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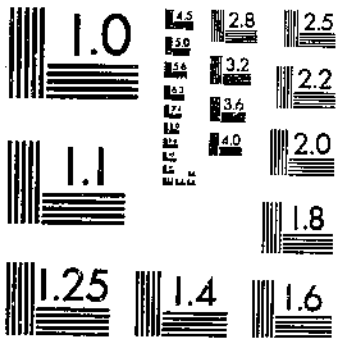

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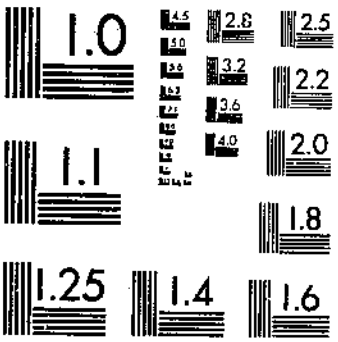

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RELATIVE MERITS OF PRODUCING CREEP-FED, FEEDER, AND LOT-FATTENED CALVES IN THE APPALACHIAN REGION[1]

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CONTENTS

INTRODUCTION

The Appalachian region has supported a large number of small herds of beef cattle for several generations and has long been recognized as a source of feeder cattle and grass-fat cattle, the latter attaining sufficient finish on pasture alone to meet market-beef requirements.

The results of previous experiments pointed the way toward economical methods of wintering breeding herds and steers of different ages.[3] Later studies indicated methods for shortening the time required to produce cattle fat enough to meet market requirements by feeding a grain supplement while they were on pasture.[4]

Experiments in the Corn Belt in recent years have shown that well-finished steers can be produced at weaning time or shortly thereafter by creep-feeding. The results in that region made it appear advisable to determine the adaptability of this method to the farms in the Appalachian region, the pastures and cropland of which compare

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[2] The experiments were directed by W. H. Black, senior animal husbandman, Animal Husbandry Division, Bureau of Animal Industry, U. S. Department of Agriculture, and E. A. Livesay, head of the Department of Animal Husbandry, West Virginia Agricultural Experiment Station.

[3] BLACK, W. H. WINTERING BEEF CATTLE IN THE APPALACHIAN REGION. U. S. Dept. Agr. Dept. Cir. 408, 12 pp., illus. 1927.

[4] BLACK, W. H., WARNE, K. F., and WILSON, C. V. BEEF PRODUCTION AND QUALITY AS AFFECTED BY GRADE OF ST[illegible] AND FEEDING GRAIN SUPPLEMENT ON GRASS. U. S. Dept. Agr. Tech. Bull. 227, 44 pp., illus. 1931.

——— and others. BEEF PRODUCTION AND QUALITY AS AFFECTED BY METHOD OF FEEDING GRAIN SUPPLEMENTARY TO GRASS. [Unpublished manuscript.]

favorably with those of the Corn Belt, and to the farms with high-quality pastures but with limited cropland, yet so situated that grain can be procured readily.

The present experiments were made to determine the relative merits of producing (1) fat weanling calves on highly productive land by creep-feeding of supplements, (2) fat calves by pasturing them with their dams on highly productive land and lot-feeding them after weaning, and (3) feeder calves either on highly productive land or on less fertile, rough, mountainous land in the Appalachian region. The work was carried on in the bluegrass section of West Virginia near Lewisburg, with calves born in 1933, 1934, and 1935.

EXPERIMENTAL PROCEDURE

CATTLE, LAND, AND EQUIPMENT USED

Sixty grade Hereford beef cows 2½ to 6 years old obtained in southeastern West Virginia were divided into two groups on the basis of conformation, age, breeding, and weight and bred to two high-quality registered Hereford bulls similar in age, breeding, and conformation. Heifers selected from the calf crop before the calves were marketed were used as replacements for cows that died or that were removed from the experiments because of disease or injury.

Two types of bluegrass pasture land were used in these experiments. One consisted of rolling, hilly, but fertile land with no timber; the other of rough, mountainous, sparsely wooded land of several hundred feet greater elevation. The carrying capacity of these two pastures was estimated to be 4 and 8 acres, respectively, for one cow and calf. Each pasture afforded adequate shade and water during the grazing season. Barns adjacent to the pastures were used for feeding and shelter in winter, but the cattle were not confined during this season.

