

UNIVERSITY OF TENNESSEE

Upon the request of the Committee on Graduate Study
the under-signed have examined the thesis entitled

Three Years' Work Comparing Normal Corn Silage

With Grainless Corn Silage For Finishing Beef Cattle.

presented by Henry Rankin Duncan

candidate for the degree of Master of Science in Agriculture

_____, and hereby certify that it is
worthy of acceptance.

M. L. Lamb
G. W. Williams

Examiners.

THREE YEARS' WORK COMPARING NORMAL
CORN SILAGE WITH GRAINLESS CORN SILAGE
FOR FINISHING BEEF CATTLE

A THESIS

Submitted to the Graduate Committee
of the
University of Tennessee
in
Partial Fulfillment of the Requirements
for the degree of
Master of Science in Agriculture

HENRY RANKIN DUNCAN

May, 1930

TABLE OF CONTENTS

	PAGE
INTRODUCTION	2
OBJECTS OF EXPERIMENT	4
EQUIPMENT USED	5
SILAGE MAKING	6
CATTLE USED	6
FEEDING, MANAGEMENT AND WEIGHING OF CATTLE	9
REMARKS & DISCUSSION OF SOME PHASES OF EXPERIMENT	25
CONCLUSIONS	30
TABLES	
1. Silage Questionnaire Results	3
2. Summary of the first years' Work Comparing Normal Corn Silage with Grainless Corn Silage for Finishing Beef Cattle	11
3. Summary of the Second Years' Work Comparing Normal Corn silage with Grainless Corn Silage for Finishing Beef Cattle	12
4. Summary of Third Year's Work Comparing Normal Corn Silage with Grainless Corn Silage for Finishing Beef Cattle	13
5. Yields of Silage and Corn per Acre	16
6. Feed Saved by Normal Silage Producing 100 lbs. Gain	17
7. Value of Corn Saved from Grainless Silage	19
8. Initial Costs, Selling Prices and Margins Secured for the Three Years	21
9. Value of Corn in Normal Silage	24
10. Returns per Acre from Normal & Grainless Silage	28
11. Returns per Acre Based on Finish and Market Value of Cattle	28
12. Returns per Acre from Various Methods of Handling the Corn Crop	29

KL13 1.25

TABLE OF CONTENTS (Cont.)

FIGURES

	PAGE
1. Finished Cattle Third Year	1
2. Barn & Silos used for the Experiment	5
3. Lot I after 61 days on Experiment	7
4. Lot II after 61 days on Experiment	8
5. Cattle fed Second Year before Beginning of Feeding Period	10
6. Rate of Gain and Cost of 100 lbs. Gain	14
6A Feed Replaced by Normal Silage in Producing 100 lbs. Gain Third Year.	18
7. Extent of Damage to Corn Saved in Making Grainless Silage First Year	20
8. Extent of Damage to Corn saved in Making Grainless Silage Third Year.	20
9. College Flock Grazing on Barley seeded Sept. 15 after Normal Silage was made First Year of Experiment	27

APPENDIX--TABLES

1. Showing Weights and Gains of Cattle Fed First Year (Normal Silage)	4
2. Weights and Gains of Cattle Fed First Year (Grainless Silage)	7
3. Daily Rations for the First Period of 42 days	10
4. Daily Rations for the Second Period of 19 days	11
5. Feed Consumption & Cost of Gains 42 days	12
6. Summary of Feed Consumption & Cost of Gains for Both Periods	13
7. Weights and Gains of Cattle fed Second Year (Normal Silage)	14
8. Weights and Gains of Cattle fed Second Year (Grainless Silage)	19
9. Daily Rations for the First Month	24
10. Daily Rations for the Second Month	25
11. Daily Rations for the Third Month	26

TABLE OF CONTENTS (Cont.)

	PAGE
12. Daily Rations for the Fourth Month	27
13. Daily Rations for the Fifth Month	28
14. Summary of Feed Consumption for All Periods	29
15. Record of Sale, Weights, Shrinkage, Dressing Percentage and Sale Receipts	30
16. Capacity of Silos (1928-29)	31
17. Financial Statement (1928-29)	32
18. Weights and Gains of Cattle Fed Third Year (Normal Silage)	33
19. Weights & Gains of Cattle Fed Third Year (Grainless Silage)	37
20. Daily Rations for the First Period	41
21. Daily Rations for the Second Period	42
22. Daily Rations for the Third Period	43
23. Daily Rations for the Fourth Month	44
24. Summary of Feed Consumption & Cost of Gains for All Periods (120 days)	45
25. Sale Report of Cattle Fed Third Year	46
26. Capacity of Silos	47



Fig. 1--Farmers viewing lot 1 (fed Normal silage) at the conclusion of the third year's work. All present readily detected the marked difference in finish between the cattle fed normal silage and those fed grainless silage.

Introduction

In Tennessee, corn silage and cottonseed meal is a common ration for winter finishing beef cattle. Cottonseed meal is produced in large quantities in Tennessee and adjacent states and is considered one of the most economical feeds available, especially when combined with a carbonaceous, succulent, bulky roughage, such as silage. It furnishes protein in the cheapest form for balancing the silage ration. It is richer in nitrogen, phosphoric acid and potash than any other feed except high grade tankage and has the high manurial value of \$23.37 per ton, after being fed. Since \$45.00 is charged for Cottonseed meal for the three years, its manurial value is more than half of its original value. The extensive use of cottonseed meal in feeding cattle for maintaining and building up the nitrogen and mineral impoverished soils of the state is a commendable farm practice. Corn silage is one of the best feeds for feeding with cottonseed meal and can be produced abundantly and cheaply on Tennessee farms.

In making silage for finishing beef cattle, many feeders in the state have developed a practice of pulling the corn off and ensiling only the stalks and fodder. The usual reason given for this practice is that "it does not pay to include corn in silage for beef cattle". In many cases the corn pulled off is fed in the early fall to fattening hogs and is available early for feeding. Many farmers use the corn for feeding work stock

and other purposes while a few sell it on the market. More definite information was secured thru the following questionnaire:

Silage Questionnaire

How many cattle do you usually finish on silage each year?
Do you remove the ears in making your silage?
Are the ears removed in making silage for feeding beef cattle in your own community?
Do you consider pulling the corn off a good practice?
What use do you make of the corn pulled off?

The above questionnaire was sent to 400 cattle feeders of the state. The information received from the seventy-one farmers who responded is tabulated below:

Table 1.

General information

(1) Number of feeders replying to questionnaire	71
(2) Number of cattle fed by those reporting	2700
(3) Number of counties heard from	28

Practice of the individual feeder responding

(1) Percentage of feeders making normal silage	45
(2) Percentage of feeders making grainless silage	46
(3) Percentage of feeders using both practices	9

Prevailing practice in community as reported by feeder

(1) Percentage of communities producing Normal sil.	31
(2) Percentage of communities producing Grainl. sil.	54
(3) Percentage of communities divided on practice	15

Opinion of the feeders regarding their particular practice

(1) Percentage of Normal silage makers believing in their practice	94
(2) Percentage of Grainless silage makers believing in their practice	80
(3) Percentage of Grainless silage makers doubting in their practice	15
(4) Percentage of Grainless silage makers not believing in their practice	5

Use of corn pulled off in making grainless silage

(1) Percentage using corn for hogs	93
(2) Percentage using corn for other purposes	7

While the above data was secured from a small percentage

of the cattle feeders of the state, they represent perhaps, a fair cross section of the state and clearly indicate that there is a clean-cut division among the feeders of the state both in practices of making silage and in the merits of the two practices. Fully ninety percent of the feeders were very positive regarding merits of their particular practice.

With the idea of getting some definite information regarding the merits of the two practices, feeding trials were begun by the Tennessee Experiment Station in the fall of 1927. This experiment has been continued for three winters, to compare normal corn silage with grainless corn silage for finishing beef cattle. In this work, "normal silage" refers to silage made from the entire corn plant, including the ear, and "grainless silage" to silage made from the stalk and fodder only, the ears having been removed

Objects of Experiment

1. To compare the feeding value of normal silage with grainless silage, when fed with cottonseed meal for finishing steers.
2. To determine the effect of "pulling the ears", upon the yield of silage per acre.

3. To determine the amount and cost of labor necessary to pull the corn from the stalk, handle it in the field and haul it to the barn.

4. To determine the effect of pulling the corn from the stalk, running over with corn harvester, wagons and teams and weathering upon the quality, market grade and price of the corn.

It was necessary to make some changes in the original plan of the experiment but none of them materially affected the objects or results of the experiment.

Equipment Used

The main wing of one of the barns on Cherokee farm at the Knoxville station was used for feeding the steers. The part used consists of two large stalls, each of which is 50' long by 14' wide. Each stall provides ample space for 20 steers. There is an automatic water tank in each stall to which the steers had access at all times. Two concrete silos 12'x42', each of estimated 100 ton capacity, were used. The first year only one silo was used and it was divided through the center by a temporary partition made of shiplop, which enabled us to place two kinds of silage in the same silo. But as only 50 tons were actually fed from the silo of 100 ton estimated capacity, the two lots of cattle emptied the silo in 61 days, exclusive of the preliminary feed. For the second and third years, both silos were used--one for normal silage and the other for grainless silage.



Fig.2--Barn & Silos used for experiment.

Silage Making

For the first and second years Jarvis Golden Prolific corn, with a light mixture of sorghum, was used and for the third year Neal's Paymaster without any sorghum. Each year the corn was well ripened before being put in the silo. In most cases the shuck was entirely yellowed, so that the stage of maturity was most favorable for the corn pulled off. Had the silage been put up sooner a slightly better quality might have been produced. Water was added when necessary to produce a good pack. During the three years there was only an occasional evidence of mould due to the over-ripe and dry condition of the corn.

In making the silage the first and third years, alternate strips of 20 rows each were taken for each silo--the ears being removed from one and left on the other. This method tended to average up any unevenness in yield of corn or its stage of maturity, in different parts of the field. The ears were removed from the standing corn before harvesting. The second year, due to drouth and the fertility of the land used there was not sufficient corn of a good yield of grain produced on the farm to permit taking alternate strips for each silo and get a very high or uniform yield of corn in the Normal silage. Therefore the Normal silage was made from those parts of the fields having the heaviest yield of grain and the grainless silage from the light parts.

Cattle Used

A total of 120 head of steers were used during the three years' work. For the first and third years, native East Ten-

nessee steers were used. They were of grade Shorthorn, Hereford and Angus breeding and would grade common to choice, varying considerably in type and quality. They were, however, about as good native cattle as can be bought in droves without a great deal of sorting. These steers were bought in the early part of October and run on grass until started on feed. The second year the cattle were bought during the latter part of August at National Stock Yards, Illinois. They were lighter and plainer than the native cattle used.

Each year the cattle were divided into two lots as uniform as possible from the standpoint of breeding, quality and weight. Lot I received Normal silage and Lot II received Grainless silage.



Fig. 3--Lot I taken Jan. 16, 1928 after 61 days on experiment.



Fig. 4--Lot II taken Jan. 16, 1928 after 61 days on experiment.

Feeding, Management and Weighing of Cattle

The cattle were fed silage and cottonseed meal twice daily, at 6:00 A.M. and 5:00 P.M. A small amount of dry roughage of either hay or corn stover was fed after the morning feed was cleaned up. The plan was to feed the maximum amount of silage the steers would consume in addition to the cottonseed meal fed. Lot 2 usually cleaned up their feed quicker and would have eaten more of the grainless silage, but the amount fed each lot was regulated by the amount consumed by the lot having the dullest appetite. The amount of silage fed to each lot was the same. The rations fed during the three years, with slight variation was as follows:

Lot I--Normal Silage

Cottonseed Meal

First month	-	4 lbs.
Second month	-	5 lbs.
Third month	-	6 lbs.
Fourth month	-	7 lbs.

Corn stover or hay (small amount)
Molasses during the last month.

Lot II--Grainless Silage

Cottonseed meal

First month	-	4 lbs.
Second month	-	5 lbs.
Third month	-	6 lbs.
Fourth month	-	7 lbs.

Corn stover or hay (small amount)
Molasses during the last month.

Each year the cattle were given a preliminary feed for about 10 days of silage and a light cottonseed meal allowance, in order to accustom them to their quarters and feeds. The cattle were bedded comfortably in so far as the supply of straw would permit and were kept confined to the stalls in which they were fed.

The cattle were weighed at the beginning and at the end of each experiment and at the end of each 30 day interval. Weighings of each individual steer were made on three consecutive days, and the average of the three weights was considered the weight of the steer for that date.



