Lot 7—Wintered on dry bluestem pasture, 3 pounds of alfalfa hay, and 1½ pounds of corn per head daily, grazed on bluestem pasture until August 2.

Lot 8—Wintered on dry bluestem pasture and 6 pounds of alfalfa hay per head daily, grazed on bluestem pasture until August 2.

All lots had free access to salt and mineral (equal parts of bonemeal and salt).

Four heifers in each lot or a total of 12 were implanted with 48 mgs. of stilbestrol; results of this test are reported elsewhere. In the test this year there was no fattening phase due to the loss of two of the implanted heifers because of vaginal prolapse.

Observations

1. In a comparison of dry-lot wintering (lot 4) with wintering on dry grass (lots 7 and 8), the total winter and summer gain is of particular interest. Lot 4 gained 25 pounds more than lot 7 and 44 pounds more than lot 8. Lots 7 and 8 wintered on dry grass on a low plane of nutrition failed to gain enough during the summer to make their total gain equal to the well-wintered lot 4. Cost of gain for lots 7 and 8 wintered on dry grass depends to a large extent on the charge for winter grass.

2. Apparently 3 pounds of alfalfa hay furnishes ample protein for calves wintered on dry bluestem pasture, since lot 7, fed alfalfa and grain, gained slightly more during the winter and summer than lot 8, which received only alfalfa hay. The 1½ pounds of grain fed to lot 7 furnished approximately the same amount of energy as the additional 3 pounds of alfalfa hay fed to lot 8.

Table 33

The Value of Dry Bluestem Pasture and a Comparison of Supplements for Heifer Calves, 1955-56.

Phase 1—Wintering, November 15, 1955, to May 3, 1956—170 days for lot 4; November 15, 1955, to April 7, 1956—144 days for lots 7 and 8.

Lot number	4	7[1]	8
Number of heifers	10	9[2]	10
Place wintered	dry lot	pasture	pasture
Initial wt. per heifers, lbs.	473	474	482
Final wt. per heifer, lbs.	685	501	501
Gain per heifer, lbs.	212	27	19
Daily gain per heifer, lbs.	1.24	.19	.13
Daily ration per heifer, lbs.:			
Alfalfa hay	3.0	3.0	6.0
Corn, ground	1.4	1.5	
Sorghum silage	28.1		
Dry bluestem pasture		Free choice	Free choice
Prairie and alfalfa hay		.29[1]	.29[1]
Salt	.09	.03	.03
Mineral (bonemeal and salt)	.06	.04	.04
Feed cost per heifer, $[3]	27.97	14.23	12.37
Phase 2—Grazing, May 3, 1956, to August 2, 1956—91 days for lot 4; April 7, 1956, to August 2, 1956—117 days for lots 7 and 8.			
Initial wt. per heifer, lbs.	685	501	501
Final wt. per heifer, lbs.	762	738	727
Gain per heifer, lbs.	77	237	226
Daily gain per heifer, lbs.	.85	2.03	1.93
Feed cost per heifer, $	16.00	16.00	16.00

1. Prairie and alfalfa hay in limited quantities were fed to lots 7 and 8 when snow covered the grass.

2. One stilbestrol-implanted heifer was removed from lot 7 with a prolapsed vagina.

3. Feed prices may be found inside the back cover.

Table 33 (Continued).

Summary—November 15, 1955, to August 2, 1956—261 days.			
Initial wt. per heifer, lbs.	473	474	482
Final wt. per heifer, lbs.	762	738	727
Gain per heifer, lbs.	289	264	245
Daily gain per heifer, lbs.	1.11	1.01	.94
Feed cost per heifer[2]	43.97	30.23	28.37
Feed cost per 100 lbs. gain[2]	15.21	11.45	11.58

Relationships Between Summer Gains of Yearling Steers on Bluestem Pastures and Feeder Grade, Shade of Color, Weight at the Start of the Grazing Season, and Previous Winter Gain, 1956 (Project 253-3-5).