A creep was set up in the pasture used by the group 1A cows and their calves. Stock scales were located in both pastures.

FEEDING AND HANDLING OF THE CATTLE

The experiments were begun in May 1932 at the commencement of the breeding season and continued until March 1936 with the lot-fattened calves. The cows comprising group 1 were turned into the lower pasture and those in group 2 into the mountain pasture about April 26 of each year. The bulls were turned into the pastures with the cows about May 11 and allowed to run with them for 70 days, after which they were removed and pastured at some distance from the cows. The two bulls were alternated annually between the two cow herds.

Corn silage, cottonseed meal, and wheat straw were the winter feeds for the group 1 cows and both bulls. Mixed hay alone was fed to the group 2 cows the first winter but as it appeared to be inadequate, subsequently a small quantity of shelled yellow corn was fed in order that the cows which calved early would be somewhat more vigorous at calving time.

About May 25 of each year, the cows and calves in the group 1 herd were divided as equally as possible into groups 1A and 1B. They were assigned to the two groups on the basis of the age, weight, conformation, and quality of the calves. Each group was limited to

one-half of the lower pasture during the remainder of the grazing season. During this time the bull was kept one-half of each day with each group.

Group 1A calves had access in a creep to a feed mixture of 8 parts of shelled yellow corn and 1 part of cottonseed meal by weight for 168 days beginning about May 25 of each year. A small quantity of oats was fed at the beginning of the first year to induce the group 1A calves to eat grain more readily, but this feed was not necessary in succeeding years. Neither the group 1B calves, raised on the highly productive pasture land, nor the group 2 calves, raised on the less fertile mountain pasture, received any supplement from about May 25 of each year until about November 10. Common salt was available to the calves, as well as to the cows, at all times.

All feeds except the mixture given to the creep-fed calves were weighed at each feeding and the quantity was recorded. Only a small quantity of feed was refused during these experiments, but any that remained in the bunks or racks at the time of the next feeding was removed, weighed, and recorded. The mixture for the creep-fed calves was weighed before it was put into the self-feeder and that which remained at the end of the experiment was weighed back. When the record of an individual cow or calf had to be omitted as the result of death or injury of the animal or other cause, the quantity of feed to be deducted from the total fed to the group was determined on the basis of the ratio of the live weight of the animal to the total weight of animals in the group during the time it was in the experiment.

At the end of a 168-day grazing period all calves were weaned. They were weighed individually on 3 consecutive days at the beginning and end of the experiments, and the average of the three weights was taken as the initial and final weights. They were also weighed at regular 28-day intervals. When the calves were weaned, a committee representing the United States Department of Agriculture and the West Virginia Agricultural Experiment Station graded the calves in group 1A as slaughter calves and those in groups 1B and 2 as feeders. The committee appraised the value of the feeders at the station. The group 1A calves were then driven to the railroad loading point about 4 miles from the station and shipped to Baltimore, Md. Here they were graded by the committee before they were sold.

The calves in group 1B were put in the feed lot about November 9 and fed the shelled-corn and cottonseed-meal mixture and alfalfa hay until they had attained what was believed to be the same degree of fatness as that displayed by the group 1A calves at weaning time. They were marketed each year at Baltimore.

The experimental work with the group 2 calves ended at the time they were weaned and appraised as feeders.

FEEDS USED AND THEIR VALUES

All corn fed during the experiments was of No. 2 grade coarsely ground, and 41-percent cottonseed meal was used.

The alfalfa hay and most of the mixed hay (consisting of clover and timothy) were produced on the farm. Although not officially graded, these hays were comparable with the No. 2 standard, for they were well cured, fairly leafy, free from weeds, and had a moderately bright-green color.

The corn used for silage was also grown on the farm and was of good quality. The wheat straw was of good quality, clean, and bright, and was obtained locally.

