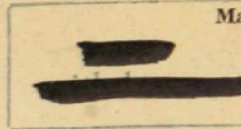


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Bulletin 370-A

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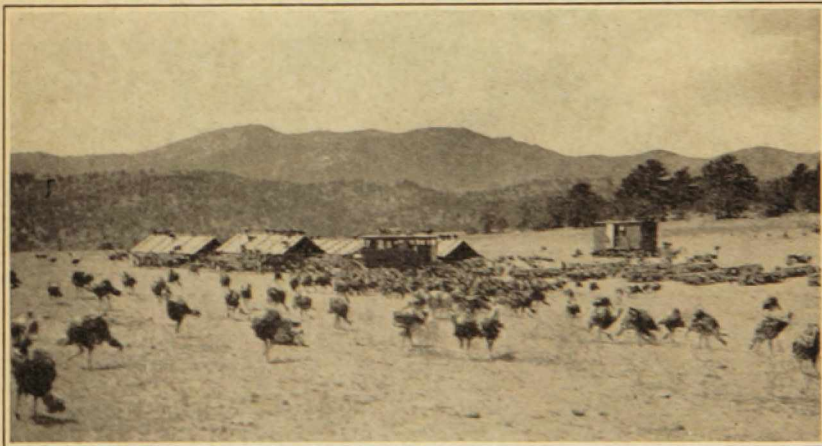
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TURKEY PRODUCTION IN COLORADO



Conditions in Colorado are especially favorable for raising turkeys.

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Cooperative Extension Work in Agriculture and Home Economics, Colorado State College of Agriculture and Mechanic Arts and the United States Department of Agriculture Cooperating. Distributed in Furtherance of the Acts of Congress of May 8 and June 30, 1914.

TURKEY PRODUCTION IN COLORADO

H. S. WILGUS, JR., *Department of Poultry Husbandry*

O. C. UFFORD, *Extension Poultryman*

Turkey production in Colorado has become a highly specialized business. Numerous growers have progressed from the small farm flock to flocks numbering up to thousands of birds. The two chief phases of the industry are the production of turkeys for market and the production of breeding stock, hatching eggs, and poults. The first phase has been well developed; the second is only at the beginning stage and offers an excellent opportunity for future development.

The development of turkey hatching has progressed to the point where it is now possible to purchase poults in almost any number. The practice today is for the grower to buy poults rather than do his own hatching. The lure of good prices and the financing of turkey raisers by various agencies have drawn many into the business of turkey raising. These factors are partially responsible for the large numbers grown and for some of the present problems.

Growers should not be misled by tales of great profits to be made on turkeys. The turkey industry is highly competitive, and the day of quick profits is gone. Success is attained only through experience, ability, hard work, long hours, and adequate cash reserve. A sound practice is to grow only the number of birds that one can adequately feed with home-grown grains, allowing 50 pounds of grain per poult. Poults should be purchased only from stock bred and selected for excellent market qualities, tested by the tube method for pullorum disease, and hatched in incubators entirely separate from chicks.

Managing Turkey Breeders

The increase in turkey-hatching capacity in Colorado is creating a demand for hatching eggs and offers an income from this source for growers. The production of early hatching eggs in this State is possible if the breeding flock can be housed in comfortable, well-ventilated quarters and fed a ration balanced for production of hatchable eggs.

The proper practice is to use as breeders young birds which have been selected for early maturity, fine finish at market age, and low-set, blocky type of body. They should be free from pin feathers, fully fleshed, and well and evenly fattened. Females should be fully finished at 24 weeks of age, and males at 28 weeks. The earlier



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the bird is ready for market, the lower the cost of production and the greater the profits. All birds should meet standard requirements for weight or about 12 pounds for Bronze females at 24 weeks, and 22 pounds for Bronze males at 28 weeks. Only the very best birds which are free from defects, such as crooked, notched, or knobby breastbones, should be saved as breeders. The best market type has a relatively short shank, long breastbone, and moderate front-body depth. It has been found that the shorter the shank length for a given weight, the greater the fleshing. Oklahoma Agricultural Experiment Station workers suggest the following body measurements as minimum requirements for turkeys at the size and age indicated:

