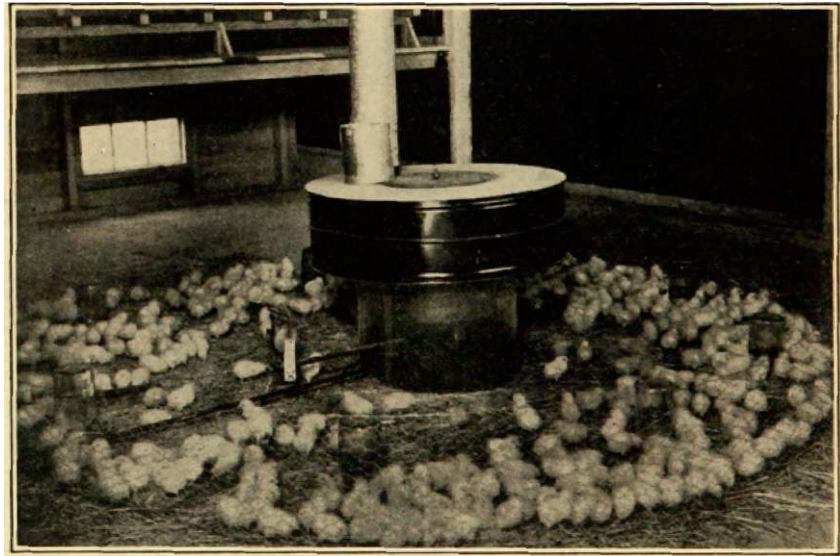


FEEDING POULTRY OF ALL AGES



Give the chicks the right start in a good home.

COLORADO AGRICULTURAL COLLEGE
EXTENSION SERVICE F. A. ANDERSON, DIRECTOR
FORT COLLINS



Fig 1.—The successful poultryman has come to realize that it pays to feed a well-balanced ration if he expects to secure economical results.

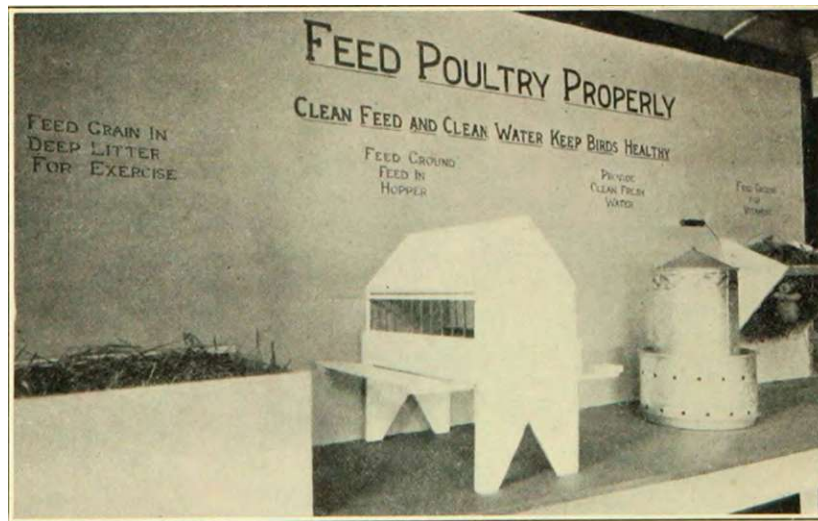


Fig 2.—Clean feeds fed in a clean way pay dividends.

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FEEDING POULTRY OF ALL AGES

By O. C. UFFORD, Extension Poultryman

Colorado produces an abundance and variety of feeds that can be used for feeding poultry, and there is no more profitable way to market some of these grains than in the form of poultry meat and eggs.

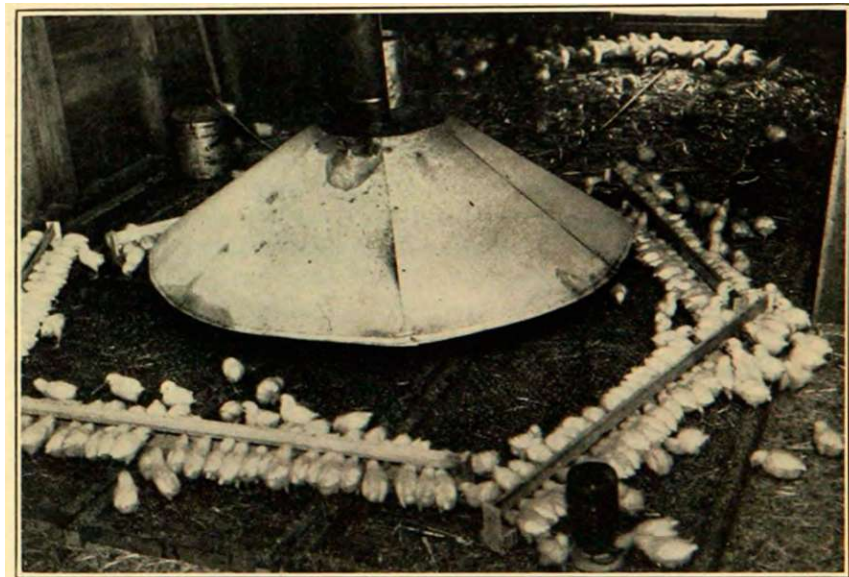


Fig. 3.—Three feet of hopper space for each lot of 50 chicks is necessary to give them the right start.

