

TEXAS AGRICULTURAL EXPERIMENT STATION

BULLETIN NO. 198

NOVEMBER, 1916

DIVISION OF ANIMAL HUSBANDRY

FEEDING BABY BEEVES



POSTOFFICE:

COLLEGE STATION, BRAZOS COUNTY, TEXAS.



AUSTIN, TEXAS:

VON BOECKMANN-JONES CO., PRINTERS,
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BY

J. C. BURNS, B. S.

Animal Husbandry, Feeding Investigations



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*As of December 1, 1916.

**In cooperation with United States Department of Agriculture.

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FEEDING BABY BEEVES.

BY JOHN C. BURNS, B. S., ANIMAL HUSBANDMAN, FEEDING INVESTIGATIONS.

OBJECTS OF EXPERIMENT.

In the conducting of this experiment the following objects were kept in view:

1. To gain as much information as possible pertaining to the fattening of calves for the market, or, in other words, the production of "baby beef."
2. To compare cotton seed meal, cold-pressed cotton seed, and peanut meal for supplementing a ration composed of ground milo, corn or sorghum silage, and Sudan hay for fattening cattle.
3. To compare the feeding values of Sudan hay and cotton seed hulls.

THE CALVES.

Forty-eight high-grade Aberdeen-Angus steer calves were used in the experiment. These were purchased from Mr. G. O. Cresswell of Oplin, Callahan County, Texas, and were the "tops" of his 1915 calf crop. They were quite uniform and, as a whole, a choice lot of feeders. Being, for the most part, March and April calves they were from six to eight months old when on November 2 they were weaned and shipped to College Station. They arrived here November 4, and weighed before receiving any fill, 411 pounds, as an average. They cost f. o. b., Novice, Texas, \$31.25 per head. The freight from that place to College Station amounted to 93½ cents per head; thus the calves cost, delivered here, \$32.18½ each.

PRELIMINARY FEEDING.

The experiment was not begun immediately, and the calves were fed together from the day they arrived until December 13, their ration consisting of cold-pressed cotton seed, ground milo, corn silage, and Sudan hay. There was no trouble whatever in getting them on feed. After the first few days they were fed all the roughage (silage and hay) they would eat, but the amount of concentrates (cake and milo) was kept low until after the experiment started.

On December 12 and for several days previous, the ration per head daily was 2 pounds cold-pressed cotton seed, 2 pounds ground milo, 14 pounds silage, and 3 pounds Sudan hay.

On December 13 the calves were divided into four lots of twelve each, the effort being made to have the lots as similar to each other as possible with respect to weight, conformation, quality, and condition.

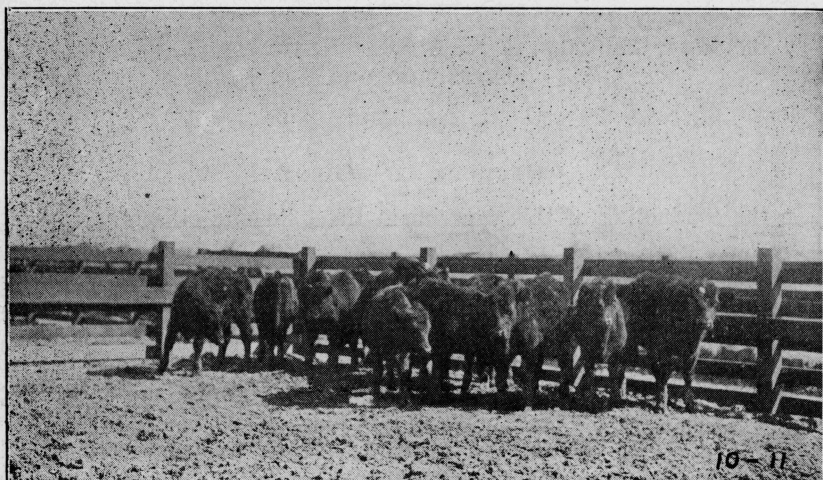


Figure 1—The calves of Lot 1 on January 20, 1916.



Figure 2—The calves of Lot 1 on January 20, 1916.

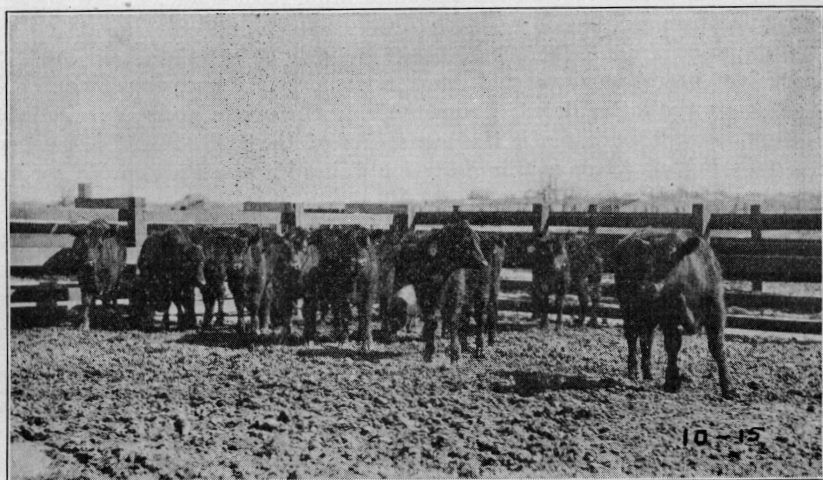


Figure 3—The calves of Lot 3 on January 20, 1916.