The values of the feeds used are shown in table 1.

TABLE 1.—*Values of feeds used during the experiments* [1]

Feed	1932–33	1933–34	1934–35	1935–36
Corn, shelled,[2] per bushel	----------	$0.50	$0.84	$0.70
Corn, shelled,[3] per bushel	----------	.50	1.12	.70
Cottonseed meal,[1] per ton	----------	20.00	30.00	30.00
Cottonseed meal,[3] per ton	$20	20.00	40.00	30.00
Corn silage, per ton	4	4.00	6.00	6.00
Alfalfa hay, per ton	----------	12.00	20.00	20.00
Mixed hay, per ton	10	10.00	15.00	15.00
Wheat straw, per ton	4	4.00	4.00	4.00

[1] Pasturage for 1 cow and calf was valued at 5 cents per day.
[2] Purchased for creep-feeding.
[3] Purchased for wintering cows and fattening group 1B calves.

WEATHER CONDITIONS DURING THE EXPERIMENTS

The summers of 1932, 1933, and 1935 and the winters of 1932–33 and 1933–34 were nearly normal or average for the region. During the early part of the 1934 grazing season, however, the rainfall was somewhat deficient, but late in the summer and early in the fall there was enough rainfall to assure adequate pasturage at the station. The early part of the winter of 1934–35 was mild, but the weather during part of February 1935 was exceptionally severe. The first 3 months of the winter of 1935–36 were more severe than were those of either of the 2 preceding years.

EXPERIMENTAL RESULTS

GAINS OR LOSSES IN WEIGHT AND FEED DATA OF DAMS

The average winter losses in weight and feed data of the dams are shown in table 2. The losses per head of the two groups of cows over the 3-year period were practically the same. The great variation in the average loss of the group-2 cows in the different years is due partly to difference in the time of calving and partly to difference in percentage of calf crop.

TABLE 2.—*Average winter loss in weight, feed consumption, and feed cost per cow by groups and years*

Group	Year of experiment	Cows	Days fed	Loss in weight	Total consumption of— Corn silage	Wheat straw	Cottonseed meal	Mixed hay	Shelled corn	Total feed cost
		Number	*Number*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Dols.*
1, fed silage, straw, and cottonseed meal.	1932–33	30	147	149	2,856	980	143	--------	--------	9.16
	1933–34	29	140	167	2,838	966	145	--------	--------	13.35
	1934–35	28	140	164	2,799	1,000	140	--------	--------	13.20
	Average	------	142	160	2,842	982	143	--------	--------	11.83
2, fed mixed hay alone or with shelled corn.	1932–33	29	147	138	--------	--------	--------	2,110	--------	10.55
	1933–34	28	140	78	--------	--------	--------	2,031	160	16.38
	1934–35	27	140	257	--------	--------	--------	2,221	141	18.91
	Average	------	142	156	--------	--------	--------	2,118	[1] 151	15.10

[1] Average for 2 years.

The average cost, per head, of the winter feed consumed by the group 2 cows was about 28 percent greater than that by the cows in group 1. In the first year the cows in group 2 wintered satisfactorily on mixed hay but did not do so well for several weeks after calving as did the cows in group 1. Hence a small quantity of shelled corn was added to the ration during the second and third winters.

The data in table 3 show that during the first year the average summer gain of the cows whose calves were creep-fed (group 1A) was nearly 23 percent greater than that of the cows whose calves received no grain supplement on good pasture (group 1B) and nearly 26 percent greater than the gain of the cows on the lower quality mountain pasture (group 2). In the second year, however, cows in group 1A gained only 7.6 percent more than those in group 1B and 5.6 percent more than the group-2 cows. In the third year the gain of group 1A was only 0.8 percent greater than that of group 1B but was 11.4 percent more than that of group 2. In the 3 years the cows in group 1A gained 10.6 percent more than those in group 1B and 13.3 percent more than those in group 2. The cows in all three groups gained satisfactorily during the suckling period each year.

