Table 23 (Continued)

Av. size of ribeye, sq. in.[5]	10.83	10.34	10.43	10.93	10.93
Av. fat thickness at 12th rib[6]	4.2	3.9	4.0	4.0	3.9
Av. fat thickness at 12th rib, in.[7]	.56	.59	.58	.66	.56
Av. degree of marbling[8]	7.7	7.3	7.1	7.6	7.8
Av. degree of firmness[9]	4.0	3.8	3.7	4.0	3.9

5. Planimeter reading of ribeye muscle.
6. Very thick, 1; thick, 2; moderately thick, 3; modestly thick, 4; slightly thin, 5; visual estimate.
7. Reciprocal Meat Conference Standards, 1952.
8. Modest, 6; small amount, 7; slight amount, 8; trace, 9; visual estimate.
9. Very firm, 1; firm, 2; moderately firm, 3; modestly firm, 4; slightly soft, 5; soft, 6; visual estimate.

Table 24

Effect of certain climatic factors on average daily gains of yearling heifers by periods.

Drylot fattening period—June 12, 1958, to November 30, 1958—140 days.

Period	1	2	3	4	5
Date	6/12-7/10	7/11-8/7	8/8-9/4	9/5-10/2	10/3-10/30
Av. maximum temperature[1]	88.2	88.4	85.8	78.9	77.2
Av. radiation[2]	604.8	496.1	531.2	395.3	384.6
Av. wind movement[3]	172.1	123.6	118.1	141.6	128.2
Av. relative humidity[4]	60.2	63.2	55.8	62.7	46.5
Av. daily gain:					
Lot 1. No shade	2.36	1.50	2.08	2.61	1.79
Lot 2. No shade	1.14	2.17	1.31	2.50	2.50
Lot 3. Shade	1.93	1.66	2.04	2.32	2.00
Lot 4. No shade, implant	2.96	1.70	1.85	2.57	2.07
Lot 5. Shade, implant	2.57	2.40	2.31	2.35	2.35

1. Reading made daily at 7 p.m.; thus maximum temperature will have occurred. Thermometer in standard thermometer shelter.
2. Reading in Langleys. Langleys x 3.69 = BTU's per square foot.
3. Wind movement is miles per hour past the station.
4. Reading from an autographic hygrograph exposed in thermometer shelter.

The Use of Antibiotics at Shipping Time To Suppress the Occurrence of Respiratory Complex in Cattle.

F. W. Boren, B. A. Koch, E. F. Smith, D. Richardson, R. F. Cox, and J. Smith

One of the major problems confronting cattlemen is control of the occurrence of respiratory diseases such as shipping fever, colds, nasal congestion, and pneumonia. These respiratory conditions are especially troublesome to cattle feeders who ship and receive cattle during the fall and winter months, when adverse weather conditions put added stress on cattle.

This study is to investigate the value of various antibiotics administered orally or by injection to weaning calves to control the occurrence of respiratory diseases during the first few weeks they are in drylot.

Experimental Procedure

The calves used in this experiment originated on the Jeff Ranch, Fort Davis, Texas. They were gathered early in the morning, weaned from the cows, loaded into trucks and hauled 54 miles to Alpine, Texas. Upon arrival at the yards, they were group weighed and randomly allotted into four lots, with about equal numbers of steers and heifers in each lot. Each lot was marked for identification and given its designated treatment by injection. On arrival in Manhattan, the calves were unloaded and trucked from the railroad yards to the experimental unit, at which time they were group weighed by treatments. Thereafter they were weighed each day until their initial weight was reached.

During the first two weeks after arrival, the calves were inspected daily for occurrence of respiratory involvements, and other symptoms of illness. They were fed 2 pounds of wheat bran per head daily, and alfalfa hay free choice.

