Table 19 (Continued)

Av. U.S.D.A. grade[6]	11.2	11.4	11.8
Av. marbling score[7]	8.0	7.2	7.0
Av. fat thickness score[8]	3.2	3.2	3.6
Av. firmness score[9]	4.5	4.1	4.2
Av. ribeye size, sq. in.[10]	10.46	9.96	10.07

6. Average grade determined as follows: high choice, 15; average choice, 14; low choice, 13; high good, 12; average good, 11; low good, 10; high standard, 9.
7. Visual marbling score determined as follows: moderate, 5; modest, 6; small amount, 7; slight amount, 8.
8. Visual fat covering at 12th rib: moderate, 3; modest, 4; slightly thin, 5.
9. Firmness of ribeye: firm, 2; moderately firm, 3; modestly firm, 4; slightly firm, 5.
10. Measured at the 12th rib.

Stilbestrol[1] and Synovex[2] Implants (and Reimplants) for Steers on a Fattening Ration. Project 253-6.

B. A. Koch, Ed F. Smith, R. F. Cox, D. Richardson, and G. L. Walker

The steers used in this fattening trial were part of a larger group used in a wintering trial reported on page 46 of Kansas Circular 358. At the beginning of the fattening period the ration was gradually changed from a high roughage, wintering type, to a high energy, fattening type. Also at that time five of the steers in the stilbestrol lot were reimplanted with 24 mgs. of diethylstilbestrol and five steers in the synovex lot were reimplanted with synovex. Individual calves remained in the same experimental group as during the wintering study but the groups were moved from the outdoor lots to concrete lots in which shelter was available.

The steers were brought to a full-feed of sorghum grain and alfalfa hay plus 1 pound of soybean meal per head per day during the first 4 weeks of the trial. After they were on full-feed alfalfa hay and sorghum grain were available at all times on a free-choice basis. The soybean meal was fed once per day and was scattered over the grain in the feed bunk.

During this fattening trial the cattle suffered from a severe outbreak of foot-rot. Almost all animals in all lots were under veterinary care at some time and some individuals were treated for recurring cases of the infection. In some cases the animals apparently suffered very little while other animals showed large losses of body weight during the period of infection. For this reason the data obtained are being reported with no conclusions or observations. Previous tests reported in Kansas Circulars 349 and 358 have indicated that fattening calves do show a favorable response to both stilbestrol and Synovex implants and reimplants.

1. Supplied by Chas. Pfizer & Co. (24 mgs. per steer implanted in the ear; 24 mgs. reimplant also).
2. Supplied by E. R. Squibb & Sons. (Each implant contained 200 mgs. of progesterone plus 20 mgs. of estradiol benzoate.)

Table 20

The use of stilbestrol[1] and synovex[2 3] implants for steers during the fattening period. Project 253-6.

Fattening—April 24, 1958, to August 22, 1958—120 days.

I—By Pens

Treatment	Control	Synovex[2] implant	Stilbestrol[1] implant
Number steers per lot	9[4]	10	10
Av. initial wt. per steer, lbs.	738	783	758
Av. final wt. per steer, lbs.	947	1011	1002
Av. total gain per steer, lbs.	209	228	244
Av. daily gain per steer, lbs.	1.74	1.90	2.04
Standard error	±.04	±.11	±.07
Daily ration per steer, lbs.:			
Ground sorghum grain	15.70	16.88	16.30
Soybean oil meal	1.00	1.00	1.00
Alfalfa hay	5.82[5]	5.94[5]	5.72[5]
Salt	.04	.03	.03

Table 20 (Continued)

