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The Value of Dried Skim Milk for Fattening Poultry



Weighing Dressed birds to obtain dressed weight

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The Value of Dried Skim Milk for Fattening Poultry

E. M. FUNK, H. L. KEMPSTER, AND C. G. BRYAN*

Fattening poultry is an important specialized phase of the poultry industry. Due to the fact that the farmer lacks facilities necessary for handling the finished product, poultry fattening is not done extensively on the farm. Dressed poultry, being highly perishable, requires cooling, chilling and storage. Poultry finishing and fleshing as done in modern packing plants may be regarded as a manufacturing process whereby market poultry received by the packer is fattened, dressed, cooled, chilled, graded and packed.

Market poultry as it comes from the farm lacks uniformity with respect to finish and quality. To obtain uniformity of finish and to improve the quality of the flesh, poultry packers have developed the practice of using milk in fattening chickens. In this process much of the water in the flesh is replaced with fat and the quality of the meat is improved. This finishing process also increases the value of such poultry to the consumer in that fattening adds weight to the edible part more rapidly than to the inedible parts. An improvement in the finish and quality is not only the best means of increasing consumption but will also tend to increase the price of the finished product.

Lippincott states that in 1900 S. Brill of the St. Joseph, Missouri plant of Swift & Company conducted a series of demonstrations on feeding poultry by using milk in the ration. Brill found this method to give satisfactory results. Since that time milk fattening has increased very rapidly and today practically all feeding is based on this method.

The process of feeding and finishing poultry on a ration containing a high percentage of milk is commonly called milk fattening. The usual forms of milk are liquid buttermilk, condensed buttermilk, dried buttermilk, and dried skim milk.

Object of Experiment

The object of this experiment was to compare condensed buttermilk, liquid buttermilk and dried skim milk as a source of milk for fattening poultry, and to determine the percentage of dried skim milk which should be used to give the best results. It was also planned to determine the

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effect of the breed upon the gain, the effect of age upon the gain, and the effect of the ration upon the final grade of the dressed poultry. The relative values of the different milk concentrates were determined by the net gains made by each lot, the percentage of initial weight packed, and the feed cost of producing the gains.

Plan of Experiment

Since the object of the experiment was to compare condensed buttermilk, liquid buttermilk and dried skim milk as a source of milk and to determine the amount of dried skim milk to be used, the following rations were used in the various feeding tests:

RATION	COMPOSITION OF RATION
1.....	Basal plus condensed buttermilk
2.....	Basal plus liquid buttermilk
3.....	Basal plus 5 per cent dried skim milk
4.....	Basal plus 10 per cent dried skim milk
5.....	Basal plus 15 per cent dried skim milk
6.....	Basal plus 20 per cent dried skim milk

Basal Rations

Two basal rations were used. The primary basal ration used in the experiment was exactly the same as used by the commercial poultry packing plant where the feeding work was conducted. In order to make the fattening experiment conform as nearly as possible to the methods used in commercial feeding and fattening of poultry, the following basal ration was used:

60 pounds of yellow corn meal
 60 pounds of rolled oats
 40 pounds of oat meal
 40 pounds of ground wheat
 10 pounds of bran
 2 pounds of meat scraps
 2 pounds of alfalfa meal
 1 pound of salt

The other basal ration used was a more simple ration. This ration was recommended by the Poultry Department of the University of Missouri and for this reason was called the poultry department basal ration. The composition of this basal ration was:

70 pounds yellow corn meal
 20 pounds wheat middlings
 1 pound of salt



Fig. 2.—Banding and weighing live birds before being placed on feed.

All ingredients contained in the basal rations were accurately weighed out in correct proportions and then thoroughly mixed in a mechanical feed mixer.

Cost of Feeds

The price of all feeds was relatively low when this feeding experiment was conducted. All feeds that were used in these rations were of the highest grade and quality.

FEED	COST
Station basal.....	\$1.60
Poultry department basal.....	1.15
Dried skim milk.....	4.00
Condensed buttermilk.....	2.50
Liquid buttermilk (estimated).....	.25

Stock

The stock used in this experiment consisted of three breeds; Plymouth Rocks, Rhode Island Reds, and White Leghorns. Many flocks of these breeds are found in this area and consequently the available supply of these breeds at the plant where the experiment was conducted was plentiful. Fifty-four lots of birds were used in the experiment

consisting of Plymouth Rock broilers, roasters and hens; Rhode Island Red broilers, roasters and hens; and White Leghorn broilers and hens. All lots of live birds were selected for uniformity of quality and there was very little difference between the different lots except lots 37 and 39 which were trucked 200 miles on a cold, rainy day and contracted colds in transit. All lots contained a high percentage of grade No. 1 birds except the lots of Plymouth Rock and Rhode Island Red hens. These lots of hens were classed as grade No. 2 hens since they were rather thin in flesh.

Length of Feeding Period

The hens and roasters were fed seven days while the broilers were fed ten days. Neither the day the birds were started nor the day they were killed and dressed was counted as feeding days and therefore were not a part of the feeding period. The length of the feeding period used was the same as that used by the management of the plant on birds of the same class and quality. The broilers were fed somewhat longer than the hens and roasters because they make more satisfactory gains and usually continue to gain over a longer period of time.

Method of Procedure

Steel and wood fattening batteries divided into sixteen compartments were used. The number of birds placed in each compartment depended upon their size. Four or five hens were placed in each compartment while six and seven broilers or roasters occupied the same amount of space. As a precaution against an outbreak of disease, all batteries used were thoroughly cleaned and disinfected before the birds were placed in them.

As soon as each lot of birds was selected and placed in the battery it was taken to the feeding floor. Each bird was then banded and weighed, the band number and initial weight being recorded for each bird. All weights were recorded as accurately as possible in pounds and tenths of a pound. Each battery of birds was then supplied with new troughs to prevent the waste of feed.

Feeding

The condensed buttermilk ration was prepared in the proportion of 35 pounds of buttermilk to 100 pounds of basal ration and enough water added to give it the correct consistency. The liquid buttermilk ration was prepared for feeding in the proportion of 250 pounds of milk to 100 pounds of basal feed. The dried skim milk rations were prepared by adding enough water to the dried skim milk ration to give it the same consistency as that of the other two rations. The feed was prepared

usually about four times a day. It was the aim of the feeder to mix just enough feed for each day, but in case there was too much feed prepared, the feed left over at the last feeding was taken to the cooler where it would not spoil and was then fed the next morning.

