 properly cooled bird has an internal temperature of 36° F. or lower. A poorly cooled or frozen bird is rejected. When a bird is thoroughly cooled the abdomen between the keel and pelvic bones becomes ridged like a tallow candle.

Fig. 11—For proper bleeding cut the jugular vein (A). The vein is found just back of the cleft of the mouth (B) which starts just below the ear (C).

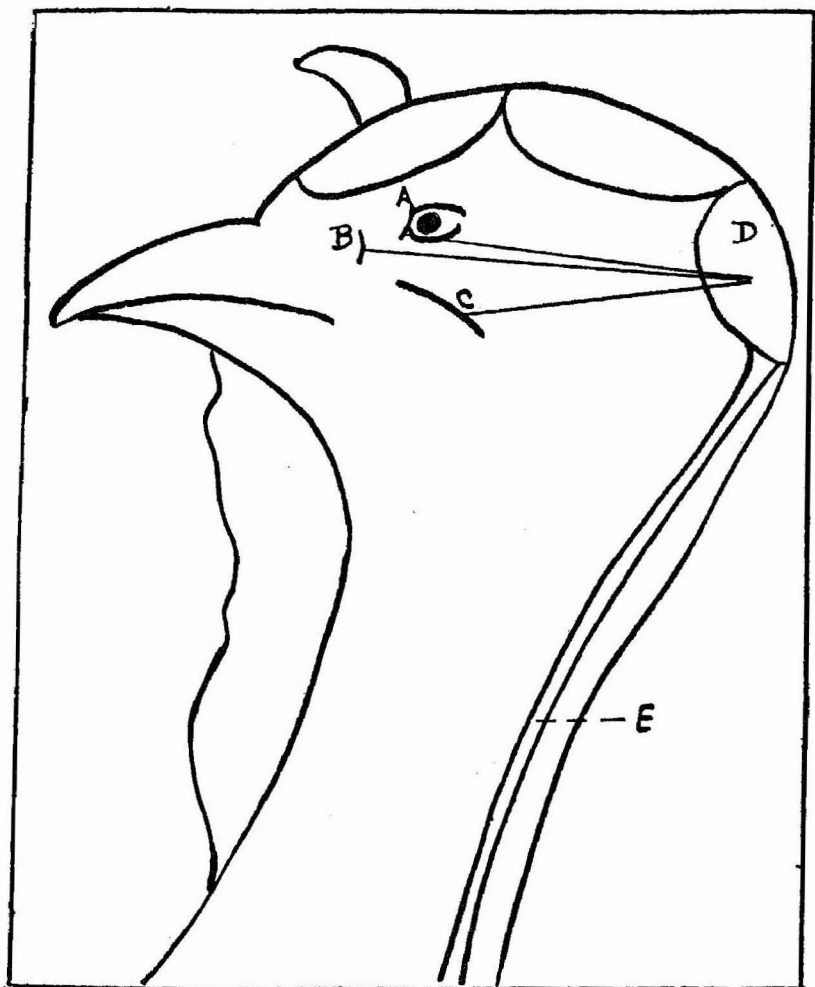


Fig. 12—The brain (D) must be pierced to loosen feathers. To reach the brain the knife may be inserted at the edge of the eye (A), just in front of the eye (B) or in the cleft in roof of mouth (C). The spinal cord (E) connects with the brain.

Dressing Losses—Knowing the live weight of any given number of birds it is simple to estimate the dressed, cooled weight or the amount that is inevitably lost through dressing operations. A bird loses about 3.3 per cent of its weight during the “starving” period. This is the reason for not keeping birds off feed for more than 15 to 18 hours. The shrink due to loss of blood in slaughtering, feathers in picking, evaporation in over night cooling, averages about 9.6 percent. Of this amount only 0.2 per cent is the loss

incurred from "cooling" shrink. Fully-drawn birds weight loss is about 14.65 per cent of the dressed and chilled weight. These figures were obtained from an article by S. J. Marsden, Bureau of Animal Industry, formerly at the U. S. Range Livestock Station at Miles City, Montana.

