FEEDING 2YR. OLD BEEF CATTLE.

A THESIS PRESENTED TO THE ~~GRADUATE~~ Degree COMMITTEE

OF THE VIRGINIA POLYTECHNIC INSTITUTE

IN APPLICATION FOR THE DEGREE

OF MASTER OF SCIENCE.

BY

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approved.

EXPERIMENT

Feeding Beef Steers.

This experiment was conducted by the Virginia Agricultural Experiment Station for the purpose of comparing the values of several feeds for wintering beef steers with especial regard for local conditions.

The objects of the experiment were in detail as follows:

1. To compare the results of wintering two-year old steers on corn meal and corn stover, corn silage and cottonseed meal, and corn silage alone.

2. To determine the advisability of using cottonseed meal in connection with corn silage for wintering steers.

3. To determine the amount of corn silage required to winter steers when fed 1 pound cottonseed meal per head per day, so that their weights will vary as follows:

(1) To gain 25# to 50#.
(2) To lose 1# to 25#.
(3) To lose 50# to 75#.

4. To determine the relative cost and advisability of using the above rations.

The cattle used were high grade Short Horn 2 year olds, averaging about 1000 pounds in weight and in good condition. They were taken from pasture on November 23 and divided into five lots of five steers each with due regard for uniformity of size, condition, quality, and breeding.

The feed lots, about one-third of an acre in size each, were situated in rather an exposed location near the top of a small hill. Shelter was furnished by sheds 12 x 15 feet, enclosed on three sides and open to the South. Saw-dust was used for bedding. Water was available at all times.

The steers were weighed individually every four weeks for three

successive days. A drive of perhaps 300 yards was necessary to reach the scales.

Before beginning the experiment the steers were fed regular rations for eight days and the first weights were taken on December 1st, 2nd & 3rd.

Feeding was done twice daily at about seven A.M. and four thirty P.M., the same ration being furnished at each time.

Rations were given each lot as follows:

Lot 1. - 35 lbs. of corn silage and 1 lb. of cottonseed meal per head per day. The silage was increased 2 lbs. on December 16th and again on January 27th.

Lot 2. - 30 lbs. of corn silage and 1 lb. of cottonseed meal per head per day. Silage was increased as with lot 1.

Lot 3. - 25 lbs. of corn silage and one lb. of cottonseed meal, Silage increased as with lot 1.

Lot 4. - 35 lbs. of corn silage alone. Silage increased as with lot 1.

Lot 5. - 20 lbs. of shredded corn stover and 1 lb. of corn meal. The meal was increased $\frac{1}{4}$ lb. on March 2nd and again increased $\frac{1}{4}$ lb. on March 25th.

The above rations are based on the amount of feed fed each steer in 24 hours.

All feeds were in good condition. The stover was left in the field and about two weeks supply hauled under shelter at a time, thus duplicating local conditions as much as possible, where the stover is fed in the fields.

After February 1st the stover depreciated noticeably in value due to weathering.

In no case did the animals fail to clean up their rations well with the exception of those fed stover. These left small amounts of stalks after each feeding. From results found by Missouri, and Kansas Stations, whole stover has practically the same feeding value as shredded stover.

The steers were turned on grass April 27.

Prices of Feeds.

The actual costs of the feeds used were per ton as follows:

Corn silage -------- $5.00.
Stover ------------ $8.00.
Cottonseed meal ---- $30.00.
Corn meal ---------- $38.00.

To make due allowance for possible variations in these values and the consequent effects upon the results, three different values have been given each material used and combinations of prices made by holding the concentrates constant and varying the roughages and vice-versa.

Table 1.