Bonemeal-salt	.05	.04	.04
Feed per cwt. gain, lbs.:			
Ground sorghum grain	902	888	799
Soybean oil meal	58	53	49
Alfalfa hay	334	313	280
Salt	2	2	2
Bonemeal-salt	3	2	2
Feed cost per cwt. gain	$ 22.74	22.13[6]	19.96[6]
Carcass grades, U.S.D.A.:			
Av. choice			
Low choice	1		
High good	3	2	3
Av. good	3	1	2
Low good	1	4	4
High standard	1	3	1
Av. U.S.D.A. grade[7]	11.2	10.2	10.7
Av. marbling score[8]	8.0	8.0	7.6
Av. fat thickness score[9]	3.2	3.7	3.8
Av. firmness score[10]	4.5	4.5	4.4
Av. ribeye size, sq. in.[11]	10.46	9.72	10.20

II—Treatment

Treatment	Control	Synovex[2] implant	Synovex[2] reimplant	Stilbestrol[1] implant	Stilbestrol[1] reimplant
Lot number	1	2	2	3	3
Number of steers per lot	9[4]	5	5	5	5
Av. initial wt. per steer, lbs.	738	785	781	757	758
Av. final wt. per steer, lbs.	947	1017	1005	984	1020
Av. total gain per steer, lbs.	209	232	224	227	262
Av. daily gain per steer, lbs.	1.74	1.93	1.87	1.89	2.18
Standard error	±.04	±.14	±.18	±.12	±.07
Carcass grades, U.S.D.A.:					
Av. choice					
Low choice	1				
High good	3	1	1		3
Av. good	3	1		2	
Low good	1	2	2	3	1
High standard	1	1	2		1
Av. U.S.D.A. grade[7]	11.2	10.4	10.0	10.4	11.0
Av. marbling score[8]	8.0	8.0	8.0	7.6	7.6
Av. fat thickness score[9]	3.2	3.6	3.8	3.8	3.8
Av. firmness score[10]	4.5	4.4	4.6	4.4	4.4
Av. size ribeye, sq. in.[11]	10.46	9.40	10.14	10.08	10.32

1. Supplied by Chas. Pfizer & Co., Inc., Terre Haute, Ind.
2. Supplied by E. R. Squibb and Sons, New Brunswick, N.J.
3. Each implant contained 200 mgs. Progesterone plus 20 mgs. estradiol benzoate.
4. One animal died 47 days after test began.
5. Each animal also received 225 lbs. of sorghum silage during the first 15 days of this fattening period.
6. Implant cost not included.
7. Average grade determined as follows: high choice, 15; average choice, 14; low choice, 13; high good, 12; average good, 11; low good, 10; high standard, 9.
8. Visual marbling score determined as follows: moderate, 5; modest, 6; small amount, 7; slight amount, 8.
9. Visual fat covering at 12th rib: moderate, 3; modest, 4; slightly thin, 5.
10. Firmness of ribeye: firm, 2; moderately firm, 3; modestly firm, 4; slightly firm, 5.
11. Measured at the 12th rib.

Feeding a Tranquilizer to Fattening Steer Calves (with and without Diethylstilbestrol). Project A-626.* A Progress Report.

B. A. Koch, E. F. Smith, D. Richardson, and M. M. McCartor

Several of the tranquilizer materials have shown promise when included in fattening rations of steers under certain conditions. However, results reported have not been consistent, and further work is needed to definitely establish the value of these additives in fattening rations.

The study reported here was designed to study the effect of one tranquilizer, Trifluomeprazine, on the performance of beef steers receiving a fattening ration. The tranquilizer is being fed with and without added diethylstilbestrol.

Experimental Procedure

Steers used in this study were the heavy end of a group purchased near Paducah, Texas, in early fall, 1958. Sixty head of steer calves averaging approximately 570 pounds in weight were randomly allotted, according to weight, into six treatment groups of 10 each. Treatment groups are as follows:

1. Control ration.
2. Control plus 10 mgs. oral diethylstilbestrol[1] per head per day.
3. Control plus 2.5 mgs. Trifluomeprazine[2] per head per day.
4. Control plus 5.0 mgs. of Trifluomeprazine per head per day.
5. Control plus 10 mgs. of diethylstilbestrol plus 2.5 mgs. of Trifluomeprazine per head per day.
6. Control plus 10 mgs. of diethylstilbestrol plus 5.0 mgs. of Trifluomeprazine per head per day.