Rations for Starting Baby Chicks—(First 2 weeks)

Ration 1

Grain Mixture	
Fine cracked corn	50 lbs.
Fine cracked wheat	50 "
Mash Mixture	
Fine yellow cornmeal	20 lbs.
Ground oatmeal	50 "
Bran	15 "
Wheat shorts or middlings	15 "
Plenty of sour skimmilk or buttermilk to drink.	
Ground wheat may be substituted for the bran and shorts.	

Ration 2

Grain Mixture	
Fine cracked corn	40 lbs.
Cracked wheat	30 "
Steel-cut oats	30 "
Mash Mixture	
Fine yellow cornmeal ...	25 lbs.
Bran	20 "
Wheat shorts or middlings	20 "
Ground oatmeal	10 "
Meat scrap or meatmeal..	5 "
Dried milk	10 "
Alfalfa leafmeal	5 "
Bonemeal	4 "
Fine salt	1 "
When sour milk is available reduce dried buttermilk to 5 percent.	

Ration No. 3

In some sections of the state the feeds found in this ration are available and can be utilized in the chick rations.

Grain Mixture		Mash Mixture	
Cracked wheat	50 lbs.	Ground wheat	50 lbs.
Cracked kafir	20 "	Ground oatmeal	50 "
Cracked milo	20 "	or	
Millet or Hershey	10 "	Ground wheat	50 lbs.
Ground kafir and milo....		Ground millet or Hershey.	30 "
			20 "
Plenty of sour milk to drink.			

Vitamins

Vitamins A, B and D have an important bearing upon the normal growth and health of poultry.

Vitamins A and B are found in an abundance in the leafy parts of green plants and in many of the grains used in the feeding of poultry, and prevent nutritional troubles and a form of rickets known as polyneuritis.

Ultra-violet rays produced artificially or from sunshine and certain fish liver oils are available sources of vitamin D and prevent leg weakness among chicks. Two percent of a reliable grade of cod liver oil mixed with the feed is recommended for the prevention of leg weakness.

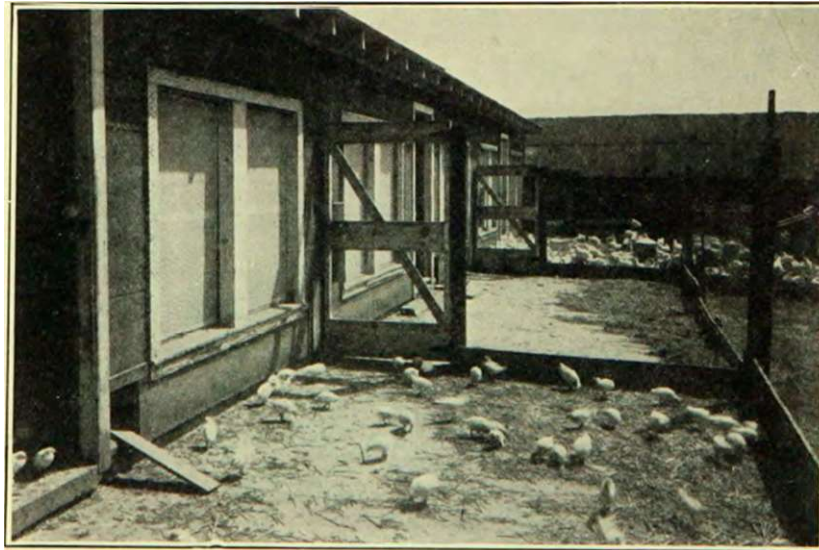


Fig. 4—Sanitation plays an important part in the feeding of growing chicks. This shows a cement run in front of the brooder house.

Rations for Growing Chicks—(After 2 weeks of age)

Ration No. 1

Grain Mixture	
Cracked corn	50 lbs.
Wheat	50 "
Mash Mixture	
Cornmeal	35 lbs.
Bran	25 "
Wheat shorts or middlings ..	25 "
Meatmeal	10 "
Bonemeal	4 "
Fine salt	1 "
Ground wheat may be substituted for the bran and shorts.	
Ration suitable for chicks with a green range.	