TABLE 3.—*Average initial weight and gain per dam during the suckling period each year*

Group No.	Period	Dams	Initial weight	Gain in weight
		Number	*Pounds*	*Pounds*
1A (dams of creep-fed calves on good pasture).	Apr. 28–Nov. 10, 1933	14	823	238
	Apr. 27–Nov. 9, 1934	11	870	226
	Apr. 26–Nov. 8, 1935	11	890	254
	Average		858	239
1B (dams of calves receiving no supplement on good pasture).	Apr. 28–Nov. 10, 1933	15	810	194
	Apr. 27–Nov. 9, 1934	11	844	210
	Apr. 26–Nov. 8, 1935	11	900	252
	Average		847	216
2 (dams on mountain pasture)	Apr. 28–Nov. 10, 1933	23	804	189
	Apr. 27–Nov. 9, 1934	14	849	214
	Apr. 26–Nov. 8, 1935	25	864	228
	Average		838	211

RESULTS FROM THREE GROUPS OF CALVES AT END OF SUCKLING PERIOD

TOTAL WEIGHTS, GAINS, AND FEED DATA

Table 4 summarizes the results obtained from the three groups of calves during the suckling period.

The differences in the average initial weights per calf in the three groups were not significant.

The variation in the average gain of the creep-fed calves (group 1A) was substantially the same as that of the calves not creep-fed (group 1B and group 2) during the suckling period. However, a comparison of the average data for the 3 years shows that the group 1A calves gained 27 pounds, or 8.1 percent, a head more than the group 1B calves and 73 pounds, or 25.3 percent, more than the group 2 calves. The differences in final weight are significantly in favor of

TABLE 4.—*Comparison of average results obtained for the three groups of calves during the last 168 days of the suckling period of each experiment*

Group No.[1]	Period	Calves	Age at beginning of period	Weight per calf		Gain per calf	Quantity and cost of supplemental feed per calf		Dressing percentage	Value per hundredweight at farm[2]	Value per head at farm[2]	Total costs per calf	Return per calf[3]
				Initial	Final								
		Number	*Days*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Dollars*	*Percent*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1A	May 26–Nov. 10, 1933	14	58	168	527	359	511	4.62	59.53	5.91	31.15	28.15	3.00
	May 25–Nov. 9, 1934	11	53	197	580	383	430	6.45	58.57	6.45	37.41	34.45	2.96
	May 24–Nov. 8, 1935	11	69	204	546	342	393	5.04	60.22	8.91	48.65	32.67	15.98
	Average		62	188	549	361	450	5.31	59.43	6.99	38.38	31.46	[3] 6.92
1B	May 26–Nov. 10, 1933	15	54	162	478	316				4.50	21.51	20.06	1.45
	May 25–Nov. 9, 1934	11	62	199	552	353				5.50	30.36	24.25	6.11
	May 24–Nov. 8, 1935	11	60	186	524	338				8.25	43.23	24.10	19.13
	Average		58	180	514	334				5.91	30.38	22.51	7.87
2	May 26–Nov. 10, 1933	23	54	136	408	272				4.50	18.36	21.45	−3.09
	May 25–Nov. 9, 1934	14	50	152	458	306				5.50	25.19	27.28	−2.09
	May 24–Nov. 8, 1935	25	71	208	502	294				8.25	41.41	29.81	+11.60
	Average		60	169	457	288				6.24	28.52	26.14	+2.38

[1] For description of groups, see text.
[2] For the group 1A calves, calculated from sale price per 100 pounds' live weight less marketing expense; for calves in groups 1B and 2, estimated on feeder basis.
[3] Gross return per calf less all feed costs for cow and calf and marketing charge also for group 1A.

the group 1A calves. This group consistently showed a distinctly higher degree of finish at weaning time than did the other groups, a fact that was supported by the findings of the grading committee. All the calves in group 1A were classed as slaughter cattle, whereas all the others were classed as feeders.

The table shows that there was a progressive reduction in the average quantity of supplemental feed consumed per head each year by the group 1A calves even though the mixture was available at all times during the 168-day period. Markedly lower feed prices in 1933 than in 1934 and 1935 account for the lower value of the feed consumed per steer in 1933 than in the other 2 years.