The daily ration being fed includes 10 pounds of sorghum silage, 1.5 pounds of alfalfa hay, 1.0 pound of soybean meal and a variable quantity of cracked corn. After 108 days on feed, the steers' cracked corn consumption varies from 13.5 pounds to 16.5 pounds per head per day. Corn and silage are fed mixed together in the bunks. The soybean meal is used as a carrier for the appropriate additive and is fed with the corn and silage.

The cattle are in concrete lots which have open sheds on the north side. Each lot is equipped with an automatic waterer. Salt and a mixture of salt and bonemeal are available to the animals at all times.

Observations

Average weight gains for the first 108 days of the study are reported in Table 21. Weight gains of these calves are similar to those reported on another page for individually-fed calves receiving the same additives in their rations. None of the animals shows any visible evidence of sedation or quietness. Nor have any undesirable side effects been observed. To date it appears that stilbestrol is stimulating rate of gain the most. Trifluomeprazine apparently is effective at the 5-mg. level. However, the increased gains due to feeding either stilbestrol or tranquilizer do not appear to be additive when the compounds are fed together. Final conclusions will be made at the end of the study.

*Partially supported by a grant-in-aid from Smith, Kline & French Labs., Philadelphia, Pa.

1. Stilbosol furnished by Eli Lilly & Co., Indianapolis, Ind.
2. Trifluomeprazine furnished by Smith, Kline & French Labs., Philadelphia, Pa.

Table 21

Feeding a tranquilizer to fattening steer calves (with and without the addition of diethylstilbestrol). First 108 days on feed.

Treatment	Control	Stilbestrol[1]	½ mgs.[2] TFM	5 mgs. TFM	2½ mgs. TFM + stilbestrol	5 mgs. TFM + stilbestrol
Number of steers	10	10	10	10	10	10
Av. initial wt., lbs.	576	566	580	562	580	574
Av. total gain, lbs.	222	310	221	274	250	282
Av. daily gain, lbs.	2.06	2.87	2.05	2.54	2.31	2.61

1. Diethylstilbestrol.
2. Trifluomeprazine.

Tranquilizers in the Fattening Ration of Individually-fed Steers (with and without Added Diethylstilbestrol). Projects A-597* and A-626. A Progress Report.

B. A. Koch, E. F. Smith, D. Richardson, and M. M. McCartor

Some of the recent experimental work indicates that tranquilizers may be of value in the fattening ration of beef cattle. There is also some evidence that these compounds may be of further value when used in combination with other additives.

This study is designed to determine the effect of tranquilizers fed with and without diethylstilbestrol, on the performance of beef steers receiving a fattening ration. Steers are being individually fed. During the study each animal will be placed in a metabolism stall at intervals for collection of urine and feces. Thus, it will also be possible to determine the effect of the various additives on body nitrogen retention, digestibility of the ration, and ration energy utilization.

Experimental Procedure

Twenty-four steer calves weighing approximately 500 pounds each were randomly allotted, according to weight, into six treatment groups of four each. Animals are being individually fed twice daily. During the part of the day when they are not eating, the calves are penned together in two groups of 12 each. One month was allowed to train the calves and accustom them to being tied twice daily for individual feeding.

Animals were placed on their respective treatments February 3, 1959. Treatment groups are as follows:

1. Control ration.
2. Control plus 10 mgs. of oral stilbestrol[1] per head per day.
3. Control plus 2.5 mgs. of Tran-Q[2] per head per day.
4. Control plus 5.0 mgs. of Trifluomeprazine[3] per head per day.
5. Control plus 10 mgs. of oral stilbestrol plus 2.5 mgs. Tran-Q per head per day.
6. Control plus 10 mgs. of oral stilbestrol plus 5.0 mgs. Trifluomeprazine per head per day.