L. A. Holland, J. D. Wheat, E. F. Smith, W. H. Smith, D. L. Good, and R. F. Cox

The Department of Animal Husbandry purchases steer calves each fall to be wintered and grazed the following summer in studies of different methods of managing bluestem pastures. This affords opportunities to study the relationships between summer gains and feeder grade, shade of color, weight at the start of the grazing season, and previous winter gain. Several years will elapse before definite conclusions can be drawn concerning these relationships. Following, however, is a report of progress to date of the studies made of these factors:

Experimental Procedure

The 136 Hereford steers in this study were purchased as calves in the fall of 1955 and wintered 170 days in dry lot on sorghum silage, alfalfa hay, and 2 pounds of milo grain per head daily. The summer grazing period was from April 25 to October 1.

The steers were individually scored for feeder grade and shade of red by five animal husbandmen working independently in April, 1956. Feeder grades were the USDA grades fancy, choice, good, medium, and common. Each grade was further subdivided to high, middle, and low. For statistical analysis, a numerical grade of 18 was assigned to high fancy, 17 to middle fancy, 16 to low fancy, etc. Shade-of-red scores were dark, medium, and light; each shade-of-red score was further subdivided to high, middle, and low. High dark was assigned a numerical grade of 9, middle dark a grade of 8, etc. Thus the higher the numerical color score, the more intense was the shade of red.

Results

Since the steers were allotted to several pastures and some received hormone implants, correlations were computed on a within-treatment, within-pasture basis. The correlations were: Feeder grade and summer gain, —.03; color score and summer gain, —.05; winter gain and summer gain, —.20; and beginning weight and summer gain, —.32.

The correlation between feeder grade and summer gain, —.03, is, for all practical purposes; zero and indicates that feeder grade was not a good indicator of summer gaining ability.

Likewise, the correlation between color score and summer gain, —.05, is essentially zero and indicates that shade of red was not a good indicator of summer gains. On the basis of these results, an advantage could not be claimed for any particular shade of red.

The correlation between winter gain and summer gain, —.20, indicates that steers making high winter gains tended to make lower summer gains and steers making low winter gains tended to compensate with higher summer gains. Animal husbandmen have long known that steers wintered on a low plane of nutrition tend to make higher summer gains than steers wintered on a high nutritional plane. The results in this study point to compensatory gains in the summer even when steers were wintered uniformly on what was considered to be a medium plane of nutrition.

The correlation between beginning weight and summer gain, —.32, shows that light-weight steers at the start of the summer grazing period tended to make larger gains than the heavier steers.

Different Methods of Managing Bluestem Pastures, 1956 (Projects 253-3 and 253-5).

E. F. Smith, K. L. Anderson, B. A. Koch, and G. L. Walker

This experiment is to determine the effects of different stocking rates, deferred grazing, and pasture burning on livestock gains, productivity of pastures, and range condition as determined by plant population changes. In addition to the yearly report, a summary of the cattle gains for the first seven years of this test is included.

Experimental Procedure

Good-quality Hereford yearling steers weighing about 650 pounds were used to stock the pastures. They were purchased as calves from the Williams Ranches near Lovington, N.M., in the fall of 1955. They were wintered at Manhattan in dry lot on sorghum silage, alfalfa hay, and 2 pounds of milo grain per head daily. The method of management of each pasture was:

Pasture 1—Normal rate, 3.75 acres per head.
Pasture 2—Overstocked, 3.0 acres per head.
Pasture 3—Understocked, 5.0 acres per head.
Pastures 4, 5, 6—Deferred grazing, 3.60 acres per head. All steers were held in Pastures 5 and 6 until July 1, then placed on deferred Pasture 4 until mid-September. From mid-September on, they were allowed the run of all three pastures.
Pasture 9—Burned March 8, 1956, normal rate of stocking.
Pasture 10—Burned April 10, 1956, normal rate of stocking.
Pasture 11—Burned April 28, 1956, normal rate of stocking.

The steers were weighed off test October 1, 1956, but remained on the pastures until October 8. Results are presented in Tables 34 and 35.