*Males, 28 Weeks of Age				*Females, 24 Weeks of Age			
Wt. (lb.)	Maximum shank (inches)	Minimum keel (inches)	Maximum depth (inches)	Wt. (lb.)	Maximum shank (inches)	Minimum keel (inches)	Maximum depth (inches)
	less than	more than	less than		less than	more than	less than
15	7.0	6.7	8.2	8	5.4	5.3	6.1
16	7.1	6.8	8.4				
17	7.3	7.0	8.5	9	5.7	5.5	6.4
18	7.4	7.1	8.7				
19	7.5	7.2	8.9	10	5.9	5.7	6.6
20	7.7	7.3	9.0	11	6.0	5.9	6.8
21	7.8	7.5	9.2				
22	7.9	7.6	9.3	12	6.2	6.0	7.0
23	8.1	7.7	9.4	13	6.4	6.2	7.2
24	8.2	7.8	9.6				
25	8.3	7.9	9.7	14	6.5	6.3	7.3

*These measurements are applicable only to turkeys at or before the ages specified. This table is from Okla. Exp. Sta. Bul. No. 236, by Milby and others.

These measurements are taken with a machinists' sliding-jaw caliper with 4- to 5-inch jaws and with a capacity up to 12 inches, calibrated by 1/10 inches. The shank is measured from the heel or back of the hock joint to the skin between the pads of the foot while the turkey is held on its left side with the feet pulled up in normal standing position. The breastbone length also can be measured at this time. The breast line should be straight or slightly curved and approximately parallel to the back. The front-body depth is measured from the front edge of the keel to the middle of the back just behind the shoulder joints (or roughly on a line perpendicular to the line of the breastbone) while the bird is suspended from the milk scales used for weighing. These measurements afford an accurate gage of body type and remove many of the errors of individual judgment.

One tom is usually mated to 10 to 15 females, depending on the age and activity of the male. A good practice is to divide the males into two or more groups and to alternate these groups with the females every week or so. When large numbers of males are running in the flock, fertility is often lowered by fighting and interference among the males. Young birds make the best layers; old birds are kept for breeders when they are of exceptionally fine quality and have good production and hatchability records. The breeder desires as many offspring as possible from such birds as long as they produce. In cases where old birds are used, it is preferable to mate young toms to old hens and old toms to young hens. Where possible, males should come from pedigreed stock, selected for type, production, hatchability, rapid maturity, and low mortality in order constantly to improve the flock in these important factors.

Early eggs can be obtained by the use of artificial light to provide a 14-hour day. One 60-watt bulb, with reflector 7 feet from the floor in the house will suffice for 200 square feet of floor space. Morning lights are preferable. Lights should be turned on about 5 weeks before egg production is desired. Birds should be 8 months old when lights are started. Toms should be put under lights 4 weeks before the hens are, so that early fertility will be aided. Lights stimulate egg production by the ovaries and spermatazoa production by the testes.

Pullorum disease and paratyphoid have increased alarmingly in poults. Mortality has been as high as 50 percent even in large flocks. Since these diseases are transmitted from infected breeders through the egg to the poults, it is important that no infected breeders be used. The usual rapid, whole-blood, stained-antigen test for pullorum disease in chickens is not accurate for turkeys. The laboratory-tube test is accurate and can be obtained at cost at the college. No breeders should be saved from flocks where this disease has been serious or where heavy death losses have occurred during the first 3 to 4 weeks of brooding. Since practically all chicken flocks carry more or less pullorum disease, it is of the utmost importance to keep chickens and turkeys entirely and completely separated at all times, in incubation, brooding, rearing, and breeding.

