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*Finishing Two-Year-Old Steers
With Grass and Grain*

by E. A. Livesay

Agricultural Experiment Station
College of Agriculture, Forestry, and Home Economics
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Finishing Two-Year-Old Steers With Grass and Grain

CO. 1.15.1.1

by E. A. Livesay

TWO-YEAR-OLD STEERS in West Virginia usually are sold as feeders to be fattened in the drylot on a heavy grain ration, or they are sold as stockers to be wintered and then fattened on bluegrass pasture the following summer. Such steers are sold usually during the late summer and early fall months. Previous experimental work at the West Virginia Station combined with the practical experience of cattlemen in the state has shown that two-year-old steers do not finish sufficiently on grass alone to make desirable carcasses. In order to encourage cattlemen to market cattle for slaughter younger than three-year-old steers, it was apparent that grain must be fed in conjunction with pasture, or a short drylot feeding period following the grazing season would be necessary in order to produce the finish necessary to make two-year-old steers desirable for slaughter.

The data presented cover a period of three years, or from the fall of 1930 to the fall of 1933.¹

Method of Handling and Feeding Steers

Thirty head of native grade yearling Hereford steers were purchased each fall. In the fall of 1930 the purchase was made in Ritchie County, in the fall of 1931 and 1932, in Roane County. These steers were removed from pasture and started on a winter ration around the middle of December.

The steers were wintered as one lot each year, with the aim of having all steers in the same flesh or on the same level of nutrition at the beginning of the pasture season. The winter rations were sufficient for growth and development and were not intended to produce much increase in finish.

After the wintering period, which was 126 days for each of the three trials, the steers were graded as feeder steers and divided into three lots of 10 head each and turned to pasture. The steers were divided into lots according to weights, grades, and condition. These lots were designated as I, II, and III each year, and all lots were pastured on the same pasture area. Each year, after the steers were on grass for 56 days, Lot I received grain at the rate of 5 lb. per day per steer. After 84 days the steers of Lot II received grain at the rate of 7½ lb. per day. The steers of Lot III received no grain supplement. Near the end of the better grazing season, or 140 days after the

¹ Mr. Bert Moore, beef-cattle herdsman, was in direct charge of the feeding of the steers. Mr. J. A. Beal, graduate assistant in animal husbandry (now a member of the Department of Animal Husbandry at Oklahoma A. & M. College) assisted in collecting and recording data during the second and a portion of the third experimental trials.

steers were turned on pasture, all lots (I, II, and III) were fed a full grain ration for a period of 56 days. The steers of Lots I and II were continued on pasture and their grain ration was increased to a full feed. The steers of Lot III, which did not receive grain in connection with pasture, were removed from pasture and fed a full grain ration with a mixed hay (clover and timothy) replacing pasture.

The steers were wintered in an open shed with a small outside runway. The steers of Lot III were quartered in the same shed for the short full-grain feeding period. The shed was equipped with a hayrack and a grain trough. The entire floor area of the shed and the runway was of concrete construction. Water and salt were before the steers at all times during their confinement. When on pasture they were salted once each week. Running water from springs and a branch was available while the steers were on pasture. Lots I and II while on pasture received grain in covered bunks in small enclosures within the pasture area.

The grain was fed once per day (7 a. m.) until full feeding began. At the beginning of full feeding, all cattle were fed grain twice daily in an amount they would clean up in approximately 40 minutes. The hay was limited to 8 lb. per steer per day in the case of Lot III.

The grain mixture fed to all lots (both on grass and in drylot) consisted of 6 lb. of cracked corn and 1 pound of cottonseed meal.

After the 56-day full-grain feeding of all lots, each steer was graded from the standpoint of a slaughter steer, shipped to Pittsburgh, sold on the open market, and followed through the slaughter house, where all carcasses were graded.

Feeds and Weights

All the roughages used in wintering and finishing the steers were home-grown, of good quality, and of normal chemical analysis, with the exception of the corn silage fed during the winter of 1930-31. This silage was made from corn grown during the drought of 1930; it contained only a few short ears. The steers were not making the gain they should make on the ration used and it was necessary to supply additional nutrients. This was done by adding one-half pound of cottonseed meal just a few days before reaching the half-way point of the wintering period. The chemical composition² of this silage was as follows: moisture, 79.9; ash, 1.6; crude protein, 2.27; fiber, 5.57; N. F. E., 10; and fat, 0.67. This silage was high in moisture and low in total nutrients. The nutritive ratio was 1:9.54—a much narrower N. R. than found in the case of normal corn silage. The concentrates fed were all purchased, of good quality, and of normal chemical analysis. The corn was of No. 2 grade and the cottonseed meal of choice grade.