Schedule of Feeding

The schedule of feeding used in fattening the birds was the same as used in the commercial plant where the experiment was conducted. Scant feeding was practiced at the beginning of the feeding period and the amount of feed gradually increased until toward the end of the feeding period when the birds were given all they would eat. The practice followed was to feed the birds rather lightly but often and to scrape the sides of the feeding troughs down after each feeding. These practices stimulated feed consumption. The birds were fed according to the following hourly schedule:

TIME	FEEDING
5:00 A. M.	Feeder cleans troughs
5:30 A. M.	First feed
6:30 A. M.	Second feed
7:30 A. M.	Third feed
9:30 A. M.	Fourth feed
10:30 A. M.	Fifth feed
12 Noon	Birds were given water a few days when temperature was real high.
2:30 P. M.	Sixth feed
3:30 P. M.	Seventh feed
5:30 P. M.	Eighth feed
6:30 P. M.	Ninth feed

Accurate records of the amount of basal ration and milk concentrates used were kept. The liquid buttermilk and condensed buttermilk used was weighed each time and a daily record was kept of the amount consumed. Two hundred pounds of the basal ration was weighed out for each lot and the amount consumed was calculated from the amount remaining at the end of the feeding period.

Rejects

Birds "going off feed" or becoming sick during the fattening period were rejected and dressed or destroyed at once. In some lots there were no rejected birds but in other lots there were quite a number rejected. In order to obtain a fair comparison of the feeding value of the milk



Fig. 3—Weighing live birds before being killed and dressed

concentrates, rejected birds were not considered in the final data. The amount of feed consumed by the rejected birds was calculated by finding the number of days they were fed and deducting a proportionate amount of feed from the total feed consumption. Unless birds that “go off feed” are rejected and dressed at once they become worthless.

Dressing

At the end of the feeding period the battery of birds was moved into the killing and picking room where the birds were removed from the battery and weighed to obtain the final weight before they were dressed. After being weighed they were hung on shackles to insure complete bleeding when killed. The killing was done by cutting the jugular vein and piercing the brain with a sharp knife. The birds were scalded by the semi-scald method, being immersed for 35 seconds in water kept at a temperature of 128°F. After being picked and dressed the birds were plumped by immersing them in cold water. They were then hung on chilling racks to dry with heads downward and legs well spread. After drying, the heads of the dressed birds were wrapped.

Before being taken to the chilling room the dressed birds were weighed individually to obtain the dressed weight. The birds were allowed to hang in the chilling room for 24 hours before being graded and packed.

TABLE 1.—GAINS MADE BY ROCK BROILERS

Lot	No. Bds.	Ration	Initial Weight	Final Weight	Gain	Dressed Weight	Dressing Loss	Percentage of Initial Weight Packed
					Per cent		Per cent	
			<i>lbs.</i>	<i>lbs.</i>		<i>lbs.</i>		
46	94	Basal + Cond. Buttermilk	195.6	236.3	20.1	204.7	13.4	104.7
1	98	Basal + Liquid Buttermilk	211.9	262.3	23.8	234.8	10.5	110.8
7	100	Basal + 5% D. S. milk	208.0	248.1	19.3	222.0	10.5	106.7
13	98	Basal + 10% D. S. milk	185.3	242.7	31.0	213.3	12.1	115.1
19	96	Basal + 15% D. S. milk	201.6	271.3	34.6	238.5	12.1	118.3
25	98	Basal + 20% D. S. milk	215.7	270.3	25.3	240.9	10.9	111.7
Total			1218.1	1531.0	25.7	1354.2	11.5	111.2

TABLE 2.—GAINS MADE BY RED BROILERS

Lot	No. Bds.	Ration	Initial Weight	Final Weight	Gain	Dressed Weight	Dressing Loss	Percentage of Initial Weight Packed
					Per cent		Per cent	
			<i>lbs.</i>	<i>lbs.</i>		<i>lbs.</i>		
47	100	Basal + Cond. Buttermilk	204.3	262.7	28.6	230.3	12.3	112.7
2	95	Basal + Liquid Buttermilk	227.3	279.9	23.1	248.0	11.4	109.1
8	100	Basal + 5% D. S. milk	221.6	286.6	29.3	253.2	11.7	114.3
14	98	Basal + 10% D. S. milk	226.9	280.2	23.5	249.9	10.8	110.1
20	96	Basal + 15% D. S. milk	231.1	280.6	21.4	243.6	13.2	105.4
26	88	Basal + 20% D. S. milk	210.5	250.2	18.9	223.9	10.5	106.4
Total			1321.7	1640.2	24.1	1448.9	11.7	109.6

TABLE 3.—GAINS MADE BY LEGHORN BROILERS

Lot	No. Bds.	Ration	Initial Weight	Final Weight	Gain	Dressed Weight	Dressing Loss	Percentage of Initial Weight Packed
					Per cent		Per cent	
			<i>lbs.</i>	<i>lbs.</i>		<i>lbs.</i>		
48	98	Basal + Cond. Buttermilk	158.9	211.7	33.2	184.4	12.9	116.0
3	100	Basal + Liquid Buttermilk	145.3	203.1	40.0	175.9	13.4	121.1
9	100	Basal + 5% D. S. milk	175.9	238.5	35.6	207.1	13.2	117.7
15	97	Basal + 10% D. S. milk	166.9	218.3	30.8	194.8	10.8	116.7
21	94	Basal + 15% D. S. milk	207.0	247.7	19.7	221.5	10.6	107.0
27	92	Basal + 20% D. S. milk	196.3	242.4	23.5	209.9	13.4	106.9
Total			1050.3	1361.7	29.6	1193.6	12.3	113.6

TABLE 4.—GAINS MADE BY ROCK ROASTERS

Lot	No. Bds.	Ration	Initial Weight	Final Weight	Gain	Dressed Weight	Dressing Loss	Percentage of Initial Weight Packed
					Per cent		Per cent	
			<i>lbs.</i>	<i>lbs.</i>		<i>lbs.</i>		
52	82	Basal + Cond. Buttermilk	248.5	284.7	14.6	254.2	10.7	102.3
31	95	Basal + Liquid Buttermilk	276.9	310.0	11.6	280.3	9.6	101.2
34	93	Basal + 5% D. S. milk	290.0	342.7	18.2	303.3	11.5	104.6
*37	88	Basal + 10% D. S. milk	316.7	339.8	7.3	301.5	11.3	95.2
40	84	Basal + 15% D. S. milk	256.1	294.6	15.0	265.0	10.0	103.5
43	70	Basal + 20% D. S. milk	197.6	223.0	12.9	198.3	11.1	100.4
Total			1585.8	1794.8	13.2	1602.6	10.7	101.1

*Lot 37 came in 200 miles by truck on a cold, damp day.