Rations for Turkey Breeders

As in the case of chickens, the ration fed to the turkeys markedly affects the hatchability of the eggs and the vitality of the poults. To assure good results, special breeder mash rich in milk products and alfalfa or other green feed should be fed. Until more is known concerning the exact requirements of turkeys that are used for breeders, the same breeding rations recommended for breeding

chickens should be used, except that the content of standard fish oil should be increased to $2\frac{1}{2}$ percent unless the birds are out in the direct sunlight. The additional cost of this mash over an ordinary mash is repaid many times by the increased number and vigor of the poults.

Incubation of Turkey Eggs

For incubation, turkey eggs require conditions differing only slightly from those required for chicken eggs. An incubation temperature of 99° at a relative humidity of 60 percent appears to be best for the first 24 days in the cabinet-type incubator. During the last 4 days a temperature of 98° and a relative humidity of about 70 percent are recommended in separate hatchers. In the still-air type the temperature should be 102° for all 4 weeks or 100.5° , 101.5° , 102.5° and 103° for each of the 4 weeks in order. The bulb of the thermometer should be level with the tops of the eggs.

Turkey eggs should be turned three to five times daily to the twenty-fourth day. A wet-bulb humidity indicator should be used when placed where air movement is rapid. For still-air machines, a good hair hygrometer is advised. Proper relative humidity and ventilation can be checked by weighing certain eggs before and during incubation. Under proper conditions, turkey eggs should lose $2\frac{1}{2}$ percent to 3 percent of their weight the first 6 days, 5 percent in 12 days, $7\frac{1}{2}$ percent in 18 days, and 10 percent in 24 days.

Brooding Turkeys

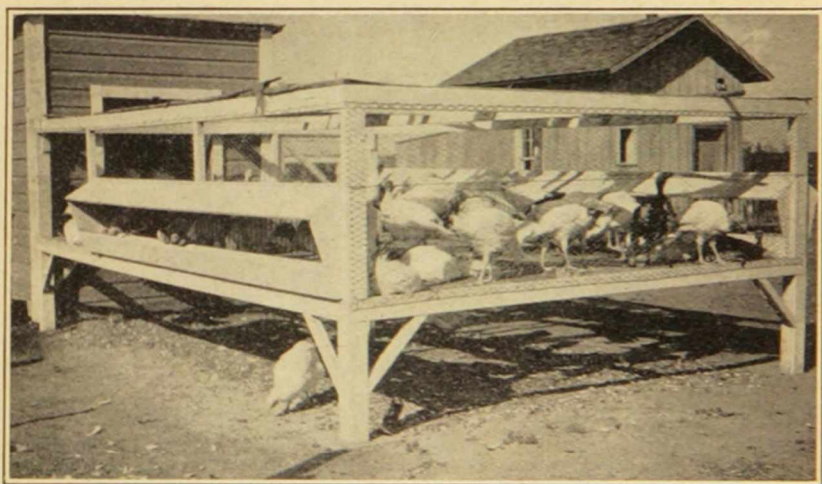
Many of the practices followed in the brooding of chicks can be used for poults. This applies principally to brooder house and equipment. The practice of growing large numbers of poults together is not generally advocated. Lots of not more than 200 poults give best results. A convenient size of colony brooder house for this number of poults is approximately 12 feet by 16 feet. Other types of brooder houses are being successfully used. Home-made battery brooders, equipped with feather-board hovers and with the room heated to about 80° the first week or equipped with electric-heated hovers, are in wide use. An electric hover gives excellent growth and feathering.

The minimum requirements for brooding 200 poults up to 8 weeks of age are as follows:

200 square feet floor space in floor brooding, or

70 square feet battery-brooder space per poult to 5 weeks; then doubled by adding outdoor runs of the same area.

- 17 square feet of hover space or one 56-inch hover.
- 40 feet feeder space from one side or 20 feet from both sides, 2 inches deep by 4 inches wide; feeder equipped with bill-cleaning wires or metal reels.
- 2 three-gallon water fountains, or,
- 8 feet of water-trough space from one side.
- 40 feet of 1-inch by 3-inch or 2-inch by 4-inch slightly tilted roosts—to 4 weeks, and 80 feet of 1-inch by 3-inch or 2-inch by 4-inch slightly tilted roosts—to 8 weeks.