Observations

1. The steer gains per head in 1956 were greatest on the mid-spring burned pasture and least on the deferred and rotated pastures.

2. It is of particular interest to note that the steers on the overstocked pastures gained more than those on the understocked pastures and slightly more than those on the normally stocked pastures. This occurred in a year of subnormal moisture which had been preceded by four years of low rainfall. Very little grass remains on the overstocked pasture as compared to the understocked or normally stocked.

3. Pasture 2, overstocked, and Pasture 9, early spring-burned, had the least top growth remaining after the growing season, whereas Pasture 3, understocked, and Pastures 5 and 6 of the deferred pastures had the most top growth remaining at the close of the season.

4. Close use of the overstocked pasture has weakened the grasses and increased weeds, but forage depletion has not yet reached the point where serious reductions in livestock yields are noted. Table 36 shows production and use of both forage and mulch on the six pastures of the grazing study.

Early spring burning is also causing depletion. Bare areas have appeared and weeds are increasing. Amounts of cover remaining at the close of the grazing season are not large enough to protect the soil against runoff and erosion. Table 37 compares these residues with those on Pasture 1, stocked at the same rate but not burned. Table 38 shows the long-time effects of time of burning on bluestem forage yields at the old College plots on an ordinary uplands rangs site nearer the college campus.

Table 34
Comparison of Different Methods of Managing Bluestem Pastures.
April 29, 1956, to October 1, 1956—155 days.

Pasture number	1	2	3	4, 5, 6	9	10	11
Management	Normally stocked	Over-stocked	Under-stocked	Deferred rotated	Early spring-burned	Mid-spring-burned	Late spring-burned
Number of steers per pasture	16	20	12	50	12	12	12
Acres in pasture	60	60	60	3-60[1]	44	44	44
Number acres per head	3.75	3	5	3.60	3.66	3.66	3.66
Initial wt., lbs.	652	641	645	644	643	645	643
Final wt., lbs.	831	825	813	798	855	879	859
Gain per steer, lbs.	179	184	168	154	212	234	216
Daily gain, lbs.	1.15	1.19	1.08	0.99	1.37	1.51	1.39
Gain per acre, lbs.	47.73	61.33	33.60	51.33	57.92	63.93	59.02

1. Three 60-acre pastures.

Table 35
Yearly Account of Cattle Gains under Different Methods of Grazing Pastures; Seven-year Summary, 1950-1956. Gain per Steer in Pounds for the Summer Season of Approximately 150 Days.

Pasture number	1	2	3	4, 5, 6	9	10	11
Management	Normally stocked	Over-stocked	Under-stocked	Deferred rotated	Early spring-burned	Mid-spring-burned	Late spring-burned
1950	221	210	214	205	216	254	230
1951	242	256	290	234	243	265	254
1952	246	209	228	197	251	278	283
1953	226	194	233	197	205	217	234
1954	261	237	236	214	270	271	306
1955	270	224	253	213	282	305	307
1956	179	184	168	154	212	234	216
Average	235	216	232	202	240	261	261

Table 36

Effect of Stocking Practice on Production and Use of Bluestem Forage and Mulches on Three Major Range Sites. Figures Given Are in Pounds Air-dry Weight per Acre, Average of 1955 and 1956 Yields.

Range site	Stocking practice: Heavy, lbs./A.	Medium, lbs./A.	Light, lbs./A.	Deferred rotation, lbs./A.
Ordinary upland:				
Forage produced	1780	1901	2470	2149
Forage used	986	803	570	1051
Limestone breaks:				
Forage produced	1909	1806	2130	2124
Forage used	875	824	72	548
Clay upland:				
Forage produced	1313	1407	1370	1613
Forage used	921	1019	747	642
Ordinary upland:				
Mulch accumulation	1487	2046	2769	1964
Mulch disappearance	487	400	393	145
Limestone breaks:				
Mulch accumulation	988	1578	3264	2173
Mulch disappearance	132	294	92	239
Clay upland:				
Mulch accumulation	569	1317	608	1265
Mulch disappearance	67	500	153	208

Table 37

Effect of Time of Burning on Protective Residue of Top Growth per Acre Remaining at Close of Grazing Season. Air-dry Weight 1955-1956 Grazing Seasons.