TABLE 5.—GAINS MADE BY RED ROASTERS

Lot	No. Bds.	Ration	Initial Weight	Final Weight	Gain	Dressed Weight	Dressing Loss	Percentage of Initial Weight Packed
					Per cent		Per cent	
			<i>lbs.</i>	<i>lbs.</i>		<i>lbs.</i>		
53	95	Basal + Cond. Buttermilk	259.4	304.8	17.5	270.5	11.3	104.3
33	88	Basal + Liquid Buttermilk	281.6	315.6	12.1	281.4	10.8	99.9
36	92	Basal + 5% D. S. milk	279.0	324.7	16.4	287.1	11.6	102.9
*39	81	Basal + 10% D. S. milk	265.1	285.6	7.7	253.2	11.3	95.5
42	92	Basal + 15% D. S. milk	270.5	316.3	16.9	280.4	11.3	103.7
45	93	Basal + 20% D. S. milk	294.9	346.2	17.4	307.7	11.1	104.3
Total			1650.5	1893.2	14.7	1680.3	11.2	110.8

*Lot 39 came in 200 miles by truck on a cold, damp day.

TABLE 6.—GAINS MADE BY ROCK ROASTERS

Lot	No. Bds.	Ration*	Initial Weight	Final Weight	Gain	Dressed Weight	Dressing Loss	Percentage of Initial Weight Packed
					Per cent		Per cent	
			<i>lbs.</i>	<i>lbs.</i>		<i>lbs.</i>		
54	96	P. D. Basal + Cond. B. milk	264.3	291.5	10.3	261.4	10.3	98.9
32	86	P. D. Basal + Liquid B. milk	256.9	292.7	13.9	261.8	10.6	101.9
35	92	P. D. Basal + 5% D. S. milk	260.7	306.5	17.6	276.4	9.8	106.0
38	94	P. D. Basal + 10% D. S. milk	281.1	331.2	17.8	296.2	10.6	105.4
41	94	P. D. Basal + 15% D. S. milk	275.1	323.9	17.7	289.5	10.6	105.2
44	92	P. D. Basal + 20% D. S. milk	281.2	316.1	12.4	279.6	11.5	99.4
Total			1619.3	1861.9	15.0	1664.9	10.6	102.8

*Poultry Department Basal.

Each lot of dressed birds was graded by the chief inspector of the packing plant into three grades. The grade of each individual bird was recorded. The dressed birds were classified as to weight and then packed, 12 in a box, breast up and in single layer boxes. The boxes of dressed poultry were then moved to the freezer which was held at a temperature of -5°F where they were held until shipped out in iced refrigerator cars.

DISCUSSION OF RESULTS

Gains Made by Broilers

All lots of Plymouth Rock broilers made excellent gains. Lot 19, which was fed 15 per cent dried skim milk, showed the greatest gain and the highest percentage of initial weight packed. This lot made a gain of 34.6 per cent and packed 18.3 per cent more than their initial weight. Plymouth Rock broilers receiving 10 per cent dried skim milk made a gain of 31.0 per cent and those fed 5 per cent dried skim milk made the poorest gains, an increase in weight of 19.3 per cent. Birds receiving condensed buttermilk had the highest percentage of dressing loss and the lowest percentage of initial weight packed.

Average gains made by Rhode Island Red broilers were not as high as those made by Plymouth Rock broilers. The most rapid gains made by Rhode Island Red broilers was made by lot 8 which received 5 per cent dried milk. They made a gain of 29.3 per cent. The lowest gain was made by the lot fed 20 per cent dried skim milk.

The White Leghorn broilers made much better gains than either Plymouth Rock or Rhode Island Red broilers. Leghorn broilers which were fed liquid buttermilk and 5 per cent dried skim milk made the most rapid gains with gains of 40.0 per cent and 35.6 per cent respectively.

Leghorn broilers made nearly 4 per cent more gain than Plymouth Rocks and over 5 per cent more gain than Rhode Island Reds. White Leghorns showed more initial weight packed than Plymouth Rocks or Rhode Island Reds. However, Rhode Island Reds and Plymouth Rocks showed a lower dressing loss than the White Leghorns.

Gains Made by Roasters

Plymouth Rock roasters fed a ration containing 5 per cent dried skim milk gained 18.2 per cent and packed 104.6 per cent of their initial weight. This lot was superior to the other lots. The birds in lot 37 contracted colds in transit and should be disregarded when arriving at conclusions. The poorest gains (11.6 per cent) for Plymouth Rock roasters was made by the lot fed liquid buttermilk. Rhode Island Red roasters receiving condensed buttermilk and 20 per cent dried skim milk made the most satis-

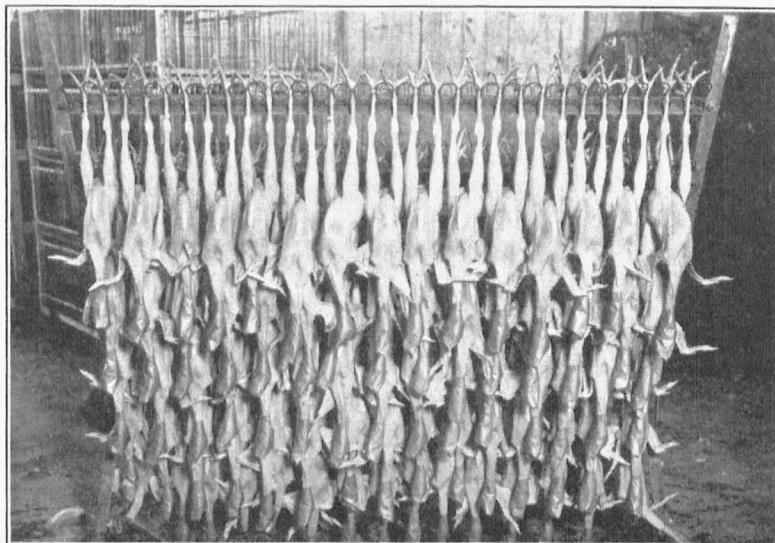


Fig. 4. Roasters fattened on poultry department basal ration and liquid buttermilk

factory gains and resulted in the highest packing percentage. Lot 39 which was improperly handled in transit showed inferior results and should not be considered. Disregarding Lot 39, the least satisfactory gains (12.1 per cent) were made by Rhode Island Red roasters fed liquid buttermilk.

The average dressing loss for Rhode Island Red roasters was 11.2 per cent as compared to 10.7 per cent for the Plymouth Rock roasters. The percentage of initial weight packed for Red and Rock roasters was 101.8 per cent and 101.1 per cent respectively.