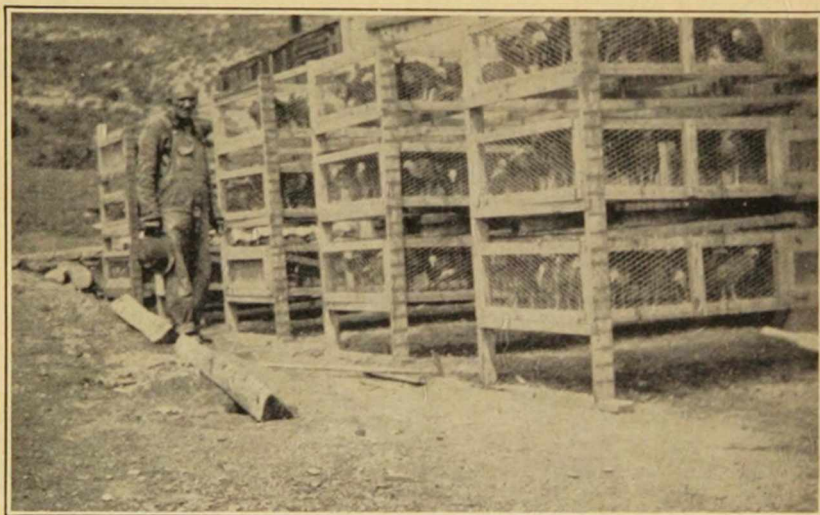


A convenient sunporch complete with feeders and water troughs for use with floor brooding. This provides extra floorspace and plenty of fresh air and sunshine.

Concrete, wood, oil mat, or adobe floors are preferable to the dirt floor because they are much easier to clean and disinfect. Several inches of ground corn cobs, short straw, wood shavings, or sand make good litter. When it is necessary to raise poults on a dirt floor, the dirt should be replaced yearly with clean soil to a depth of 6 inches and covered with 2 or 3 inches of sand or fine gravel which should be cleaned or changed as necessary. Litter should be changed as soon as it becomes dirty, damp, dusty, or badly-broken up.

Home-made battery brooders should have floors of 18-gage, $\frac{3}{8}$ -inch-mesh, hardware cloth.

The oil, gas, wood, electric, underground, and fireless types of brooders may be used with good results if properly handled. It is always a good practice to operate the brooder 2 or 3 days before putting poults around it. Poults should have access to a hover



Home-built battery brooders are a very satisfactory means of brooding poults.

temperature of about 90° when first placed around the brooder, the bulb of the thermometer being about 2 inches above the litter. It may be necessary to circle the stove with a hover ring of corrugated cardboard or of boards about 12 inches high to confine the poults near the heat for the first few days, but the ring must be at least 3 feet from the stove to permit the poults to get away from the heat if they so desire. The temperature should be carefully controlled, because poults will pile if it is too cold or too hot. A dim light in the brooder house will help to prevent piling at night. The brooder temperature should be reduced about 5° each week.

Fresh air in the brooder house is just as essential as heat. There is a very common tendency to keep poults too warm. When they are subjected to excessive heat with little ventilation, the poults are weakened and their vitality will be lowered. The poults should be hardened and put outdoors at the first opportunity.

Definite provision must be made for fresh-air intakes about $2\frac{1}{2}$ to 3 feet from the floor and for exhaust-air outlets at the peak of the house. Further directions on ventilation may be obtained by writing to the Poultry Department, giving a rough sketch of the house, the location and type of windows, and approximate dimensions.

Usually, windows are kept closed the first few days. They are opened more each week, the exact opening depending on the age of the poults and the outside temperature. They should be open sufficiently to keep the air in the house always fresh. Under such

conditions poults will be enabled to grow rapidly and will be well feathered and vigorous.