COMPARATIVE RETURNS FROM CALVES

The return per calf in group 1B at weaning was larger than that in groups 1A and 2 in 1934 and 1935 and also when the 3 years' data were averaged. However, the returns from group 1A are not exactly comparable with those from groups 1B and 2. Marketing charges of $3.71 per calf were deducted from the returns of the first-mentioned group, whereas this deduction was not made from the returns of the other groups, since they were not shipped to market at this time. However, even after marketing charges were deducted in the case of group 1A, their returns were still considerably higher than those of the group 2 calves raised on the less fertile, more mountainous land. In 2 of the 3 years the latter group did not yield sufficient returns to offset the value of pasture and their dams' feed. In the third year the returns were especially favorable. If the 1B calves had been sent to market at this time, their returns would also have been lower than those of group 1A.

Attention is called to the fact that the price of fat cattle was relatively somewhat lower than that of Choice feeder calves in the fall of 1933 and of 1934, although both were distinctly lower than in the corresponding period in 1935. The feeder calves were appraised on a basis of current market prices for calves of similar grade and quality, but the values given for the fat calves are the prices actually paid for them at the market.

DAILY QUANTITIES OF SUPPLEMENTS AND DAILY GAINS

Table 5 shows the daily quantities of supplements received by animals in group 1A and the daily gains of the three groups of calves by 28-day periods before the animals were weaned. Nearly 2 months was required each year to induce the calves to eat appreciable quantities of supplement in the creep. At the beginning of the first year a very small quantity of oats was fed to hasten the consumption of the feed mixture, but this procedure was not repeated in the two subsequent years.

The creep-fed calves (group 1A) gained a little more rapidly than the others during the last three 28-day periods each year and averaged a slightly higher gain during all periods except the first. An average consumption of 2.65 pounds of the supplement per head daily apparently accounted for the difference in development at weaning time, as well as the slightly greater gain during the 168-day period. The creep-fed calves were fat, whereas those in groups 1B and 2 were merely in good flesh.

TABLE 5.—*Feed mixture consumed by calves in group 1A and daily gains of the three groups of calves by 28-day periods prior to weaning*

Year of experiment	28-day period No.	Feed mixture consumed by group 1A—		Daily gain per calf in—		
		Per calf per day	Per 100 pounds of gain	Group 1A	Group 1B	Group 2
		Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*
1933	1	[1] 0.43	20.44	2.08	2.29	[2] 1.84
	2	.97	46.00	2.12	1.85	2.00
	3	1.78	80.23	2.22	2.04	1.55
	4	3.55	154.38	2.04	1.97	1.79
	5	4.89	190.84	2.57	2.15	1.68
	6	6.60	422.19	1.56	1.04	.91
	Average	3.07	141.96	2.14	1.93	1.62
1934	1	.30	13.90	2.17	2.03	1.93
	2	.74	34.97	2.12	2.23	1.89
	3	2.23	96.90	2.31	2.15	1.83
	4	2.57	108.20	2.38	2.21	2.28
	5	3.33	141.77	2.35	2.31	1.66
	6	6.18	261.18	2.37	1.68	1.33
	Average	2.56	112.22	2.28	2.10	1.82
1935	1	.19	8.49	2.23	2.30	2.14
	2	.42	19.69	2.13	2.11	2.01
	3	2.37	112.46	2.11	2.40	2.04
	4	3.38	144.72	2.34	2.03	2.13
	5	3.81	190.57	2.00	2.00	1.27
	6	3.85	272.64	1.41	1.25	.91
	Average	2.34	114.72	2.04	2.02	1.75
Average	1	.32	14.28	2.17	2.20	1.98
	2	.71	33.55	2.12	2.08	1.96
	3	2.13	96.53	2.21	2.19	1.81
	4	3.17	135.77	2.35	2.07	2.07
	5	4.01	174.39	2.31	2.15	1.55
	6	5.54	318.67	1.79	1.32	1.04
	Average	2.65	122.97	2.15	2.00	1.72

[1] 0.054 pound of oats included.
[2] Average of 22 head instead of 23.