Gains Made By Hens

White Leghorn and Rhode Island Red hens gained 14.0 per cent and 13.9 per cent respectively. Lowest gains (12.6 per cent) were made by Plymouth Rock hens.

Plymouth Rock hens lost 9.8 per cent when dressed as compared to 10.6 per cent for Rhode Island Red hens and 11.8 per cent for Leghorn hens.

The percentage of initial weight packed for the Rhode Island Reds, Plymouth Rocks and White Leghorns was 101.9, 101.6 and 100.5 per cent respectively.

TABLE 7.—GAINS MADE BY ROCK HENS

Lot	No. Bds.	Ration	Initial Weight	Final Weight	Gain	Dressed Weight	Dressing Loss	Percentage of Initial Weight Packed
					Per cent		Per cent	
			<i>lbs.</i>	<i>lbs.</i>		<i>lbs.</i>		
49	90	Basal + Cond. Buttermilk	347.4	408.1	17.5	363.1	11.0	104.5
4	89	Basal + Liquid Buttermilk	352.5	401.6	13.9	364.1	9.3	103.3
10	95	Basal + 5% D. S. milk	416.6	456.5	9.6	419.1	8.2	100.6
16	95	Basal + 10% D. S. milk	360.6	421.7	16.9	377.1	10.6	104.6
22	91	Basal + 15% D. S. milk	361.8	395.5	9.3	357.0	9.7	98.7
28	96	Basal + 20% D. S. milk	414.3	454.4	9.7	408.9	10.0	98.7
Total			2253.2	2537.8	12.6	2289.3	9.8	101.6

TABLE 8.—GAINS MADE BY RED HENS

Lot	No. Bds.	Ration	Initial Weight	Final Weight	Gain	Dressed Weight	Dressing Loss	Percentage of Initial Weight Packed
					Per cent		Per cent	
			<i>lbs.</i>	<i>lbs.</i>		<i>lbs.</i>		
50	92	Basal + Cond. Buttermilk	356.0	429.6	20.7	378.2	12.0	106.2
5	93	Basal + Liquid Buttermilk	383.7	437.2	13.9	391.1	10.5	101.9
11	100	Basal + 5% D. S. Milk	399.6	449.5	12.5	412.4	8.3	103.2
17	92	Basal + 10% D. S. Milk	370.3	426.1	15.1	380.4	10.7	102.7
23	90	Basal + 15% D. S. milk	353.4	397.2	12.4	356.9	10.1	101.0
29	91	Basal + 20% D. S. milk	350.5	382.0	9.0	336.3	12.0	95.9
Total			2213.5	2521.6	13.9	2255.3	10.6	101.9

TABLE 9.—GAINS MADE BY LEGHORN HENS

Lot	No. Bds.	Ration	Initial Weight	Final Weight	Gain	Dressed Weight	Dressing Loss	Percentage of Initial Weight Packed
					Per cent		Per cent	
			<i>lbs.</i>	<i>lbs.</i>		<i>lbs.</i>		
51	94	Basal + Cond. Buttermilk	300.2	339.5	13.1	300.2	11.6	100.0
6	97	Basal + Liquid Buttermilk	291.6	333.6	14.4	293.7	12.0	100.7
12	94	Basal + 5% D. S. milk	270.2	305.6	13.1	268.0	12.3	99.2
18	95	Basal + 10% D. S. milk	275.8	326.5	18.4	288.7	11.6	104.7
24	91	Basal + 15% D. S. milk	262.8	293.7	11.8	258.6	12.0	98.4
30	95	Basal + 20% D. S. milk	292.1	330.7	13.2	291.9	11.7	99.9
Total			1692.7	1929.6	14.0	1701.1	11.8	100.5

Effect of Ration Upon Gain, Dressing Loss and Percentage of Initial Weight Packed

It will be observed in Tables 10 to 15 that there were no significant differences in the percentage gain for the various rations. Attention, however, should be called to the lots included in Table 13 which were fed 10 per cent dried skim milk. Lots 37 and 39 of this group were improperly handled before being received at the station, having been trucked in a cold rain for 200 miles. Even when these birds are included the percentage gain compares favorably with the other rations. Were these lots eliminated as arranged in the table the percentage gain for the remaining lots would be 20.3 per cent with a percentage of initial weight packed of 107.2. These results are also misleading when compared with the other groups because it will be noted that the roasters in all groups made relatively poor gains. With the exceptions noted, in general the most satisfactory gains were secured with the ration containing 10 per cent dried skim milk.

Loss in weight from dressing ranged from 10.5 per cent when 5 per cent dried skim milk was fed to 11.6 per cent when condensed buttermilk was used. The variation in dressing loss within a group of birds receiving the same ration was greater than between different rations. Age and breed differences influence the variation within the groups receiving the same ration.

The poultry packer is interested in the percentage of initial live weight which can be packed as dressed poultry ready for the market. If this is used as a measure of feeding efficiency it will be noted that the rations rank as follows: (1) 10 per cent dried skim milk, (2) 5 per cent dried skim milk, (3) condensed buttermilk, (4) liquid buttermilk, (5) 15 per cent dried skim milk and (6) 20 per cent dried skim milk.

Feed Consumption, Gain and Feed Cost of Gain

Feed consumption was calculated by using the actual pounds of the dried skim milk rations consumed and by combining the estimated solids of the liquid or condensed milk consumed with the basal mash used, considering liquid buttermilk as having 10 per cent solids and condensed buttermilk 30 per cent solids.

There were no very significant differences in feed consumption. It was apparently possible to maintain a slightly higher rate of feed consumption when condensed buttermilk was used. Increasing the dried skim milk content of the ration decreased feed consumption. The amount of water consumed by the various lots was not measured.