Packing—While most of the Montana turkeys are sold through co-operative associations where the packing is handled by the pool, methods of packing are included for these who market individually. The associations either side or breast-pack their birds in cottonwood or similarly odorless soft wood boxes (See Fig. 13). Single layer pack is preferred because

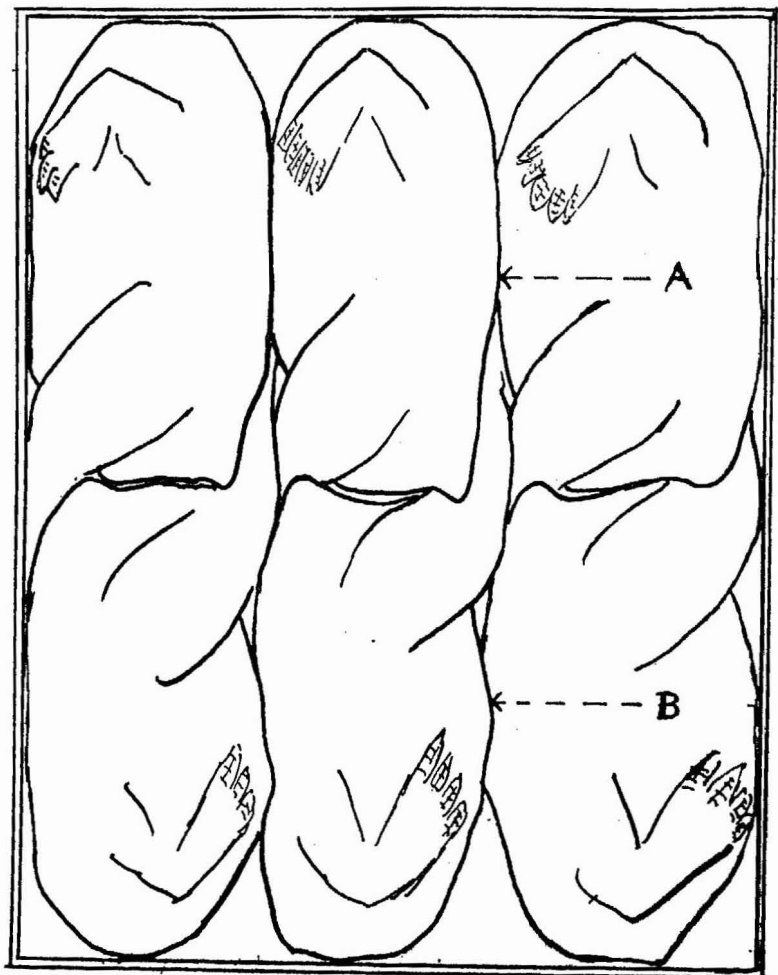


Fig. 13—The proper box pack, showing the relative positions of backs (A) and breasts (B).

of cooling advantages. Toms are packed on their sides, while hens are packed breast up, heads tucked under and feet hidden under the bird opposite. Eight to 10 hens can be packed in a $7\frac{1}{2}$ x 28 x 32 inch box. All boxes should be wired.

The barrel pack is avoided except in rare instances as there is too great a risk of spoilage. Besides birds are misshapened and not as salable when removed from a barrel.

Remember never to pack a bird until the internal temperature is 36° or lower. An accurate thermometer is a necessity in turkey packing.

The appearance of the pack is enhanced by head wrapping (Figs. 14 and 15).

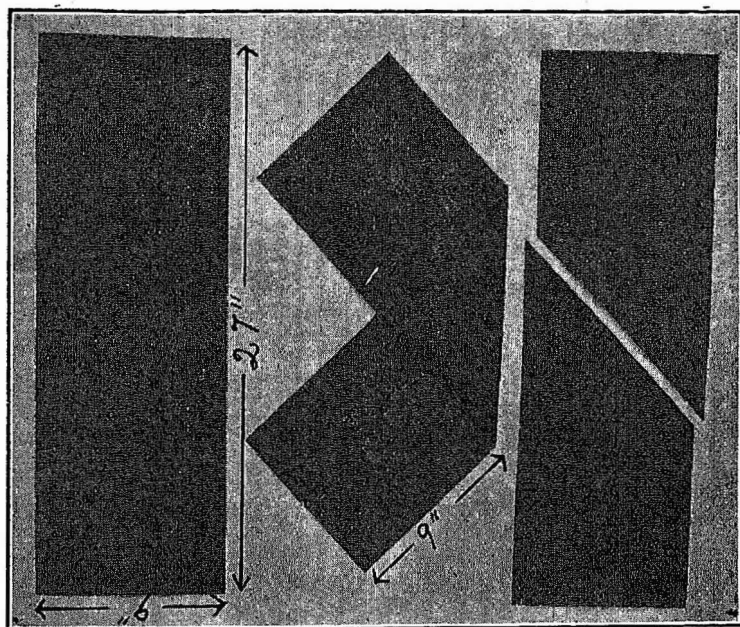


Fig. 14—The size and shape of head-wrap used when preparing turkeys for market.