Ration No. 2

Grain Mixture	
Cracked corn	50 lbs.
Wheat	50 "
or	
Cracked corn	35 "
Wheat	35 "
Kafir	10 "
Milo	10 "
Millet or Hershey	10 "
Mash Mixture	
Cornmeal	30 lbs.
Bran	20 "
Wheat shorts or middlings ..	20 "
Fine ground oats or barley ...	10 "
Dried milk	5 "
Alfalfa leafmeal	5 "
Meatmeal	5 "
Bonemeal	4 "
Fine salt	1 "

All-Mash Feeding of Chicks

Many Colorado poultry raisers are using the all-mash method of growing chicks with satisfactory results. The all-mash method of feeding is the one in which all of the materials are ground and fed in hoppers. No scratch feed is given the birds. The method of brooding pertaining to sanitation, proper heat, etc., should be regulated as with other methods of feeding.

The all-mash system has several advantages. It is a simple method of feeding. It is more sanitary as there is no scratch feed thrown on the floor or in dirty litter. It requires less skill in feeding because the mash is always balanced, and it requires less time and labor and regularity than other methods require.

Rations Without Milk to Drink	
Ground yellow corn	80 lbs.
Bran	50 "
Wheat shorts or middlings	50 "
Meatmeal	5 "
Dried buttermilk	5 "
Alfalfa leafmeal	5 "
Steamed bonemeal	4 "
Salt	1 lb.

Rations With Plenty of Sour Skimmilk or Buttermilk to Drink	
Ground yellow corn.....	85 lbs.
Bran	25 "
Wheat shorts or middlings	25 "
Meatmeal	5 "
Alfalfa leafmeal	5 "
Steamed bonemeal	4 "
Salt	1 lb.
Ground wheat may be substituted for bran and shorts.	

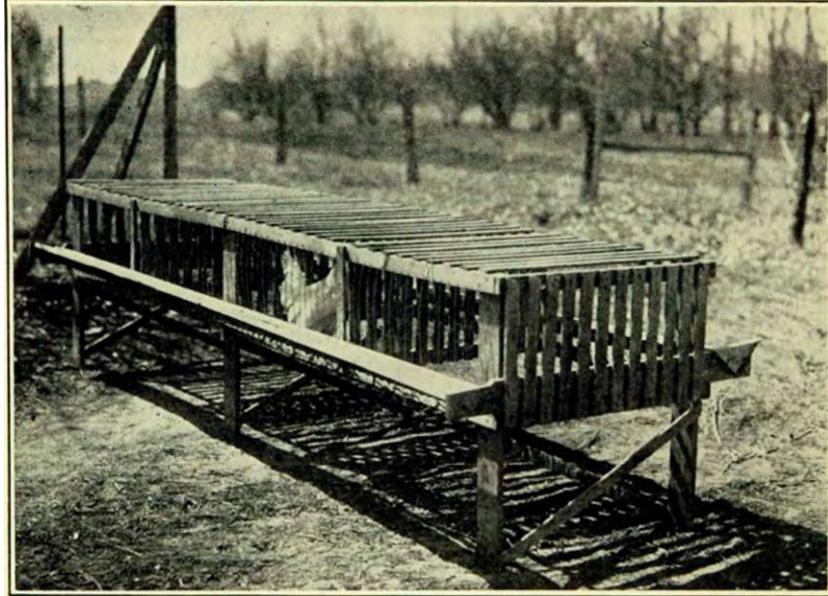


Fig. 5.—A suitable fattening crate.

Rations for Fattening

Ration No. 1

Fine cornmeal	60 lbs.
Wheat shorts or middlings	20 "
Fine ground oats	20 "
Mix 1 part of the above mixture with 2 parts liquid buttermilk.	

or

Ration No. 2

Cornmeal	60 lbs.
Wheat shorts or middlings ...	10 "
Fine ground oats	20 "
Meatmeal	10 "
Mix 1 part of the above mixture with 2 parts water.	

To fatten birds, place them in a fattening coop and feed a light feed two or three times daily for the first day or two, gradually bringing them on to a full feed, giving them all they will consume in 15 to 20 minutes of feeding. Do not leave feed before them longer than this. No water or other feeds will be necessary if the ration is mixed as prescribed above.

The fattening process is continued for 7 to 14 days on full feed, depending upon the appetite and condition of the birds.

Rations for Finishing Pullets

Pullets should not come into production until they have reached full body growth and bone development.

The growing mash will sometimes develop the egg organs before pullets have reached their full growth. When this occurs the comb and wattles begin to redden and increase in size at from 3 to 4 months of age because of too much meat or milk in the ration. One can hold the pullets back and get them to put on more weight by substituting the following for their regular growing ration:

Grain Mixture

Corn or wheat fed only in the evening.