A pound of gain was produced with 3.2 pounds of feed when liquid buttermilk, 5 per cent dried skim milk or 10 per cent dried skim milk was fed. With the condensed buttermilk 3.3 pounds of feed was required

TABLE 10.—GAINS MADE BY BIRDS RECEIVING CONDENSED BUTTERMILK

Lot	No. Bds.	Stock	Initial Weight	Final Weight	Gain	Dressed Weight	Dressing Loss	Percentage of Initial Weight Packed
					Per cent		Per cent	
46	94	Rock Broilers----	<i>lbs.</i> 195.6	<i>lbs.</i> 236.3	20.8	<i>lbs.</i> 204.7	13.4	104.7
47	100	Red Broilers----	204.3	262.7	28.6	230.3	12.3	112.7
48	98	Leghorn Broilers----	158.9	211.7	33.2	184.4	12.9	116.0
49	90	Rock Hens-----	347.4	408.1	17.5	363.1	11.0	104.5
50	92	Red Hens-----	356.0	429.6	20.7	378.2	12.0	106.2
51	94	Leghorn Hens----	300.2	339.8	13.1	300.2	11.6	100.0
52	82	Rock Roasters----	248.5	284.7	14.6	254.2	10.7	102.3
53	95	Red Roasters----	259.4	304.8	17.5	270.5	11.3	104.3
54	96	P. D. Rock Roast- ers-----	264.3	291.5	10.3	261.4	10.3	98.9
Total -----			2334.6	2768.9	18.6	2447.0	11.6	104.8

TABLE 11.—GAINS MADE BY BIRDS RECEIVING LIQUID BUTTERMILK

Lot	No. Bds.	Stock	Initial Weight	Final Weight	Gain	Dressed Weight	Dressing Loss	Percentage of Initial Weight Packed
					Per cent		Per cent	
1	98	Rock Broilers----	<i>lbs.*</i> 211.9	<i>lbs.</i> 262.3	23.8	<i>lbs.</i> 234.8	10.5	110.8
2	95	Red Broilers----	227.3	279.9	23.1	248.0	11.4	109.1
3	100	Leghorn Broilers----	145.3	203.1	40.0	175.9	13.4	121.1
4	89	Rock Hens-----	352.5	401.6	13.9	364.1	9.3	103.3
5	93	Red Hens-----	383.7	437.2	13.9	391.1	10.5	101.9
6	97	Leghorn Hens----	291.6	333.6	14.4	293.7	12.0	100.7
31	95	Rock Roasters----	276.9	310.0	12.0	280.3	9.6	101.2
33	88	Red Roasters----	281.6	315.6	12.1	281.4	10.8	99.9
32	86	P. D. Rock Roast- ers-----	256.9	292.7	13.9	261.8	10.6	101.9
Total 841*			2427.7	2836.0	16.8	2531.1	10.8	104.3

TABLE 12.—GAINS MADE BY BIRDS RECEIVING 5% DRIED SKIM MILK

Lot	No. Bds.	Stock	Initial Weight	Final Weight	Gain	Dressed Weight	Dressing Loss	Percentage of Initial Weight Packed
					Per cent		Per cent	
7	100	Rock Broilers----	<i>lbs.</i> 208.0	<i>lbs.</i> 248.1	19.3	<i>lbs.</i> 222.0	10.5	106.7
8	100	Red Broilers----	221.6	286.6	29.3	253.2	11.7	114.3
9	100	Leghorn Broilers----	175.9	238.5	35.6	207.1	13.2	117.7
10	95	Rock Hens-----	416.6	456.5	9.6	419.1	8.2	100.6
11	100	Red Hens-----	399.6	449.5	12.5	412.4	8.3	103.2
12	94	Leghorn Hens----	270.2	305.6	13.1	268.0	12.3	99.2
34	93	Rock Roasters----	290.0	342.7	18.2	303.3	11.5	104.6
36	92	Red Roasters----	279.0	324.7	16.4	287.1	11.6	102.9
35	92	P. D. Rock Roast- ers-----	260.7	306.5	17.6	276.4	9.8	106.0
Total 866			2521.6	2958.7	17.3	2648.6	10.5	105.0

TABLE 13.—GAINS MADE BY BIRDS RECEIVING 10% DRIED SKIM MILK

Lot	No. Bds.	Stock	Initial Weight	Final Weight	Gain	Dressed Weight	Dressing Loss	Percentage of Initial Weight Packed
					Per cent		Per cent	
13	98	Rock Broilers	<i>lbs.</i> 185.3	<i>lbs.</i> 242.7	31.0	<i>lbs.</i> 213.3	12.1	115.1
14	98	Red Broilers...	226.9	280.2	23.5	249.9	10.8	110.1
15	97	Leghorn Broilers.....	166.9	218.3	30.8	194.8	10.8	116.7
16	95	Rock Hens.....	360.6	421.7	16.9	377.1	10.6	104.6
17	92	Red Hens.....	370.3	426.1	15.1	380.4	10.7	102.7
18	95	Leghorn Hens.....	275.8	326.5	18.4	288.7	11.6	104.7
38	94	P. D. Rock Roasters.....	281.1	331.2	17.8	296.2	10.6	105.4
Total	669		1866.9	2246.7	20.3	2000.4	11.0	107.2
*37	88	Rock Roasters..	316.7	339.8	7.3	301.5	11.3	95.2
*39	81	Red Roasters..	265.1	285.6	7.7	253.2	11.3	95.5
Grand Total	838		2448.7	2872.1	17.3	2555.1	11.0	104.3

*Lots 37 and 39 were trucked 200 miles on a cold, rainy day and contracted colds in transit.

TABLE 14.—GAINS MADE BY BIRDS RECEIVING 15% DRIED SKIM MILK

Lot	No. Bds.	Stock	Initial Weight	Final Weight	Gain	Dressed Weight	Dressing Loss	Percentage of Initial Weight Packed
					Per cent		Per cent	
19	96	Rock Broilers..	<i>lbs.</i> 201.6	<i>lbs.</i> 271.3	34.6	<i>lbs.</i> 238.5	12.1	118.3
20	96	Red Broilers...	231.1	280.6	21.4	243.6	13.2	105.4
21	94	Leghorn Broilers.....	207.0	247.7	19.7	221.5	10.6	107.0
22	91	Rock Hens.....	361.8	395.5	9.3	357.0	9.7	98.7
23	90	Red Hens.....	353.4	397.2	12.4	356.9	10.1	101.0
24	91	Leghorn Hens.....	262.8	293.7	11.8	258.6	12.0	98.4
40	84	Rock Roasters..	256.1	294.6	15.0	265.0	10.0	103.5
42	92	Red Roasters..	270.5	316.3	16.9	280.4	11.3	103.7
41	94	P. D. Rock Roasters.....	275.1	323.9	17.7	289.5	10.6	105.2
Total	828		2419.4	2820.8	16.6	2511.0	11.0	103.8