The same pasture area was used each year. It was a bluegrass sod of only fair quality.

² Chemical analysis of all feeds were made by Dr. A. H. VanLandingham of the department of agricultural chemistry.

TABLE 1—*First Group of Two-Year-Old Steers (1930-31)*

Winter Feeding Period (Dec. 12 to Apr. 17—126 days).

	LOT 1	LOT 2	LOT 3
No. steers	10	10	10
No. days	126	126	126
Ave. initial weight (lb.)	631.0	664.5	662.0
Ave. final weight	716.5	718.5	705.0
Ave. gain	85.5	54.0	43.0
Ave. daily gain	.68	.43	.34
RATION			
Corn silage	20	20	20
Mixed hay	3	3	3
Oat straw	3	3	3
Cottonseed meal	1.776	1.776	1.776
FEED COST PER STEER			
Corn silage	\$ 4.375	\$ 4.375	\$ 4.375
Mixed hay	2.25	2.25	2.25
Oat straw	1.50	1.50	1.50
Cottonseed meal	3.885	3.885	3.885
Total	12.01	12.01	12.01

Grazing Period (Apr. 18 to Sept. 4—140 days)

Ave. initial weight (lb)	716.5	718.5	705.0
Ave. final weight	1006.0	995.8	994.0
Ave. gain	289.5	277.3	289.0
Ave. daily gain	2.07	1.98	2.06
RATION			
Pasture			
Cracked corn (84 da.)	4.29	(56 da.) 6.43	
Cottonseed meal (84 da.)	.71	1.07	
FEED COST PER STEER			
Pasture	\$ 5.86	\$ 6.86	\$ 6.86
Cracked corn	4.629	4.629	
Cottonseed meal	.72	.72	
Total	12.21	12.21	6.86

Finishing Period (Sept. 5 to Oct. 30—56 days)

Ave. initial weight (lb.)	1006.0	995.8	994.0
Ave. final weight	1113.0	1119.0	1124.0
Ave. gain	107.0	123.2	130.0
Ave. daily gain	1.91	2.20	2.32
RATION			
Pasture			
Cracked corn	14.23	14.23	15.26
Mixed hay			8.00
Cottonseed meal	2.37	2.37	2.54
FEED COST PER STEER			
Pasture	\$ 2.744	\$ 2.744	\$ 10.985
Cracked corn	10.245	10.245	1.792
Mixed hay			1.709
Cottonseed meal	1.594	1.594	
Total	14.583	14.583	14.486

Summary of Grazing and Finishing Periods—196 days

Cost per steer	\$ 49.18	\$ 49.12	\$ 49.12
Ave. initial weight (lb.)	848.0	847.0	847.0
Ave. final weight	1212.0	1195.5	1174.0
Ave. gain	364.0	348.5	327.0
Ave. daily gain	1.86	1.78	1.67
Feed and pasture costs	\$ 22.37	\$ 22.37	\$ 18.29
Cost per 100 lb. gain	5.87	6.10	5.59
Total cost per steer	71.55	71.49	67.41

Market and Slaughter Data

	LOT 1	LOT 2	LOT 3
Market Data:			
Ave. market wt. (lb.)	1150.0	1142.0	1132.0
Shrink	62.0	54.0	42.0
Selling price	\$ 4.65	\$ 4.65	\$ 4.50
Returns per steer	53.47	53.10	50.94
Marketing cost	4.25	4.25	4.25
Total cost	75.80	75.74	71.66
Margin per steer	-22.33	-22.27	-20.72
Slaughter Data:			
Ave. hot carcass wt.	696.0	694.0	672.0
Ave. dressing percentage			
Hot and market weight	60.52	60.77	59.36
Hot and home weight	57.43	58.03	57.24

Note:

The same feed prices were used in the cost calculations for 1933 as were used for the second year or 1932.