Mash Mixture

Ground wheat	40 lbs.
Cornmeal	45 "
Bonemeal	4 "
Ground oats or barley	10 "
Salt	1 "

Up to 5 percent meatmeal may be included in the mixture.

The pullet that goes into the laying house with good body development and in good flesh is less likely to go into a fall moult. Keep the pullets on this ration until they are in good flesh and condition, then gradually bring them on to a full laying ration.

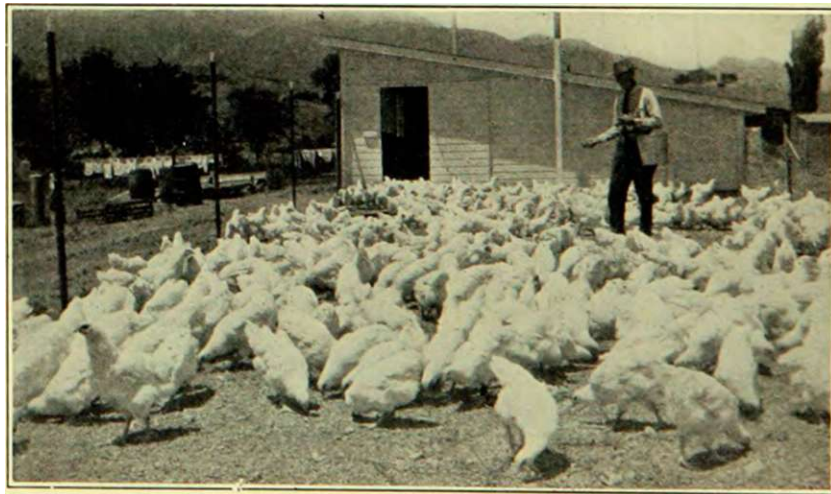


Fig. 6.—Pullets well raised mean pullets well fed.

Feeding for Quality Eggs

The enactment by the state legislature of an act in relation to poultry eggs which requires that after July 1, 1933, all hen and pullet eggs sold to the consumer must be candled and graded, should have a decided influence in bettering the quality of the Colorado egg.

The feeds that are fed to the laying flock play an important part in the production of quality eggs. A properly balanced ration gives firmness to the yolk and white that insures the egg a better chance of reaching the consumer in good condition.

When fresh greens are available in abundance, hens will eat them in preference to grain and mash with the result that the eggs produced under such conditions will have dark-yellow yolks. Such eggs are known as "grass eggs." The white or albumen soon breaks down and becomes watery and will not stand up in quality when shipped.

Marketing organizations that are handling and shipping quality eggs recommend controlled feeding of balanced rations to the laying flock in order to produce the egg with the light-colored yolk which is most desired by the consuming public.

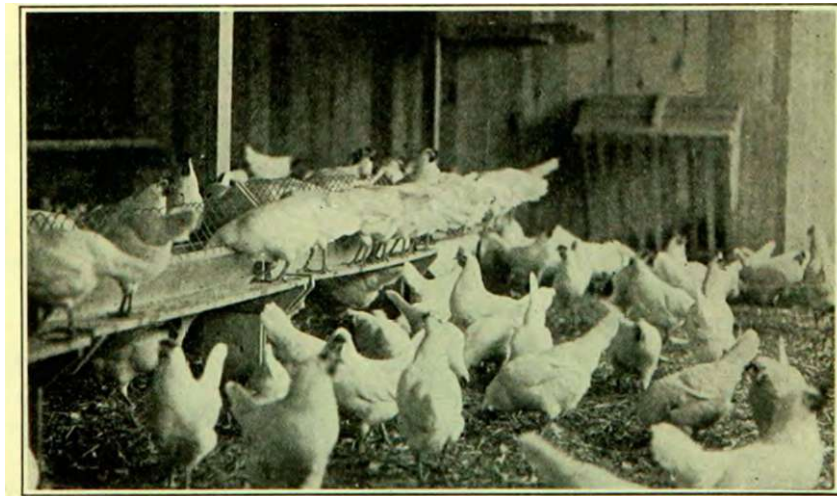


Fig. 7.—A balanced mash mixture available at all times to the laying flock is necessary for steady and profitable egg production.

Rations for Laying Hens

Ration No. 1

Grain Mixture	
	Summer Winter
Cracked or whole	
corn	50 lbs. 60 lbs.
Wheat	50 " 40 "
Mash Mixture	
Fine cornmeal	20 lbs.
Bran	20 "
Wheat shorts or middlings	20 "
Ground oats or barley.....	20 "
Meatmeal	20 "
Ground wheal: may be substituted for the bran and shorts.	
Add 1 pound of salt to every 100 lbs. of feed.	
Oyster shell or calcite and green feed should be fed separately.	