TABLE 15.—GAINS MADE BY BIRDS RECEIVING 20% DRIED SKIM MILK

Lot	No. Bds.	Stock	Initial Weight	Final Weight	Gain	Dressed Weight	Dressing Loss	Percentage of Initial Weight Packed
					Per cent		Per cent	
25	98	Rock Broilers..	<i>lbs.</i> 215.7	<i>lbs.</i> 270.3	25.3	<i>lbs.</i> 240.9	10.9	111.7
26	88	Red Broilers...	210.5	250.2	18.9	223.9	10.5	106.4
27	92	Leghorn Broilers.....	196.3	242.4	23.5	209.9	13.4	106.9
28	96	Rock Hens.....	414.3	454.4	9.7	408.9	10.0	98.7
29	91	Red Hens.....	350.5	382.0	9.0	336.3	12.0	95.9
30	95	Leghorn Hens.....	292.1	330.7	13.2	291.9	11.7	99.9
43	70	Rock Roasters..	197.6	223.0	12.9	198.3	11.1	100.4
45	93	Red Roasters..	294.9	346.2	17.4	307.7	11.1	104.3
44	92	P. D. Rock Roasters.....	281.2	316.1	12.4	279.6	11.5	99.4
Total	815		2453.1	2815.3	14.8	2497.4	11.3	101.8

TABLE 16.—FEED CONSUMPTION, GAINS AND FEED COST OF GAINS WHEN FED CONDENSED BUTTERMILK

Lot	No.	Stock	Feed Consumed*		Pounds of gain	Pounds of feed per pound gain	Cost per pound gain
			Total lbs. of feed	Lbs. of feed per bird per day			
46	94	Rock Broilers.....	161.5	.1718	40.7	4.0	\$.1000
47	100	Red Broilers.....	190.8	.1908	58.4	3.3	.0786
48	98	Leghorn Broilers.....	176.7	.1804	52.8	3.3	.0833
49	90	Rock Hens.....	162.5	.2379	60.7	2.7	.0611
50	92	Red Hens.....	168.6	.2618	73.6	2.3	.0523
51	94	Leghorn Hens.....	154.0	.2340	39.3	3.9	.0934
52	82	Rock Roasters.....	125.8	.2192	36.2	3.5	.0834
53	95	Red Roasters.....	137.7	.2071	45.4	3.0	.0758
54	96	Rock Roasters.....	137.0	.2039	27.2	5.0	.1026
Average			157.2	.2092	48.3	3.3	.0772

*Feed consumption was calculated by considering condensed buttermilk as containing 30 percent solids.

TABLE 17.—FEED CONSUMPTION, GAINS AND FEED COST OF GAINS WHEN FED LIQUID BUTTERMILK

Lot	No.	Stock	Feed Consumed*		Pounds of gain	Pounds of feed per pound gain	Cost per pound gain
			Total lbs. of feed	Lbs. of feed per bird per day			
1	98	Rock Broilers.....	157.9	.1611	50.4	3.1	\$.0558
2	95	Red Broilers.....	159.9	.1683	52.6	3.0	.0536
3	100	Leghorn Broilers.....	166.9	.1669	57.8	2.9	.0509
4	89	Rock Hens.....	137.4	.2205	49.1	2.8	.0491
5	93	Red Hens.....	142.7	.2192	53.5	2.7	.0469
6	97	Leghorn Hens.....	159.3	.2346	42.0	3.8	.0660
31	95	Rock Roasters.....	126.6	.1904	33.1	3.8	.0680
33	88	Red Roasters.....	123.9	.2011	34.0	3.6	.0647
32	86	Rock Roasters.....	120.7	.2005	35.8	3.4	.0466
Average			143.9	.1914	45.4	3.2	.0548

*Feed consumption was calculated by considering liquid buttermilk as containing 10 per cent solids

TABLE 18.—FEED CONSUMPTION, GAINS AND FEED COST OF GAINS WHEN FED 5 PER CENT DRIED SKIM MILK

Lot	No.	Stock	Feed Consumed		Pounds of gain	Pounds of feed per pound gain	Cost per pound gain
			Total lbs. of feed	Lbs. of feed per bird per day			
7	100	Rock Broilers.....	167.0	.1670	40.1	4.2	\$.0716
8	100	Red Broilers.....	183.0	.1830	65.0	2.8	.0485
9	100	Leghorn Broilers.....	165.0	.1650	62.6	2.6	.0454
10	95	Rock Hens.....	166.5	.2504	39.9	4.2	.0717
11	100	Red Hens.....	167.0	.2386	49.9	3.3	.0575
12	94	Leghorn Hens.....	120.8	.1836	35.4	3.4	.0588
34	93	Rock Roasters.....	151.4	.2326	52.7	2.9	.0493
36	92	Red Roasters.....	154.2	.2394	45.7	3.4	.0580
35	92	Rock Roasters.....	145.4	.2258	45.8	3.2	.0410
Average			157.8	.2040	48.6	3.2	.0544

TABLE 19.—FEED CONSUMPTION, GAINS AND FEED COST OF GAINS WHEN FED 10 PER CENT DRIED SKIM MILK

Lot	No.	Stock	Feed Consumed		Pounds of gain	Pounds of feed per pound gain	Cost per pound gain
			Total lbs. of feed	Lbs. of feed per bird per day			
13	98	Rock Broilers.....	178.6	.1822	57.4	3.1	\$.0573
14	98	Red Broilers.....	174.1	.1777	53.3	3.3	.0600
15	97	Leghorn Broilers.....	160.2	.1652	51.4	3.1	.0574
16	95	Rock Hens.....	154.1	.2317	61.1	2.5	.0465
17	92	Red Hens.....	149.3	.2318	55.8	2.7	.0493
18	95	Leghorn Hens.....	140.4	.2111	50.7	2.8	.0509
37	88	Rock Roasters.....	142.2	.2308	23.1	6.2	.1134
39	81	Red Roasters.....	132.0	.2328	20.5	6.4	.1185
38	94	Rock Roasters.....	140.2	.2131	50.1	2.8	.0403
Average			152.3	.2033	47.0	3.2	.0583

TABLE 20.—FEED CONSUMPTION, GAINS AND FEED COST OF GAINS WHEN FED 15 PER CENT DRIED SKIM MILK

Lot	No.	Stock	Feed Consumed		Pounds of gain	Pounds of feed per pound gain	Cost per pound gain
			Total lbs. of feed	Lbs. of feed per bird per day			
19	96	Rock Broilers.....	176.2	.1835	69.7	2.5	\$.0495
20	96	Red Broilers.....	166.3	.1732	49.5	3.4	.0659
21	94	Leghorn Broilers.....	171.0	.1819	40.7	4.2	.0823
22	91	Rock Hens.....	153.3	.2407	33.7	4.5	.0890
23	90	Red Hens.....	151.2	.2400	43.8	3.5	.0676
24	91	Leghorn Hens.....	131.2	.2060	30.9	4.2	.0832
40	84	Rock Roasters.....	118.8	.2020	38.5	3.1	.0605
42	92	Red Roasters.....	136.8	.2124	45.8	3.0	.0585
41	94	Rock Roasters.....	144.4	.2195	48.8	3.0	.0467
Average			149.9	.2028	44.6	3.4	.0645