Fig. 5--Cattle fed second year, taken while on pasture on Cherokee Farm before the beginning of feeding period.

Table II. Summary of the first years' work comparing
Normal Corn Silage with Grainless Corn Silage for finish-
ing Beef Cattle

Table 1.--Weights and gains

	Lot 1	Lot 2
	Normal silage	Grainless silage
Length of experiment in days	61	61
Number of cattle in each lot	19	20
Average initial wt. of steers	921 lb.	954.8 lb
Ave. wt. at end of the 61-day period	1037.3 "	1042.9 "
Ave. gain per steer in 61 days	116.3 "	88.1 "
Ave. daily gain per steer in 61 days	1.906 "	1.444 "
% gain made by lot 2 compared with lot 1		75.7 %

Table 2.--Feed consumption and cost of gains

Average daily ration:			
Cottonseed meal	4.19 lbs.	4.19	lb.
Corn silage (Normal)	31.5 "		
Corn silage (Grainless)		31.5	"
Corn fodder	6.2 "	6.2	"
Salt	.06 "	.06	"
Feed for 100 lbs. gain:			
Cottonseed meal	220	290	
Corn silage (Normal)	1656		
Corn silage (Grainless)		2185	
Corn fodder	325	423	
Salt	3	4	
Total feed for 100 lbs. gain	2204	2902	
Cost of 100 lbs. gain	\$ 13.32	\$ 12.66	
Price of feeds:			
Cottonseed meal	\$ 45.00 T.		
Normal silage	8.50 T.		
Grainless silage	4.00 T.		
Corn fodder	8.00 T.		
Salt	20.00 T.		

Table III. Summary of the second years' work comparing
Normal corn silage with Grainless corn silage
for finishing beef cattle

Table 1.--Weights and gains

	Lot 1	Lot 2
	Normal silage	Grainless silage
Length of experiment in days	150	150
Number of cattle in each lot	19	19
Average initial weight	707.0 lbs	723.4 lbs
Ave. wt. at end of the 150 day period	998.8 "	951.7 "
Average gain per steer in 150 days	291.8 "	228.3 "
Ave. daily gn. per steer in 150 days	1.945 "	1.521 "
% gain made by lot 2 compared with lot 1		78.2 %

Table 2.--Feed consumption and cost of gains

Average daily rations:

Cottonseed meal	5.1 lbs	5.1 lbs
Molasses	1.1 "	1.1 "
Corn silage (Normal)	32. "	
Corn silage (Grainless)		32. "
Hay	1. "	1. "
Corn fodder	.9 "	.9 "

Feed for 100 lbs. gain:

Cottonseed meal	265	339
Molasses	59	74
Corn silage (Normal)	1673.	
Corn silage (Grainless)		2141
Hay	90	116
Corn fodder	49	63

Total feed for 100 lbs. gain

2136 2733

Cost of 100 lbs. gain

\$ 14.51 \$ 13.73

Price of feeds:

Cottonseed meal	\$ 45.00 T.
Normal silage	8.50 T.
Grainless "	4.00 T.
Hay	10.00 T.
Corn fodder	8.00 T.
Molasses	26.50 T.

Table IV. Summary of third year's work comparing Normal Corn silage with Grainless corn silage for finishing beef cattle

Table 1.--Weights and gains

	Lot 1	Lot 2
	Normal silage	Grainless silage
Length of experiment in days	120	120
Number of cattle in each lot	21	21
Average initial weight	867.9 lb	881.3 lbs
Ave. wt. at the end of 120-day period	1069.5 "	1030.0 "
Ave. gain per steer in 120 days	201.6 "	148.7 "
Ave. daily gain per steer in 120 days	1.679"	1.230 "
% gain made by lot 2 compared with lot 1		73.8 %

Table 2.--Feed consumption and cost of gains

Average daily rations:

Cottonseed meal	5.4 lb	5.4 lbs
Molasses	.46"	.46 "
Corn silage (Normal)	33.0 "	
Corn silage (Grainless)		33.0 "
Hay	3.0 "	3.0 "
Salt	.04"	.04 "

Feed for 100 lbs. gain:

Cottonseed meal	325. "	441. "
Molasses	27. "	37. "
Corn silage (Normal)	2016. "	
Corn silage (Grainless)		2738. "
Hay	188. "	255. "
Salt	2.5 "	3.4 "

Total feed for 100 lbs. gain

2558.5 "	3474.4 "
----------	----------

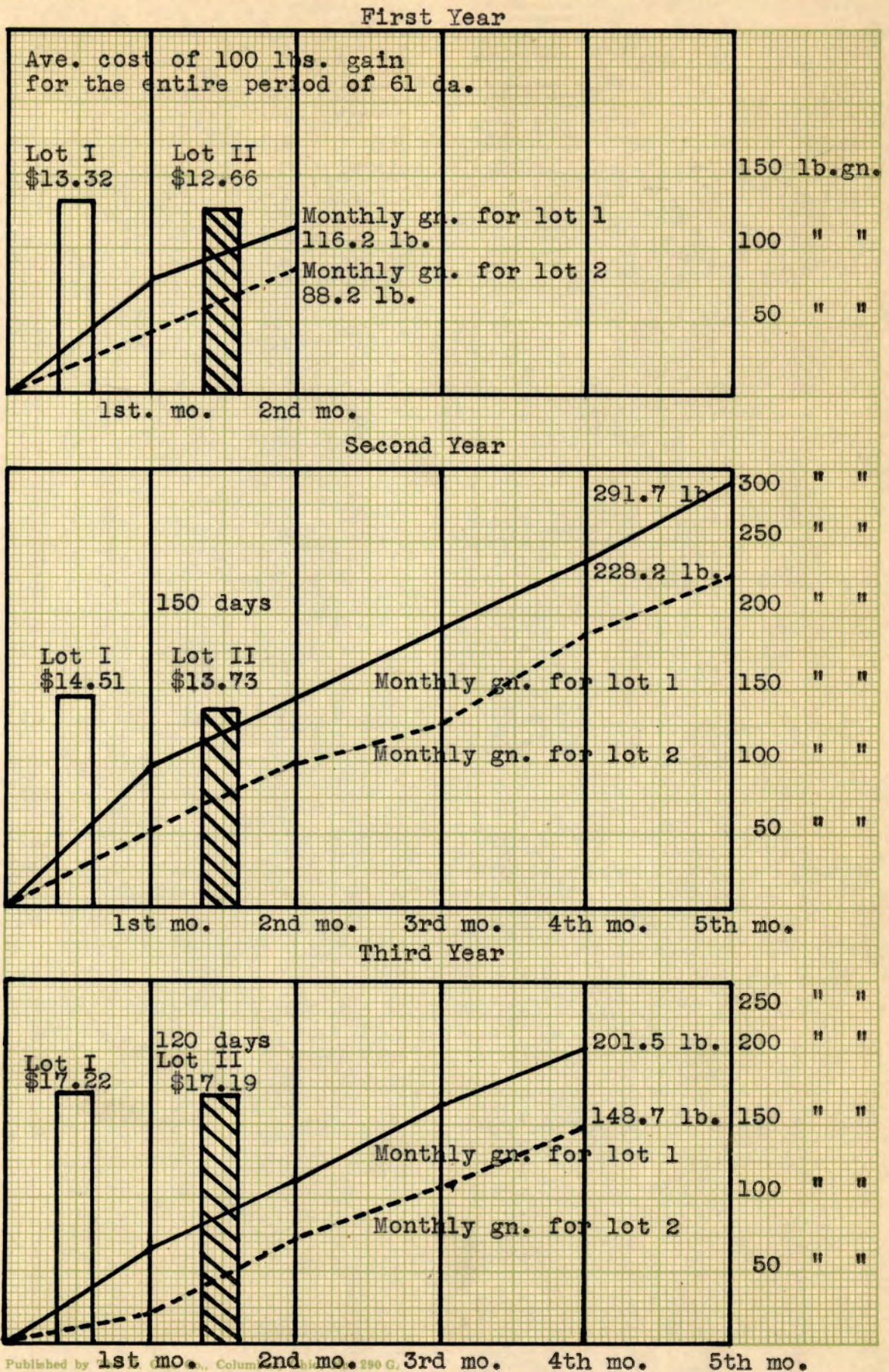
Cost of 100 lbs. gain

\$ 17.22	\$ 17.19
----------	----------

Price of feeds:

Cottonseed meal	\$ 45.00 T.
Normal silage	8.50 T.
Grainless silage	4.00 T.
Hay	19.00 T.
Molasses	26.50 T.
Salt	20.00 T.

Fig.6 Showing Rate of Gain and Cost of 100 lbs. Gain for the Three Years.



It will be noticed that the same prices for feeds are used in figuring the costs of gains for each year. This was done to give uniformity. The price, actually paid for cottonseed meal, varied from \$38.00 to \$50.00 per ton. The price charged for hay was fixed at \$10.00 per ton. The hay was second crop consisting of sweet clover, some alfalfa and red clover, crab and Johnson grass. \$8.00 per ton was charged for corn stover fed. The price of grainless silage was fixed at \$4.00 per ton. After some preliminary figuring it was found, when \$8.50 per ton was charged for Normal silage, that the cost of 100 lbs. gain for Lot I was approximately the same as for Lot II, so this price was used for Normal silage. Using the above values, the variation in the cost of 100 lbs. gain is as follows: first year 66 cents, second year 78 cents and for the third year 3 cents. There is some variation in the cost of 100 lbs. gain from year to year. The first year is the lowest and out of line with the other two years because the cattle were fed on the silage comparison ration only 61 days. The cost of gains the third year were some higher than for the second year even though the feeding period was shorter than the third year. The fact, that the cattle used the second year were younger, lighter and went on feed in a thinner condition than those used the third year, might account for this difference.

Each year the cattle receiving normal silage made faster gains and gained more uniformly from month to month than those receiving grainless silage. They were inspected at the end of each trial by both experts and novices, yet difference in finish and general thrift was apparent to all.

For the average of the three years, grainless silage produced only 75.9 percent as much gain as did normal silage.

Table V. Yields of silage and corn per Acre

Year	Silage	Acreage in silo	Yield per acre from silo	Yield of corn per acre	Bu. of corn per T. silage	% yields sil.
1st year (one silo divided)	Normal	3.15	7.7	31. bu.	4.	100
	Grainless	4.45	5.5	31.	--	71
2nd year	Normal	9.3	6.2	38.	6.2	100
	Grainless	14.0(est)	4.0(est)	--	---	65
3rd year	Normal	7.73	7.5	52.2	7.	100
	Grainless	10.51	4.7	52.2	---	63

As the corn used for silage was rather dry and was a little past the ideal silage stage each year, the yields of silage in table 5 appear rather low. The silage had 9% less moisture in it than the average analysis of corn silage given by Henry and Morrison, which would affect the yield to a considerable extent. The yields given, however, represent the weight of the silage as it was fed. Two methods were used in determining the yield of corn per acre. The first year, the corn which was pulled off of the area which went into the grainless silage, was kept separate until thoroughly dry when it was weighed and the yield per acre calculated. The second and third years a sufficient number of square rod areas were cut from different parts of the field to give a very close average of the yield of stover and grain. The stover and grain were weighed separately and a sample of the ear corn kept for drying. Moisture tests were run on the air dry corn and the yield of 14% moisture corn calculated from the green weights.

The third year the yield of silage per acre as fed from the silo (exclusive of top) was only 70% of the yield of freshly cut corn in the field. As the corn harvester was run about $\frac{1}{2}$ day ahead of the wagons the corn dried considerably before going into the silo. Taking the corn off reduced the yield of silage per acre approximately 33 percent. The number of bushels of corn per ton of silage varied considerably, being 4, 6.2 and 7. bushels for the respective years. Weather conditions and the presence of considerable sorghum in the first year's crop were no doubt the most important factors affecting the yield of grain for that year.

Table VI. Feed Saved by Normal Silage in Producing 100 lbs.gn.

	1st year		2d year		3d year	
	Amt.	Value	Amt.	Value	Amt.	Value
Cottonseed Meal @\$45.00 T.	70.3	\$1.58	74	\$1.66	106	2.36
Molasses @ 26.50 T.	----	----	15	.19	10	.12
Grainless silage @ 4.00 T.	529.0	1.05	468	.92	722	1.44
Hay (mixed) @ 10.00 T.	----	----	26	.13	67	.33
Corn fodder @ 8.00 T.	98.0	.39	14	.05	--	---
Totals	697.3	\$3.02	597	\$2.98	905	4.25



Fig. 6--Feed replaced by normal silage in producing 100 lbs. gain third year. Worth \$4.25 and gives a feed-replacement value of 68 cents for each bushel of corn in normal silage. This figure is based alone on cost of gain.