Ration No. 2

Grain Mixture	
Corn	40 lbs.
Wheat	10 "
Barley	10 "
Oats	10 "
Mash Mixture	
Cornmeal	30 lbs.
Bran	10 "
Wheat shorts or middlings ..	10 "
Ground oats	10 "
Ground barley	10 "
Alfalfa leafmeal	5 "
Meatmeal	15 "
Dried milk	5 "
Bonemeal	2 "
Salt	1 "
Fine ground oyster shell	
or calcite	2 "
5 lbs. of meatmeal may be substituted for the dried milk.	

Some other suitable grain mixtures when such feeds are available are:

Ration No. 1

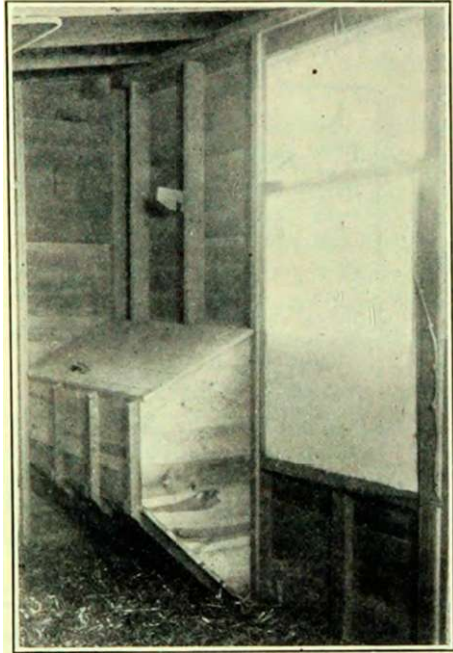
Barley	30 lbs.
Wheat	50 "
Oats	20 "

Ration No. 2

Kafir	10 lbs.
Milo	10 "
Millet or Hershey	10 "
Corn	20 "
Wheat	50 "

Ration No. 3

Grain Mixture	
Corn	10 lbs.
Wheat	60 "
Mash Mixture	
Cornmeal (yellow)	20 lbs.
Ground barley or ground oats	15 "
Wheat middlings	15 "
Wheat bran	20 "
Meatmeal	10 "
Fishmeal	5 "
Dried milk	5 "
Alfalfa leafmeal	5 "
Steamed bonemeal	2 "
Fine ground oyster shell or calcite	2 "
Salt	1 "



The type of storage hopper shown in Figure 8 is a convenient arrangement for the storage of feed for the laying flock, especially when other storage accommodations are limited.

It can be constructed large enough to hold several hundred pounds of feed without taking up floor space.

A hopper of this type can be located in the corner at each end of the laying house to hold mash and grain.

Fig. 8.—A storage supply hopper for mash and grain.

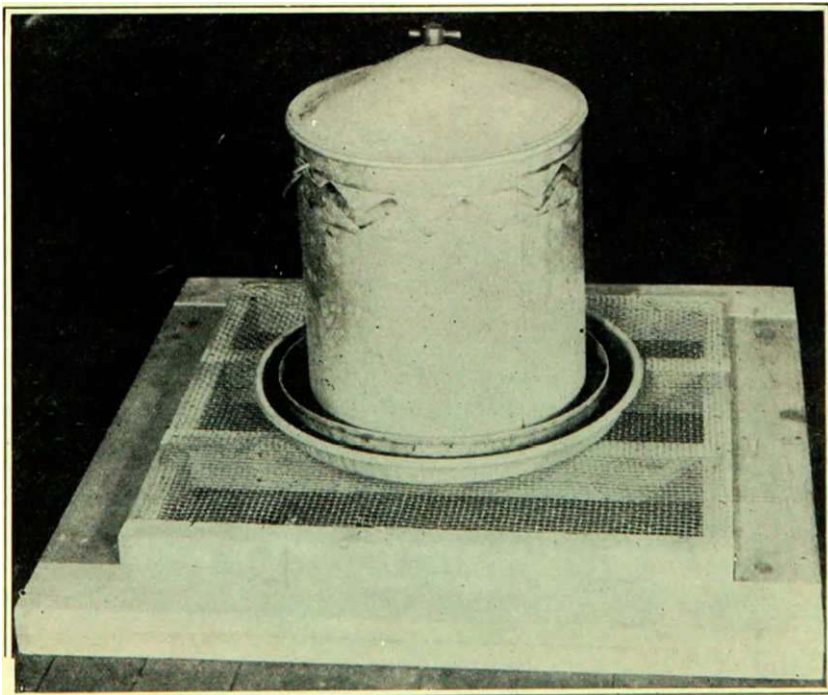


Fig. 9.—A sanitary drinking fountain and stand for baby chicks

Feeding Practice for the Laying Flock

Water is a very important part of a ration. Two-thirds of the egg and chicken's body are composed of water. Therefore, a supply should always be available. There are a number of suitable types of waterers on the market with heater attachments that enable the flock always to have water during cold weather.