TABLE 21.—FEED CONSUMPTION, GAINS AND FEED COST OF GAINS WHEN FED 20 PER CENT DRIED SKIM MILK

Lot	No.	Stock	Feed Consumed		Pounds of gain	Pounds of feed per pound gain	Cost per pound gain
			Total lbs. of feed	Lbs. of feed per bird per day			
25	98	Rock Broilers.....	177.8	.1814	54.6	3.3	\$.0678
26	88	Red Broilers.....	157.1	.1785	39.7	4.0	.0824
27	92	Leghorn Broilers.....	152.1	.1653	46.1	3.3	.0685
28	96	Rock Hens.....	149.6	.2226	40.1	3.7	.0776
29	91	Red Hens.....	145.0	.2276	31.5	4.6	.0959
30	95	Leghorn Hens.....	137.9	.2074	38.6	3.6	.0744
43	70	Rock Roasters.....	92.6	.1890	25.4	3.6	.0760
45	93	Red Roasters.....	137.6	.2114	51.3	2.7	.0558
44	92	Rock Roasters.....	141.8	.2202	34.9	4.1	.0699
Average			143.5	.1975	40.2	3.5	.0728

for one pound of gain and with the 15 per cent dried skim milk it took 3.4 pounds of feed to produce a pound of gain. However, these differences are not very great nor significant.

The cheapest gains were made with the 5 per cent dried skim milk ration at a cost of \$.0544 per pound of gain and the liquid buttermilk ration at a cost of \$.0548 per pound. The 10, 15 and 20 per cent dried skim milk rations showed feed costs per pound of gain amounting to \$.0583, \$.0645 and \$.0728 respectively. Gains made on rations containing condensed buttermilk cost \$.0772 per pound. The costs of rations vary considerably from year to year and are low now as compared to other recent prices.

The Rhode Island Red broilers consumed more feed per bird than the Plymouth Rock or Leghorn broilers. The average feed consumption per bird for the ten-day feeding period was: Rhode Island Reds 1.787 pounds, Rocks 1.745 pounds and Leghorns 1.707 pounds. Rhode Island Red roasters also consumed more feed per bird with 1.502 pounds as compared to 1.479 pounds and 1.498 pounds with Rock roasters. Feed consumption of the Red and Rock hens was 1.66 pounds while the Leghorn hens consumed 1.49 pounds per bird.

Relation of Initial Weight to Gains Made

Tables 22 and 23 show that the small and medium sized birds made better gains than did the larger birds. This was true of all classes of stock used; broilers, roasters and hens. The greatest difference was between the small and large broilers and particularly the Leghorn broilers where a gain of 54.2 per cent was made by the small birds.

Relation of Age to Gains Made, Dressing Loss and Percentage Initial Weight Packed

The broilers made an average gain of 26.3 per cent, the roasters 14.3 per cent and the hens 13.5 per cent. It is evident that the younger birds respond more readily to fattening. The hens had a dressing loss of 10.6 per cent, the broilers 11.8 per cent and the roasters 10.8 per cent. The broilers showed an average initial weight packed of 111.3 per cent, the roasters 101.9 per cent and the hens 101.4 per cent.

It is readily apparent from this investigation that the age of the stock fattened influences quite decidedly the gains made and the percentage of initial weight packed, the young stock producing most satisfactory results. Older stock such as hens show less dressing loss when prepared for the market.

TABLE 22.—RELATION OF INITIAL WEIGHT TO GAINS MADE WHEN FED CONDENSED BUTTERMILK

Lot	Stock	Class I—Small				Class II—Medium				Class III—Large			
		No.	Avg. Wt.	Gain		No.	Avg. Wt.	Gain		No.	Avg. Wt.	Gain	
				Lbs.	%			Lbs.	%			Lbs.	%
46	Rock Broilers.....	22	1.6	9.1	25.6	47	2.0	19.2	20.2	25	2.6	12.4	19.1
47	Red Broilers.....	25	1.6	11.8	29.1	49	2.0	27.2	28.0	26	2.6	19.4	29.1
48	Leghorn Broilers.....	20	1.1	11.4	53.5	54	1.5	30.0	36.0	24	2.3	11.4	21.0
49	Rock Hens.....	21	3.2	15.6	23.5	47	3.8	29.2	16.4	22	4.7	15.9	15.4
50	Red Hens.....	23	3.2	17.6	24.2	47	3.8	37.6	20.9	22	4.7	18.4	17.8
51	Leghorn Hens.....	24	2.5	14.2	23.4	45	3.1	19.3	13.7	25	4.0	5.8	5.9
52	Rock Roasters.....	21	2.5	8.6	16.4	42	2.9	21.9	17.8	19	3.8	5.7	7.8
53	Red Roasters.....	26	2.3	12.4	20.7	47	2.7	23.3	18.4	22	3.3	9.7	13.3
54	P. D. Rock Roasters.....	26	2.3	6.8	11.3	45	2.7	11.5	9.4	25	3.3	8.9	10.9
	Total.....	208		107.5		423		219.2		210		107.6	
	Average.....	23	2.3	11.9	22.9	47	2.7	24.4	19.1	23	3.4	12.0	15.0

TABLE 23.—RELATION OF INITIAL WEIGHT TO GAINS MADE WHEN FED FIVE PER CENT DRIED SKIM MILK

Lot	Stock	Class I—Small				Class II—Medium				Class III—Large			
		No.	Avg. Wt.	Gain		No.	Avg. Wt.	Gain		No.	Avg. Wt.	Gain	
				Lbs.	%			Lbs.	%			Lbs.	%
7	Rock Broilers.....	27	1.6	12.2	27.5	50	2.1	20.1	19.2	23	2.6	7.8	13.2
8	Red Broilers.....	24	1.7	16.9	41.9	52	2.1	33.6	30.1	24	2.9	14.5	20.8
9	Leghorn Broilers.....	26	1.4	19.3	54.2	46	1.8	27.9	34.1	28	2.1	15.4	26.3
10	Rock Hens.....	19	3.4	9.7	14.9	56	4.3	26.7	11.1	20	5.5	3.5	3.2
11	Red Hens.....	24	3.3	11.7	14.8	54	4.0	28.3	13.2	22	4.9	9.9	9.2
12	Leghorn Hens.....	22	2.4	8.3	16.0	49	2.8	20.6	15.0	23	3.5	6.5	8.1
34	Rock roasters.....	24	2.6	11.8	19.0	43	3.1	26.1	19.8	26	3.7	14.8	15.4
36	Red Roasters.....	24	2.6	11.4	18.3	45	3.0	24.6	18.3	23	3.6	9.7	11.8
35	P. D. Rock Roasters.....	26	2.3	12.5	20.7	40	2.7	20.1	18.8	26	3.6	13.2	14.1
	Total.....	216		113.8		435		228.0		215		95.3	
	Average.....	24	2.3	12.6	22.7	48	2.9	25.3	18.0	24	3.5	10.6	12.6