Some of the more common troubles encountered in brooding, and their causes, are as follows:

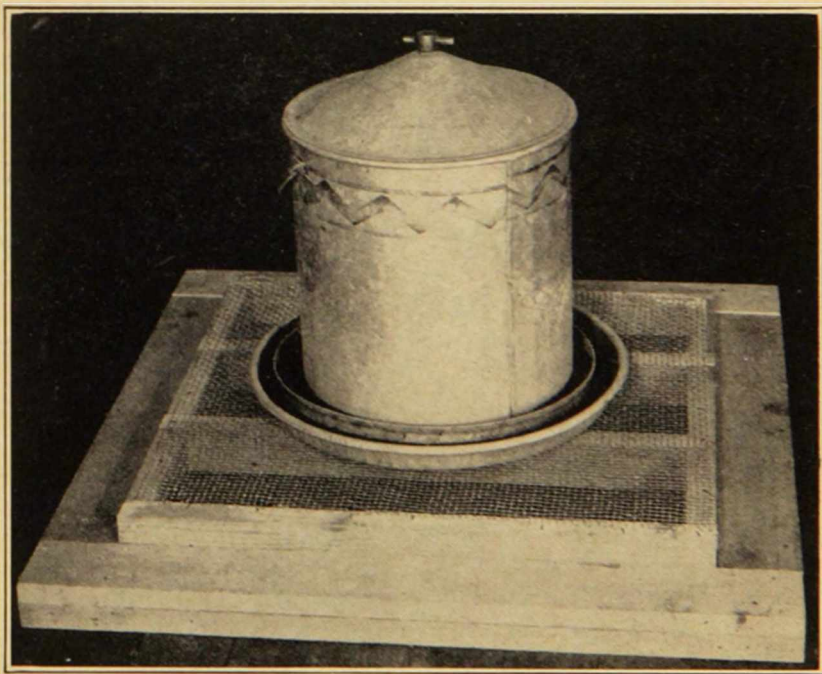
Feather picking.—Overcrowding of floor, feeder, or water space, and lack of wire or reel on mash feeder on which to clean beaks. Insufficient feed.

Poor or uneven growth; poor feathering.—Overcrowding as just described; inadequate rations; lack of ventilation; house too hot.

Crusty lesions at the corners of the mouth and on the feet.—Lack of ventilation; house too hot; possible dietary deficiency.

“Carbon-monoxide poisoning.”—Lack of proper ventilation; flue not carried 9 feet above peak of roof; flue leaking; incomplete combustion in stove owing to improper adjustment of fuel and air; dirty or sooty burner.

Disease.—Using feeders or waterers in which poults can get droppings or filth; overcrowding; not cleaning frequently enough or dis-



All feeders and water founts should be raised each week and should be kept on wire-screen frames.

infecting with 3- to 4-percent compound cresol solution before brooding. Contact with chickens in the breeding flock, in the incubator, or in brooding. Lowered resistance caused by inadequate rations, too much or too little heat, insufficient ventilation, overcrowding, faulty incubation, etc.

Special care should be taken to use feeders and waterers which exclude droppings and filth. Feeders should be equipped with reels or guards to keep poults out. Both feeders and water fountains should be blocked up from week to week to keep droppings and litter out of them. Water fountains should be placed on $\frac{1}{2}$ -inch mesh, hardware-cloth stands 3 to 4 inches high to keep poults away from dampness.