Cost of steers was obtained each year by adding the total cost and the total winter feed cost then prorating this amount between the three lots according to their weight at the beginning of the summer grazing period.

The steers were weighed individually at the beginning of the winter feeding periods and each 28 days or fraction thereof during the remainder of the trials each year. Individual weights were recorded on three successive days at the beginning and end of the winter feeding periods. The average of these weights was considered the correct weight of each steer. Since it was necessary to drive Lots I and II from the pasture to obtain final weights, it did not seem advisable to weigh on three successive days. A single weighing therefore represents their actual final weights. The winter, the grazing, and the finishing periods were of the same duration each year—126, 140, and 56 days respectively.

All cattle were sold on the Pittsburgh market. Both live and dressed weights were obtained.

Results of the Wintering, Grazing, and Finishing Periods

The results of each of the three years' work are given in Tables 1, 2, and 3.

Winter Periods—

Since the 30 head of steers were wintered as one lot each winter, it is of interest to note the results when the steers were graded and placed in their respective lots (at the beginning of the grazing season). When divided, the steers of each lot were distributed as nearly equal in respect to grade and weight as possible. When the data were tabulated as to the initial winter weights and winter gains, rather wide variations were found between the lots. For instance, the steers of Lot I, Table 1, were lighter by an average of approximately 30 lb. per steer than the steers of Lots II and III and made an average winter gain of approximately 30 lb. per steer more than the steers of the other lots. Table 2 shows that the steers of Lot II were lighter than the steers in Lots I and III by an average of approximately 35 lb. per

TABLE 2— *Second Group of Two-Year-Old Steers (1931-32)*

Winter Feeding Period (Dec. 11 to Apr. 15—126 days)

	LOT 1	LOT 2	LOT 3
No. steers	10	10	10
No. days	126	126	126
Ave. initial weight (lb.)	657.5	619.0	651.0
Ave. final weight	806.0	805.0	804.5
Ave. gain	148.5	186.0	153.5
Ave. daily gain	1.17	1.47	1.22
RATION			
Corn silage	20	20	20
Mixed hay	3	3	3
Oat straw	3	3	3
Cottonseed meal	1.5	1.5	1.5
FEED COST			
Corn silage (\$4.50)	5.67	5.67	5.67
Mixed hay	8.00	1.51	1.51
Oat straw	6.00	1.13	1.13
Cottonseed meal	20.00	1.89	1.89
Total	10.20	10.20	10.20

Grazing Period (April 16 to Sept. 2—140 days)

Ave. initial weight (lb.)	806.0	805.0	804.5
Ave. final weight	1038.0	1036.0	996.0
Ave. gain	232.0	231.0	191.5
Ave. daily gain	1.66	1.65	1.37
RATION			
Pasture
Cracked corn (84 da.)	4.29 (56 da.)	6.3	No grain
Cottonseed meal	0.71	1.07	
FEED COST PER STEER			
Pasture	\$ 6.86	\$ 6.86	\$ 6.86
Cracked corn	2.60	2.60
Cottonseed meal	0.60	0.60
Total	10.06	10.06	6.86

Finishing Period (Sept. 9 to Nov. 3—56 days)

Ave. initial weight (lb.)	1038	1036	996
Ave. final weight	1173	1166	1199
Ave. gain	135	130	203
Ave. daily gain	2.41	2.32	3.62
RATION			
Pasture			8.00
Mixed hay			18.75
Cracked corn	16.68	16.68	3.17
Cottonseed meal	2.78	2.78	
FEED COST PER STEER			
Pasture	\$ 2.74	\$ 2.74	\$ 1.79
Mixed hay			7.89
Cracked corn	7.01	7.01	1.75
Cottonseed meal	1.56	1.56	
Total	11.31	11.31	11.43

Summary of Grazing and Finishing periods—196 days

Cost per steer	\$ 50.21	\$ 50.15	\$ 50.12
Ave. initial weight (lb.)	806.0	805.0	804.5
Ave. final weight	1173.0	1166.0	1199.5
Ave. gain	367.0	361.0	395.0
Ave. daily gain	1.87	1.84	2.00
Feed and pasture costs	\$ 22.37	22.37	18.29
Cost per 100 lbs. gain	6.09	6.19	4.63
Total cost per steer	72.58	72.58	68.41