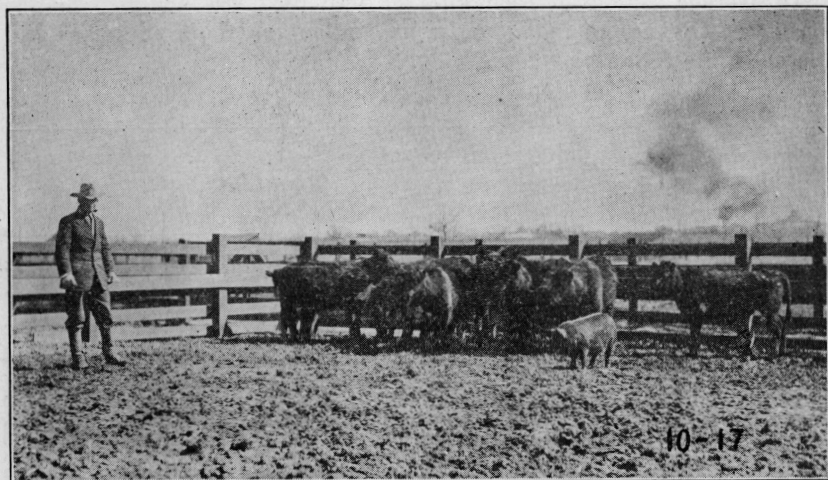


Figure 4—The calves of Lot 4 on January 20, 1916.

Each lot was then started on the ration it was to receive during the experiment. The feeds constituting the rations fed were as follows:

Lot 1: Cotton seed meal, ground milo, corn silage, and Sudan hay.

Lot 2: Peanut meal, ground milo, corn silage, and Sudan hay.

Lot 3: Cold-pressed cotton seed, ground milo, corn silage, Sudan hay.

Lot 4: Cotton seed meal, ground milo, corn silage, and cotton seed hulls.

The period from December 13 to December 20 was used in getting the calves accustomed to their new rations, the actual experiment beginning on the latter date. From the date the calves arrived at College Station, November 4, until the beginning of the experiment, December 20, a period of 46 days, the forty-eight head consumed the following amounts of feeding stuffs:

160.5 pounds cotton seed meal.
 160.5 pounds peanut meal.
 3,569 pounds cold-pressed cotton seed.
 4,080.5 pounds ground milo.
 28,426.5 pounds corn silage.
 6,067.5 pounds Sudan hay.
 234 pounds cotton seed hulls.

The value of the above stated amounts of feeding stuffs at the prices later quoted in the bulletin was \$177.69. Therefore, the calves had cost, at the beginning of the experiment, \$35.90 a head. Their average weight at this time was 471 pounds, and hence they had cost \$7.62 per hundred pounds.

FEEDS USED.

An average sample of each kind of feed used was analyzed by the Chemistry Division of the Experiment Station and the average analyses appear in the following table:

TABLE 1.

Feeds.	Percentage Composition.					Fat.	Analysis Number.
	Water.	Ash.	Crude protein.	Crude fiber.	Nitrogen free extract.		
Cotton seed meal....	8.81	6.04	42.88	10.46	25.04	6.77	11276
Peanut meal (hull included).....	9.34	3.39	35.27	22.76	19.60	6.64	11277
Cold-pressed cotton seed.....	10.19	4.19	24.06	23.44	29.78	8.34	11278
Milo chops.....	11.41	1.70	10.38	2.40	71.48	2.63	11275-11378 11499-11700 11712
Corn silage.....	67.08	1.98	2.87	8.10	19.22	.75	11269-11498 11697
Sorghum silage.....	73.20	1.88	1.87	7.86	14.51	.68	11696-11710
Sudan hay.....	6.59	10.08	8.30	31.76	41.77	1.50	11279-11280 11387
Cotton seed hulls....	11.50	2.92	3.44	45.41	36.36	.37	11274

Based on the analyses given in Table 1, the digestible nutrients of each feed are presented in Table 2.

TABLE 2.

Feeds	Dry matter in 100 pounds.	Digestible Nutrients in 100 Pounds.		
		Crude protein.	Carbo- hydrates.	Fat.
Cotton seed meal.....	91.19	36.02	22.65	6.43
Peanut meal (hulls included).....	90.66	25.04	12.33	8.67
Cold-pressed cotton seed.....	89.81	19.49	32.69	8.00
Milo chops.....	88.59	6.85	63.16	2.37
Corn silage.....	32.92	1.46	18.91	.61
Sorghum silage.....	26.80	.17	13.84	.38
Sudan hay.....	93.41	4.1	41.53	.81
Cotton seed hulls.....	88.50	.48	39.59	.25

All the calculations pertaining to the financial results of the experiment are based on the following prices for feeding stuffs, these prices representing the actual cost of the feeds in the barn and in the silo at the feeding and breeding farm, where the experiment was conducted:

Cotton seed meal.....	\$35.00 per ton.
Peanut meal (hulls included).....	28.00 per ton.
Cold-pressed cotton seed.....	24.00 per ton.
Milo chops.....	23.80 per ton.
Corn silage.....	3.50 per ton.
Sorghum silage.....	3.50 per ton.
Sudan hay.....	10.00 per ton.
Cotton seed hulls.....	10.00 per ton.
Black strap molasses, at 16½¢ a gallon...	27.00 per ton.