The difference in feeding value of the two kinds of silage was evidently due to the presence of corn in the normal silage. It required practically one ton of normal silage with other feeds to produce 100 lbs. of gain the third year. This ton of silage contained 7 bu. of corn. As the value of feed replaced by the corn was \$4.25, each bushel of corn fed had a replacement value of 60 cents. The second year the replacement value was 58 cents for each bushel of corn fed in the silage. These values represent the difference in value of the feed requirements for producing 100 lbs. gain in each lot and do not include the enhanced value of the cattle in lot 1 over lot 2 due to their extra finish and dressing percentage. This replacement value of 58 and 60 cents per bushel is as much or more than the corn is worth were it pulled off. Our data indicates that it costs approximately 15 cents per bushel to pull this immature corn off the stalk, haul it to the barn when dry and stir it in the barn to keep it from heating.

It is hard to pull, and bulky and tedious to haul since it contains all the shucks and shanks. It also requires more barn space to store it than the average farm affords, since it cannot be piled deeper than 12 to 15 inches.

Again, corn pulled off in making grainless silage will depreciate in value from 15 to 40 cents per bushel depending on weather conditions and storage facilities. The bullwheel of the corn harvester, the wagons and teams will also break and shatter considerable corn. It is safe to estimate that the market or feeding value will be reduced on an average of 25 cents per bushel.

Table VII Value of Corn Saved from Grainless Silage

	<u>Grade</u>	Value Compared to #2 Corn
First year	#5	85¢ @ \$1.00 Bu.
Third year	19% (damaged sample)	60-75¢

Note: The weather was very favorable for saving the corn the first year and very unfavorable the third year.



Fig. 7--Showing extent of damage to corn saved in making grainless silage first year (Jarvis Golden Prolific) Grade 5 U.S. Standard. Upper row undamaged and lower row damaged kernels.

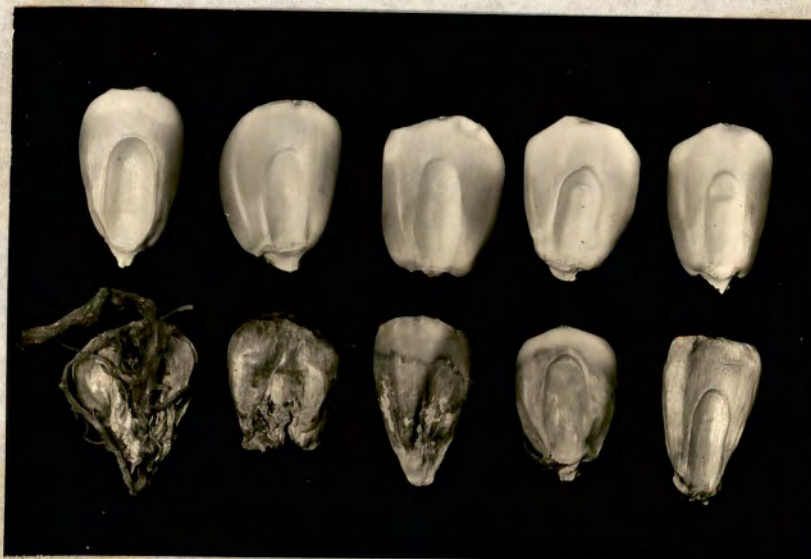


Fig. 8--Showing extent of damage to corn saved in making grainless silage third year (Neal's Paymaster) Grade sample, 19 percent damaged. Upper row undamaged and lower row damaged kernels.

In Figures 7^{&8} the extent of the damage to the corn pulled off in making grainless silage is shown. The first year conditions were very favorable for saving the corn, as it was hauled to the barn before there was any rain on it. The weather was also very hot and the ground dry, which facilitated drying the corn. But even then the corn was considerably damaged and graded No. 5, U. S. Standard. Conditions were unfavorable the third year. The corn was nearly ready to go to the barn when a three weeks spell of rainy weather came on. Much of it sprouted and a great deal of it turned black at the heart or had a white, mouldy appearance. Nineteen percent of the kernels were damaged and the corn was not satisfactory even for feeding hogs.

Table VIII. Actual Initial Costs, Selling Prices and Margins Secured for the Three Years

	1st year		2nd year		3rd year	
	Lot 1	Lot 2	Lot 1	Lot 2	Lot 1	Lot 2
Initial cost of cattle per cwt.	\$ 7.94	\$ 7.94	\$10.73	\$10.73	\$ 8.00	\$ 8.00
Price of finished cattle per cwt	11.00*	11.00*	12.00	11.00	10.50	9.78
Margin secured	3.06	3.06	1.27	.27	2.50	1.78

*Sold after 60 days supplemented feeding to the 61 days on silage experiment.

It will be noticed that the buying and selling prices and the margins received varied considerably for the three years. This is nothing unusual, as prices for feeder cattle or for finished cattle are seldom the same for two consecutive years. Each year the cattle were sold locally: the first and third years

to shippers and the second year to the East Tennessee Packing Co. Each year, though there was a marked difference in the finish between the two lots, buyers would try to buy the two lots for the same price. They simply made an average bid on the drove as was their usual practice and it was therefore hard to arrive at a true valuation of the two lots upon their merits.

Since the cattle were sold the second year to the East Tennessee Packing Co., it was possible to get dressing percentages for each lot and to observe the appearance of the dressed carcasses. Using the selling weights of the cattle and the chilled dressed weight of the carcasses as a basis of calculation: Lot I dressed 56.27% and Lot II, 52.07% or a difference of 4.20%. With dressed beef carcasses at 20¢ per lb. this amounts to 84 cents per cwt. on the liveweight of the steer. The carcasses of Lot I had more purse, kidney and outside covering of fat and were more attractive in appearance than those of Lot II and should have commanded a higher price based on the extra finish alone. Even though the packing company bought both lots at the same price of \$11.50 per cwt., after the cattle were dressed and hung in the cooler they readily agreed that there was fully \$1.00 per cwt. difference in the value of the live cattle. Therefore Lot I was figured as sold at \$12.00 per cwt. and Lot II at \$11.00 per cwt.

In selling the cattle the third year a difference of 72 cents per cwt between Lot I and Lot II was received. However other competent judges and packers appraised Lot I at from \$0.75 to \$1.25 higher than Lot II. In making an attempt to summarize

In making an attempt to summarize the returns expected from corn in silage, based upon these experiments, a spread, of \$1.00 per cwt. between Lot I and Lot II has been used. In this final analysis only the last two years are used, as the first experiment was so short the results are not considered with the last two years.

The main object in feeding beef cattle is to provide a market for feeds grown on the farm, which in many cases are rough feeds and cannot be marketed profitably or conveniently in any other way. The feeds thus marketed constitute the feeders main source on income in feeding beef cattle. The production of manure for improving the farm and the net profit above feed costs are important secondary considerations. However the amount of net profit received in finishing beef cattle is usually small (from \$3.00-\$5.00 per head) unless an abnormal margin between buying and selling price is secured and should not be made the yard stick by which profit in cattle feeding is measured.

In winter feeding cattle, margin between buying and selling price is necessary for the success of the venture, because gains made, usually cost considerably more than they will realize on the market. In attempting to summarize the results of these experiments the same price of feeder cattle (\$9.00 per cwt.) and the same margins (\$2.66 for Lot I and \$1.66 for Lot II) have been used in order to give uniformity to the results of the years compared. A margin of \$1.66 was taken for lot 2 because it takes about this much margin to break even after paying \$4.00 per ton for grainless silage and the other feeds

at the prices used. Cattle shrink from 3 to 5 percent in marketing, so a 5% shrink was deducted from the final experimental weights in order to take care of marketing shrinkage and to make the computations conservative.

Table IX. Value of Corn in Normal Silage

	2nd year		3rd year	
	Normal	Grainless	Normal	Grainl.
Initial value of feeder steer @9¢	\$63.63	\$65.10	\$78.11	\$79.31
Value of feed consumed per head (exclusive of silage)	21.59	21.59	17.44	17.44
Total cost of steer (exclusive of silage fed)	85.22	86.69	95.55	96.74
Value of steer with 5% shrink @ \$10.66 for Lot II		96.39		104.36
Value of steer with 5% shrink @ \$11.66 for Lot I	110.65		118.46	
Profit per steer (incl. silage)	25.43	9.70	22.91	7.62
Tons silage consumed per steer	2.44	2.44	2.03	2.03
Value of each ton silage consumed	10.42	4.00	11.29	3.75
Bu. corn in each T. Normal silage	6.2		7.	
Value each bu. corn in one ton Normal silage	1.03		1.07	

The above interpretation is of course partially hypothetical but it is not far off in expressing average expectations in cattle feeding or in showing the actual returns from the two kinds of silage fed during the three years' work. The actual average cost of the feeder cattle for the three years was \$8.89 and the average actual margin secured on Lot I for the three years was \$2.28 per cwt. Had the cattle the second year been bought three months later than they were the average margin for the

three years would have been about \$2.85 per cwt. At any rate this interpretation shows what may be expected under these conditions. Corn at \$1.00 per bushel is considered a good farm price. The three years' results indicate that steers bought right, sold right and fed a ration of normal silage and cottonseed meal, will pay a good price for every bushel of corn consumed in the silage.

Remarks and Discussion of Some phases of the Experiment

1. Less acreage of corn is required for the silo. It requires only 66 percent as much acreage to fill the silo with normal silage as it does with grainless silage; therefore less corn can be planted for the silo or the extra one-third area of the crop which would normally be required to fill the silo with grainless silage could be used for other purposes.

2. Less labor is required for making normal silage than grainless silage either on the acre or ton basis. No attempt was made to make an accurate cost accounting study of the two methods of making silage, because of insufficient help on the project. However, enough data was collected to indicate clearly that an acre of corn can be converted into normal silage cheaper than grainless silage. The difference lies in the amount of extra labor required to pull and take care of the corn removed from the stalk. The charges for the corn harvester, twine and for running through the ensilage cutter are practically the same for both processes. In many cases the ensilage cutter will handle the normal silage with less delay from pipe-stopage than when the corn has been pulled. In loading

and unloading the wagons, it is largely a case of handling bundles in either instance. Of course the bundles with ears on are somewhat heavier but not enough to make much difference in the time since it requires about one-third more bundles to fill the silo with grainless silage than with normal silage, the advantage, from a labor standpoint is in favor of Normal Silage. In hauling to the cutter, a load, in either case, is usually more a matter of bulk than weight. Usually as many bundles with the ears on may be hauled and in some cases more because they pack better on the wagon than when the ears are removed.

3. The crop is cleaned off the land entirely at one operation and a small grain crop may be put in much earlier. By making normal silage the land is ready for small grain preparation from three to six weeks earlier than when grainless silage is made. With early corn this means that the small grain may be seeded by the middle or 20th of September. With late corn this advantage becomes more apparent. It often means success or failure with the small grain crop. An important advantage of the silo is that the corn crop is removed early enough so that a small grain crop may be put in on time. The making of grainless silage often defeats this advantage as the corn pulled off must lie in the field to dry from three to six weeks before it can be saved at the barn.



Fig. 9--College flock grazing on barley seeded Sept. 15 after Normal silage was made first year of experiment. The sheep grazed this barley continuously, except during very wet weather from Dec. 1 to April 1.

4. Normal silage produced greater net returns per acre than Grainless silage (inclusive of corn)

Table X.

Returns per Acre from Normal Silage and Grainless Silage with silage at \$3.50 and \$4.00 Respectively (The Two Kinds of Silages at the above prices produced gains at approximately the same cost)

Kind of silage	1st year	2nd year	3d yr
Normal silage @ \$3.50 per ton	\$ 66.45	\$ 52.78	\$ 63.75
Grainless silage @ \$4.00 per ton and Corn produced per A @ 75¢ bu.	45.25	44.50	57.95
Returns per A from the corn harvested in usual manner @ \$1.00 per bu.	31.00	38.00	52.20

Table XI.

Returns per Acre Based on Finish and Market Value of Cattle

Kind of Silage	2nd year	3rd year
Normal Silage-2d year @ \$10.42, 3rd year @ \$11.29	\$64.60	\$84.67
Grainless Silage-2d year @ \$4.00, 3rd year @ \$3.75 and corn produced per A @ 75¢ bu.	44.50	56.77

The results shown in Tables X and XI emphasize the value of the silo and normal silage, when fed to cattle for finishing, in converting the corn crop into maximum cash returns per acre. They show that the corn crop as normal silage was harvested, stored and marketed to better advantage than any other system involving its feeding to cattle. As previously indicated, 93 percent of the corn pulled off by farmers in this state is fed to hogs. Granting that hogs would return \$1.50 per bushel for the corn pulled off, the returns per acre from grainless

silage, plus the corn, would not equal the returns from Normal silage by 6 to 7 dollars per acre. Hogs would not return the above amount, except in unusual instances, from immature, watery and in many cases badly damaged corn. Then there is also the necessary labor to pull off the corn, storing in some instances, and feeding it to the hogs. Pulling corn from the silage crop for hogs involves sometimes as high as five extra handlings of the corn, that would not be necessary were it put in the silo and fed to cattle.