Market and Slaughter Data

	LOT 1	LOT 2	LOT 3
Market Data:			
Ave. market weight (lb.)	1121.0	1115.0	1137.0
Shrink	52.0	51.0	62.0
Selling price	\$ 6.50	\$ 6.25	\$ 7.00
Returns per steer	72.86	69.69	79.59
Marketing cost	4.60	4.60	4.60
Total cost	77.18	77.18	73.01
Margin per steer	— 4.32	— 7.49	+ 4.98
Slaughter Data:			
Ave. hot carcass weight	681.70	669.80	683.70
Ave. dressing percentage			
Hot and market weight	60.81	60.07	60.13
Hot and home weight	58.11	57.44	57.02

Note:

The following feed prices were used in the calculations for the second year. These are actual cost prices for cottonseed meal, corn, and pasture. Corn silage, \$4.50 per ton; cottonseed meal, \$20.00 per ton; mixed hay, \$8.00 per ton; oat straw, \$6.00 per ton; corn, 42 cents per bushel; and pasture, \$0.049 per day.

steer and made greater average winter gains by approximately the same amount. In the third winter (Table 3) the steers of Lot II were lighter than the steers of Lot III by an average of 40.5 pounds per steer, and their average winter gains were exactly 40.5 lb. greater than the gains made by the steers of Lot III.

Since the steers were purchased each year from three or four farmers, there was evidently some variation in finish at the start of the wintering periods which was eliminated more or less during winter feeding and may explain the variations in winter gains.

The winter ration of 20 lb. of corn silage (made from Boone County White corn, each year), 3 lb. of mixed hay, 3 lb. of oat straw, and 1.5 lb. of cottonseed meal proved satisfactory, except during the winter of 1930-31. As previously mentioned, the silage was made from corn grown during the drought year of 1930 and was not normal. The corn was normal with respect to size but it lacked ears. The steers probably made slightly heavier winter gains during the second (Table 2) and third (Table 3) winters than necessary for the most economical method of wintering. Previous experimental work at this Station has shown that too heavy winter gains always lighten subsequent pasture gains.

Grazing Periods—

From a study of the winter gains it is evident that the steers of the various lots equalized their condition of flesh during the winter periods and minimized this variable among the lots at the start of the grazing periods.

All lots were grazed on the same pasture each year. The grazing periods extended from around the middle of April to the first week of September, the actual grazing period being 140 days each year. Grain feeding began on the 56th day in the case of Lot I and on the 84th day in the case of Lot II; thus during the grazing periods Lot I was fed grain at the rate of 5 lb. for a period of 84 days and Lot II was fed grain at the rate of 7.5 lb. for 56 days. The amount of grain fed during the grazing season to Lot I and Lot II was the same—420 lb. per steer. Lot III received no grain.

TABLE 3—Third Group of Two-Year-Old Steers (1932-33)

Winter Feeding Period (Dec. 16 to Apr. 21—126 days)

	LOT 1	LOT 2	LOT 3
No. days	10	10	10
No. steers	126	126	126
Ave. initial weight (lb.)	640.0	627.0	667.5
Ave. final weight	848.0	847.0	847.0
Ave. gain	208.0	220.0	179.5
Ave. daily gain	1.65	1.74	1.42
RATION			
Corn silage	20	20	20
Mixed hay	3	3	3
Oat straw	3	3	3
Cottonseed meal	1.5	1.5	1.5
FEED COST			
Corn silage (\$4.50 per ton)	5.67	5.67	5.67
Mixed hay 8.00 per ton	1.50	1.50	1.50
Oat straw 6.00 per ton	1.13	1.13	1.13
Cottonseed meal 20.00 per ton	1.89	1.89	1.89
Total	10.20	10.20	10.20

Grazing Period (Apr. 22 to Sept. 8—140 days)

Ave. initial weight (lb.)	848.0	847.0	847.0
Ave. final weight	1076.0	1061.0	1046.0
Ave. gain	228.0	214.0	199.0
Ave. daily gain	1.63	1.53	1.42
RATION			
Pasture			
Cracked corn (84 da.)	4.29	6.43	No grain
Cottonseed meal	0.71	1.07	
FEED COST PER STEER			
Pasture	\$ 6.86	\$ 6.86	\$ 6.86
Cracked corn	2.60	2.60	
Cottonseed meal	0.60	0.60	
Total	10.06	10.06	6.86