PLAN OF EXPERIMENT.

Each lot of calves was subjected to the same conditions throughout the experiment except in respect to the rations. Each lot occupied a pen 60x100 feet and had access to a shed open on the south side. Water from a deep well was supplied in galvanized iron troughs in the open pen, and granular salt in small wooden troughs under the shed, so that the calves had free access to both at all times. The hay racks were under the shed, but the troughs for the concentrates and silage were in the open. Except in the case of hay, all feeds were supplied regularly twice daily, early in the morning and late in the afternoon, the rations being equally divided between the two feeds. The concentrates and silage in the cases of Lots 1, 2, and 3 and the concentrates, silage, and hulls in the case of Lot 4, were thoroughly mixed together by hand in the troughs. The hay was placed in the racks in the morning, a sufficient quantity being allowed for the whole day.

At the beginning and again at the end of the experiment each lot was weighed every day for three successive days, and the initial and final weights, herein reported, represent the respective averages. A single weight of each lot was obtained every thirty days. The weighing was done each time between 10:00 and 11:00 a. m.

Pigs were kept in the pen with each lot of calves to work over the droppings and to consume any grain wasted from the troughs.

THE EXPERIMENT PROPER.

The actual feeding experiment covered a period of 201 days, from the evening of December 20, 1915, to the morning of July 8, 1916; hence, if the light preliminary feeding from the time of the calves' arrival, November 4, until the morning of December 20, is included, they were fed 247 days.

The rations per head daily for the first three days of the experiment were as follows:

Lot 1:	11 $\frac{1}{8}$ pounds cotton seed meal.
	2 pounds ground milo.
	16 pounds corn silage.
	3 pounds Sudan hay.
Lot 2:	2 $\frac{1}{4}$ pounds peanut meal.
	2 pounds ground milo.
	16 pounds sorghum silage.
	1 $\frac{3}{4}$ pounds Sudan hay.
Lot 3:	2 $\frac{1}{4}$ pounds cold-pressed cotton seed.
	2 pounds ground milo.
	16 pounds corn silage.
	1 $\frac{3}{4}$ pounds Sudan hay.
Lot 4:	11 $\frac{1}{8}$ pounds cotton seed meal.
	2 pounds ground milo.
	16 pounds corn silage.
	3 pounds cotton seed hulls.

By January 24, the cotton seed meal in Lots 1 and 4 had been gradually increased to 2 pounds per head daily and the peanut meal in Lot 2 and the cold-pressed cotton seed in Lot 3, likewise, had been increased to 4 pounds each per head daily. Thus, the amounts of each were continued throughout the experiment. It will be noted that twice as much of each peanut meal and cold-pressed cotton seed as of cotton seed meal per animal was fed. The amount of hulls contained in the two first named feeds was the reason for doing this. It should not be taken to mean, however, that it requires as much as 2 pounds of either peanut meal or cold-pressed cotton seed to equal 1 pound of cotton seed meal. The lots receiving peanut meal and cold-pressed cotton seed, it will be seen, consumed about half as much hay as the lots receiving cotton seed meal, which was to be expected, in view of the larger quantity of peanut meal and cold-pressed cotton seed fed. Lot 2, however, before the expiration of the first thirty days of the experiment, reached the point where it would not consume as much silage as any of the other lots. In fact, this lot receiving peanut meal, though cleaning up as much concentrates as Lot 3, required considerably longer to do so and ate with less relish throughout the experi-

ment,—an indication that peanut meal containing the hull is not as palatable to cattle as cold-pressed cotton seed or cotton seed meal.

The same amount of ground milo was fed to each lot and this was gradually increased throughout the experiment as the calves grew larger and became able to take more. None of the calves were "off feed" at any time, nor were any of them affected with the scours.

A small quantity of black strap molasses was fed to all of the lots as an appetizer for eleven days during the latter part of the experiment. The average allowance was .59 pound per head daily.

Good weather for feeding prevailed most of the time through the winter and spring. The pens were well drained and even during and after heavy rains did not become very muddy.

The average rations fed and the gains made during each period are presented in the following table:

TABLE 3.