Table 5 shows a gradual increase in daily consumption of the supplement by the creep-fed calves during the first five periods and a much greater increase during the sixth period of the first two experiments. This rapid increase was very likely occasioned by a marked change in diet involving a decrease in the supply of nutrients from grass and milk. The relatively small quantity of feed mixture consumed in the sixth period of the 1935 experiment, as compared with the consumption during the same period in the other years, was probably due to more abundant pasturage toward the end of the year. All three groups of calves, except those that were creep-fed in the second year gained less during this sixth period than in several of the preceding ones. An important point in the creep-feeding method of fattening calves for beef is the relatively small quantity of supplement required to produce 100 pounds of gain. In a previous experiment at this station, 3-year-old steers, grading Good, when fed a grain supplement for 125 days while on pasture, required 176 pounds more supplement for each 100 pounds of gain than did the steer calves in the present experiment, as calculated from the data of Black, Warner, and Wilson.[5]

[5] BLACK, W. H., WARNER, K. F., and WILSON, C. V. See footnote 4.

RESULTS FROM GROUP OF CALVES FATTENED IN DRY LOT AFTER WEANING

Table 6 shows that at the beginning of the fattening period in 1933 the group 1B calves, receiving no supplement during the suckling period and fattened in the dry lot, averaged 72 pounds less in weight than did those in the second year's work and 39 pounds less than those in the third year, but they did not make a significantly greater gain than the calves in the two succeeding years. In the third year, however, the calves required a 15-day longer period to acquire a degree of finish believed to be comparable with that of the creep-fed calves (group 1A) in that year's test. As shown by table 7, the group 1B calves did not get on full feed during the third year so promptly as in preceding years and undoubtedly required a larger proportion of their feed for maintenance owing to the unfavorable weather, which was exceptionally severe during the third 28-day period in the winter of 1935–36.

TABLE 6.—*Average results obtained from the group 1B calves from weaning to marketing (calves fattened in dry lot after weaning)*

Period	Length of feeding period	Calves	Weight per calf		Gain per calf	Dressing percentage	Value per hundredweight at farm [1]	Value per head at farm	Total cost per calf	Return per calf [2]
			Initial	Final						
	Days	*Number*	*Pounds*	*Pounds*	*Pounds*	*Percent*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Nov. 10, 1933–Mar. 2, 1934	112	13	478	615	137	57.06	6.26	38.50	35.09	3.41
Nov. 9, 1934–Mar. 1, 1935	112	9	550	682	132	59.17	5.65	58.99	50.58	8.41
Nov. 8, 1935–Mar. 14, 1936	127	9	517	647	130	58.13	8.18	52.92	44.52	8.40
Average	116		516	644	134	58.38	7.51	48.36	42.32	6.04

[1] Calculated from sale price per 100 pounds live weight less marketing charges.
[2] Gross return per calf less all feed costs for cow and calf and marketing charge per calf.

TABLE 7.—*Average rations and daily gains of group 1B calves by 28-day periods in the dry lot after weaning*

Year of experiment	Period No.	Ration		Daily gain
		Feed mixture	Hay	
		Pounds	*Pounds*	*Pounds*
1933–34	1	6.18	4.12	0.31
	2	7.85	2.85	1.50
	3	9.38	2.85	1.76
	4	10.90	3.48	1.33
Average		8.58	3.33	1.22
1934–35	1	5.17	3.98	.36
	2	7.98	4.00	1.65
	3	8.00	4.00	1.33
	4	9.66	4.32	1.35
Average		7.70	4.00	1.17
1935–36	1	3.40	2.99	.16
	2	6.00	4.20	.67
	3	7.25	3.51	1.17
	4	9.79	4.00	1.65
	[1] 5	10.82	4.00	2.41
Average		7.11	3.72	1.02

[1] 15-day period.

On the basis of average slaughter and carcass grades obtained in the 3-years' work, the calves in group 1B actually did not attain the degree of finish displayed by those in group 1A, which were graded low Choice. The former group most nearly approached the same degree of finish in the second year's experiment when it averaged high Good.