Many experiments show that the silo is one of the most economical means of cribbing or storing the corn crop known, where cattle are involved. Some show that there is less loss of dry matter in the grain stored in the silo than in the crib. The silo is certainly the best means of saving the stover part of the crop. Investigations have shown that approximately one-third of the feeding value of the corn crop is in the stover. In Tennessee thousands of acres of stover are left standing in the fields unutilized. This study indicates that the best method of utilizing the corn crop so far as acre returns are concerned is to put the entire crop in the silo.

Table XII. Returns per Acre from Various Methods of Handling the Corn Crop.
(Average of 2nd & 3d years' work)

Method	Dollars per acre	Percent returns
(1) Normal Silage	\$ 74.63	100
(2) Grainless silage including corn removed at 75¢ bu.	50.63	68
Matured corn harvested in the usual (3) manner @ \$1.00 bu.	45.10	60

In comparing method 1 and 3, it will be noticed that the corn stalks and fodder, when combined with the grain, had a value of \$29.63 per acre but when fed as grainless silage the value per acre was only \$17.13 (Table XI).

\$29.63 is a good cash return from an acre of cornstalks, a product considered of little value and in many cases, wasted in Tennessee. The silo provides the best means of converting cornstalks into cash. Apparently, for greatest returns, the entire corn plant should be utilized as silage.

In conclusion, it may be said that the returns from feeding normal silage to beef cattle for finishing during the three years, were satisfactory; that the practice of making grainless silage should in most cases, be discontinued in the state and that more extensive use of silos, as a means of utilizing the corn crop in the state, should be encouraged.

Conclusions

1. Steers fed grainless corn silage gained on an average for three years only 75.9 percent as fast as those fed Normal Corn silage.

2. With grainless corn silage at \$4.00 per ton and other feeds at the same price for both lots, normal corn silage at \$7.70 the first year, \$7.56 the second year and \$8.50 the third year produced 100 lbs. gain at the same cost.

3. The steers receiving normal silage, due to their extra finish and dressing percentage, were worth about \$1.00 more per 100 lbs. live weight than those receiving grainless

silage.

4. With feeder steers @\$9.00 per cwt., and allowing a \$2.66 margin for Lot I and \$1.66 margin for Lot II on the finished steers, after deducting a 5% shrink, normal silage was worth on the average for the last two years \$10.85 per ton and grainless silage \$3.87 per ton. Therefore the grainless silage was worth only 36 percent as much as normal silage under these conditions.

5. Under the same conditions as in conclusion No. 4 each bushel of corn in the normal silage was worth \$1.05, as an average for the two years.

6. The yield of silage is reduced one third by removing the ears.

7. The market value of corn pulled off in making grainless silage is reduced by its immaturity, weathering and heating, from 15 to 40 cents per bushel, depending upon conditions under which it is handled.

APPENDIX

PROJECT SHEET

OF
AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF TENNESSEE

Station No. _____

Dept. No. _____

Department of **Animal Husbandry**

Source of maintenance:

Subject: **Steer Feeding Experiment Corn Silage with Ears vs Corn Silage without ears.**

Location: **Barn 1, Cherokee Farm**

Date begun:

Date completed:

Duration: **The winter of 1927-28, 1928-30.**

Leader:

Assistants:

Objects: 1. To compare the feeding value of silage, made with the ears on and that made with the ears off, for finishing steers.

~~XXXXXXXXXXXX~~
Reports, bulletins, etc.:

2. To determine the effect that pulling the ear corn has upon the yield of silage per acre.

3. To find the labor necessary to pull the corn from the stalk, handle it in the field when necessary and haul it to the barn.

~~XXXX~~
Objects: 4. To determine the effect of pulling the corn, running over with harvester, wagons, teams and weathering upon the quality and grade of the corn.

General Plan: It is proposed that one of the silos at Barn No. 1. be divided into halves by a partition from the bottom to the top and that one half of this silo be filled with silage with the ears left on and the other half be filled with silage from which the ears have been removed. It is also proposed that the silage be fed to two lots of steers as follows:

(Silage with the ears on

(Cottonseed meal

(4 lbs. first mo.

(5 lbs. second mo.

(6 lbs. third mo.

(Corn fodder or hay

Lot I

(Silage with the ears off

(Cottonseed meal

(4 lbs. first mo.

(5 lbs. second mo.

(6 lbs. third mo.

(Corn fodder or hay

Lot II

~~XXXXXXXXXXXX~~
Plan of experiment:

Details of Feeding and Management of Steers:

1. Forty steers weighing approximately 950 lbs. shall be used. They shall be divided into two lots of twenty each as uniform as possible in weight.
2. The feeding period shall be 90 days, more or less, depending upon the exhaustion of the silage.
3. Each steer shall be identified by a metal ear tag, with number, placed in the upper part of each ear.

4. The steers in each lot shall be weighed individually on three consecutive mornings at the beginning and the end of the experiment and at the end of each 30 day period. The average of the three weights shall constitute the average weight of each steer for that date.
5. Steers shall be placed in the barn on or about November 1 and given a preliminary feed of silage with a small amount of cottonseed meal for about 10 days, in order to accustom them to feed and quarters.
6. Both lots shall be full fed on silage but both lots shall receive the same amount of silage each day. The lot consuming the smallest amount of silage shall govern the amount of silage both lots shall receive.
7. Two weeks shall be taken in getting the steers up to the maximum allowance of cottonseed meal for the first month.
8. Dry roughage, corn fodder or hay, shall be fed in limited amounts during the entire period.
9. Each pen shall be provided with water at all times.
10. Loose salt shall be kept before both lots of steers at all times.
11. Steers shall be kept bedded comfortably with either corn stalks, straw or shavings.
12. Each lot of steers shall be appraised at the beginning and the end of the experiment by a committee of disinterested parties in order to establish values to be used in making a financial statement at the end of the experiment.
13. Both lots of cattle shall be fed silage and cottonseed meal twice daily--at 5 A.M. and 5 P.M. Roughage shall be fed once per day and that just before noon.
14. An estimate of the amount of grain in each lot of silage shall be made in order to determine the amount of corn in the silage fed daily to each steer.

Details of Filling the Silo, Pulling and Saving the Ear Corn.

1. Each half of the silo shall be filled with its respective kind of silage. This may be done by having half the wagons haul one kind of silage and the other wagons shall haul the other kind and by shifting the distributed from one side of the silo to the other as the various loads are run through the cutter.
2. In pulling corn (for the silage with corn off) it shall be pulled in lands of about 20 rows each alternating with the lands not pulled so as to give uniformity in silage and corn yields for the two kinds of silage.

3. In handling the ear corn pulled off in the field, it shall be handled as the average farmer is accustomed to handling it, viz; allow it to lie in the field as long as weather conditions will permit or until it is dry and then haul it to the barn and spread it out thinly in some well ventilated loft or floor.

4. The corn pulled shall be weighed when taken from the field and placed in the barn and again after having had time to thoroughly dry.

5. A comparison of the grade and market value of corn thus produced and that harvested direct from the fields after ripening and drying. Chemical analysis shall also be made of the above.

6. Chemical analysis shall be made of the two kinds of silage in order to throw light upon the quality and feeding value of the two kinds of silage.

Final Report: The final report on experiment shall contain the following information:

1. Weights and gains of cattle.
2. Feeds of various kind consumed by each lot of cattle.
3. Cost of 100 lbs. gain for each lot.
4. Report on condition, thrift, appetites of cattle.
5. Initial and final appraisal on each lot.
6. Financial statement showing profit or loss on the feeding operation.
7. Yield of silage per acre in each case.
8. Yield of ear corn per acre.
9. Labor costs for pulling and handling the ear corn.

Leaders: M. Jacob, H. R. Duncan.

TABLE 1. Showing Weights and Gains of Cattle fed First Year.

Lot I--Normal Silage

No.	Description	No. in R. Ear	No. in L. Ear
1	Red, some white in switch	21	121
2	Long head, white switch	23	123
3	Light roan, two nubs	24	124
4	Red, dehorned	25	125
5	Black, white face, white on brisket	26	126
6	Blue roan, two heavy nubs	27	127
7	Red, mottled face, 2 drooping nubs	28	128
8	Brindle, white face	29	129
9	Light roan, branded left hip	30	130
10	Red, white face, two nubs	31	131
11	Red, left nub, white tail	32	132
12	Deep red	33	133
13	Black	35	135
14	Red, mottled face	36	136
15	Red, mottled face, white underline	37	137
16	Red, behind fore leg. Muley	38	138
17	Red, white face, Hereford, good	39	139
18	Red, white on left hind foot	40	140
19	Red, mottled face	41	141

TABLE 1. (Continued)

Lot I--Normal Silage

No.	Weight Nov. 7	Weight Nov. 8	Weight Nov. 9	Ave. Wt. Nov. 9	Wt. Dec. 19	Weight Dec. 20	Weight Dec. 21	Ave. Wt. Dec. 21	Gn. in 42 da.
1	1080	1040	1000	1040	1155	1150	1120	1142	102
2	1050	1035	1000	1028	1115	1110	1115	1113	85
3	880	835	850	855	940	945	920	935	80
4	925	915	885	908	1000	965	960	975	67
5	980	970	950	966	1080	1060	1060	1067	101
6	935	910	910	918	1000	955	980	978	60
7	1035	1010	985	1010	1120	1095	1100	1105	95
8	965	915	950	943	1055	1055	1055	1055	112
9	865	860	870	865	910	950	950	937	72
10	925	905	880	903	1000	1000	1000	1000	97
11	930	905	860	898	1010	1010	1010	1010	112
12	900	885	805	863	905	935	905	915	52
13	990	950	935	958	1040	1015	1020	1025	67
14	1040	1025	950	1005	1060	1055	1055	1057	52
15	925	885	900	903	1005	995	1000	1000	97
16	935	890	880	902	1000	995	995	997	95
17	980	965	950	965	1010	1015	1010	1012	47
18		760	750	755	860	860	860	860	105
19		830	800	815	860	860	855	858	43
Tot. Wt.				17500				19041	1541
Ave. " 962				921				1002.2	81.1
Ave. Daily Gain									1.931

TABLE 1. (Continued)

Lot I--Normal Silage

No.	Weight Jan. 7	Weight Jan. 8	Weight Jan. 9	Weight Jan. 10	Ave. Wt. Jan. 9	Gain for 19 days	Gain for both Periods of 61 da.
1		1180		1180	1180	38	140
2		1175		1170	1172	59	144
3	940		930	970	947	12	92
4	1050	1050		1055	1052	77	144
5		1130		1120	1125	58	159
6	965	960		980	968	-10	50
7	1130		1120	1150	1133	28	123
8	1070		1075	1090	1078	23	135
9		970		980	975	38	110
10	1030	1000	1000	1020	1017	17	114
11	1060		1040	1055	1052	42	154
12		940	935	945	940	25	77
13	1055	1050	1050	1090	1066	41	108
14	1105	1110		1100	1105	48	100
15	1010	1000		1010	1007	07	104
16	1010	1010		1000	1007	10	105
17		1080		1085	1082	70	117
18		870		900	885	25	130
19	920	910		925	918	60	103
Total Weight					19.709	668	2209
Average "					1037.3	35.16	116.26
Ave. Daily gain						1.847	1.906

TABLE 2. Showing Weights and Gains of Cattle fed First Year.