Lot No.	Average Rations.		Total gain per calf.	Average daily gain.
			Pounds.	Pounds.
First Period—30 Days.				
1	1.33 lbs. cotton seed meal, 12.46 lbs. corn silage,	3.78 lbs. milo chops 2.97 lbs. Sudan hay	44	1.46
2	2.66 lbs. peanut meal, 12.40 lbs. corn silage,	3.78 lbs. milo chops 1.73 lbs. Sudan hay	43	1.43
3	2.66 lbs. cold-pressed cotton seed, 12.46 lbs. corn silage,	3.78 lbs. milo chops, 1.74 lbs. Sudan hay	51	1.7
4	1.33 lbs. cotton seed meal, 12.53 lbs. corn silage,	3.78 lbs. milo chops, 3 lbs. cotton seed hulls..	40	1.33
Second Period—30 Days.				
1	1.93 lbs. cotton seed meal, 11.28 lbs. corn silage,	6.43 lbs. milo chops, 2.95 lbs. Sudan hay	64	2.13
2	3.86 lbs. peanut meal, 10.56 lbs. corn silage,	6.43 lbs. milo chops, 1.26 lbs. Sudan hay	49	1.63
3	3.86 lbs. cold-pressed cotton seed, 12 lbs. corn silage,	6.43 lbs. milo chops, 1.39 lbs. Sudan hay	63	2.1
4	1.93 lbs. cotton seed meal, 12.16 lbs. corn silage,	6.43 lbs. milo chops, 2.95 lbs. cotton seed hulls..	65	2.16
Third Period—30 Days.				
1	2 lbs. cotton seed meal, 12.65 lbs. corn silage,	7.93 lbs. milo chops, 2 lbs. Sudan hay	74	2.47
2	4 lbs. peanut meal, 9.48 lbs. corn silage,	7.93 lbs. milo chops, .95 lb. Sudan hay	64	2.13
3	4 lbs. cold-pressed cotton seed, 12 lbs. corn silage,	7.93 lbs. milo chops, .99 lb. Sudan hay	63	2.1
4	2 lbs. cotton seed meal, 14 lbs. corn silage,	7.93 lbs. milo chops, 2 lbs. cotton seed hulls..	57	1.9
Fourth Period—30 Days.				
1	2 lbs. cotton seed meal, 13.15 lbs. corn silage,	8.90 lbs. milo chops, 2 lbs. Sudan hay	61	2.03
2	4 lbs. peanut meal, 9 lbs. corn silage,	8.90 lbs. milo chops, 1 lb. Sudan hay	71	2.37
3	4 lbs. cold-pressed cotton seed, 12.15 lbs. corn silage,	8.90 lbs. milo chops, 1 lb. Sudan hay	68	2.26

TABLE 3—Continued.

Lot No.	Average Rations.		Total gain per calf.	Average daily gain.
			Pounds.	Pounds.
Fourth Period—30 Days—Continued.				
4	2 lbs. cotton seed meal, 12.51 lbs. corn silage,	8.90 lbs. milo chops, 2 lbs. cotton seed hulls..	60	2.00
Fifth Period—30 Days.				
1	2 lbs. cotton seed meal, 14.05 lbs. corn silage,	9.92 lbs. milo chops, 2 lbs. Sudan hay.....	52	1.73
2	4 lbs. peanut meal, 10.02 lbs. corn silage,	9.92 lbs. milo chops, 1 lb. Sudan hay.....	71	2.37
3	4 lbs. cold-pressed cotton seed, 14.05 lbs. corn silage,	9.92 lbs. milo chops, 1 lb. Sudan hay.....	69	2.3
4	2 lbs. cotton seed meal, 13.92 lbs. corn silage,	9.92 lbs. milo chops, 2 lbs. cotton seed hulls..	71	2.37
Sixth Period—51 Days.				
1	2 lbs. cotton seed meal, 16.67 lbs. sorghum silage,	10.69 lbs. milo chops, 1.94 lb. Sudan hay.....	31	.6
2	3.98 lbs. peanut meal, 11.52 lbs. sorghum silage,	10.64 lbs. milo chops, .90 lb. Sudan hay.....	9	.17
3	3.98 lbs. cold-pressed cotton seed, 11.81 lbs. sorghum silage,	10.64 lbs. milo chops, .91 lb. Sudan hay.....	2	.04
4	2 lbs. cotton seed meal, 13.06 lbs. sorghum silage,	10.69 lbs. milo chops, 1 lb. cotton seed hulls	11	.37

The total dry matter, the digestible nutrients, and the nutritive ratio of the average rations used during the last period of 51 days are presented in the following table:

TABLE 4.

Lot No.	Average Rations—Lbs.	Dry matter, Lbs.	Digestible Nutrients, Lbs.			Nutritive Ratio.
			Protein.	Carbohydrates.	Fat.	
1	2 cotton seed meal.....	1.823	.720	.453	.128	
	10.69 milo chops.....	9.470	.732	6.751	.253	
	16.67 sorghum silage.....	4.467	.028	2.307	.063	
	1.94 Sudan hay.....	1.812	.079	.805	.015	
	Total.....	17.572	1.559	10.316	.459	
2	3.98 peanut meal.....	3.608	.996	.490	.345	
	10.64 milo chops.....	9.425	.728	6.720	.252	
	11.52 sorghum silage.....	3.087	.019	1.594	.043	
	.90 Sudan hay.....	.840	.036	.373	.007	
	Total.....	16.960	1.779	9.117	.647	
3	3.98 cold-pressed cotton seed.....	3.574	.775	1.301	.318	
	10.64 milo chops.....	9.425	.728	6.720	.252	
	11.81 sorghum silage.....	3.165	.020	1.634	.044	
	.91 Sudan hay.....	.850	.037	.377	.007	
	Total.....	17.014	1.560	10.032	.621	
4	2 cotton seed meal.....	1.823	.720	.453	.128	
	10.69 milo chops.....	9.470	.732	6.751	.253	
	13.06 sorghum silage.....	3.500	.022	1.807	.049	
	2.00 cotton seed hulls.....	1.770	.009	.791	.005	
	Total.....	16.563	1.583	9.802	.435	

Since the nutritive ratio of the commonly accepted fattening standard varies from 1:6.5 to 1:7.5, it will be seen that the above rations corresponded very closely to the standard, except in the case of Lot 2, whose ration was somewhat narrower than the others.

THE HOGS.