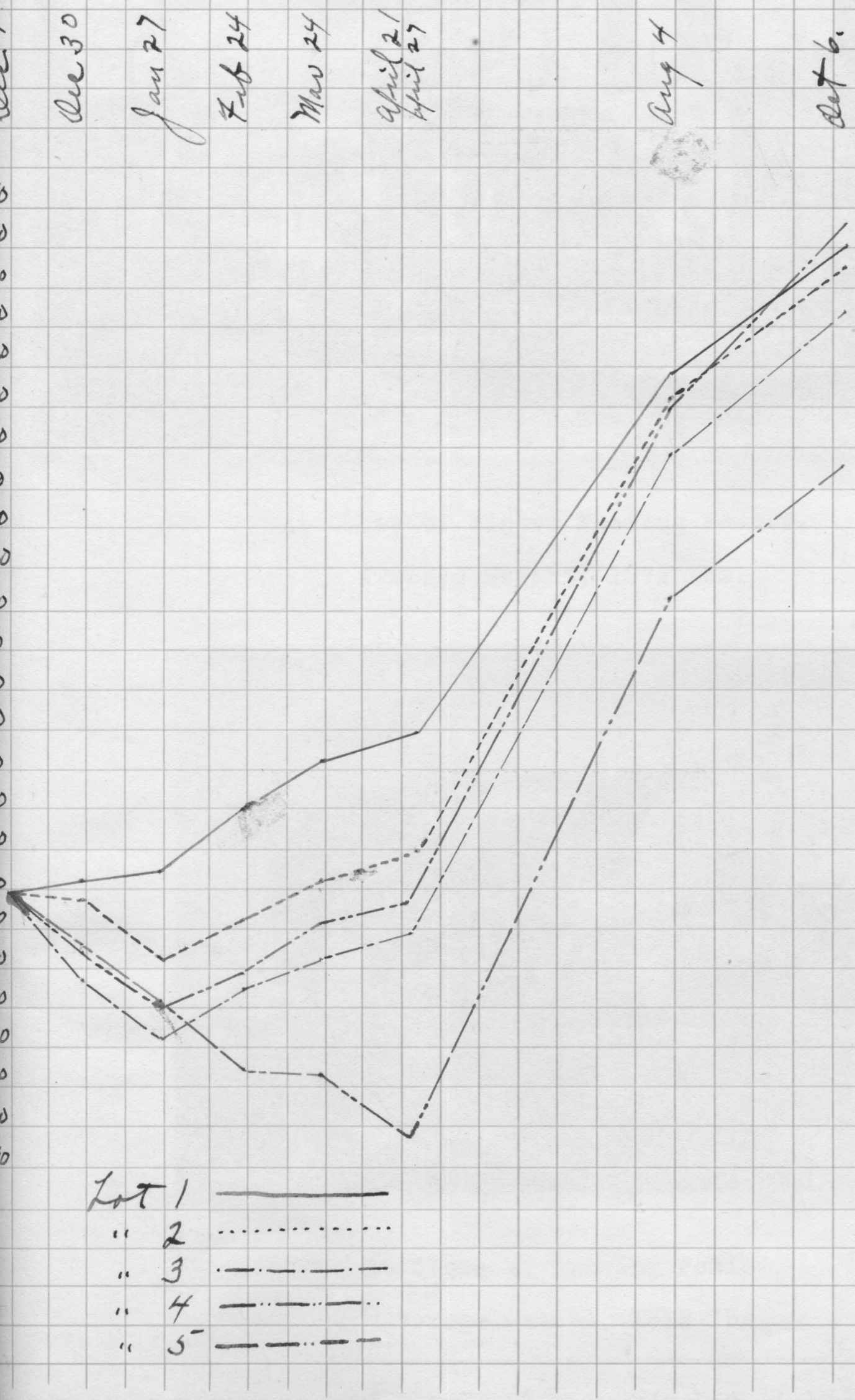
The values used in the ensuing tables are based on the following prices per ton.

value 1.	Silage	$5.00,	Stover	$8.00,	Cottonseed meal	$30.00,	Cornmeal	$38.00.
2.	"	4.50,	"	7.00,	" "	30.00,	"	38.00.
3.	"	4.00,	"	6.00,	" "	30.00,	"	38.00.
4.	"	4.50,	"	7.00,	" "	33.00,	"	40.00.
5.	"	4.50,	"	7.00,	" "	27.00,	"	36.00

The table giving weight curve below will demonstrate the losses and gains of the respective lots from December 1 to October 6.

See table 2.

Table 2.



OBSERVER

At Close of Winter Feeding Period.

Average Weight, 1072 lbs.

At Close of Grazing Period,

Average Weight, 1318 lbs.

Average Summer Gain, 246 lbs. Total Gain Dec. 1 to Oct 6, 320 lbs.

LOT 1.

Table 3.

Showing weights at different periods.

Lot:	Dec. 1 - 2 3	Dec. 29 -30 31	Jan. 26 - 27 2 8	Feb. 23 - 24 25	Mar. 23 - 24 25	April 20 - 21 22	April 27	Aug* 4	Oct* 6
1	998	1003	1005	1038	1065	1071	1072	1252	1318
2	1000	996	963	983	1004	1014	1022	1242	1309
3	969	924	895	919	934	942	946	1184	1254
4	1002	971	940	960	985	985	990	1240	1332
5	1027	998	967	937	934	904	900	1172	1238

Table 4.