Marketing

Since marketing is a distinct subject and cannot be done justice in a bulletin devoted to the growing of turkeys, those interested in the subject of grading and marketing are referred to Montana Extension Service Bulletin No. 150.

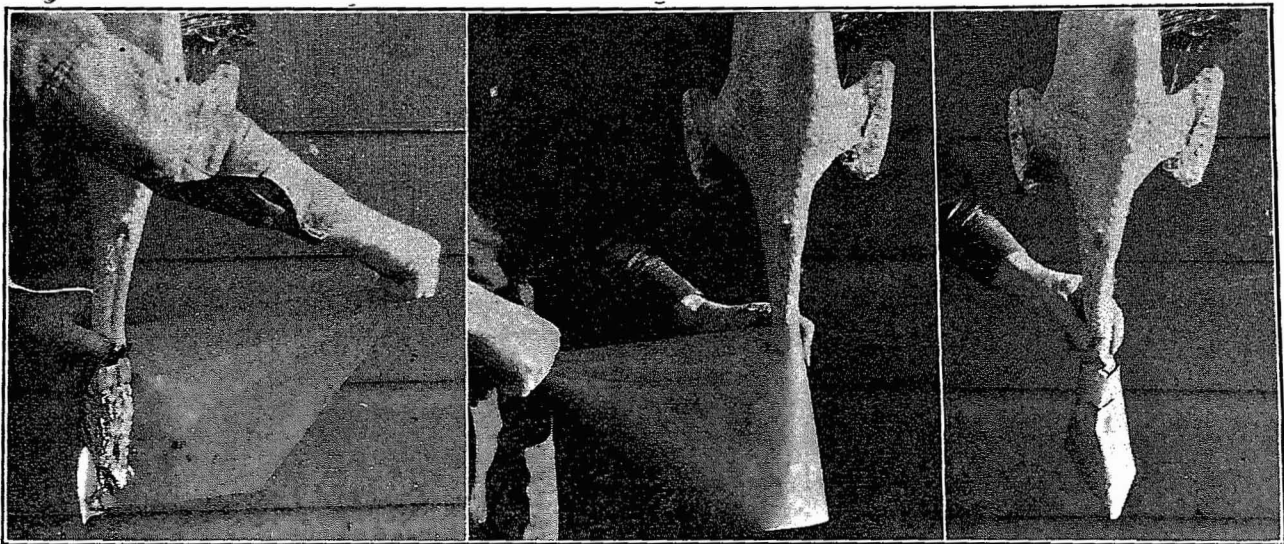


Fig. 15—Wrapping the heads gives dressed turkeys a better appearance on the market, but it must be done properly.

Diseases and Parasites of Turkeys

By

DR. HOWARD WELCH

Veterinarian, Montana Agricultural Experiment Station

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 heavier 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 hothouse 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. The turkey grower, therefore, must be able to recognize some of the well known turkey ailments and know something about their control.

Blackhead

Blackhead is an infectious disease of turkeys, rarely affecting chickens and other birds. It is acutely infectious, with a high mortality, in half-grown poults, 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. 45 of the Montana Extension Service describes tuberculosis 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 flock of turkeys that have had losses from blackhead. Since the disease is of the lower intestine and liver, discharges from the bowels 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. Poultts 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 infecting their ranch.

Tuberculosis

Tuberculosis is a common disease of chickens, and occasionally affects turkeys. The disease has not been noticed as affecting as large a percentage of a flock of turkeys as chickens. The emaciated body, the long drawn out sickness, and the typical "spotted liver" make the disease relatively easy to recognize. Observations of tuberculosis in turkeys indicate that most of the tuberculous 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 tuberculous 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 important among turkeys than among chickens.