The return per calf in group 1B after fattening in the dry lot was more uniform during the 3 years than that of any of the groups at time of weaning, as shown by a comparison with table 4. The average return of the group 1B calves, when fattened, was $1.83 less than that of the same calves at weaning time and $0.88 less than that of the group 1A calves.

The average quantities and cost of the feed mixture and the hay consumed by the group 1B calves, for each 100 pounds of gain and per head during the entire feeding period, are shown in table 8. Notwithstanding the higher consumption of the mixture per head in the first year's experiment, the feed costs per head and per pound of gain were lower than in either of the other 2 years. The lower cost per head the first year was due mainly to the lower unit cost of feed at that time (table 1). The lower cost per 100 pounds of gain during the same year was also due to the slightly increased gain in weight.

TABLE 8.—*Average quantities and cost of feed consumed by the group 1B calves during the lot-fattening period*

Year of experiment	Calves	Feed consumed				Feed cost	
		Per head		Per 100 pounds gain		Per head	Per 100 pounds gain
		Grain mixture	Alfalfa hay	Grain mixture	Alfalfa hay		
	Number	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Dollars*	*Dollars*
1933–34	13	961	373	701.9	272.1	10.92	7.98
1934–35	9	863	448	657.3	341.1	21.73	16.47
1935–36	9	903	474	697.3	366.4	16.28	12.52
Average		916	424	685.8	317.6	15.68	11.70

SUMMARY AND CONCLUSIONS

Experiments were carried on for 3 years at the West Virginia Agricultural Experiment Station in which three groups of calves were handled as follows: The group 1A calves were creep-fed a mixture consisting of 8 parts of shelled corn and 1 part of cottonseed meal by weight while running with their dams on highly productive pasture. Those in group 1B received no supplement while with their dams on highly productive pasture and, after being weaned, were fattened in the dry lot. The group 2 calves received no supplements while with their dams on mountain pasture. During the 168-day period previous to weaning, group 1A gained 8.1 percent more than group 1B and 25.3 percent more than group 2.

The creep-fed calves were fat enough to be classed as slaughter cattle when weaned and were marketed at an average age of 230 days, whereas the calves that received no supplement while on similar pasture with their dams were classed as feeders when weaned at 226 days of age.

An average of 2.65 pounds of supplement a head daily accounted for the difference in development at weaning time of the creep-fed calves over those not creep-fed.

An important point in the creep-feeding method of fattening calves for beef is the relatively small quantity of grain supplement required to produce 100 pounds of gain. An average of 123 pounds of grain was required for each 100 pounds of gain made by the creep-fed calves during the 3 years.

Calves in these experiments fattened by the creep-feeding method possessed sufficient finish to satisfy market requirements nearly 4 months sooner than the calves that received no supplement while on grass with their dams but that were fed, after weaning, alfalfa hay and a mixture of corn and cottonseed meal in the dry lot.

On the basis of the average slaughter and carcass grades for the 3 years, the group of calves fattened in the dry lot after weaning actually did not attain the degree of finish—low Choice—displayed by the creep-fed calves when they were marketed. The former group most nearly approached the same degree of finish in the second year's experiment, when the group average was high Good.

At weaning time in 1934 and 1935, the return per calf in the group of feeders raised on highly productive land (group 1B) was larger than that of the fat weanlings (group 1A) and of the feeders raised on less fertile, rough mountainous land (group 2) and also when the 3 years' data are averaged. However, a marketing charge of $3.71 per calf was deducted from the returns of the calves in group 1A, whereas such a deduction was not made from the returns of the other groups since they were not shipped to market at this time. If this charge had been deducted from the returns of the two feeder groups, the returns from group 1A would have been the highest in all years.

The return per head of the group of calves fattened in the dry lot after weaning (group 1B) was more uniform during the 3 years than that of any of the groups at weaning. However, the average return per calf in group 1B, when fattened, was $1.83 less than that from these calves at weaning time and $0.88 less than that from the calves in group 1A.

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