Observations

Table 25 gives the results of this study. Some observations concerning the data presented are:

1. Although there was less percentage shrink by calves receiving penicillin-streptomycin and terramycin injections, the difference between the groups and the control group in average pounds of weight lost per head was small and probably not significant.
2. All groups required the same amount of time to recover the shrink lost.
3. There was no occurrence of respiratory illness suggestive of shipping fever in any lot.

Table 25

Use of tranquilizer and antibiotics to control shipping fever complex and transit shrink of weaning beef calves.

Treatment	Control	Strepto-mycin[3]	Penicillin-Streptomycin[4]	Terramycin[5]
Number of calves	47	48	53	52
Av. initial wt. per head[1]	446	447	430	450
Av. final wt. per head[2]	417	419	412	432
Av. lbs. shrink per head	29	28	18	18
% shrink	6.5	6.3	4.2	4.0
Day required to recover shrink	7	7	6	6
No. of calves treated for illness	0	0	0	0

1. Weight at Alpine, Texas.
2. Weight at Manhattan, Kans.
3. Streptomycin sulfate suspension. Merck, Sharp & Dohme, West Point, Pa.
4. Procaine Penicillin G in Dihydrostreptomycin sulfate solution. Pro-K-Mycin. American Cyanamid, New York, N.Y.
5. Terramycin—Pfizer & Company, Terre Haute, Ind.
6. Weights made each day until initial weight was reached.

Fattening Heifer Calves on Dry Bluestem Pasture versus Fattening in Drylot. Project 252-2.

F. W. Boren, E. F. Smith, and B. A. Koch

Considerable work has been done at this station to determine the performance of cattle being fattened on summer pasture compared with fattening in drylot. This experiment is to study the feasibility of fattening cattle on dry bluestem pasture versus fattening in drylot.

Experimental Procedure

Heifers used in this experiment were the light end of calves purchased from the Pumray Ranch, Logan, N.M., the fall of 1957. Twenty-one heifers were placed in two groups on the basis of live weight and grade. One lot of 10 heifers, averaging 346 pounds each, was placed on 18 acres

of dry mature bluestem pasture. The second lot of 11 heifers was put in drylot.

The roughage portion of the ration for the pasture and drylot heifers consisted of dry bluestem grass and prairie grass hay, respectively. The concentrate fed to both lots of heifers consisted of a mixture of 75 percent ground sorghum grain, 10 percent dehydrated alfalfa meal, 10 percent soybean oil meal, and 5 percent molasses made into a ⅜-inch pellet. Both the roughage and concentrate were fed free choice.

Observations and Results

The results of this experiment appear in Table 26. Observations and results under the conditions of this trial were as follows:

1. Heifers fattened in drylot were more desirable in practically every respect. They made 0.64 pound more average daily gain, and consequently gained 65 pounds more per head for the fattening period of 176 days.
2. Drylot-fattened heifers produced gain for $2.60 less per cwt. than the pasture-fattened heifers.
3. The pasture-fattened heifers sold for less on the market, had a greater shrink to market, but yielded slightly higher than the drylot heifers.
4. The average carcass grade for the drylot- and pasture-fattened heifers was average good and high standard, respectively. This is an advantage of two thirds of one grade for the drylot heifers.
5. The drylot heifers had larger ribeyes, more marbling, a firmer lean, and thicker fat at the 12th rib.

Table 26

Fattening heifer calves on dry bluestem pasture versus fattening in the drylot.

December 12, 1957, to June 8, 1958—176 days.

Treatment	Pasture	Drylot
No. calves per lot	10	11
Av. initial wt. per head	346	351
Av. final wt. per head	643	713
Av. gain per head	297	362
Av. daily gain per head	1.69	2.05
Av. daily ration:		
Pasture	6 months	
Prairie hay, lbs.		3.6
Pellet, lbs.[1]	10.6	13.3
Lbs. feed per cwt. gain:		
Pasture	6 months	
Prairie hay, lbs.		175
Pellet, lbs.	628	647
Feed cost per cwt. gain	$19.94	17.34
Selling price per cwt. at market	25.00	26.00
% shrink to market	4.6	3.3
Dressing %	58.5	58.0
Carcass data, USDA grades:		
Av. standard	3	
High standard	4	
Low good	2	3
Av. good	1	2
High good		5
Low choice		1
Av. carcass grade[2]	15.1	17.4
Av. fat thickness at 12th rib[3]	5.0	4.0

1. Pellet—⅜ inch diameter pellet composed of 75% ground sorghum grain, 10% dehydrated alfalfa meal, 10% soybean oil meal, and 5% molasses.