Lot II--Grainless Silage

No.	Description	No. in R. Ear	No. in L. Ear
1	Red	1	101
2	Red, fork left, lop left	2	102
3	Red, white underline, brand L hip	3	103
4	Black, Jersey Angus	4	104
5	Red, fork left	5	105
6	Dark roan, white inside hocks	6	106
7	Deep red	7	107
8	Black, two nubs	108	8
9	Deep red	9	109
10	Red, white face, four white feet	10	110
11	Red, white switch, underline	11	111
12	Roan, dehorned	12	112
13	Red, white hind feet	13	113
14	Black, white face, left nub	14	114
15	Solid black, 2 horns 6 in. long	15	115
16	Red, white tail, spot forehead	16	116
17	Red, some white on belly	17	117
18	Roan, small, 2 white hind feet	18	118
19	Deep red	19	119
20	Red, white line over hips	20	120

TABLE 2. (Continued)

Lot II--Grainless Silage

[illegible]

TABLE 2. (Continued)

Lot II--Grainless Silage

No.	Weight Jan. 7	Weight Jan. 8	Weight Jan. 9	Weight Jan. 10	Ave. Wt. Jan. 9	Gain for 19 days	Gain for both Periods of 61 da.
1		1010		1010	1010	48	79
2		1060		1050	1055	45	163
3	905	915	900	910	907	47	82
4	1000		1000	1055	1018	30	42
5	1000	1000		1000	1000	48	98
6		1030		1060	1045	42	84
7	1120	1130		1150	1133	59	93
8	1125	1100	1110	1150	1128	45	95
9	1110	1130		1125	1122	39	74
10	980		980	1010	990	42	90
11		1070		1070	1070	32	87
12		1180		1185	1182	72	104
13		1005	990	1050	1015	07	82
14		990		990	990	63	104
15	1010	990		1025	1008	25	43
16	980	985	985	1020	992	27	82
17	1140		1130	1180	1150	68	98
18		900		900	900	48	87
19	1140	1135	1130	1160	1141	34	96
20		990		1015	1002	44	79
Total Weight					20858	862	1762
Average "					1042.9	43.1	88.1
Ave. Daily Wt.						2.268	1.444

TABLE 3. Daily Rations for the First Period of 42 Days.

Date	Lot I				Lot II			
	C.S.M.	Silage	Fodder	Salt	C.S.M.	Silage	Fodder	Salt
Nov. 10	40	592	124	9	40	592	124	9
11	40	600	124	35	40	600	124	35
12	40	600	124		40	600	124	
13	50	600	124		50	600	124	
14	50	600	124		50	600	124	
15	50	600	124		50	600	124	
16	60	720	124		60	720	124	
17	60	720	124		60	720	124	
18	60	720	124		60	720	124	
19	60	720	124		60	720	124	
20	70	720	124		70	720	124	
21	70	720	124		70	720	124	
22	70	720	124		70	720	124	
23	80	720	124		80	720	124	
24	80	720	124		80	720	124	
25	80	720	124		80	720	124	
26	80	720	124		80	720	124	
27	80	720	124		80	720	124	
28	80	720	124		80	720	124	
29	80	720	124		80	720	124	
30	80	720	124		80	720	124	
Dec. 1	80	720	124		80	720	124	
2	80	600	124		80	600	124	
3	80	600	124		80	600	124	
4	80	600	124		80	600	124	
5	80	600	124		80	600	124	
6	80	600	124		80	600	124	
7	80	600	124		80	600	124	
8	80	600	124		80	600	124	
9	80	600	124		80	600	124	
10	80	600	124		80	600	124	
11	84	600	124		84	600	124	
12	88	600	124		88	600	124	
13	92	600	124		92	600	124	
14	96	600	124		96	600	124	
15	100	600	124		100	600	124	
16	100	600	124		100	600	124	
17	100	600	124		100	600	124	
18	100	600	124		100	600	124	
19	100	600	124		100	600	124	
20	100	600	124		100	600	124	
21	100	600	124		100	600	124	
TOTAL	3220	27112	5208	44	3220	27112	5208	44

TABLE 4. Daily Rations for the Second Period of 19 Days.

Date	Lot I				Lot II			
	C.S.M.	Silage	Fodder	Salt	C.S.M.	Silage	Fodder	Salt
Dec. 22	95	570	118		100	600	124	
23	95	570	118		100	600	124	
24	95	570	118		100	600	124	
25	95	570	118		100	600	124	
26	95	570	118		100	600	124	
27	95	570	118		100	600	124	
28	95	570	118		100	600	124	
29	95	570	118		100	600	124	
30	95	570	118		100	600	124	
31	95	570	118		100	600	124	
Jan. 1	95	570	118		100	600	124	
2	95	570	118		100	600	124	
3	95	570	118		100	600	124	
4	95	570	118		100	600	124	
5	95	570	118		100	600	124	
6	95	570	118		100	600	124	
7	95	570	118		100	600	124	
8	95	570	118		100	600	124	
9	95	570	118	23	100	600	124	23
TOTAL	1805	10830	2242	23	1900	11400	2356	23

TABLE 5. Feed Consumption & Cost of Gains

First period 42 days				
Feed	Amount Consumed	Price	Value	Cost of 100 lbs. gain
LOT I*				
C.S.M.	3,059	45.00	68.80	
Silage	25,759	8.50	109.47	
Fodder	4,948	8.00	19.79	
Salt	46	20.00	.46	
			198.52	\$12.98
LOT II				
C.S.M.	3,220	45.00	72.45	
Silage	27,112	4.00	54.24	
Fodder	5,208	8.00	20.83	
Salt	46	20.00	.46	
			147.98	16.44
Second period 19 days				
LOT I				
C.S.M.	1,805	45.00	40.61	
Silage	10,830	8.50	45.98	
Fodder	2,242	8.00	8.96	
Salt	23	20.00	.23	
			95.78	14.34
LOT II				
C.S.M.	1,900	45.00	42.75	
Silage	11,400	4.00	22.80	
Fodder	2,356	8.00	9.42	
Salt	23	20.00	.23	
			75.20	8.72

* Table 3 from which this table is compiled shows the feed consumed by 20 steers in Lot 1. Since one steer became sick and was taken out, this summary shows the feed consumed by only 19 steers, the average feed consumed by one steer being subtracted from the total.

TABLE 6. Summary of Feed Consumption and Cost of Gains
for Both Periods(61 days)

Feeds	Amount consumed	Price	Value	Cost of 100 lb. gn.	Ave. da. Ration	Feed for 100 lb. gn.
LOT I						
C.S.M.	4,864	\$45.00L	109.44		4.19 lb	220.2
Silage	36,589	8.50	155.46		31.5 "	1656.
Fodder	7,190	8.00	28.76		6.2 "	325.
Salt	69	20.00	.69		.06 "	3.1
			294.35	13.32	41.95 "	2204.3
LOT II						
C.S.M.	5,120	45.00	115.20		4.19 "	290.5
Silage	38,512	4.00	77.02		31.5 "	2185.
Fodder	7,564	8.00	30.25		6.2	423.
Salt	69	20.00	.69		.06	4.0
			223.16	12.66	41.95	2902.5

TABLE 7. Showing Weights and Gains of Cattle fed Second Year
Lot I--Normal Silage

No.	Description	No. in R. Ear	No. in L. Ear
1	Pole red, mubs, white switch	62	162
2	Jersey red, slit each ear	63	163
3	Red, white face, R flank white	64	164
4	White face, burley head	65	165
5	Red brindle	66	166
6	Red, brand L side LYZ	67	167
7	Red, white pissle	68	168
8	Spotted brindle, four white feet	69	169
9	Red, four white feet, short ears	70	170
10	Yellow red	71	171
11	Spotted	72	172
12	Red, horns, long head, black nose	75	175
13	Roan brindle	76	176
14	Red, white switch	78	178
15	Dutch belted	79	179
16	Red, white tail	80	180
17	Red, muley, white face, brand R hip	43	143
18	Black	54	154
19	Hereford, grey twist	60	160

TABLE 7. (Continued)

Lot I--Normal Silage

No.	Weight Nov.13	Weight Nov.14	Weight Nov.15	Ave.Wt. Nov.15	Weight Dec.13	Weight Dec.14	Weight Dec.15	Av.Wt. Dec.15	Gn.lst 30 da.
1	740	730	740	737	820	850	840	837	100
2	630	640	630	633	700	720	710	710	77
3	760	780	780	773	850	860	860	857	84
4	710	720	715	715	800	800	800	800	85
5	690	700	695	695	790	780	790	787	92
6	730	740	745	738	830	840	840	837	99
7	730	720	725	725	820	840	830	830	105
8	660	690	690	680	780	780	800	787	107
9	760	760	785	768	850	850		850	82
10	700	720	730	717	800	810	810	807	90
11	650	650	660	653	740	760	760	753	100
12	770	770	750	763	870	870	870	870	107
13	700	710	720	710	810	820	820	817	107
14	790	790	790	790	850	850	870	857	67
15	730	740	740	737	850	860	870	860	123
16	660	660	660	660	740	770	770	760	100
17	620	620	630	623	730	740	740	737	114
18	670	660	655	662	760	760	760	760	98
19	650	650	665	655	740	750	740	743	88
Totals				13434				15359	1825
Averages				707.0				803.1	96.1
Ave. daily gains									3.20

TABLE 7. (Continued)

Lot I--Normal Silage

No.	Weight Jan.12	Weight Jan.13	Weight Jan.14	Ave.Wt. Jan.14	Gn.2d 30 da	Weight Feb.11	Weight Feb.12	Weight Feb.13
1	880	900	920	900	63	940	940	930
2	740	730	780	750	40	780	770	800
3	910		940	925	68	940	960	970
4	870	880	880	877	77	900	930	910
5	850	850	860	853	66	900	910	910
6	830	870	890	863	26	920	910	920
7	870	880	880	877	47	910	930	920
8	820	830	840	830	43	880	860	860
9	890	880	910	893	43	930	960	950
10	830	810	830	823	16	870	890	890
11	780	780	800	787	34	840	830	850
12	910	890	900	900	30	920	920	930
13	880	880	890	883	66	920	950	940
14	910	910	940	920	63	980	970	990
15	900	910	940	917	57	950	960	990
16	810	800	830	813	53	840	860	880
17	740	730	760	743	6	780	770	800
18	820	820	830	823	63	860	850	860
19	790	810	800	800	57	870	860	870
Total 16030				16117	918	16930		
Averages				851.42	48.32	8910		
Ave. daily gains					1.61			

TABLE 7. (Continued)

Lot I--Normal Silage

No.	Ave.Wt. Feb.13	Gain 3d 30 da.	Weight Mar.13	Weight Mar.14	Weight Mar.15	Ave.Wt. Mar.15	Gain 4th month
1	937	37	990	980	970	980	43
2	783	33	820	830	820	823	40
3	957	32	980	970	1000	983	26
4	913	36	950	980	960	963	50
5	907	54	950	940	950	947	40
6	917	54	990	970	980	980	63
7	920	43	980	970	980	977	57
8	867	37	910	920	900	910	43
9	947	54	990	1000	980	990	43
10	883	60	960	960	980	967	84
11	840	53	920	910	910	913	73
12	923	23	960	950	930	947	24
13	937	54	1000	1000	1010	1003	66
14	980	60	1020	1020	1020	1020	40
15	967	50	1020	1020	1010	1017	50
16	860	47	910	920	910	913	53
17	783	40	820	820	800	817	34
18	857	34	900	910	900	903	46
19	867	67	900	890	880	890	23
Tot.WT 17045		868				17943	898
Ave." 897.1		45.684				944.37	47.26
Ave.Da.Gn.		1.523					1.575

TABLE 7. (Continued)

Lot I--Normal Silage

No.	Weight Apr.12	Weight Apr.13	Weight Apr.14	Ave.Wt. Apr.14	Gain 5th month	Gain for 150 days
1	1020	1030	1020	1023	43	286
2	870	870	870	870	47	237
3	1030	1030	1050	1037	54	264
4	1030	1050	1030	1037	74	322
5	990	990	980	987	40	292
6	1030	1040	1050	1040	60	302
7	1030	1050	1060	1047	70	322
8	940	960	960	953	43	273
9	1020	1020	1030	1023	33	255
10	1010	990	1000	1000	33	283
11	970	980	980	977	64	324
12	1030	1020	1040	1030	83	267
13	1070	1070	1060	1067	64	357
14	1080	1070	1070	1073	53	283
15	1060	1070	1070	1067	50	330
16	950	960	960	957	44	297
17	890	870	890	883	66	260
18	960	970	950	960	57	298
19	950	960	930	947	57	292
Tot. Weight				18978	1035	5544
Ave. "				998.8	54.4	291.7
Ave. Daily Gain					1.813	1.945

TABLE 8. Showing Weights and Gains of Cattle fed Second Year
Lot II--Grainless Silage

No.	Description	No. in R. Ear	No. in L. Ear
1	Red, Black nose	44	144
2	Red, star in forehead	45	145
3	Black, tip off each ear	46	146
4	Red, white switch, label L ear	47	147
5	Red, left nub	48	148
6	Brindle, whiteface, lineback	49	149
7	Red, white star, spot each quarter	50	150
8	Roan	51	151
9	Red, white switch, small spots	52	152
10	Deep red, R. flank white	53	153
11	Brindle, mottled face	55	155
12	Spotted, mottled face	56	156
13	Black, white belly, nubs	57	157
14	Red, white on belly, white switch	58	158
15	Red, tip off right ear	59	159
16	Deep red, short nubs	61	161
17	Deep red, Shorthorns, brand L hip	73	173
18	White face, red eyes	74	174
19	Deep red	77	177