Metabolism studies were started April 1 when six calves, one from each treatment group, were placed into metabolism stalls. After a one-week preliminary period to allow the calves to become accustomed to stalls, a complete collection of urine and feces was made over a seven-day period. Representative samples of all feed, feces, and urine collections will be analyzed in the nutrition laboratory of the Department of Animal Husbandry. Over an eight-week period all 24 calves will have spent one seven-day collection period in the metabolism stalls.

The calves receive a daily ration of cracked corn, soybean meal, sorghum silage, and chopped alfalfa hay. Each calf receives 1 pound of soybean meal per day and this contains the approximate additive. Sorghum silage is limited to 10 pounds per day and chopped alfalfa hay to 1.5 pounds per day. Cracked corn is fed according to the appetite of each calf.

Observations

Average weight gains to date of the calves in each treatment group are presented in Table 22. Weight gains of these individually-fed calves are similar to those of group-fed calves receiving the same ration and described in another report in this bulletin. None of the animals shows any visible evidence of sedation or calming. Neither are any undesirable side effects evident at this time. Final conclusions will be made at the end of the study.

*Partially supported by a grant-in-aid from Chas. Pfizer & Co., Inc., Terre Haute, Ind.

1. Stilbosol furnished by Eli Lilly & Co., Indianapolis, Ind.
2. Tran-Q furnished by Chas. Pfizer & Co., Inc., Terre Haute, Ind.
3. Trifluomeprazine furnished by Smith, Kline & French Labs., Philadelphia, Pa.

Table 22

Tranquilizers in the fattening ration of individually-fed steers (with and without diethylstilbestrol). First 49 days on test.

Treatment	Control	Stilbestrol[1]	Tran-Q[2]	TFM[3]	Stilbestrol + Tran-Q	Stilbestrol + TFM
No. of steers	4	4	4	4	4	4
Av. initial wt., lbs.	518	506	519	525	510	527
Av. total gain, lbs.	109	127	110	120	123	130
Av. daily gain, lbs.	2.22	2.59	2.24	2.45	2.51	2.65

1. Diethylstilbestrol
2. Tran-Q (hydroxyzine)
3. Trifluomeprazine

The Effect of Shade and Hormone Implant on Fattening Yearling Heifers, 1958.

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

This is the second year of an experiment designed to study the value of shade for beef cattle under Kansas environmental conditions. In cooperation with the Department of Agricultural Engineering, shades were designed and constructed from material made available by commercial interests. The contributors were American Iron and Steel Institute, American Zinc Institute, and Dierks Forests, Inc.

As a part of the 1957 shade study, five heifers within each lot were implanted with Synovex heifer implant (20 mgs. estradiol benzoate and 100 mgs. of testosterone) to determine the value of this implant and shade on the performance of heifers in drylot. This experiment was repeated in 1958 by adding two lots of implanted heifers, one shaded, and one in the sun.

Experimental Procedure

Fifty head of Hereford heifers averaging 640 pounds per head were used. They were placed in five lots, 10 head per lot, on the basis of live weight.

The heifers were on test from June 12 to November 30, 1958 (140 days). At the beginning of the experiment the heifers were consuming 5 pounds of sorghum grain, 1 pound of soybean meal, and 6 pounds of alfalfa hay per head daily. They were rapidly brought to a daily ration composed of all the sorghum grain they would consume, 1 pound of soybean meal, and 5 pounds of alfalfa hay. At the termination of the test, the heifers were sold on the central market at St. Joseph, Mo.

The shades were constructed from corrugated sheet iron and attached to 16 x 20 foot wooden frames. The frames were then placed on posts 12 feet high. The top side of the sheet iron was covered with white paint. The shades provided 64 square feet of shade per animal.

One lot of heifers having access to shade, and one lot of heifers having no shade, were implanted at the beginning of the feeding trial with one Synovex hormone implant containing 20 mgs. of estradiol benzoate and 100 mgs. of testosterone.

Results and Observations

Table 23 shows the results of this experiment.