Hogs followed the calves to clean up any grain in the droppings and any waste of grain from the troughs. They received no other feed. On January 19, two shoats were placed in the pen with each lot of calves. They remained there until May 2, when they were marketed at Fort Worth with other hogs shipped at that time. These shoats cost \$7.00 per hundredweight and brought \$9.60 per hundredweight when sold. An account of the weights, gains, and financial returns is presented in the following table:

TABLE 5.

Lot No.	No. of hogs.	Total weight Jan. 19, lbs.	Total weight on market May 4, lbs.	Total gain. Lbs.	Marketing expenses, per lot.	Net profit per lot.
1.....	2	255	344	89	\$1.15	\$14.02
2.....	2	250	351	101	1.16	15.04
3.....	2	255	352	97	1.16	14.78
4.....	2	260	333	73	1.13	12.63

On May 2, two other shoats were placed with each lot of calves to replace those that were sold. Those of Lot 1 weighed 282 pounds; those of Lot 2, 283 pounds; those of Lot 3, 272 pounds, and those of Lot 4, 282 pounds. As the calves were receiving a heavy grain ration at the time, two shoats to each lot did not prove to be a sufficient number, and, therefore, June 7, another shoat was added to each lot. These additional shoats weighed as follows: Lot 1, 140 pounds; Lot 2, 210 pounds; Lot 3, 165 pounds, and Lot 4, 180 pounds. These hogs, now three to each lot, continued with the calves until the end of the experiment, July 8. The total gains were as follows: Lot 1, 61 pounds; Lot 2, 77 pounds; Lot 3, 68 pounds, and Lot 4, 58 pounds. As these hogs were not sold at the close of the experiment, only the value of the gain has been considered in calculating the financial returns. This value was placed at 9 cents per pound and was conservative, in view of the price of hogs at that time. On this basis the returns were as follows: Lot 1, \$5.49; Lot 2, \$6.93; Lot 3, \$6.12, and Lot 4, \$5.22.

Combining the gains from the hogs used in the early part of the experiment with those from the hogs used in the latter part, one gets the following results: Lot 1, 150 pounds; Lot 2, 178 pounds; Lot 3, 165 pounds; Lot 4, 131 pounds. Combining the financial returns, one finds that Lot 1 yielded \$19.51; Lot 2, \$21.97; Lot 3, \$20.90, and Lot 4, \$17.85.

MARKETING OF THE CALVES.

As previously stated, the experiment closed after the morning feed of July 8, the final weights being taken between 10:00 and 11:00 a. m.

That evening only one-half of the regular feed of concentrates was fed to each lot. The regular amount of silage was allowed all lots and the regular amount of hulls was fed to Lot 4. More than the usual amount of Sudan hay was fed, however; Lot 4, as well as the others, receiving it. The morning of July 9, the calves were not fed, but about 6:00 o'clock were driven to the shipping pens, a distance of one mile. By 8:30 a. m. they were loaded on the cars for shipment to the Fort Worth market. They arrived at the stock yards about 4:00 a. m. July 10, and were unloaded by 5:40. They were supplied water and hay between 7:30 and 8:00, and by 9:00 a. m., were sold to Armour & Company. By 9:30 they had passed over the scales. The prices received were as follows:

Lot 1: 12 calves	\$9.50 per hundred pounds.
Lot 2: 10 calves	9.50 per hundred pounds.
Lot 2: 2 calves	9.00 per hundred pounds.
Lot 3: 12 calves	9.50 per hundred pounds.
Lot 4: 10 calves	9.50 per hundred pounds.
Lot 4: 2 calves	9.00 per hundred pounds.

The two calves in each of Lots 2 and 4 that sold for \$9.00 per hundredweight were not as good individuals nor as well finished as the others; hence the lower price received for them. The packers evidently saw little difference on foot in the lots after these four calves were eliminated.

DETAILED RESULTS.

The results of the experiment in detail are presented in the following table:

TABLE 6.

Feeding Period 201 Days—Dec. 20, 1915 to July 8, 1916.