Grain.—The following are the approximate pounds of grain to feed per 100 hens per day during the different months of the year:

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov	Dec.
Heavy Breeds	15	16	14	13	12	11	11	11	12	13	13	14
Light Breeds	12	12	13	13	12	12	12	9	8	10	12	12

Mash.—Keep laying mash before hens all the time in non-wasting hoppers.

Green feed is always an important part of the chickens' ration. Healthier birds and more eggs result when it is fed.

Cabbage, alfalfa, lawn clippings, beets, carrots, etc., are excellent green feeds.

Grit and Lime.—Keep a box of fine gravel in the laying house for grit in winter time. Lime is furnished in the form of oyster shell or calcite.

Daily Feeding Practice.—Feed one-third of the grain mornings and two-thirds evenings, in straw litter at least an hour before dusk. Fill mash hoppers with fresh mash in the morning if needed. If feeding wet mash, make it quite crumbly and only give amounts hens will clean up in a half hour. Use wet mash only in the middle of the day. Be regular in your daily feeding and care.

Feeding the Breeding Flock

A well-balanced ration for the breeding flock at all times is good insurance for hatchable eggs and livable chicks.

Aside from feeding a balanced ration similar to those used for the laying hens, the breeding flock should have plenty of exercise, sunshine and green feed.

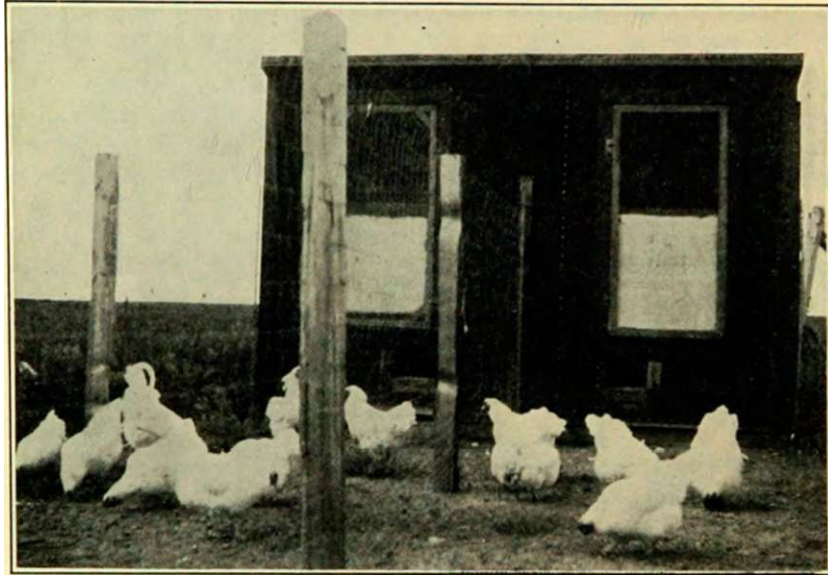


Fig. 10.—A balanced ration fed to the breeding flock is essential for the production of hatchable eggs and livable chicks.

Feeding Minerals

Minerals play an important part in the growing and laying rations of the poultry flock. Most of the minerals are found in

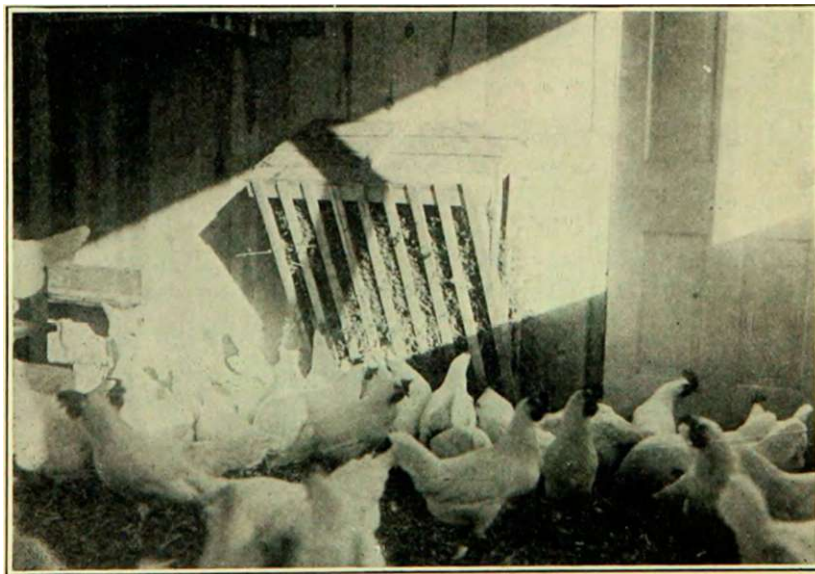


Fig. 11.—An alfalfa rack.

sufficient amounts in the grains and other feeds that make up the diet of birds. But calcium or lime and phosphorus are minerals that are necessary to supply for growth and production in addition to what are found in feeds.