TABLE 24.—COMMERCIAL GRADES OF DRESSED BIRDS FATTENED ON DIFFERENT RATIONS

Ration	Number Birds	Grade No. 1 Per cent	Grade No. 2 Per cent	Grade No. 3 Per cent
Basal + condensed buttermilk.....	841	93.6	3.8	2.6
Basal + liquid buttermilk.....	841	87.3	9.4	3.3
Basal + 5% dried skim milk.....	866	88.8	7.6	3.6
Basal + 10% dried skim milk.....	838	90.4	7.2	2.4
Basal + 15% dried skim milk.....	828	87.7	9.2	3.1
Basal + 20% dried skim milk.....	815	88.5	7.8	3.7

TABLE 25.—COMMERCIAL GRADES OF DRESSED BIRDS CLASSIFIED BY BREED AND AGE

Stock	Number Birds	Grade No. 1 Per cent	Grade No. 2 Per cent	Grade No. 3 Per cent
Rock roasters No. 1.....	512	94.0	3.7	2.3
Rhode Island Red roasters.....	541	93.4	3.5	3.1
Rock roasters No. 2.....	554	95.9	2.2	1.9
Rock hens.....	556	82.9	11.9	5.2
Red hens.....	558	73.7	21.1	5.2
Leghorn hens.....	566	83.6	11.8	4.6
Rock broilers.....	584	94.7	2.7	2.6
Red broilers.....	577	91.7	6.1	2.2
Leghorn broilers.....	581	94.8	4.3	.9

No. 1 Received Station basal ration.
 No. 2 Received poultry department basal ration.

Comparison of Basal Rations

Six lots of Plymouth Rock roasters were fed the regular station basal ration plus the various milk concentrates and six lots of roasters of the same breed received the poultry department basal ration plus the different milk concentrates. It was found (Tables 4 and 6) that the poultry department basal ration was slightly superior to the station basal ration in that it produced 1.8 per cent more gain, 1.7 per cent more initial weight was packed and there was .1 per cent less loss from dressing.

Disregarding Lot 37 in Table 4, the average gains made by the Plymouth Rocks receiving the station basal ration were 14.6 per cent, average dressing loss 10.6 per cent and the percentage initial weight packed 102.5 per cent as compared to 15.0 per cent gain, 10.6 per cent dressing loss and 102.8 per cent initial weight packed for the Plymouth Rocks fed the poultry department basal ration.

Table 25 shows that in the lots of Plymouth Rock roasters fed the poultry department ration there were approximately two per cent more No. 1 birds than in those lots which received the station basal ration.

From this investigation it is evident that a very simple basal ration when used for fattening poultry will produce satisfactory results if properly supplemented with some form of milk.

Commercial Grades of Dressed Poultry

Birds receiving condensed buttermilk and 10 per cent dried skim milk graded higher than those fed other rations. These lots had 93.6 per cent and 90.4 per cent of No. 1 birds respectively. The birds fed liquid buttermilk showed the highest percentage of low grade dressed birds as there were only 87.3 per cent of No. 1 birds in this group.

The low grades of the different birds was not due entirely to the feed. Many birds graded low because of skin abrasions, skin bruises, broken legs and wings, poor bleeding, egg bound, crooked breasts and crooked backs.

Rhode Island Red birds graded lower in every case than did the other breeds while the Plymouth Rock roasters, Leghorn hens and Leghorn broilers graded highest. In the broilers the Leghorns graded 94.8 per cent No. 1 birds, the Plymouth Rocks 94.7 per cent and the Rhode Island Reds 91.7 per cent. Leghorn hens graded 83.6 per cent, Plymouth Rocks 82.9 per cent and Rhode Island Reds 73.7 per cent No. 1 birds. The Plymouth Rock roasters which received the poultry department basal ration graded 95.9 per cent No. 1 dressed birds, while the Plymouth Rock and Rhode Island Red roasters which were fed the station basal ration graded 94.0 per cent and 93.4 per cent respectively.

With respect to age the roasters graded the highest with an average of 94.4 per cent No. 1 birds while the broilers and hens graded 93.7 per cent and 80.1 per cent respectively. A lower grade was expected with the hens since only No. 2 hens were used in the fattening experiment.

CONCLUSIONS

1. Most satisfactory gains were obtained with Leghorn broilers, Rhode Island Red roasters and Leghorn hens.
2. Loss in dressing was lowest in Plymouth Rock broilers, roasters and hens.
3. The highest percentage of initial weight was packed when Leghorn broilers, Rhode Island Red roasters and Rhode Island Red hens were fattened.
4. Most satisfactory gains were produced by the 10 per cent dried skim milk ration.
5. The lowest dressing loss was obtained when birds were fattened with a ration containing 5 per cent dried skim milk.
6. The highest percentage of initial weight packed was secured with birds fattened with the 10 per cent dried skim milk ration.
7. Greatest feed consumption per bird per day was obtained with Rhode Island Red broilers, Rhode Island Red roasters and Plymouth Rock hens.
8. Apparently the ration does not influence feed consumption materially. The amount of feed consumed per bird per day varied from .2092 pounds for the lots receiving condensed buttermilk to .1914 pounds for the lots receiving liquid buttermilk.
9. When cost per pound of gain was calculated from current feed prices the cheapest gains were made by birds receiving rations containing 5 per cent dried skim milk and liquid buttermilk and the most expensive gains were made by birds receiving condensed buttermilk. When Lots 37 and 39 are disregarded the cheapest gains were produced by 10 per cent dried skim milk.
10. In the lots of broilers, roasters and hens studied, most rapid gains were made by the smaller birds.
11. Condensed buttermilk produced the highest quality birds with 93.6 per cent No. 1 birds as compared to 90.4 per cent for birds receiving 10 per cent dried skim milk.
12. Broilers and roasters graded considerably higher than the hens. This difference may be attributed in part to the fact that only thinly fleshed hens were fattened.
13. Leghorns and Plymouth Rocks dressed a higher percentage of quality birds than did Rhode Island Reds.
14. A simple basal ration when properly supplemented with milk products produced as satisfactory gains as a more complex basal ration similarly supplemented.