Finishing Period (Sept. 9 to Nov. 3—56 days)

Ave. initial weight (lb.)	1076.0	1061.0	1046.0
Ave. final weight	1212.0	1195.5	1174.0
Ave. gain	136.0	134.5	128.0
Ave. daily gain	2.43	2.40	2.30
RATION			
Pasture			
Mixed hay			8.00
Cracked corn	16.68	16.68	18.75
Cottonseed meal	2.78	2.78	3.17
FEED COST PER STEER			
Pasture	\$ 2.74	\$ 2.74	\$ 1.79
Mixed hay			7.89
Cracked corn	7.01	7.01	7.89
Cottonseed meal	1.56	1.56	1.75
Total	11.31	11.31	11.43

Summary of Grazing and Finishing Periods—196 days

Cost per steer	\$ 57.94	\$ 58.10	\$ 57.01
Ave. initial weight (lb.)	716.5	718.5	705.0
Ave. final weight	1113.0	1119.0	1124.0
Ave. gain	396.5	400.5	419.0
Ave. daily gain	2.02	2.04	2.14
Feed and pasture costs	26.79	26.79	21.35
Cost per 100 lb. gain	6.75	6.69	5.09
Total cost per steer	84.73	84.89	78.36

Market and Slaughter Data

	LOT 1	LOT 2	LOT 3
Market Data:			
Wt. on market (lb.)	1074.0	1070.0	1071.0
Shrink	39.0	49.0	52.5
Percent shrink	3.50	4.38	4.67
Selling price	\$ 8.00	\$ 7.75	\$ 8.25
Returns per steer	85.92	82.92	88.35
Marketing cost	4.44	4.44	4.44
Total cost	89.17	89.33	82.80
Margin* per steer	— 3.25	— 6.41	+ 5.55
Slaughter Data:			
Ave. hot carcass wt.	635.2	640.3	623.6
Ave. dressing percentage			
Hot and market weight	59.20	59.78	58.10
Hot and home weight	57.07	57.22	55.48

Note:

The following feed prices were used in the calculations for the first winter feeding period: corn silage, \$3.50 per ton (inferior silage contained very little or no grain); cottonseed meal, \$35.00 per ton; mixed hay, \$12.00 per ton; oat straw, \$8.00 per ton. These are actual cost prices for cottonseed meal and corn.

The following feed prices were used in the calculations for the first summer and fall feeding period: pasture, \$.049 per day or actual cost; corn .72 per bu.; cottonseed meal, \$24.00 per ton; mixed hay, \$8.00 per ton. These are actual cost prices for cottonseed meal and corn.

*"Margin" represents the difference between the sale value and the costs of steer, feed, and marketing expenses.

Larger gains were made by all lots (Table 1) in the first trial. This heavier gain was due in large measure to smaller winter gains than were made during the two succeeding trials. The gains for Lots I, II, and III were 289.5, 227.3, and 289.0 lb., respectively, for the first trial; 232.0, 231.0, and 191.5 lb. for the second trial; and 228.0, 214.0, and 199.0 lb. for the third trial. Thus the feeding of grain to Lots I and II did not produce additional gains in the first trial and only slightly heavier gains in the second and third trials. There was, however, a marked difference in the appearance of the steers. The steers of Lots I and II were judged to be fatter and they appeared smoother of coat and tidier of middle.

Finishing Periods—

The finishing period of 56 days followed the grazing period of 140 days, so that the actual period during which the steers were being finished for the market covered 196 days. During the last 56 days the steers were on a full grain ration. In 1931 (Table 1) the steers of Lots I and II (fed in bunks on pasture) consumed an average of 16.60 lb. of grain per steer per day and made an average gain of 107.0 and 123.2 lb. respectively. The steers of Lot III which were fed in drylot (receiving 8 lb. of mixed hay in the place of pasture) consumed an average of 17.80 lb. of grain per day and made an average gain of 130 lb. per steer.

In 1932 (Table 2) the steers of Lots I and II consumed 19.46 lb. of grain per steer per day and made an average gain of 132 and 130 lb. of gain respectively. The Lot III steers consumed 21.92 lb. of grain per day and made an average gain of 202.5 lb. per steer. This is a much larger gain than the gain made by Lot III in either of the other two trials. No definite reasons can be offered to explain this additional gain.