Showing gains made.

Lot	Winter gain.	Summer gain.	Total gain.	Average daily gain on Grass Apr. 27 - Oct. 6.	Average Daily Gain Dec. 1 - Oct 6
1:	Gain 74	246	320	1.51	1; 03
2;	" 22	287	309	1.76	1.00
3 :	Loss 23	308	285	1.88	.90
4 :	" 12	342	330	2.09	1.06
5 :	" 127	338	211	2.07	.68

Table 5.

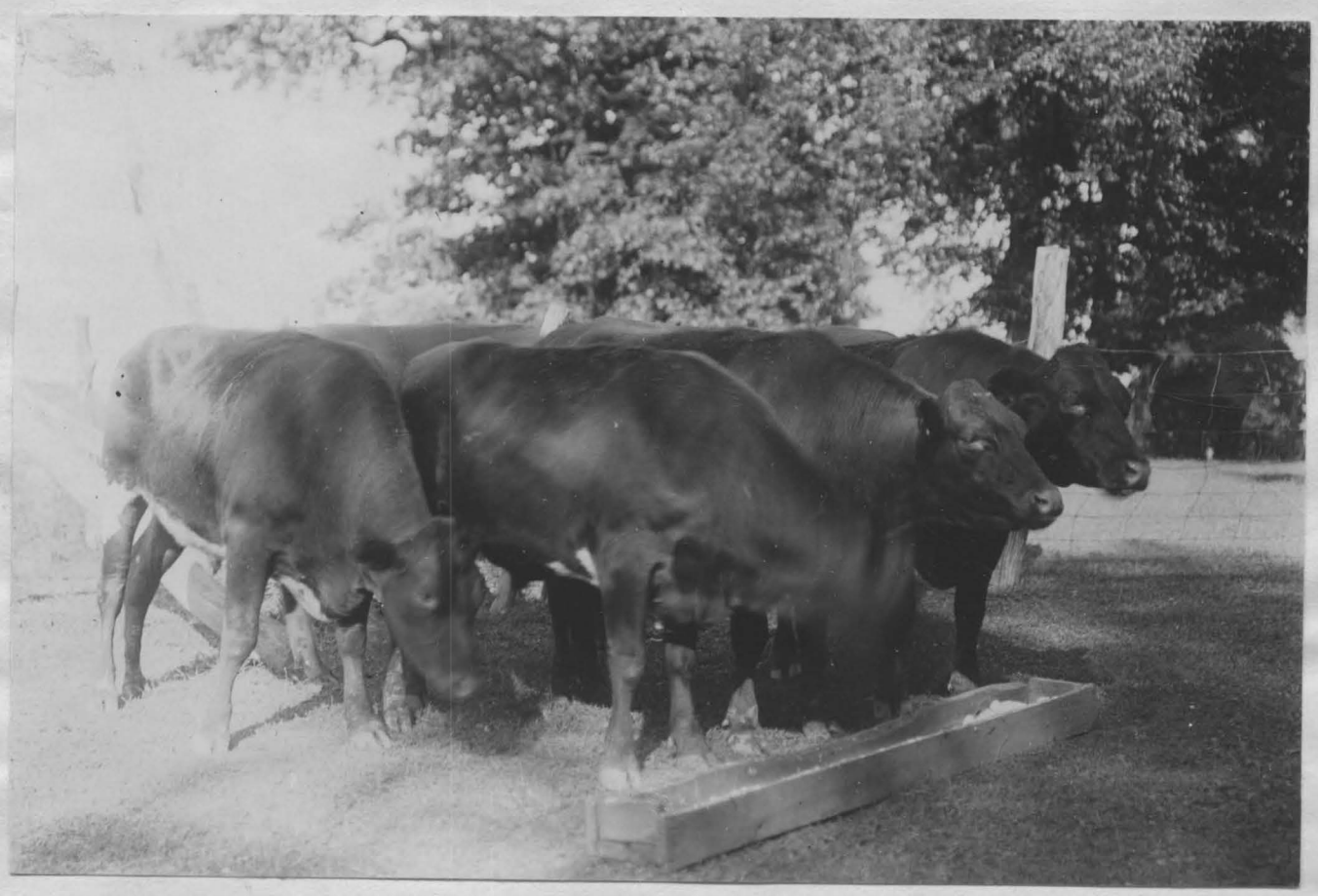
Showing cost of wintering steers at the different values of feeds Dec. 1 - April 27. #