TABLE 8. (Continued)

Lot II-Grainless Silage

No.	Weight Jan.12	Weight Jan.13	Weight Jan.14	Ave.Wt. Jan.14	Gn.2d 30 da.	Weight Feb.11	Weight Feb.12	Weight Feb.13
1	820	830	830	827	44	820	840	820
2	710	700	730	713	6	740	750	750
3	820	820	820	820	67	850	850	860
4	760	760	770	763	46	770	760	760
5	740	740	750	743	76	780	790	810
6	920	900	940	920	67	920	950	970
7	730	720	730	727	60	800	810	820
8	820	830	830	827	57	860	840	840
9	790	800	810	800	50	850	850	840
10	780	790	800	790	57	810	800	830
11	880	910	930	907	54	920	920	960
12	810	820	820	817	27	820	820	820
13	800	800	820	807	44	840	830	850
14	820	820	850	830	43	840	840	850
15	820	820	840	827	44	850	850	860
16	780	810	820	803	80	840	840	850
17	880	880	910	890	40	920	920	930
18	840	840	870	850	40	890	920	910
19	910	950	950	937	44	970	960	950
Total Wt.				15598	946	16090		
Ave. "				820.95	44.52	846.8		
Ave. Daily Gain					1.484			

TABLE 8. (Continued)

Lot II--Grainless Silage

No.	Ave.Wt. Feb.13	Gain 3d 30 da.	Weight Mar.13	Weight Mar.14	Weight Mar.15	Ave.Wt. Mar.15	Gn. 4th month
1	827	0	870	870	870	870	43
2	747	34	850	810	820	827	30
3	853	33	900	890	900	897	44
4	763	0	800	780	780	787	24
5	793	50	860	850	850	853	60
6	947	27	1050	1020	1010	1027	80
7	810	83	860	860	850	857	47
8	847	20	920	890	900	903	56
9	847	47	940	930	940	937	90
10	813	23	890	860	860	870	57
11	933	26	1030	1000	1000	1010	77
12	820	3	860	850	850	853	33
13	840	33	910	890	900	900	60
14	843	13	910	890	890	900	57
15	853	26	940	920	910	923	70
16	843	40	920	910	900	910	67
17	923	33	1020	1010	1020	1017	94
18	907	57	990	970	970	977	70
19	960	23	1020	1020	1010	1017	57
Tot. Wt	16169	571				17335	1166
Ave. "	851.0	30.05				912.37	61.36
Ave. Da. Gn.		1.002					204

TABLE 8. (Continued)

Lot II--Grainless Silage

6

No.	Weight April 12	Weight Apr.13	Weight Apr.14	Ave.Wt. Apr.14	Gain 5th month	Gain for 150 days
1	900	900	910	903	33	141
2	870	890	870	877	50	217
3	910	910	910	910	13	220
4	800-Sold Apr.9 crippled			825	38	160
5	880	890	870	880	27	277
6	1090	1080	1070	1080	53	293
7	890	880	890	887	30	170
8	930	930	950	937	34	229
9	1020	1000	1010	1010	73	315
10	890	900	900	897	27	220
11	1040	1050	1040	1043	33	218
12	860	860	870	863	10	110
13	950	960	970	960	60	228
14	940	940	920	933	33	211
15	960	980	990	977	54	257
16	960	940	960	953	43	281
17	1090	1060	1060	1070	53	288
18	1020	1010	1000	1010	33	267
19	1070	1060	1070	1067	50	234
Tot. Weight				18082	747	43.36
Ave. "				951.7	39.3	228.2
Ave. Daily Gain					1.31	1.221

TABLE 9.

Daily Rations for the First Month

Date	Lot I			Lot II		
	Silage	Fodder	C.S.M.	Silage	Fodder	C.S.M.
Nov. 16	500	95	50	500	95	50
17	500	95	50	500	95	50
18	600	95	60	600	95	60
19	600	95	60	600	95	60
20	600	0	60	600	0	60
21	600	95	70	600	95	70
22	600	95	70	600	95	70
23	600	95	70	600	95	70
24	600	95	76	600	95	76
25	600	95	76	600	95	76
26	600	95	76	600	95	76
27	600	95	76	600	95	76
28	600	95	76	600	95	76
29	600	95	76	600	95	76
30	600	95	76	600	95	76
Dec. 1	600	95	76	600	95	76
2	700	95	76	700	95	76
3	700	95	76	700	95	76
4	700	95	76	700	95	76
5	700	95	76	700	95	76
6	700	95	76	700	95	76
7	700	95	76	700	95	76
8	700	95	76	700	95	76
9	700	95	76	700	95	76
10	700	95	76	700	95	76
11	700	95	76	700	95	76
12	700	95	76	700	95	76
13	700	95	76	700	95	76
14	700	95	76	700	95	76
15	700	95	76	700	95	76
Total for mo.	19200	2755	2162	19200	2755	2162

Summary of Feed Consumption & Cost of Gain
for First Month

Lot I	Feed Fed	Price Ton	Value	Cost of 100 Lbgn.
Silage	19200	\$ 8.50	\$ 81.60	
Fodder	2755	8.00	11.02	
C.S.M.	2162	45.00	48.64	
			141.26	\$ 7.74
Lot II				
Silage	19200	4.00	38.40	
Fodder	2755	8.00	11.02	
C.S.M.	2162	45.00	48.64	
			98.06	\$ 9.73

TABLE 10.

Daily Rations For The Second Month

Date	Lot I			Lot II		
	Silage	Hay	C.S.M.	Silage	Hay	C.S.M.
Dec. 16	700	57	95	700	57	95
17	600	57	95	600	57	95
18	600		95	600		95
19	600		95	600		95
20	600		95	600		95
21	600	57	95	600	57	95
22	700	57	95	700	57	95
23	700		95	700		95
24	700		95	700		95
25	700		95	700		95
26	700	57	95	700	57	95
27	700		95	700		95
28	700		95	700		95
29	700		95	700		95
30	700		95	700		95
31	600		95	600		95
Jan. 1	600		95	600		95
2	600		95	600		95
3	600		95	600		95
4	600	57	95	600	57	95
5	600	57	95	600	57	95
6	600	57	95	600	57	95
7	600	57	95	600	57	95
8	600	57	95	600	57	95
9	600	57	95	600	57	95
10	600	57	95	600	57	95
11	600	57	95	600	57	95
12	600		95	600		95
13	600	57	95	600	57	95
14	600	57	95	600	57	95
Total for mo.	19000	855	2850	19000	855	2850

Summary of Feed Consumption & Cost of Gain
for Second Month

Lot I	Feed Fed	Price Ton	Value	Cost 100 lb. gn.
Silage	19000	\$ 8.50	80.40	
C.S.M.	2850	45.00	64.12	
Hay	855	10.00	4.27	
		148.79	148.79	\$16.20
Lot II				
Silage	19000	4.00	38.00	
C.S.M.	2850	45.00	64.12	
Hay	855	10.00	4.27	
			106.39	11.24

TABLE 11.

Daily Rations for Third Month

Date	Lot I			Lot II		
	Silage	Hay	C.S.M.	Silage	Hay	C.S.M.
Jan. 15	600	57	95	600	57	95
16	600	57	95	600	57	95
17	600	57	95	600	57	95
18	600	57	95	600	57	95
19	600	57	95	600	57	95
20	600	57	95	600	57	95
21	600	57	95	600	57	95
22	600	57	95	600	57	95
23	600	57	95	600	57	95
24	650	57	95	650	57	95
25	650	57	95	650	57	95
26	650	57	95	650	57	95
27	650	57	95	650	57	95
28	650	57	95	650	57	95
29	650	57	95	650	57	95
30	650	57	95	650	57	95
31	650	57	95	650	57	95
Feb. 1	650	57	95	650	57	95
2	650	57	95	650	57	95
3	650	57	95	650	57	95
4	650	57	95	650	57	95
5	650	57	95	650	57	95
6	650	57	95	650	57	95
7	650	57	95	650	57	95
8	650	57	95	650	57	95
9	650	57	95	650	57	95
10	650	57	95	650	57	95
11	650	57	95	650	57	95
12	650	57	95	650	57	95
13	650	57	95	650	57	95
Total for month	19050	1710	2850	19050	1710	2850

Summary of Feed Consumption & Cost of Gain
for Third Month

Lot I	Feed Fed	Price Ton	Value	Cost of 100 lb. gain
Silage	19050	\$ 8.50	\$ 80.96	
Hay	1710	10.00	8.55	
C.S.M.	2850	45.00	64.16	
			153.67	\$ 17.70
Lot II				
Silage	19050	4.00	38.10	
Hay	1710	10.00	8.55	
C.S.M.	2850	45.00	64.16	
			110.81	19.40

TABLE 12.

Daily Rations for the Fourth Month

Date	Lot I				Lot II			
	Silage	Hay	C.S.M.	Molasses	Silage	Hay	C.S.M.	Molasses
Feb. 14	650	57	114	10	650	57	114	10
15	650		114	10	650		114	10
16	650	57	114	10	650	57	114	10
17	650	57	114	10	650	57	114	10
18	650	57	114	19	650	57	114	19
19	650	57	114	19	650	57	114	19
20	650	57	114	19	650	57	114	19
21	650	57	114	19	650	57	114	19
22	650	57	114	19	650	57	114	19
23	650	57	114	19	650	57	114	19
24	650	57	114	19	650	57	114	19
25	650	57	114	19	650	57	114	19
26	650	57	114	19	650	57	114	19
27	650	57	114	19	650	57	114	19
28	650	57	114	19	650	57	114	19
Mar. 1	650	22	114	19	650	22	114	19
2	650	25	114	19	650	25	114	19
3	650	10	114	19	650	10	114	19
4	650	7	114	19	650	7	114	19
5	650	20	114	19	650	20	114	19
6	650	57	114	19	650	57	114	19
7	650	57	114	19	650	57	114	19
8	650	57	114	19	650	57	114	19
9	650	57	114	19	650	57	114	19
10	650	57	114	19	650	57	114	19
11	650	57	114	19	650	57	114	19
12	650	57	114	19	650	57	114	19
13	650	57	114	19	650	57	114	19
14	650		114	19	650		114	19
15	650	57	114	19	650	57	114	19
Total for mo.	19500	1395	3420	1068	19500	1395	3420	1068

Summary of Feed Consumption & Cost of Gain
for Fourth Month

Lot I	Feed Fed	Price Ton	Value	Cost of 100 lb.
Silage	19500	\$ 8.50	\$ 82.87	
Hay	1395	10.00	6.97	
C.S.M.	3420	45.00	76.95	
Molasses	1068	26.50	14.15	
			180.94	\$ 20.14
Lot II				
Silage	19500	4.00	39.00	
Hay	1395	10.00	6.97	
C.S.M.	3420	45.00	76.95	
Molasses	1068	26.50	14.15	
			137.07	\$ 11.75

TABLE 13.

Daily Rations for Fifth Month

Date	Lot I				Lot II			
	Silage	Hay	C.S.M.	Molasses	Silage	Hay	C.S.M.	Molasses
Mar. 16	600	57	114	60	600	57	114	60
17	600	57	114	60	600	57	114	60
18	600		114	60	600		114	60
19	600		114	60	600		114	60
20	600		114	70	600		114	70
21	600		114	70	600		114	70
22	600		114	70	600		114	70
23	600		114	70	600		114	70
24	600		114	70	600		114	70
25	600		114	70	600		114	70
26	600	57	114	80	600	57	114	80
27	500		114	80	500		114	80
28	500		114	80	500		114	80
29	500		114	80	500		114	80
30	500	57	114	80	500	57	114	80
31	500	57	114	80	500	57	114	80
Apr. 1	500	57	114	80	500	57	114	80
2	500	57	114	80	500	57	114	80
3	500	57	114	80	500	57	114	80
4	500	57	114	80	500	57	114	80
5	500	57	114	80	500	57	114	80
6	500	57	114	80	500	57	114	80
7	500	57	114	80	500	57	114	80
8	500	57	114	80	500	57	114	80
9	500	57	114	70	500	57	114	70
10	500	57	114	70	500	57	114	70
11	500	57	114	70	500	57	114	70
12	500	57	114	70	500	57	114	70
13	500	57	114	70	500	57	114	70
14	500	57	114	70	500	57	114	70
Total for mo.	16100	1083	3420	2200	16100	1083	3420	2200

Summary of Feed Consumption & Cost of Gain
for Fifth Month

Lot I	Feed Fed	Price Ton	Value	Cost of 100 lb. gn.
Silage	16100	\$ 8.50	\$ 68.42	
Hay	1083	10.00	5.41	
C.S.M.	3420	45.00	76.95	
Molasses	2200	26.50	29.15	
			179.93	\$ 17.38
Lot II	Feed Fed	Price Ton	Value	Cost of 100 lb. gn.
Silage	16100	4.00	32.20	
Hay	1083	10.00	5.41	
C.S.M.	3420	45.00	76.95	
Molasses	2152	26.50	28.52	
			143.08	19.14

TABLE 14.