The rations for 1933 (Table 3) were identical in every respect to the rations fed during the 1932 (Table 2) trials. The average gains were 136 lb. for Lot I, 134 lb. for Lot II, and 128 lb. for Lot III.

Summary of Grazing and Finishing Periods

In summing up the gains for the grazing (140 days) and the short full-grain feeding periods (56 days), a total of 196 days, we find that the following gains were made in 1931 (Table 1): Lot I, 396.5 lb., Lot II, 400.5 lb., and Lot III, 419 lb. The average home weights of these lots were 1113, 1119, and 1124 lb. respectively. In 1932 (Table 2): Lot I, 367.0, Lot II, 361.0, and Lot III, 394.0 lb. The average final home weights for these lots were 1173, 1166, and 1199.5 lb. respectively. In 1933 (Table 3): Lot I, 364.0, Lot II, 348.5, and Lot III, 327.0 lb. The average home weights of these lots were 1212, 1195.5 and 1174 lb. respectively. The average gains for the three trials were as follows: Lot I, 375.8, Lot II, 370.0, and Lot III, 380.2 lb.

These results in the case of Lots I and III check very closely with the results obtained at Lewisburg conducted with steers of the same age. The method of feeding grain was almost identical. Attention is called particularly to Lots I-b and I-c.³

Grade of Steers and Carcasses—

The steers were graded as feeders at the beginning of the grazing periods and as slaughter cattle at the close of each trial. At the close of each trial the steers were shipped to Pittsburgh for slaughter. All carcasses were graded after they were chilled.

J. H. Longwell, C. V. Wilson, and the author, all members of the staff in animal husbandry, served as the grading committee each year. Each grader worked independently, and each steer and each carcass was given an average or composite grade.

In order to discuss the average or lot grade, the 10 individual live and carcass grades were averaged. The following are the average lot grades:

TABLE 4.—Grades for Steers and Carcasses

	LOTS	FEEDER	SLAUGHTER	CARCASS
FIRST TRIAL—1930-31	I	19.16	18.45	17.89
	II	18.97	18.87	18.19
	III	18.38	20.06	19.60
SECOND TRIAL—1931-32	I	16.9	16.39	16.43
	II	16.8	17.65	17.33
	III	16.7	17.87	17.61
THIRD TRIAL—1932-33	I	18.0	16.16	16.96
	II	18.2	16.44	16.39
	III	18.2	19.31	17.08

These grades are based upon the grade of "good" being represented by 14, 16, and 18, fourteen (14) representing "high good," sixteen (16) "middle of good," and eighteen (18) "low good." "Medium" was represented by 20, 22, and 24. These data show that the steers used graded from middle to low good as feeder steers;

³ Beef production and quality as affected by method of feeding supplements to steers on grass in the Appalachian Region, by W. H. Black, R. L. Hiner and C. V. Wilson. U. S. D. A. Tech. Bul. 717.

from middle good to high medium as carcasses.

These grades indicate, based on averages for the three trials, that the steers of Lots I and II made slightly more grade improvement during the grazing and finishing periods than did the steers of Lot III, and that the carcasses of the steers of Lots I and II were slightly superior to the carcasses of the steers of Lot III. The grain feeding during a portion of the grazing season or during a somewhat longer period of grain feeding, as in the case of Lots I and II, produced slightly superior carcasses. The dressing percentages as shown in Tables 1, 2, and 3 were, on the average, slightly higher for the steers of Lots I and II than for the steers of Lot III. The carcasses from the steers of all lots were equal or superior to most carcasses produced from three-year-old grass-fat steers in this state.⁴

Sale and Dressed Yield of Steers—

All the steers were sold on the Pittsburgh market, on a gradually lower market each year. The years 1931, and 1932, and 1933 were all depression years, and 1933 values were near the bottom. In 1931 and 1932 the steers did not sell according to dressed yields or carcass grades, but in 1933 the prices paid were more in line with the relative values of the steers of the different lots. The only explanation as to why the steers did not sell more in line with the relative values of the various lots in 1931 and 1932, lies in the fact that the steers of Lot III showed evidence (soiled thighs and underlines) of being fed in drylot not exhibited by the steers of Lots I and II. In fact there has existed a prejudice against grass-finished cattle, even though they appear as well finished as grain-fed cattle.