A mixture that will supply the necessary important minerals and one that is economical to mix is the following:

Steamed bonemeal _____ 50 lbs.

Fine ground oyster shell or calcite _____ 40 lbs.

Fine salt _____ 10 lbs.

From 3 to 5 pounds of this mixture can be used in 100 pounds of ground feed for growing chicks or laying hens.

A Method of Determining the Nutritive Ratio of Poultry Rations*

The poultryman is often interested in knowing how to determine the balance of his own mixtures. The following is an example of a problem in balancing a laying ration (Ration No. 1) using the table showing the average digestible composition per 100 pounds of feed.

For egg production, a ration should have a nutritive ratio of from 1 to 4 (1:4) or 1 to 5 (1:5) and not over 5 percent fiber.

Referring to the table, 100 pounds of cracked corn has 2 pounds of fiber, 7.4 pounds of digestible protein and the total digestible nutriment is 79.8 pounds. The table indicates the composition of the other feeds used as is shown in the problem.

Problem in Nutritive-Ratio Determination for a Laying Ration Grain Mixture

	Fiber	Digestible Protein	Total Digestible Nutriment
100lbs. cracked corn	2.0	7.4	79.8
100 lbs. wheat	2.2	8.7	73.5
Mash Mixture			
100 lbs. cornmeal	2.3	6.9	78.9
100 lbs. bran	9.5	11.5	39.8
100 lbs. wheat middlings	4.7	15.7	76.5
100 lbs. ground oats	9.9	9.0	5 8.1
100 lbs. meat scrap		54.2	78.0
500 lbs. of mash mixture	26.4	97.3	331.3
100 lbs. mash mixture	5.28	19.46	66.26
Grain and Mash			
100 lbs. of grain mixture	2.1	8.0	76.6
100 lbs. mash mixture	5.28	19.46	66.26
200 lbs. of ration	7.38	27.46	142.86
100 lbs. of ration	3.69	13.73	71.43

*Rice and Botsford—Practical Poultry Management. Second Ed., 1930.

This ration then has 3.69 pounds of fiber, 13.73 pounds of protein and 71.43 pounds of total digestible nutriment for every 100 pounds of feed.

To compute the nutritive ratio:

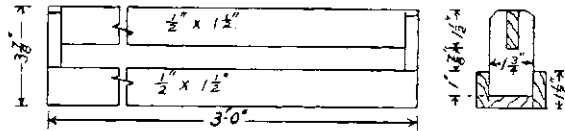
Total digestible nutriment (71.43) minus digestible protein (13.73) equals digestible carbohydrates and fat (57.70). Dividing 57.70 by digestible protein (13.73) gives the nutritive ratio 1:4.2.

$$71.43 - 13.73 = 57.70$$

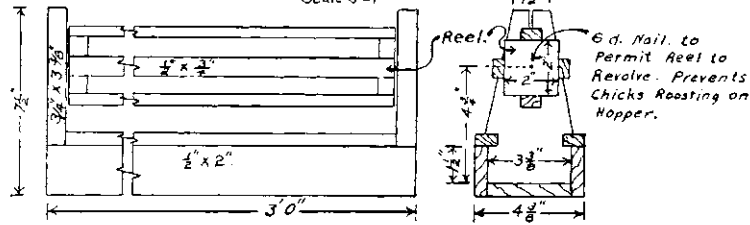
$$57.70 \div 13.73 = 4.2$$

Nutritive Ratio=1:4.2

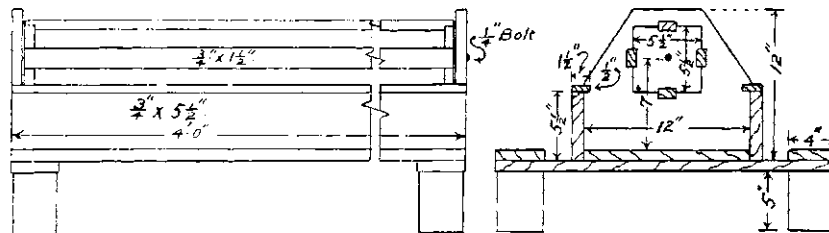
The value of a mash hopper is determined by whether or not it wastes feed. The feeder that can be filled each day with fresh mash has come into favor over the one that holds a large supply.



The Chick Starting Hopper
Scale 3"=1'



Hopper for Growing Chicks.
Scale 3"=1'



Hopper for Half-grown and Mature Birds.