	Lot 1 Cotton seed meal ground milo, silage, Sudan hay.	Lot 2 Peanut meal ground milo, silage, Sudan hay.	Lot 3 Cold pressed cotton seed ground milo silage, Sudan hay.	Lot 4 Cotton seed meal, ground milo silage, cotton seed hulls.
Number of calves.....	12	12	12	12
Average initial weight.....	475	465	476	468
Average final weight at College Station.....	801	772	792	780
Average daily gain per head.....	1.62	1.52	1.57	1.55
Average final weight, Fort Worth.....	752	742	757	738
Net shrinkage per calf, pounds.....	49	30	35	42
Net shrinkage, per cent.....	6.1	3.88	4.41	5.38
Average Daily Ration:—				
Meal or cake.....	1.89	3.77	3.77	1.89
Ground milo.....	8.23	8.21	8.21	8.23
Silage (corn or sorghum).....	13.72	10.60	12.35	13.03
Sudan hay or cotton seed hulls.....	2.27	1.11	1.14	2.29
Feed Required for 100 Pounds Gain:—				
Meal or cake.....	116.54	247.18	240.14	121.77
Ground milo.....	507.59	538.11	522.78	530.36
Silage (corn or sorghum).....	846.16	694.38	785.54	839.90
Sudan hay or cotton seed hulls.....	140.03	73.16	72.84	147.59
Blackstrap molasses.....	1.99	2.11	2.05	2.08
Cost of feed for 100 pounds gain.....	\$10.28	\$11.47	\$10.87	\$10.67
Pounds of Feed Consumed Per Calf:—				
Meal or cake.....	380.4	759.8	759.8	380.4
Ground milo.....	1657.5	1654.7	1654.7	1657.5
Silage (corn or sorghum).....	2766	2136.7	2487.3	2626
Sudan hay or cotton seed hulls.....	457.3	225	230.8	461.5
Blackstrap molasses.....	6.5	6.5	6.5	6.5
Cost of feed per calf.....	\$33.60	\$35.28	\$34.40	\$33.37
Marketing expenses per calf.....	2.02	2.00	2.02	1.99
Initial value per calf at \$7.62 per 100 pounds.....	36.20	35.43	36.27	35.66
Price received per 100 pounds at Fort Worth..	9.50	9.41	9.50	9.43
Final value per calf.....	71.41	69.86	71.88	69.53
Loss per calf.....	.41	2.85	.81	1.49
Returns per calf through hogs following.....	1.62	1.83	1.74	1.49
Profit or loss per calf with hogs included.....	profit 1.21	loss 1.02	profit .93	even
Profit per head if calves had sold for \$10.00 per 100 pounds (returns from hogs included)	5.00	3.32	4.75	4.27
Average daily gain per head for first 150 days.....	1.96	1.98	2.09	1.95
Average daily gain per head for last 51 days..	.6	.17	.04	.37
Average final weight at College Station at end of 150 days.....	770	763	790	761
Average final weight at Fort Worth (estimated)	723	733	755	720
Final value per calf at end of 150 days at same prices for which each lot sold at end of the experiment.....	68.68	\$69.01	\$71.72	\$67.90
Cost of feed per calf at end of 150 days.....	23.20	24.58	24.08	23.28
Marketing expenses per calf.....	1.96	1.98	2.01	1.96
Initial value per calf.....	36.20	35.43	36.27	35.66
Profit per calf (hogs not included).....	7.32	7.02	9.36	7.00

DISCUSSION OF RESULTS.

The foregoing table shows that, though there was not much difference in the average daily gain among the different lots, the largest gain was made by Lot 1, followed by Lots 3, 4, and 2, in the order named. Lot 1, however, shrank most in shipping, whereas, Lot 2 shrank least. On the basis of the sale weights at Fort Worth, therefore, the rank in average daily gain per head changed somewhat, giving Lot 3 first place with a gain of 1.39 pounds; Lots 1 and 2, second place with a gain of

1.37 pounds each, and Lot 4, third place with a gain of 1.34 pounds.

Comparing Lots 1, 2, and 3 as to profitableness, the returns from the hogs included, one will see that Lot 1, receiving cotton seed meal, ground milo, silage and Sudan hay, yielded the largest profit of \$1.21 per head; Lot 3, receiving cold-pressed cotton seed, ground milo, silage and Sudan hay, ranked second with a profit of 93 cents per head; and that Lot 2, receiving peanut meal, ground milo, silage and Sudan hay, ranked last with a loss of \$1.02 per head. Therefore, cotton seed meal at \$35.00 per ton proved more economical in supplementing ground milo, silage and Sudan hay, than did cold-pressed cotton seed at \$24.00 per ton, or peanut meal at \$28.00 per ton, and further, at these prices, cold-pressed cotton seed proved more economical than peanut meal. According to the results the returns from the hogs not being included, and cotton seed meal being valued at \$35.00 per ton, peanut meal proved to be worth only \$21.40 per ton and cold-pressed cotton seed, \$22.80 per ton.

Comparing Lots 1 and 4, the former receiving Sudan hay and the latter cotton seed hulls, one will note that Lot 1 yielded a profit of \$1.21 per head, whereas Lot 4 only came out even. Therefore, Sudan hay proved superior to cotton seed hulls with both feeds at the same price,—\$10.00 per ton. The returns from hogs being ignored, and Sudan hay being valued at \$10.00 per ton, it was found that cotton seed hulls were worth only \$5.34 per ton.

When one reviews the report of this experiment, the question will probably arise as to why the calves were not marketed sooner than they were, in view of the small gains made during the last 51 days. An explanation, therefore, seems appropriate at this point. During the fifth 30-day period of the experiment, which ended May 18, all lots made good gains, but at the same time did not show the degree of finish desired. It was thought, therefore, that good gains could be obtained for several weeks longer and, at the same time, that the desirable finish would result. When the regular date for weighing, June 17, came, the scales proved to be out of order, and several days elapsed before they were repaired; hence, the failure to obtain weights at the end of the sixth 30-day period. It was soon seen that the calves were not doing well enough to justify holding them longer, and while they did not show quite as high finish as we had hoped to obtain, it was decided to bring the experiment to a close July 8.

While the prices received for these calves were good, the profit was very small; in fact, if a reasonable interest on the investment had been allowed, there would have been an actual loss in each lot. In this connection, there are two important points to be taken into consideration. First, the prices paid for feeding stuffs were exceptionally high. The same feeds would ordinarily be cheaper on the farm, particularly those directly produced on the farm. Second, there would have been a large saving in feed had the calves been marketed about June 1. The market was some better then and they would likely have brought as much per pound at that time as they brought later. The gains were very small during the last 51 days, hardly sufficient to have amounted to much,

even from the standpoint of finish. The poor gains during this period are attributed to the heat and flies. Had the calves been marketed about June 1, after having been on feed 210 days, including the 164 days of the experiment and the 46 days of preliminary feeding, it is believed that a very fair profit would have resulted. This belief is supported by the data presented in the lower part of Table 6. It is very evident that if calves are to be fed in this country for the purpose of fattening them for the market, they should be started on feed by November 1, and fed not later than June 1. This plan will make possible a feeding period of seven months during the cooler portion of the year.