Ranging Turkeys

In Colorado, poults are usually brooded in battery brooders or under brooder stoves until 6 to 8 weeks of age. Then they should

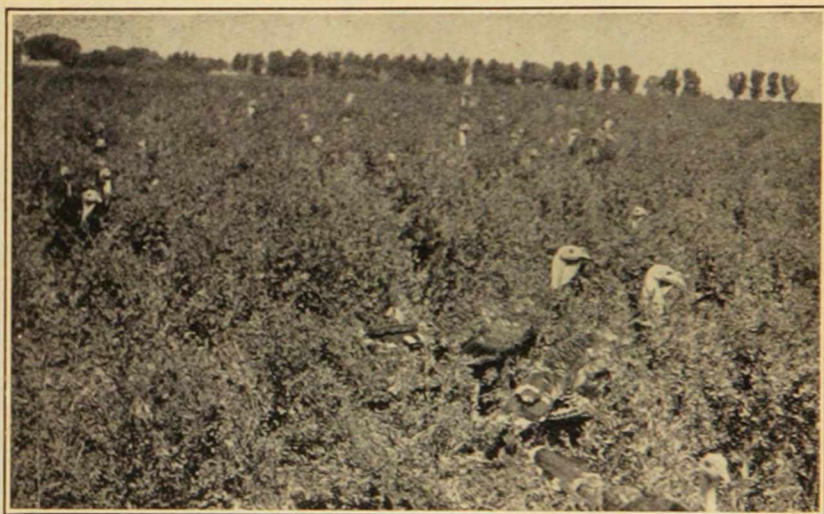


Portable range shelters of this type permit moving with a minimum of labor to clean ground twice a week and thus prevent disease.

be taken to range. Portable range shelters are used, with the sides and ends covered with canvas until the birds are hardened and accustomed to their new environment and are well accustomed to roosting. This usually requires several weeks in cool or bad weather. The canvas sides are then removed and the birds allowed to roost inside or on roosts on the roof.

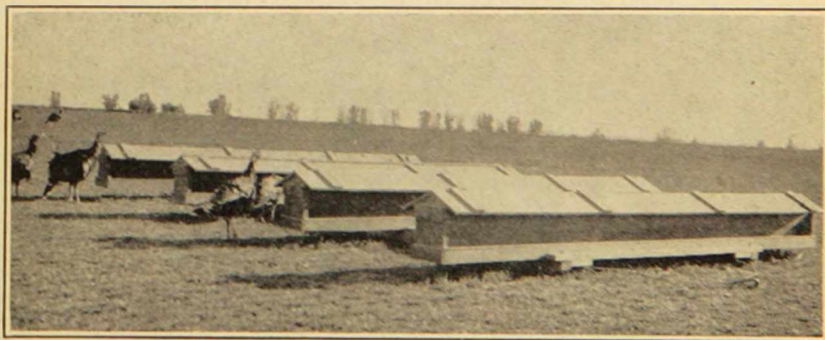
Portable feeders and waterers, constructed to keep out droppings and filth, should be provided, allowing at least 1 foot of hopper space per 5 birds. These should be moved at least 10 feet daily. The range shelters should be moved at least twice a week sufficiently far that the birds will not go back to the vacated area. By this system, con-

centration of infectious organisms in the droppings and soil is kept down, and such diseases as coccidiosis, blackhead, trichomoniasis, thrush (mycosis), and hexamita are kept under control or are avoided entirely.



Alfalfa fields provide green feed. Turkeys salvage large amounts of grain from stubble fields.

If available, range with succulent, tender, leafy, green feed is best and enables cheaper rations. To assure adequate consumption of green feed, fresh feed should not be put in the feeders in the morning until the birds have had a chance to range. Where range is limited, it is probably best to rear turkeys in **brooder houses with sun**



A battery of sanitary range feeders on long skids to facilitate moving the feeders every day or two.