1. Shade improved the average daily gain of implanted heifers 0.12 pound more per head daily than those without shade.
2. The average daily gains of the nonimplanted heifers having no shade were essentially the same as the gains made by the nonimplanted heifers having access to shade.
3. Implanted heifers having access to shade gained 0.35 pound more per head daily than those receiving no implant and no shade. Thus, the combined effects of shade and hormone implant were 0.35 pound increase in daily gain per head.
4. Implanted heifers having no shade gained 0.23 pound more per head daily than the nonimplanted heifers having no shade.
5. Implanted heifers having shade gained 0.36 pound more per head daily than the nonimplanted heifers having shade.
6. Shade alone had no effect upon efficiency of feed utilization.
7. Implanted heifers were more efficient in feed efficiency than nonimplanted heifers.
8. Heifers that were implanted and had access to shade were the most efficient in feed utilization.
9. There was only a very slight difference in the average carcass grade of the various lots of heifers.
10. Shade had no influence upon ribeye size in square inches. The heifers receiving the implant, regardless of shade, had larger ribeye muscles. However, this is probably due to the fact that the implanted heifers were heavier, since both nonimplanted and implanted heifers had the same in square inches of ribeye muscle, 0.0115, per pound of body weight.

11. The difference between lots in thickness of fat at the 12th rib, degree of marbling and firmness was very slight.
12. There were no undesirable side effects due to hormone implants.

Table 24 illustrates the effects of certain climatic factors on the average daily gains of yearling heifers by periods. Increased temperature and radiation depressed average daily gains irrespective of shade. Also, the heifers responded to a moderation of temperature and radiation, as indicated by an increase in daily gains during periods three and four. However, the summer of 1958 was very mild compared with the summer of 1957. The temperature was never above 100° F. This mildness is reflected in the desirable response of these cattle during the summer fattening period.

Table 23

The effect of shade and hormone implant[1] on fattening yearling heifers.

June 12, 1958, to November 30, 1958—140 days.

Lot number	1	2	3	4	5
Number heifers per lot	10	10	10	10	10
Management	No shade	No shade	Shade	No shade, implant	Shade, implant
Av. initial wt. per heifer, lbs.	622	651	646	621	628
Av. final wt. per heifer, lbs.	910	922	924	933	957
Av. gain per heifer, lbs.	288	271	278	312	329
Av. daily gain per heifer, lbs.	2.06	1.94	1.99	2.23	2.35
Av. daily ration per heifer, lbs.:					
Ground sorghum grain	13.40	13.78	14.5	14.13	14.40
Soybean oil meal	1.00	1.00	1.00	1.00	1.00
Alfalfa hay	5.19	5.19	5.19	5.19	5.19
Lbs. feed per cwt. gain:					
Ground sorghum grain	652.2	711.6	732.0	634.2	614.5
Soybean oil meal	48.6	51.7	50.4	44.9	42.6
Alfalfa hay	252.0	267.9	261.1	232.7	220.7
Total feed per cwt. gain	952.8	1031.2	1043.5	911.8	877.8
Feed cost per cwt. gain[2]	$17.03	18.48	18.83	16.39	15.80
Selling price per cwt. at market	$25.75	25.75	25.75	25.75	25.75
Dressing %	58.3	58.6	58.1	59.5	58.5
Carcass data					
Carcass grades, USDA:					
Average choice		1	1		
Low choice			1		
High good	8	9	8	10	7
Average good	2				3
Low good					
Av. carcass grade[3]	17.9	18.2	18.3	18	17.7
Av. size of ribeye[4]	4.0	3.8	3.9	4.0	4.0

1. Synovex heifer implant—20 mgs. estradiol benzoate and 100 mgs. testosterone. Squibb and Sons.
2. Prices of feed per cwt. are listed on inside back cover of bulletin.
3. Av. choice, 20; low choice, 19; high good, 18; av. good, 17; low good, 16.
4. Very large, 1; large, 2; moderately large, 3; modestly large, 4; slightly large, 5; visual estimate.

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