SLAUGHTER RECORD.

The calves were purchased by Armour & Company, who kindly gave us the dressing percentages of the different lots, which, together with their comments on the dressed beef, are presented in the following communication:

"Dressed Beef Department,
Fort Worth, Texas, July 13, 1916.

Professor J. C. Burns, A. and M. College, College Station, Texas.

DEAR SIR: Referring to the four twelve lots of Angus yearlings which we bought on Monday, July 10, we give you herewith dressing on same:

	Av. Live Wt.	Av. Dr. Wt.	Pct. of Beef.
Lot 1	752	442	58.80
Lot 2	742	440	59.20
Lot 3	757	453	59.90
Lot 4	737	428	58.10

In judging these lots from a beef standpoint, Lot 3 was first choice. The cattle in this lot were thicker and filled out better, had a very good cover, a good color, and a larger percentage of fat.

Lot 2, second choice, were very good cattle, with a possible exception of two off cattle in the lot, which had not done as well as the balance. They had a very good color, white fat, and showed a smoother finish than any of the other lots. However, they were not as thick, nor did they make the percentage of beef of Lot 3.

Lot 1 was third choice, had a higher color, and the fat was not as white as other lots.

Lot 4 was the lightest, and made the smallest percentage of beef.

In summing up the total, however, taking all lots together, they were a very desirable kind of beef for this territory, and were about as even a bunch as we ever get.

If there is any information we have overlooked, which you would like to have, if you will advise us, we shall be glad to give it to you.

Yours truly,

ARMOUR & Co.,
(Signed) W. G. Finlay."

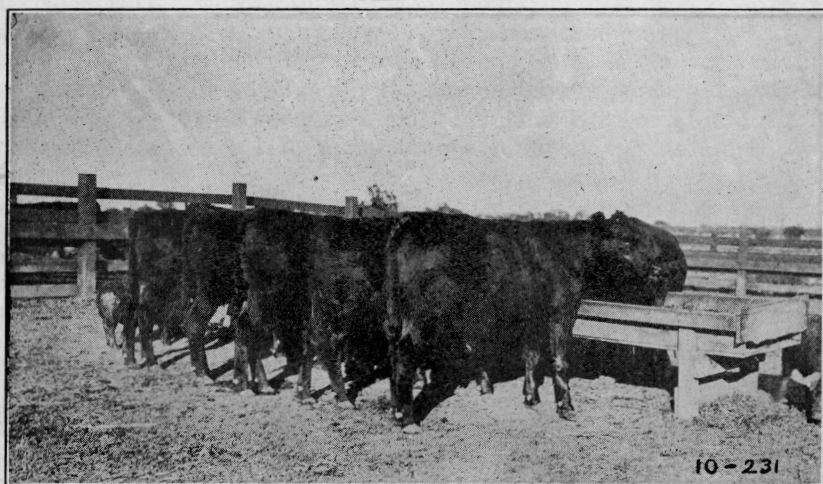


Figure 5—The calves of Lot 1 on July 6, 1916.



Figure 6—The calves of Lot 2 on July 6, 1916.

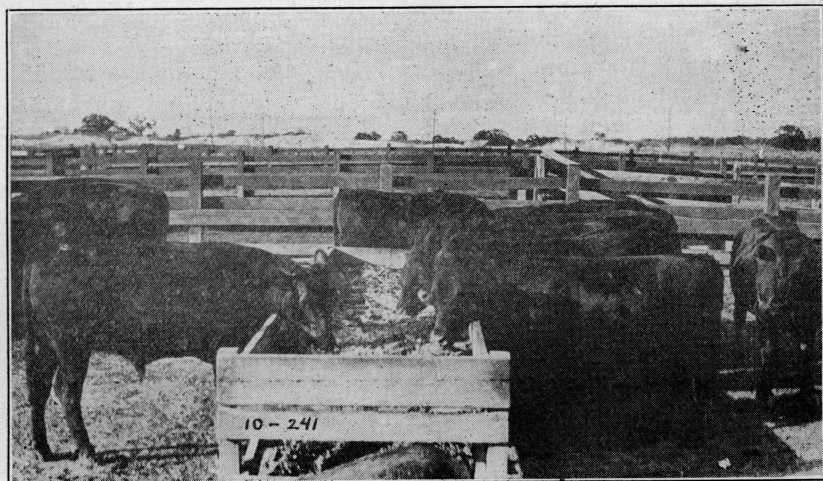


Figure 7—The calves of Lot 3 on July 6, 1916.