Summary of Feed Consumption for All Periods
150 days

	Amt. fed	Price	Value	Cost of 100lb. gn.	Ave. Da. ration	Feed for 100 lb. gn
LOT I						
Silage	92,850	\$ 8.50	\$394.61		32.0	1673.
Hay	5,043	10.00	25.21		1.0	90.
Fodder	2,755	8.00	11.02		.9	49.
C.S.M.	14,702	45.00	330.79		5.1	265.1
Molasses	3,268	26.50	43.30		1.1	59.
			\$804.93	\$14.51	40.1	2136.1
LOT II						
Silage	92,850	\$ 4.00	\$185.70		32.0	2141.
Hay	5,043	10.00	25.21		1.0	116.
Fodder	2,755	8.00	11.02		.9	63.
C.S.M.	14,702	45.00	330.79		5.1	339.
Molasses	3,220	26.50	42.66		1.1	74.
			\$595.38	\$13.73	40.1	2733.

TABLE 15.

Record of Sale, Weights, Shrinkage, Dressing
Percentage and Sale Receipts

Lot I

19 cattle sold April 17, 1929 to East Tennessee Packing Co.

Weight at barn 5:30 A.M. (without feed)	18450
" " Packing Plant	18015
Total shrinkage from barn to Pk. Plant	435 lbs.
Average shrinkage per head	23 lbs.
Percent shrinkage from barn to Plant	2.3%

Sale Returns

19 cattle weighing 18,015 lbs. @ $11\frac{1}{2}\%$ = \$2071.72

Average Weight	947.9 lbs.
Average Dressing percent- age based on selling wts. of carcasses	56.27%

Lot II

1 steer (lame) sold April 9th, 1929 to East Tennessee Pack-
ing Company Wt. 780 lbs. @ $10\frac{1}{2}\%$ \$ 89.70

18 cattle sold April 24 to East Tennessee Packing Co.

Weight at barn 5:30 A.M. (without feed)	17,250
" " Packing Plant	16,765
Total shrinkage from barn to Pk. Plant	485 lbs.
Average shrinkage per head	27 lbs.
Percent shrinkage from barn to Plant	2.8%

Salt Returns

18 cattle weighing 16,765 lbs. @ $11\frac{1}{2}\%$ = \$1927.97

Average Dressing Percent- age based on selling wts. of carcasses	52.07%
---	--------

TABLE 16.

Capacity of Silos 1928-29

Silo No. 1--12'x42' (estimated capacity 100 tons) used for Normal silage.

Fed steers during preliminary period	3235 lbs.
" " " experiment	88750
" sheep and cows	9325
" after conclusion of experiment	12575
	113885 lbs.
	56.94 Tons

Silo No. 2--12'x42' (estimated capacity 100 tons) used for Grainless silage.

Fed steers during preliminary feeding period	3235
" " " experiment	88750
" sheep and cows	1050
" after conclusion of experiment	3435
	96460 lbs.
	48.23 Tons

TABLE 17.

Financial Statement 1928-29

	Lot I	Lot II
Cost per cwt. at St. Louis Aug.25(40)	\$ 10.00	\$ 10.00
" " cwt. laid down at Knoxville two lost (33)	11.18	11.18
" " cwt. in the barn Nov.1	10.73	10.73
" per head at beginning of experiment	75.86	77.62
Feed cost per head for 150 days	44.08	31.36
Int. per head for 8 mo. @ 6% ave. initial cost (73.27)	2.93	2.93
Total cost per steer	122.87	111.91
Sale returns per steer:		
Lot I-Ave.wt. 948.1 @12¢	113.77	
Lot II- " " 923.4 @11¢		101.57
Loss per head	9.00	10.34
Actual margin received	1.27	.27
Necessary selling price to break even	12.94	12.12
Necessary margin	2.21	1.39

TABLE 18.

Showing Weights and Gains of Cattle fed Third Year.

Lot I--Normal Silage

No.	Description	No. in R. Ear	No. in L. Ear
1	Deep red	22	122
2	Red, black nose, R nub	23	123
3	Red, white belly, white R hock	24	124
4	Red, white switch, L nub	26	126
5	Red, black nose & eyes	27	127
6	Red, R nub	28	128
7	Black, white face	29	129
8	Red, mottled white face	30	130
9	Black, white R hip	31	131
10	Red, small spot in forehead	32	132
11	Red, white switch, two nubs	33	133
12	Blue gray, notched ears	34	134
13	Red, long head	35	135
14	Red line back	36	136
15	Brindle	37	137
16	Red, white face-good	38	138
17	Red, white underline & R flank	39	139
18	Red, white face, white shoulder	40	140
19	Red, bully head, R nub	42	142
20	Black	5	105
21	Spotted	11	111

TABLE 12 (Continued)

Lot I--Normal Silage

No.	Weight Nov. 19	Weight Nov. 20	Weight Nov. 21	Ave. Wt. Nov. 21	Weight Dec. 19	Weight Dec. 20	Weight Dec. 21	Ave. wt Dec. 21	Gn. 1st 30 da
1	1070	1045	1050	1055	1100	1100	1120	1107	52
2	870	860	870	867	900	940	930	923	56
3	980	980	980	980		1050	1050	1050	70
4	720	730	740	730	770	790	790	783	53
5	830	850	860	847		920	920	920	73
6	780	770	760	770		840	820	830	60
7	860	880	880	873	950	970	970	963	90
8	750	760	770	760		860	870	865	105
9	800	800	810	803		860	860	860	57
10	850	860	870	860	950	940	960	950	90
11	700	700	720	707	750	760	770	760	53
12	870	860	870	867	900	920	920	913	46
13	1000	1000	1000	1000	1050	1090	1080	1073	73
14	850	840	850	847		920	910	915	68
15	920	900	920	913		1000	1000	1000	87
16	970	985	1000	985	1040	1050	1060	1050	65
17	970	970	980	973	1020	1060	1050	1043	70
18		870	880	875	900	920	920	913	38
19	930	930	930	930	970	980	990	980	50
20	800	800	810	803	840	870	860	856	53
21	780	785	780	782	820	850	840	836	54
Total Wt.				18227				19590	1363
Ave. "				867.9				932.9	64.9
Ave. Daily Gain									2.16

TABLE 18. (Continued)

Lot I--Normal Silage

No.	Weight Jan.18	Weight Jan.19	Weight Jan.20	Ave.Wt. Jan.20	Gn.2d month	Weight Feb.17	Weight Feb.18	Weight Feb.19
1	1180	1170	1190	1180	73	1260	1250	1270
2	980	1000	990	990	67		1040	1030
3	1090	1080	1080	1083	33	1110		1110
4	820	820	820	820	37		860	860
5	990	1000	990	993	73	1060	1070	1080
6	880	870	860	870	40	890	880	880
7	1010	1010	1000	1007	44		1050	1040
8	920	940	940	933	68		1000	1000
9	900	890	870	887	27	920	910	920
10	1020	1010	1010	1013	63		1090	1070
11	800	800	800	800	40		850	850
12	970	970	950	963	50	1010	1020	1020
13	1100	1100	1100	1100	27		1180	1180
14	930	940	930	933	18		990	970
15	1060	1060	1040	1053	53	1080	1070	1070
16	1120	1130	1110	1120	70	1150	1150	1170
17	1110	1120	1120	1117	74	1180	1190	1190
18	930	920	910	920	7	950	960	950
19	1030	1020	1010	1020	40		1070	1080
20	930	920	920	923	67	980	970	980
21	890	900	890	893	57	940	950	960
Tot.Wt 20660				20618	1028			
Ave."				981.8	48.9			
Ave. Daily Gain					1.630			

TABLE 18. (Continued)

Lot I--Normal Silage

No.	Ave.Wt. Feb.19	Gn.3d month	Weight Mar.19	Weight Mar.20	Weight Mar.21	Ave.Wt. Mar.21	Gn.4th month	Gn. 120 days
1	1260	80	1300	1290	1290	1293	33	238
2	1035	45	1060	1070	1080	1070	35	203
3	1110	27	1140	1150	1150	1147	37	167
4	860	40	890	890	890	890	30	160
5	1070	77	1120	1110	1110	1113	43	266
6	883	13	930	940	950	940	57	170
7	1045	38	1080	1070	1080	1077	32	204
8	1000	67	1040	1050	1050	1047	47	287
9	917	30	970	980	980	977	60	174
10	1080	67	1110	1130	1130	1123	43	263
11	850	50	900	890	890	893	43	186
12	1017	54	1030	1020	1040	1030	13	163
13	1180	80	1200	1220	1230	1217	37	217
14	980	47	1000	1020	1020	1013	33	166
15	1073	20	1080	1050	1060	1063	-10	150
16	1157	37	1200	1200	1210	1203	46	218
17	1187	70	1250	1240	1240	1243	56	270
18	953	33	980	980	980	980	27	105
19	1075	55	1100	1090	1110	1100	25	170
20	977	54	1020	1010	1040	1023	46	220
21	950	57	1010	1010	1030	1017	67	235
Tot.Wt.	21659	1041				22459	800	4232
Ave."	1031.4	49.5				1069.5	381	201.5
Ave. Daily Gain	1.650							1.679

TABLE 19. Showing Weights & Gains of Cattle fed Third Year
Lot II--Grainless Silage

No.	Description	No. in R. Ear	No. in L. Ear
1	Mottly spotted	1	101
2	Red, black nose, spot R. quarter	2	102
3	Red, white hind legs	3	103
4	Red, white switch	4	104
5	Red, spot on left hock	6	106
6	Red, white switch, 2 short mubs	7	107
7	Brindle, white face	8	108
8	Yellow, whiteface	9	109
9	Black	10	110
10	Red, dark head	12	112
11	Red, black nose, R nub	13	113
12	Red brindle	14	114
13	Black	15	115
14	Red, spot R rump	16	116
15	Red, white forehead	17	117
16	Yellowish red, black nose	18	118
17	Deep red	19	119
18	Red, white underline	20	120
19	Dark roan, small	21	121
20	Blue roan, spot on shoulder	25	125
21	Red mottled face	41	141

TABLE 19. (Continued)

Lot II--Grainless Silage

[illegible]

TABLE 19. (Continued)

Lot II--Grainless Silage

No.	Weight Jan.18	Weight Jan.19	Weight Jan.20	Ave.Wt. Jan.20	Gn.2d Month	Weight Feb.17	Weight Feb.18	Weight Feb.19
1	900	900	870	890	54	940	950	960
2	840	830	820	830	43		900	910
3	1110	1110	1110	1110	84	1150	1140	1160
4	980	970	950	967	57	1000	1010	1010
5	950	960	930	947	34	970	970	970
6	880	880	870	877	61		930	940
7	1040	1040	1030	1037	34	1060	1050	1060
8	1020	1020	1010	1017	27	1030	1030	1050
9	960	960	930	950	60	960	970	980
10	890	900	880	890	40	900	900	910
11	840	860	830	843	63	870	880	880
12	1110	1120	1110	1113	53	1180		1180
13	1030	1040	1020	1030	70	1060	1070	1070
14	1030	1050	1040	1040	50	1070	1060	1080
15	890	880	890	887	54		930	940
16	900	900	870	890	43	910	900	930
17	1010	1010	980	1000	45	1020	1020	1040
18	1050	1060	1040	1050	53	1050	1020	
19	840	860	850	850	60		890	900
20	960	970	940	957	31	980	970	970
21	890	890	860	880	43	910	920	930
Tot.Wt 20120				20055	1059			
Ave "				955.0	50.4			
Ave. Daily Gain					1.680			

TABLE 19. (Continued)