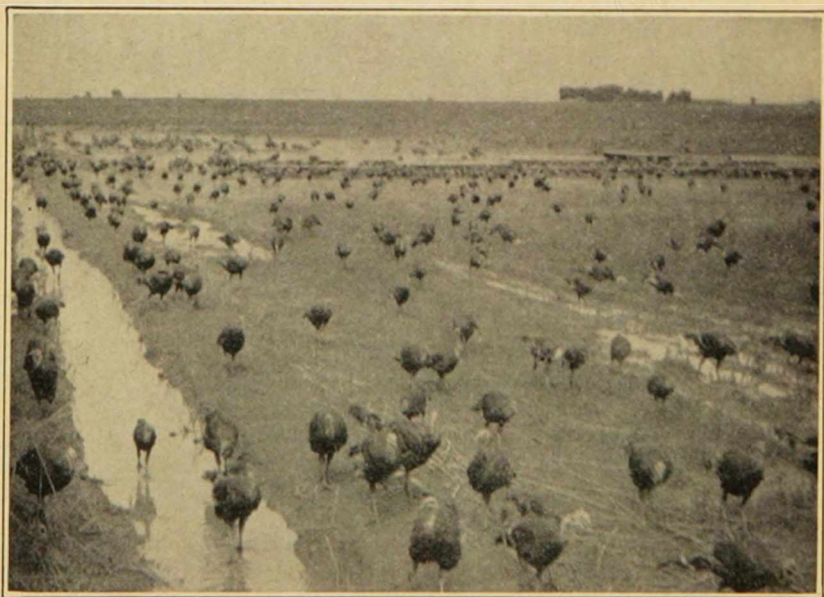
porches. Some growers use permanent yards with covered roosts for shelter and sweep the ground off daily to keep down contamination. This is possible only in a dry climate.

Finishing Turkeys

The ranging of turkeys that are ready for market should be restricted by keeping the feed hoppers full, by adding fresh feed several times daily, and by providing at least 1 foot of hopper space for every 4 or 5 birds. No special ration is required, but high-feed consumption is essential. Therefore, no sudden or marked changes in environment, management, or feed should be made. All the birds need is plenty of good, wholesome grain and growing mash or concentrate in the feeders; fresh, clean, well water or tap water in the sanitary waterers, and clean, sanitary grounds and roosting areas.

If a white finish is wanted, not more than 30 percent yellow corn and no fresh, leafy, green feed should be fed for the last 4 to 6 weeks before marketing.

No fish oil should be fed and no fish meal, or at least none having a marked fishy odor, should be used in the ration during the last 6 to 8 weeks. This precaution is necessary to avoid tainting the flesh.



A very bad practice. Turkeys must be kept away from irrigation water and wet ground in order to prevent disease.

Rations for Starting and Growing Poults

Profits in turkey production depend largely upon the percentage of prime birds produced. The chances of producing a large percentage of such birds without following proper feeding and management practices are very slight. An inadequate ration with low initial cost may be the most expensive ration one can use. Very few turkey producers lose money, even when the price for turkey meat is low, if they produce high-quality birds at a reasonable feed cost.

Since poults grow approximately 25 percent more rapidly than chicks, they require more protein and other growth-promoting nutrients in the ration, particularly those in milk and green feed. Such rapid growth is normal and can be obtained on fewer pounds of feed and at lower cost than when growth is restricted by feeding cheap, inadequate rations. Furthermore, adequate rations assure a maximum number of prime birds. The following system has been found highly satisfactory and will attain the desired ends.

Feeding Poults

1 to 4 weeks.—Use all-mash turkey starting mash alone.

5 to 6 weeks.—Use chick-size grains in every fifth feeder, starting mash in the others.

7 to 8 weeks.—Feed intermediate-size grains in every third feeder, starting mash in others.

9 to 10 weeks.—Allow the birds free range. Feed grains in every other feeder, starting mash in the rest.

11 weeks to market.—Replace starting mash with growing or laying mash and allow the birds free choice between grain and mash. Allow the birds free access to limestone grit or crushed oystershell and to alfalfa hay in racks with troughs under them to catch the leaves and prevent them falling on the ground or becoming contaminated with filth.

The following precautions must be followed to supply the turkeys with vitamin A after 10 weeks of age, because poults need about four times as much vitamin A as chickens. To supply sufficient vitamin A, it is recommended:

1. That the birds be on fresh, tender, green range, or,
2. That they be fed all they will eat in 20 to 30 minutes daily of a mixture composed of grain soaked overnight and then mixed just before feeding with an equal volume of alfalfa leaf meal or of ground alfalfa hay of highest quality. One hundred poults should be al-

lowed 4 pounds of alfalfa leaf meal or ground alfalfa hay daily in this manner.