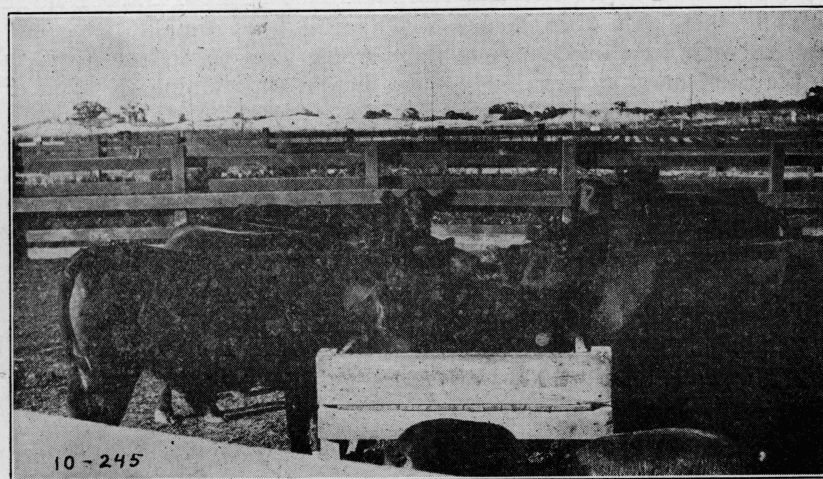


Figure 8—The calves of Lot 4 on July 6, 1916.

GENERAL DISCUSSION OF BABY BEEF PRODUCTION.

There are both advantages and disadvantages in feeding young cattle, calves, and yearlings, for the market, and it will depend upon conditions as to whether the feeding of such animals will prove more profitable than the feeding of older cattle. Chiefly in favor of baby beef production may be mentioned the following arguments:

1. Young cattle grow, as well as fatten, and require less feed for a given amount of gain, than older cattle.

2. Young cattle, if of high grade and well finished, command higher prices on the market, as a general rule.

3. Marketing cattle at an early age affords quicker returns on the money invested and enables the stockman to maintain a larger herd of breeding cattle.

In favor of feeding cattle two years old or older the following arguments may be stated:

1. Cattle two years old or older have, to a large extent, already attained their growth, and, therefore, fatten and finish more easily than younger cattle, thus requiring a shorter feeding period.

2. Cattle two years old or older can handle to good advantage a relatively larger amount of roughage or coarse feed than calves and yearlings. In order to obtain desirable finish on the younger animals, a larger proportion of concentrated feed must be fed.

3. It does not require as much skill and close attention on the part of the feeder in feeding cattle two years old or older as in feeding younger cattle.

4. The losses through deaths are less among cattle two years old or older than among calves and yearlings.

While there are other factors which arise from time to time and have a bearing on this question, those which have been stated seem to be the chief ones. They clearly show that in determining the kind of cattle to feed, it depends largely upon the conditions as to whether one should choose calves, yearlings, or older cattle. Those who have available plenty of grain and other concentrated feeds at low prices may, with good management, reap more profit by feeding young cattle. This is especially true of the man who raises his feeder cattle, and at the same time grows the bulk of his grain and roughage. With grain and other concentrated feeds high in price, the same man will likely find it more profitable to carry his feeders to a more advanced age, growing them on pasture and rough feeds and fattening them in a comparatively short period when they are two or three years old. The man who buys his feeder cattle should, also, be governed as to choice of ages largely by the prices of concentrated feeds, especially grain, remembering that calves and yearlings are more difficult to finish than older cattle and that a liberal allowance of grain is generally essential in fattening them, whereas in the case of older cattle a fair degree of finish may be obtained from such feeds as cotton seed meal, cake, and so forth, in combination with various roughages, with the use of little or no grain.

Another important consideration is the grade of cattle that should be used for producing baby beef. While high grade beef cattle, whether young or old, are always to be preferred for feeding, there is no case in which good individuality and breeding are of so much importance as in that of feeder calves and yearlings. The straight-lined, smooth, blocky, robust, sappy-hided, well-bred, beefy individuals, with short, wide heads, are the kind that give the best results. Such animals possess, in a marked degree, the tendency to fatten at an early age, and when finished they are of the class that commands the highest price on the market.

If calves that are to be fattened can be got on feed before being weaned they will shrink far less when weaning takes place and will, therefore, be further advanced in the fattening process at a given age than if they had been weaned before being started on feed. Of course, it is generally only the man who raises his calves that is in a position to handle them in this way. If weaning must take place first, then every effort should be made to get the calves on feed as soon as possible in order to keep them from losing their milk fat.

SUMMARY.

1. There was very little difference in the gains of the four lots of calves.

2. Based on the selling prices of \$9.50 per 100 pounds for Lot 1 and \$9.41 per 100 pounds for Lot 2, peanut meal (hulls included) was worth only \$21.40 per ton, with cotton seed meal at \$35.00 per ton.

3. Based on the selling price of \$9.50 per 100 pounds for Lots 1 and 3, cold-pressed cotton seed was worth only \$22.80 per ton, with cotton seed meal at \$35.00 per ton.

4. Based on the selling price of \$9.50 per 100 pounds for Lot 1 and \$9.43 per 100 pounds for Lot 4, cotton seed hulls were worth only \$5.34 per ton, with Sudan hay at \$10.00 per ton.

5. In all of the lots there was an advantage in having hogs follow the calves.

6. Though the difference in the dressing percentages of the different lots of calves was not great, Lot 3 ranked first with 59.90 per cent; Lot 2 second with 59.20 per cent; Lot 1 third with 58.80 per cent, and Lot 4 fourth with 58.10 per cent. That there was little difference in the quality of the different lots of carcasses is indicated in the following statement from Armour & Company:

"Taking all lots together, they were a very desirable kind of beef for this territory, and were about as even a bunch as we ever get."

7. The calves should have been marketed by June 1, before the hot weather and the flies became severe.