2. Low choice, 19; high good, 18; average good, 17; low good, 16; high standard, 15; average standard, 14.

3. Very thick, 1; thick, 2; moderately thick, 3; modestly thick, 4; slightly thin, 5.

Table 26 (Continued)

Av. degree of marbling[4]	9.5	8.2
Av. size of ribeye[5]	5.0	4.0
Av. firmness of lean[6]	4.2	4.0

4. Modest, 6; small amount, 7; slight amount, 8; traces, 9.

5. Very large, 1; large, 2; moderately large, 3; modestly large, 4; slightly small, 5.

6. Very firm, 1; firm, 2; moderately firm, 3; modestly firm, 4; slightly soft, 5; soft, 6.

Adapting Roughages Varying in Quality and Curing Processes to the Nutrition of Beef Cattle, 1958-1959. Project 370.

Pelleted Alfalfa Hay and Dehydrated Pelleted Forage-Type Sorghum in the Winter Ration of Heifer Calves.

F. W. Boren, E. F. Smith, B. A. Koch, D. Richardson, and R. F. Cox

Alfalfa hay and sorghum silage are used extensively in the winter rations of cattle in Kansas, and considerable experimental work has been done with these two roughages to determine their value in winter rations.

In recent years much attention has been given to the physical form in which a roughage should be harvested, stored, and fed to cattle. This experiment is to compare the feeding value of alfalfa fed as long hay or coarsely-ground hay pellets, and forage-type sorghum fed as silage or dehydrated forage sorghum pellets.

Experimental Procedure

The hay used in this study consisted of good-quality, third-cutting alfalfa. It was cut, cured, and baled in the field and stored in a conventional hay shed. After having been in storage 2 months, a part of the alfalfa hay was removed from the barn, coarsely ground through a ¼-inch screen, made into ⅜-inch pellets by a local feed processor, and stored for later feeding.

The forage-type sorghum was field harvested in mid-October with the usual silage equipment. The loads were alternately ensiled in upright silos or dehydrated, finely ground, and pelleted into ⅜-inch pellets. These pellets were then stored in bulk for later feeding.

The prairie hay used was of good quality. It was grown on a local farm meadow.

Fifty head of choice-quality heifer calves from the Jeff Ranch, Fort Davis, Texas, were used in this experiment. They were allotted into five lots, 10 head per lot, on the basis of live weight. They were fed a winter ration consisting entirely of alfalfa hay or pellets and either sorghum silage or dehydrated pelleted sorghum for 126 days.

The winter ration fed each lot per head daily was as follows:

Lot 1. Five pounds alfalfa hay plus sorghum silage free choice.

Lot 2. Five pounds alfalfa pellets plus sorghum silage free choice.

Lot 3. Five pounds alfalfa hay plus dehydrated sorghum pellets free choice.

Lot 4. Five pounds alfalfa pellets plus dehydrated sorghum pellets free choice.

Lot 5. Five pounds alfalfa pellets plus dehydrated sorghum pellets free choice plus 1.0 pound prairie hay.

Results and Observations

The results of this experiment are reported in Table 27. An examination of this table reveals the following:

1. Average daily gains made by the heifers were considered satisfactory in all lots.
2. Using lot 1, which received alfalfa hay and silage, as a control, there was a statistically significant difference between the average daily gains made by the heifers in lot 1 and lots 2, 3, 4, and 5.