Lot II--Grainless Silage

No.	Ave.Wt. Feb.19	Gn.3d month	Weight Mar.19	Weight Mar.20	Weight Mar.21	Ave.Wt. Mar.21	Gn.4th month	Gn. 120 days
1	950	60	990	980	1000	990	40	180
2	905	75	950	960	950	953	48	176
3	1150	40	1190	1180	1190	1187	37	180
4	1007	40	1050	1050	1040	1047	40	155
5	970	23	1020	1010	1040	1023	53	140
6	935	58	950	970	980	967	32	187
7	1057	20	1130	1100	1130	1120	63	147
8	1037	20	1100	1100	1100	1100	63	163
9	970	20	970	1000	1000	990	20	115
10	903	13	930	930	950	937	34	80
11	877	34	920	910	930	920	43	142
12	1180	67	1190	1190	1210	1197	17	172
13	1067	37	1090	1090	1100	1093	26	153
14	1070	30	1110	1110	1130	1117	47	154
15	935	48	980	980	1000	987	52	167
16	913	23	950	960	950	953	40	118
17	1027	27	1040	1080	1070	1063	36	145
18	1035	-15	1090	1090	1100	1093	58	106
19	895	45	910	930	950	930	35	183
20	973	16	970	990	1000	987	14	100
21	920	40	980	970	980	977	57	161
Tot. Wt.	20776	721				21631	855	3124
Ave.	989.3	34.3				10300	40.6	1487
Ave. Daily Gain		1.143					1.353	1.230

TABLE 20. Daily Rations for the First Period
(Nov.22-Dec.21)

Date	Lot I				Lot II			
	C.S.M.	Silage	Hay (each)	Salt	C.S.M.	Silage	Hay (each)	Salt
Nov.22	60	700	5	20	60	700	5	20
23	60	700	5	20	60	700	5	20
24	60	700	5		60	700	5	
25	60	700	5		60	700	5	
26	60	700	5		60	700	5	
27	84	700	5		84	700	5	
28	84	700	5		84	700	5	
29	84	700	5		84	700	5	
30	84	700	5		84	700	5	
Dec. 1	84	700	5		84	700	5	
2	84	700	5		84	700	5	
3	84	700	5		84	700	5	
4	84	700	5		84	700	5	
5	84	700	5		84	700	5	
6	84	700	5		84	700	5	
7	84	700	5		84	700	5	
8	84	700	3		84	700	3	
9	84	700	3		84	700	3	
10	84	700	3		84	700	3	
11	84	700	3		84	700	3	
12	84	700	3		84	700	3	
13	84	700	3		84	700	3	
14	84	700	3		84	700	3	
15	84	700	3		84	700	3	
16	84	700	3		84	700	3	
17	84	700	3		84	700	3	
18	84	700	3		84	700	3	
19	84	700	3		84	700	3	
20	84	700	3		84	700	3	
21	84	700	3		84	700	3	
Total for mo.	2430	21000	122	40	2430	21000	122	40

Summary of Feed Consumption & Cost of Gain
for First Month

Lot I	Feed Fed	Price Ton	Value	Cost of 100lb
C.S.M.	2430	\$ 45.00	54.67	
Silage	21000	8.50	89.25	11.52
Hay	2562	10.00	12.81	
Salt	40	20.00	.40	
			157.13	
Lot II				
C.S.M.	2430	45.00	54.67	
Silage	21000	4.00	42.00	22.47
Hay	2562	10.00	12.81	
Salt	40	20.00	.40	
			109.88	

TABLE 21.

Daily Rations for the Second Month
(Dec. 21-Jan. 20, 1930)

Date	Lot I				Lot II			
	C.S.M.	Silage	Hay (each)	Salt	C.S.M.	Silage	Hay	Salt
Dec. 22	104	800	3	25	104	800	3	25
23	104	800	3		104	800	3	
24	104	800	3		104	800	3	
25	104	800	3		104	800	3	
26	104	800	3		104	800	3	
27	104	800	3		104	800	3	
28	104	800	3		104	800	3	
29	104	800	3		104	800	3	
30	104	800	3		104	800	3	
31	104	800	3		104	800	3	
Jan. 1	104	750	3		104	750	3	
2	104	750	3		104	750	3	
3	104	750	3		104	750	3	
4	104	750	3		104	750	3	
5	104	750	3		104	750	3	
6	104	750	3		104	750	3	
7	104	750	3		104	750	3	
8	104	750	3		104	750	3	
9	104	700	3		104	700	3	
10	104	700	3		104	700	3	
11	104	700	3		104	700	3	
12	104	700	3		104	700	3	
13	104	700	3		104	700	3	
14	104	700	3		104	700	3	
15	104	700	3		104	700	3	
16	104	700	3		104	700	3	
17	104	700	3		104	700	3	
18	104	700	3		104	700	3	
19	104	700	3		104	700	3	
20	104	700	3		104	700	3	
Total for Mo.	3120	22400	90 21 1890	25	3120	22400	1890	25

Summary of Feed Consumption & Cost of Gain
for Second Month

Lot I	Feed Fed	Price Ton	Value	Cost of 100 lb.gn.
C.S.M.	3120	\$ 45.00	\$70.20	
Silage	22400	8.50	95.20	17.03
Hay	1890	10.00	9.45	
Salt	25	20.00	.25	
			175.10	
Lot II				
C.S.M.	3120	45.00	70.20	
Silage	22400	4.00	44.80	11.77
Hay	1890	10.00	9.45	
Salt	25	20.00	.25	

TABLE 22. Daily Rations for the Third Month

Date	Lot I				Lot II			
	C.S.M.	Silage	Hay	Salt	C.S.M.	Silage	Hay	Salt
Jan. 21	126	700	63		126	700	63	
22	126	700	63	10	126	700	63	10
23	126	700	63	7	126	700	63	7
24	126	700	63	5	126	700	63	5
25	126	700	63		126	700	63	
26	126	700	63		126	700	63	
27	126	700	63		126	700	63	
28	126	700	63		126	700	63	
29	126	700	63		126	700	63	
30	126	700	63		126	700	63	
31	126	700	63		126	700	63	
Feb. 1	126	700	63		126	700	63	
2	126	700	63		126	700	63	
3	126	700	63		126	700	63	
4	126	700	63		126	700	63	
5	126	700	63		126	700	63	
6	126	700	63		126	700	63	
7	126	700	63		126	700	63	
8	126	700	63		126	700	63	
9	126	700	63		126	700	63	
10	126	700	63		126	700	63	
11	126	700	63		126	700	63	
12	126	700	63		126	700	63	
13	126	700	63		126	700	63	
14	126	700	63		126	700	63	
15	126	700	63		126	700	63	
16	126	700	63		126	700	63	
17	126	700	63		126	700	63	
18	126	700	63		126	700	63	
19	126	700	63		126	700	63	
Total for mo.	3780	21000	1890	22	3780	21000	1890	22

Summary of Feed Consumption & Cost of Gain
for Third Month

Lot I	Feed Fed	Price Ton	Value	Cost of 100 lb. gain
C.S.M.	3780	\$45.00	85.05	
Silage	21000	8.50	89.25	
Hay	1890	10.00	9.45	
Salt	22	20.00	.22	
			183.97	\$17.67
Lot II				
C.S.M.	3780	45.00	85.05	
Silage	21000	4.00	42.00	
Hay	1890	10.00	9.45	
Salt	22	20.00	.22	
			136.72	18.96

TABLE 23. Daily Rations for the Fourth Month

Date	Lot I					Lot II				
	C.S.M.	Silage	Hay	Molas.	Salt	C.S.M.	Sil.	Hay	Mol.	Salt
Feb. 20	148	700	63	24		148	700	63	24	
21	148	700	63	24		148	700	63	24	
22	148	700	63	24		148	700	63	24	
23	148	700	63	32		148	700	63	32	
24	148	700	63	32		148	700	63	32	
25	148	700	63	32		148	700	63	32	
26	148	700	63	42		148	700	63	42	
27	148	700	63	42		148	700	63	42	
28	148	700	63	42		148	700	63	42	
Mar. 1	148	700	63	42		148	700	63	42	
2	148	700	63	42		148	700	63	42	
3	148	700	63	42		148	700	63	42	
4	148	700	63	42		148	700	63	42	
5	148	700	63	42		148	700	63	42	
6	148	700	63	42		148	700	63	42	
7	148	700	63	42		148	700	63	42	
8	148	700	63	42		148	700	63	42	
9	148	700	63	42		148	700	63	42	
10	148	700	63	42		148	700	63	42	
11	148	700	63	42		148	700	63	42	
12	148	700	63	42		148	700	63	42	
13	148	700	63	42		148	700	63	42	
14	148	700	63	42		148	700	63	42	
15	148	650	63	42		148	650	63	42	
16	148	700		42		148	700		42	
17	148	700		42		148	700		42	
18	148	700		42		148	700		42	
19	148	700	63	42		148	700	63	42	
20	148	700	63	42		148	700	63	42	
21	148	700	63	42	20	148	700	63	42	20
Total for Mo.	4440	20950	1638	1176	20	4440	20950	1638	1176	20

Summary of Feed Consumption & Cost of Gain
for Fourth Month

Lot I	Feed Fed	Price Ton	Value	Cost of 100 lb.gn
C.S.M.	4440	45.00	99.90	
Molasses	1176	26.50	15.58	
Silage	20950	8.50	89.03	
Hay	1638	10.00	8.19	
Salt	20	20.00	.20	
			212.90	\$ 26.61
Lot II	Feed Fed	Price Ton	Value	Cost of 100 lb.gn
C.S.M.	4440	45.00	99.90	
Molasses	1176	26.50	15.58	
Silage	20950	4.00	41.90	
Hay	1638	10.00	8.19	
Salt	20	20.00	.20	
			165.77	\$ 19.38

TABLE 24.

Summary of Feed Consumption & Cost of Gains for
All Periods---120 days

	Amt. fed	Price	Value	Cost of 100 lb.gn.	Ave.Da. ration	Feed for 100 lb.gn.
LOT I						
Silage	85,350	\$ 8.50	362.73		33.	2016
Hay	7,980	10.00	39.90		3.	188
C.S.M.	13,770	45.00	309.82		5.4	325
Molasses	1,176	26.50	15.58		.46	27
Salt	107	20.00	1.07		.04	2.5
			729.10	17.22	41.90	2558.5
LOT II						
Silage	85,350	4.00	170.70		33	2738
Hay	7,980	10.00	39.90		3	255
C.S.M.	13,770	45.00	309.82		5.4	441
Molasses	1,176	26.50	15.58		.46	37
Salt	107	20.00	1.07		.04	3.4
			537.07	17.19	41.90	3474.4

TABLE 25.

Sale Report on Cattle Fed Third Year

Lot I

21 cattle weighed from barn at 6:00 A.M. (without feed or water)	22,520 lbs.
3% shrink (675 lbs) allowed buyer	
Net Selling weight	21,845 "
21,845 lbs @ \$10.50 per cwt.	\$ 2293.72

Lot II

19 cattle weighed from barn at 6:00 A.M. (without feed or water)	19,790 lbs.
3% shrink (593 lbs) allowed buyer	
Net selling weight of 19 cattle	19,187 "
19,187 lbs. @ \$9.85 per cwt.	\$ 1890.90
2 cattle (poor finish) weighed same as above	1,830 lbs.
3% shrink (55 lbs) allowed buyer	
Net selling weight of 2 cattle	1,775 "
1775 lbs @ \$9.00 per cwt.	\$ 159.75
Total receipts from 21 cattle	\$2050.65

TABLE 26.

Capacity of Silos

	Normal	Grainless
Amount fed in preliminary period	6,300	6,300
" " first month	21,000	21,000
" " second month	22,400	22,400
" " third month	21,000	21,000
" " fourth month	20,950	20,950
" " extra	3d mo. (7,110 4th mo. (1,080	
Silage left at conclusion of experiment 4" (4,000 per foot)	16,000	5,346
	115,840 Lb 57.92 T.	96,996 Lb 48.49 T.

TABLE 27.

Financial Statement for Third Year

	Lot I	Lot II
Cost per head beginning of experiment		
Lot I--Wt. 867.9 lbs. @ 8¢	\$ 69.42	
Lot II--Wt. 881.3 lbs. @ 8¢		\$ 70.50
Feed cost per head for 120 days	34.72	25.57
Interest on investment per head for 5mo @6%	1.73	1.76
Total cost per steer	105.87	97.83
Sale returns per steer		
Lot I--Wt. 1040. @ \$10.50 per cwt	109.20	
Lot II--Wt. 993. @ \$ 9.78(ave) "		97.60
Profit per head	3.33	.23
Margin received	2.50	1.78

Note: The feed cost for the above is based on \$45.00 Cottonseed meal--the average cost of meal for the three years. Since the actual cost of meal for the year was about \$40.00, the profit would be slightly higher for each lot.