It is especially important that one of these steps be used unless the grain mixture consists of at least 50 percent yellow corn.

Feedstuffs	C. S. C. Starting mash (1 to 6 weeks with no grain; 7 to 10 weeks with grain)		C. S. C. Growing mash with grain; 11 weeks to maturity
	No. 1	No. 2	
Ground yellow corn, kaffir, or milo.....	25	25	20
Pulverized heavy oats, barley, or proso millet.....	20	15	20
Wheat gray shorts (middlings).....	12.5	10	15
Wheat bran	5	5	10
Alfalfa leaf meal	5	5	10
Dried buttermilk	5	5
Fish meal (65-70% protein	7.5
Meat and bone scrap (50% protein).....	10	15	10
Soybean oilmeal	10	20	10
Steamed bonemeal	2
Pulverized limestone or oystershell.....	1	1	2
Salt	0.5	0.5	1
Fish oil (400 D)*	0.5	0.5
Manganese sulfate, 90-95% anhydrous.....	1/5 oz.	1/5 oz.
	102	102	100

*This is biologically tested oil, guaranteed to contain 400 A.O.A.C. units of vitamin D per gram. For 200-D oil use 1 percent; for 85-D oil use 2 percent.

Approximate analysis of starting mashes.—Not less than 24.0 percent protein; 4 percent fat; 45 percent N. F. E.; and not more than 6 percent fiber, and 9.5 percent ash.

Of growing mash.—Not less than 18.5 percent protein, 3.8 percent fat; 45 percent N. F. E.; and not more than 6 percent fiber and 9 percent ash.

Grain Mixtures.—These formulas are made to use with any available grains. It is recommended for best results that considerable oats (20 percent or more) be used if possible in order to improve feathering. It is also highly desirable to use at least 25 percent and preferably 50 percent yellow corn. A suggested formula would be 25 oats, 25 kaffir, 50 yellow corn. However, these formulas should give good results with any available grains except rye. Kaffir, milo, and proso millet, or hershey are excellent grains.

Selecting and Mixing Ingredients.—Feed ingredients should be selected very carefully as described in Bulletin 367-A, "Selection of

Feedstuffs for Poultry." Unless there is a good mixing floor on the farm, it is preferable to have a local mill mix the feed in a mechanical mixer. In order to avoid misunderstanding, both the operator and the farmer should insist on each checking the weighing and mixing. This avoids mistakes and assures satisfaction. In hand mixing, all ingredients should be poured on one pile and turned over by scoop into another cone-shaped pile at least 8 times.

Crooked Breasts.—Crooked breasts are probably due to insufficient vitamin D or minerals, to an inherited tendency to this deformity, or to narrow roosts. The foregoing rations will eliminate the first possibility. The second is controlled by eliminating birds with crooked breasts from the breeder flock, and the last is overcome by using 3-inch to 4-inch roosts, slightly tilted. Further information on nutritional deficiency symptoms is available in Bulletin 368-A.

Turkeys and Grasshoppers

Turkeys are an exceedingly valuable means of controlling grasshoppers and Mormon crickets. These insects are an excellent feed and have no harmful effect on health, finish, or flavor, if the birds are properly fed. No change in the feeding program should be made. **The turkeys should be allowed free access to grain, mash, water, and grasshoppers.** Under this method of feeding, the turkeys consume large numbers of grasshoppers, eat less mixed feed, and thrive. Turkeys should not be forced to eat grasshoppers as their chief feed.

Commercial Rations

A number of good, commercial turkey rations are available. These conform rather well to the principles set forth in this circular. The feeding directions of the manufacturer should be followed closely.

If any changes in the ration are desired that are not discussed here, or for any other information on poultry, write to the Department of Poultry Husbandry, Colorado State College, Fort Collins, Colorado.