**A "Ready to Use" Table of Feeds Showing the Average
Digestible Composition per 100 Pounds of Feed***

Feed	Total crude fiber, pounds	Digestible crude protein, pounds	Total digestible nutriment, pounds	Nutritive ratio	Pounds of feed necessary to yield 100 lbs. of total digestible nutriment
• Barley	1.6	8.7	71.0	1: 7.16	141
• Bloodmeal		72.6	76.8	1: 0.06	130
Bonemeal		22.6	29.4	1: 0.3	340
• Buckwheat	10.1	6.1	63.4	1: 9.39	158
Buckwheat middlings	1.8	21.6	75.0	1: 2.0	133
• Buttermilk (dried)		27.9	68.8	1: 1.47	145
• Corn	1.8	8.4	80.6	1: 8.6	124
• Cracked corn	2.0	7.4	79.8	1: 9.78	125
• Cornmeal	2.3	6.9	78.9	1:10.43	127
• Cottonseed meal	11.5	27.6	67.5	1: 1.45	148
• Fishmeal		45.1	65.6	1: 0.45	152
Gluten feed	7.1	21.6	75.4	1: 2.5	133
Green cut bone		18.3	73.4	1: 3.01	136
Hominy feed	8.5	6.3	76.5	1:11.1	131
• Kafir corn	2.3	7.6	76.7	1: 9.09	130
Linseed oilmeal	8.1	30.2	73.1	1: 1.4	137
• Meat and bonemeal	2.1	36.6	64.2	1: 0.75	156
• Meatmeal (or beef scrap)		54.2	78.0	1: 0.44	128
• Millet	7.8	7.4	77.4	1: 9.46	129
• Oats	10.1	9.8	62.9	1: 5.42	159
Oats (crushed or ground)	9.9	9.0	58.1	1: 5.5	172
• Oats (hulled)		9.7	81.7	1: 7.42	122
• Oats (rolled oats)	1.5	12.8	88.6	1: 5.92	113
• Pea (field)	5.6	20.2	90.5	1: 3.48	110
• Peanut meat (fat not extracted)		17.1	93.6	1: 4.47	107
• Rice	9.6	5.7	62.0	1: 9.88	161
Skimmilk		3.6	9.2	1: 1.6	1087
Skimmilk (dried)		34.4	68.9	1: 1.0	145
• Soybean meal (fat extracted)	5.5	34.7	72.5	1: 1.09	138
Sunflower with hull	27.9	13.5	74.3	1: 4.5	135
• Tankage (digester)	3.1	47.3	79.4	1: 0.68	126
• Wheat	2.2	8.7	73.0	1: 7.45	136
• Wheat bran		11.5	39.8	1: 2.46	251
Wheat (feed wheat)	4.8	9.5	68.5	1: 6.2	148
Wheat feed (shorts and bran)	7.6	12.9	64.2	1: 4.0	156
• Wheat middlings (standard)		10.1	48.5	1: 3.8	206
Wheat middlings (flour)	1.7	15.7	76.5	1: 3.9	131
Wheat flour (red dog)		14.8	78.4	1: 4.3	128
Wheat screenings	7.1	9.6	62.3	1: 5.5	151
Whey		0.8	6.2	1: 7.8	1613

*Rice and Botsford—Practical Poultry Management, Second Edition, 1930.

Feed	Total crude fiber, pounds	Digestible crude protein, pounds	Total digestible nutriment, pounds	Nutri- tive ratio	Pounds of feed necessary to yield 100 lbs. of total digestible nutriment
Hay from legumes					
Alfalfa meal	30.1	10.2	16.8	1: 0.6	595
Alfalfa leaves	12.7	16.0	24.5	1: 0.5	408
Clover meal	25.9	9.7	17.4	1: 0.8	575
Fresh green legumes					
Alfalfa	7.0	3.3	11.7	1: 2.5	855
*Red clover	7.3	2.9	12.4	1: 3.28	806
Fresh green grasses					
Oat fodder (8 inches high)	1.7	3.4	7.5	1: 1.2	1333
Wheat fodder (5 inches high)	3.9	5.1	13.8	1: 1.7	725
Oat sprouts	3.7	2.4	15.8	1: 5.6	633
Roots and tubers					
Garden beet	0.9	0.9	9.3	1: 9.3	1075
Mangel beet	0.8	0.8	6.7	1: 7.4	1493
Potato	0.4	1.0	15.6	1:14.6	641
Turnip	1.1	1.0	6.9	1: 5.9	1449
Miscellaneous					
Apple	1.3	0.4	16.0	1:39.0	625
Cabbage	0.9	1.9	7.1	1: 2.7	1408
Rape	2.6	2.6	11.0	1: 3.2	909
Bread	0.7	5.8	58.4	1: 9.1	171
Bakery refuse	0.5	8.3	84.6	1: 9.2	118

*Calculated from Kaupp-Ivey tables. Bul. 22, N. C. Agr. Exp. Sta.