The prejudice is justified in many cases but it should not be allowed to cause grass cattle to sell below their relative merits as compared to grain-fed cattle.

In 1931 and 1932 the steers were sold by different livestock commission merchants and were bought by different packing houses. In 1933 one of the same merchants sold the steers and they were bought by one of the packing houses which had bought and slaughtered the steers in one of the previous years.

In 1931 the sale prices were as follows: Lot I, \$8.00, Lot II, \$7.75, and Lot III, \$8.25. In other words, the steers of Lot III, which had grain for only 56 days in drylot, were judged to be superior to either of the other lots by 25 cents per 100 lb. Both the dressing percentages and the carcass grades actually showed that the steers of Lot III were the least desirable of either of the three lots. The average hot and market-weight dressing percentages were: Lot I, 59.07, Lot II, 59.78, and Lot III, 58.10. The average hot and home-weight dressing percentages were: Lot I, 57.07, Lot II, 57.22, and Lot III, 55.48.

In 1932 the sale prices were as follows: Lot I, \$6.50, Lot II, \$6.25, and Lot III, \$7.00. In this case the steers of Lot III were judged to

⁴ Three-year-old grass-fat steers, marketed from pasture in other experimental studies at this Station, dressed from 55.6 to 57.1 percent. This is approximately a 3 percent lower dressing percentage than shown by these two-year-old steers. See W. Va. Agr. Exp. Sta. Bul. 191, Effects of winter rations on pasture gains of two-year-old steers, by E. W. Sheets, E. A. Livesay, R. H. Tuckwiller, and A. T. Stemple. Dec. 1925.

be superior to either of the other lots by a margin of 50 cents per 100 pounds. Again the dressing percentages and the carcass grades show that the highest price was paid for an inferior lot of slaughter cattle. The average hot and market-weight dressing percentages were: Lot I, 60.81, Lot II, 60.07, and Lot III, 60.13. The average hot and home-weight dressing percentages were: Lot I, 58.11, Lot II, 57.44, and Lot III, 57.02.

The superintendent of the beef department of the packing house handling the steers in 1932 made the following comment in regard to the carcasses of the three lots of steers as they hung in the cooler. "The carcasses of Lot I are worth 25 cents per hundred more than either of the other lots, and I would not make much difference between the carcasses of Lot II and Lot III."

In 1933 the sale prices were as follows: Lot I, \$4.65, Lot II, \$4.65, and Lot III, \$4.50. The average hot and market-weight dressing percentages were: Lot I, 60.52, Lot II, 60.77, and Lot III, 59.36. The average hot and home-weight dressing percentages were: Lot I, 57.43, Lot II, 58.03, and Lot III, 57.24. The carcasses of Lots I and II were slightly better covered and graded slightly higher than those of Lot III. In other words, the steers were sold more nearly at their respective values in 1933 than they were in the two previous years.

No labor charges have been made in connection with this work, and feed costs are given only for the purpose of estimating the costs of feeding grain as it was fed in these trials. Persons interested in finishing two-year-old steers in the manner demonstrated in these trials should make some calculations before starting cattle on grain feeds. As a rule the difference in price between two-year-old feeder or stocker steers and slaughter steers (similar to the steers used in these trials) is sufficiently large to warrant the feeding of grain. It should be kept in mind that these trials were conducted during a constant price movement toward a lower level, and the margin figures are of little value. The amounts of grain required and the finish obtained (as indicated by the dressing percentage) should be of value to cattlemen interested in finishing two-year-old steers by the use of grass and grain.

Conclusions

The steers of all three lots carried sufficient finish to produce desirable carcasses.

There did not exist a wide difference in the finish of the carcasses produced by steers of the three lots.

The amount of grain required to finish two-year-old steers by the three methods did not differ widely.

The data indicated that the grain fed over a slightly longer period (Lots I and II) did produce a slightly superior finish.

Either one of the three methods of feeding grain will allow for the utilization of pasture and at the same time produce steers which are more desirable for the market with respect to weight and are as well or better finished than many three-year-old grass-fat steers produced in West Virginia.

These feeding trials reveal methods by which farmers can increase the value of two-year-old feeder steers and make good slaughter steers by the use of a relatively small amount of grain.