The tuberculous 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 varying symptoms, in turkeys roup is usually an infectious, catarrhal cold. The symptoms are at 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 roup chickens. Many times it is traceable to overcrowding 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 drinking water has been recommended, it is doubtful if this practice produces any tangible results.

Treatment of affected birds consists of providing drainage for the swollen cavities of the face and head. The bulging swelling 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 per cent to 15 per cent) or with iodine. The nostrils 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 recommended for this purpose.

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

Coccidiosis

Coccidiosis is an infestation of the intestine with minute organisms known as coccidia, and though causing some trouble with chickens, it has never been reported in Montana among turkeys. If it does occur here at all, it is unimportant. Other states report trouble with coccidiosis in turkeys.

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 (Botulism)

The condition known as limberneck is characterized by a paralysis of either legs, wings, or neck, or all combined. Death usually occurs in a day or less, and as a rule a large number of birds are affected at the same time. It is due to botulism, or poisoning from the toxin of the *botulinus* organism, so often found in decayed meat, spoiled canned foods, spoiled fish, etc., and is often called ptomaine poisoning. Losses have often occurred from the turkeys drinking at stagnant water holes containing masses of decayed weeds. As with most poisons of this type, a postmortem examination shows nothing that would suggest the cause of death.

The first thing to do is to shut the entire flock in some poultry house or pen until the source of the trouble can be located and removed. It may be necessary to fence off water holes if they seem to be the cause of the trouble. There is no satisfactory treatment for the sick birds, though a few of them may recover.

Ulcerated Crop

During the fall and early winter, every year, turkeys are sent to the laboratory which, on postmortem examination, show an extensive ulceration of the crop and stomach. These ulcers are hard yellowish areas, from the size of a pinhead to the size of a pea, and thickly scattered over the lining of these organs. This condition is due to a small parasite known as *Trichomonas*, and very little is known of the conditions that cause this infestation, nor of methods of control. It has been suggested that stagnant water, mouldy strawstacks, and general unsanitary surroundings are responsible.

Copper sulphate in the drinking water, in a 1-2000 solution (1 teaspoonful of bluestone crystals to 2 gallons of water), has apparently been successful in some outbreaks of this disease. The treated water should be used for three days, and repeated in a week. During treatment, the birds should have no other water.

Tapeworms

There are six or seven types of tapeworms which infest turkeys, but as these resemble each other closely, except for size, and have the same effect upon the birds, we need not concern ourselves with any distinctions, and shall speak of them simply as tapeworms. These parasites are found

attached to the intestinal wall, nearly always in the first ten or twelve inches of intestine immediately below the gizzard, and can be plainly seen as chalky-white, ribbon-like, segmented or jointed worms, from an inch to six or eight inches in length.

Unlike roundworms, the tapeworm eggs, on the ground, are not picked up by turkeys, but by flies, grasshoppers, earthworms, etc., which serve as hosts to the young tapeworm larvae, just as the "water blisters" on rabbits are the larvae of the dog and coyote tapeworm. When the turkey eats a beetle or grasshopper or worm, it is likely that several young tapeworms will shortly locate themselves in the turkey intestine.

As with other parasites, the effect of the tapeworm upon the host turkey depends on the number of worms present. When the worms become so numerous that there is not enough food for both host and parasites, then the turkey becomes pale, listless, thin, and may die. If postmortem examination shows large numbers of tapeworms present (25 or more), some effort should be made to control the worms.

Moving the birds to clean range is about the only suggestion that can be made, though such advice cannot often be followed. There is no satisfactory medical treatment. Kamala tablets, tobacco dust in mash, lye and grain mixtures, have all been used. There are also several "worm pills" on the market. All of these will remove many of the worms, but none of them will give more than temporary relief.

Roundworms

The common roundworms, *Ascaris*, 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 in 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 or three inches long; round, firm, white and sharply pointed at both ends. 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-round 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 10 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 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, set method, or special time of the year when this should be done, but the mature turkey 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 treatment is applied to the roosts rather than to the birds. Waste crank case oil, applied liberally to the roosts with a whitewash 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 the turkeys 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 disease and parasites. Therefore, unless the turkey grower can provide double yards that are graveled or movable 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.