Lot	1st Value#: Total	2nd Value#: Total	3rd Value#: Total	4th Value#: Total	5th Value#: Total
1	$16.18	$14.78	$13.38	$15.00	$14.56
2	14.34	13.13	11.91	13.35	12.91
3	12.50	11.47	10.44	11.69	11.25
4	13.97	12.57	11.18	12.57	12.57
5	15.00	13.53	12.06	13.70	13.36

* Weights made after heavy drift.
# See table 1.

At Close of Winter Feeding Period.

Average weight,1022 lbs.



At Close of Grazing Period.

Average weight, 1309 lbs.

Average Summer Gain, 287 lbs. Total gain Dec. 1 to Oct. 6, 309 lbs.

LOT 2.

Table 6.

Showing Total cost of Steer Dec. 1 - Oct. 6,
at the different feed values.

Pasture $2.00 per steer per month.

Lot	1st Value*	2nd Value*	3rd Value*	4th Value*	5th Value*
1	$26.828	$25.45	$24.054	$25.67	$25.228
2	25.012	23.798	22.586	24.018	23.576
3	23.174	22.144	21.114	22.364	21.922
4	24.642	23.244	21.848	23.244	23.244
5	25.668	24.198	22.728	24.368	24.028

Table 7.

Showing cost per 100 pounds gain,
at the different feed values.
Pasture at $2.00 per head per month.

Lot	1st Value*	2nd Value*	3rd Value*	4th Value*	5th Value*
1	$ 8.384	$ 7.953	$ 7.517	$ 8.022	$ 7.884
2	8.094	7.701	7.309	7.733	7.953
3	8.131	7.769	7.408	7.847	7.692
4	7.467	7.043	6.621	7.043	7.043
5	12.165	11.468	10.771	11.549	11.388

* See Table 1.

At Close of Winter Feeding Period.

Average Weight, 946 lbs.

At Close of Grazing Period.

Average Weight, 1254 lbs.

Average Summer Gain 308 lbs. Total gain Dec. 1. to Oct. 6, 285 lbs.

LOT 3.

Table 8.

Showing Total cost of Steer Dec. 1 - Oct. 6.
At the different feed values.
Pasture $2.50 per steer per month.

Lot	1st Value*	2nd Value*	3rd Value*	4th Value*	5th Value*
1	$29.508	$28.12	$26.724	$28.34	$27.898
2	27.682	26.468	25.256	26.688	26.246
3	25.844	24.814	23.784	25.034	24.592
4	27.312	25.914	24.518	25.914	25.914
5	28.338	26.868	25.398	27.038	26.698

Table 9.

Showing cost per 100 pounds gain,
at the different feed values.
Pasture $2.50 per steer per month.

Lot	1st Value*	2nd Value*	3rd Value*	4th Value*	5th Value
1	$9.221	$ 8.787	$ 8.351	$8.856	$ 8.718
2	8.598	8.566	8.109	8.637	8.494
3	9.068	8.707	8.310	8.784	8.628
4	8.216	7.853	7.429	7.853	7.853
5	13.430	12.733	12.037	12.814	12.653

* See Table 1.

At Close of Winter Feeding Period.

Average Weight, 990 lbs.

At Close of Grazing Period.

Average Weight, 1332 lbs.

Average Summer Gain, 342 lbs. Total Gain Dec. 1 to Oct. 6, 330 lbs.

LOT 4.

Discussion of Results.

In comparing lots 1, 2, and 3, each being fed one pound of cottonseed meal per steer per day, with 38, 33, and 28 pounds of silage respectively, we find that lot 1 gainad 32 pounds more per steer than lot 2, and lot 2 was 47 pounds heavier per steer than lot 3. The difference in cost, using the different values of feed, was from $1.47 to $1.74. Thus producing 100 pounds gain in comparing lots 1 and 2 at a cost of from $2.83 to $3.35, and in comparing lots 2 and 3, 100 pounds gain cost $3.13 to $3.70. For simply wintering steers it would seem that the method used in lot 1, with one pound of cottonseed meal and 38 pounds of silage, was to be advised.