	Pasture 9 burned, early-spring, lbs.	Pasture 10 burned, mid-spring, lbs.	Pasture 11 burned, late-spring, lbs.	Pasture 1 not burned, lbs.
Ordinary uplands	1049	1577	1425	2530*
Limestone breaks	1179	1653	1340	2695*

* Includes mulch which has been prevented by fire from accumulating in the burned pastures.

Table 38

Effect of Time of Burning Bluestem Grassland on Yields of Top Growth per Acre; Ordinary Uplands Range Site, College Pasture Plots.

	Time of burning: Check (not burned), lbs.	Late spring, lbs.	Mid-spring, lbs.	Early spring, lbs.	Winter, lbs.
1956 yields	2351	2076	1419	1276	1274
Av. 1953-1956 yields	2054	1673	1438	1389	1259
Long-time average (23 years)	2502	2161	1934	1845	1926

The Use of Stilbestrol[1] and Synovex[2,3] Implants for Steers on a Wintering Ration (Project 253-6).

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

This is the second test designed to study the effect of stilbestrol implants on steer calves being fed on a wintering-type ration. Synovex implants were also included in the current study. Both products are being used successfully to promote growth of steers on high-energy fattening rations. However, more information is needed concerning their value when calves are fed high-roughage diets.

Experimental Procedure

Forty steer calves, weighing approximately 440 pounds each, were divided into three groups (one group of 10 and two groups of 15). Five animals will be removed from each of the larger groups at a later date for use in another study. One group of 15 served as the control lot. Each animal in the other group of 15 received a 24-mg. implant of stilbestrol in the right ear at the start of the wintering period. Each animal in the group of 10 received a Synovex implant (1000 mgs. progesterone plus 20 mgs. estradiol) in the right ear at the start of the wintering period.

Sorghum silage was used as the roughage in all lots and the steers were fed all they would consume each day. The concentrate part of the ration consisted of 5 pounds of milo grain and 1 pound of soybean meal per steer per day. A mineral mixture made up of equal parts of salt and bonemeal was available to the animals at all times. Salt alone was also available to the animals at all times.

Table 39

The Use of Stilbestrol and Synovex Implants for Steer Calves on a Wintering-Type Ration.

December 4, 1956, to March 26, 1957—112 days.

Lot number	1	2	3
Treatment	Control	Synovex implants	Stilbestrol implants
Number steers	15	10	15
Initial wt. per steer, lbs.	446	444	442
Final wt. per steer, lbs.	626	659	654
Total gain per steer, lbs.	180	215	212
Daily gain per steer, lbs.	1.60±0.05[2]	1.92±0.06[2]	1.89±0.08[2]
Daily ration per steer, lbs.:			
Ground milo grain	4.5	4.5	4.5
Soybean oil meal	1	1	1
Sorghum silage	25.6	25.9	27.6
Lbs. feed per cwt. gain:			
Ground milo grain	281.25	234.45	238.05
Soybean oil meal	62.50	52.10	52.90
Sorghum silage	1600.00	1349.39	1460.04
Feed cost per cwt. gain	$15.62	$13.07	$13.64
Implant cost per cwt. gain[1]		.86	.03
Total cost per cwt. gain	15.62	13.93	13.67

1. Stilbestrol cost = approximately 6 cents per steer; Synovex cost = approximately $1.85 per steer (no charge made for actual implanting procedure).
2. Standard error of mean.

Observations

1. Undesirable side effects such as high tailheads, elongated teats, and sexual stimulation were not apparent in any of the implanted steers.

1. Supplied by Wick and Fry, Inc., Cumberland, Ind.
2. Supplied by E. R. Squibb and Sons. New York, N.Y.
3. Each implant contained 1000 mgs. progesterone and 20 mgs. estradiol benzoate.