In comparing lots 3 and 4, where lot 4 was fed 38 pounds silage and lot 3, 28 pounds silage and one pound cottonseed meal, or the replacement of 10 pounds silage by 1 pound cottonseed meal, we find that the steers came through the winter in about the same condition, and there seemed to be no advantage one over the other as far as wintering is concerned, with the exception of where silage is low in price, or cottonseed meal abnormally high or vice-versa.

In comparing lots 1 and 4 where the same amount of silage was fed each lot but in the case of lot 1 an additional pound of cottonseed meal was used it increased the cost from $1.99 to $2.43, thus giving 86 pounds gain per steer at the very small cost of $1.99 to $2.43, thus indicating that for simply wintering steers it would be profitable and economical to use the additional pound of cottonseed-meal.

Comparing lot 5, fed corn stover and corn meal, the cost was greater than that of lots 2, 3, and four, but slightly less than lot 1.

LOT 5

At Close of Winter Feeding Period.

Average Weight, 960 lbs.

At Close of Grazing Period.

Average Weight, 1238 lbs.

Average Summer Gain, 330 lbs. Total Gain Dec. 1 to Oct. 6, 211 lbs.

LOT 5.

Steers in lot 1 gained 74 pounds each, while those in lot 5 lost 127 pounds each, making a difference in weight of 201 pounds per steer at the time when they go on pasture, thus indicating that corn stover and corn meal are very costly feeds for wintering steers, and that corn meal and stover do not give nearly as good results as silage and cottonseed meal, or silage alone.

As a general thing it is not the winter gains that the stockman is after, but the total gain from one fall until the next. That being the case we should turn to table 4 showing summer gain, total gain, and average daily gain for both of these periods. Lots 4 and 5 made the best gains on grass, and were the only steers to average over two pounds per day on pasture.

The steers fed cottonseed meal did not go on to grass as well as steers fed silage alone or corn stover and corn meal due to various reasons.

First - steers in a very thin condition, as those in lot 5, will make very rapid gains when first turned on grass.

Second - Steers wintered under extremely good conditions, as those in lot 1, do not make satisfactory gains when first turned on grass, due to its immature and watery condition.

The cost of pasturing steers during the summer is a very important factor. The difference of 50 cents per steer per month makes a difference of 75¢ to $1.25 in the cost of producing 100 pounds gain. The real question, however, is the total gain for the year and cost of producing 100 pounds gain.

Using the first value of the feeds and $2.00 per month for pasture, the winter rations should be ranked as follows:

1st.	38	lbs.	silage			producing	100	lbs.	gain	at	a	cost	of $ 7.47
2nd.	33	"	"	-1 lb.	C.S.M.	"	100	"	"	"	"	"	" 8.09
3rd.	28	"	"	-1 lb.	C.S.M.	"	100	"	"	"	"	"	" 8.13
4th.	38	"	"	-1 lb.	C.S.M.	"	100	"	"	"	"	"	" 8.38
5th.	20	"	stover	- 1 1/8 lb.	C.M.	"	100	"	"	"	"	"	" 12.17

The foregoing table indicates that corn silage is a most excellent feed for wintering 2 year old steers. Silage and 1 pound of cottonseed meal are very satisfactory winter rations, and the different amounts of silage do not seem to make but very little difference in the cost per 100 pounds gain.

Also - that corn meal and stover were very unprofitable in this case, and that the steers were handled at a great loss.

Summary.

1st. 28 lbs. silage and 1 lb. cottonseed meal will maintain 1000-pound steers during the winter without a loss of more than 25 lbs. per head.

2nd. 38 lbs. silage per steer per day will give about the same results as above.

3rd. Steers will change from grass to silage and from silgge to grass again with practically no loss in weight.

4th. Steers fed silage alone, and stover and corn meal during the winter were the only steers to average 2 pounds gain per day on grass.

5th. Steers fed on silage alone made greatest total gain at the lowest cost per 100 pounds gain.

6th. Steers fed on stover and corn meal made the least total gain at the greatest cost per 100 pounds gain.

7th. Silage is a very economical feed for wintering steers, while stover and corn meal is a very costly feed.

8th. One pound of cottonseed meal will replace ten pounds of silage and it may be advisable to make this substitution when silage is scarce, or cottonseed meal cheap, or both, although cottonseed meal is not absolutely necessary.

9th. Winter steers so that they will not lose more than 25 pounds each during the winter months, for greater losses cannot be overcome during the grazing season.