

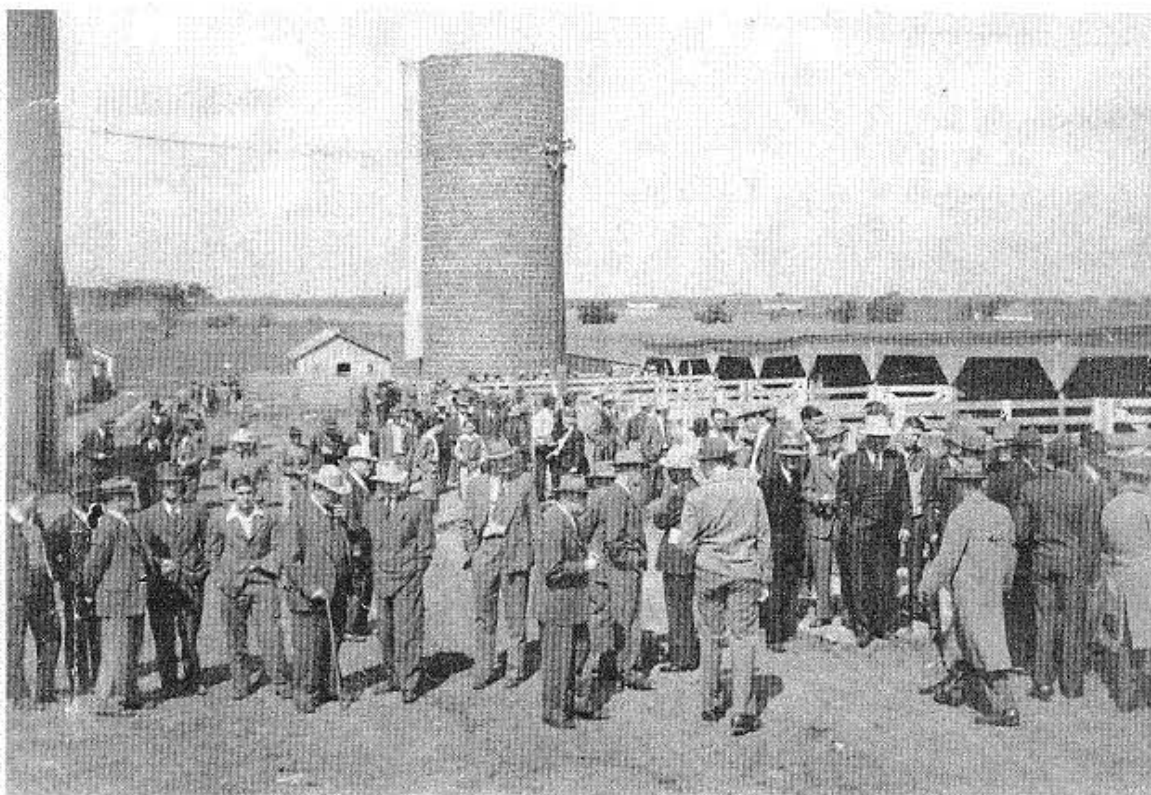
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THIRTY-FIFTH ANNUAL

LIVESTOCK FEEDERS' DAY

85th Anniversary

May 1, 1948



DEPARTMENT OF ANIMAL HUSBANDRY

Kansas Agricultural Experiment Station

Manhattan, Kansas

THIRTY-FIFTH ANNUAL KANSAS LIVESTOCK FEEDERS' DAY

Kansas State College
Manhattan, Kansas

Saturday - May 1, 1948

9:30-11:45 a.m. - FORENOON PROGRAM

Animal Husbandry Barns and Feedlots.

Inspection of Experimental Livestock and
Purebred Herds and Flocks.

Reports on Feeding Trials and Management
Tests.

Beef Cattle - A. G. Pickett, Ed. F. Smith, F. W. Bell, and
Don L. Good.

Sheep - Rufus F. Cox and Robert A. Edgar.

Hogs - C. E. Aubel and R. B. Cathcart.

Noon -- Luncheon sponsored by the Kansas Livestock Association and served
by the Block and Bridle Club.

1:15 p.m. - AFTERNOON PROGRAM - North Pavilion.

Presiding - Herb Barr, Leoti, Kansas
President, Kansas Livestock Association.

Opening Remarks - Milton S. Eisenhower, President
Kansas State College.

Animal Husbandry in 1948 - R. I. Throckmorton, Director
Kansas Agricultural Experiment Station.

Address - Paul Gerlaugh, Chief, Animal Industry Department,
Ohio Agricultural Experiment Station, Wooster, Ohio.

Presentation of Kansas Beef Production Winners -
Walter H. Atzenweiler, Agricultural Commissioner,
Chamber of Commerce, Kansas City, Missouri; and
Lot F. Taylor, Extension Animal Husbandman, Kansas
State College.

Research Trends and Accomplishments -
A. D. Weber, Head, Department of Animal Husbandry,
Kansas State College.

J. W. Robison - First President of the Kansas Livestock
Association - C. W. McCampbell, Professor of
Animal Husbandry, Kansas State College.

Question Box

Women's Program

1:15 p.m. -- Room 312, West Waters Hall.
Discussion on meat and related topics.

ANIMAL HUSBANDRY IN 1948
KANSAS LIVESTOCK FEEDERS DAY, MAY 1, 1948

R. I. Throckmorton

The topic, "Animal Husbandry in 1948," has many possibilities, but I intend to limit my brief discussion to some of our research plans for the next year.

The research projects reviewed by you this morning will be continued, but will be varied to meet the demands for information on new phases of the livestock industry. Feeding, management, and nutrition must be varied with changing conditions and the development of new information. We attempt to keep pace with these changes and adapt our research programs to them. The physical features of the grass utilization project have been developed to a point where we can now begin to initiate the research program. Getting the physical plant in readiness for this project has been expensive and time-consuming, but much progress has been made.

As many of you know, the research work in Animal Husbandry of Kansas State is centered at the College where the studies deal with beef cattle, hogs, and sheep. Important research work, however, is conducted with beef cattle at the Hays Branch Station, and with lambs at the Garden City Branch Station. At these two stations, emphasis is placed on the utilization of the feeds produced in Western Kansas.

During the next year, we hope to initiate a project on the improvement of beef cattle through breeding methods. This project will be in cooperation with the United States Department of Agriculture and with several other states. The objects of the project on beef cattle breeding may be listed as follows:

1. To develop a superior line of cattle, and to maintain a detailed record of its progressive development.
2. To determine the practicability of inbreeding for the establishment of a superior line.
3. To develop testing procedures and other objective techniques for the evaluation of breeding animals.
4. To collect data pertaining to the inheritance of physical characteristics of beef cattle.

We hope to undertake this study because the efficient utilization of grass, roughage, and feed grain is a major problem in Kansas. The problem will, I believe, become more significant in the future because of the emphasis being placed on soil conservation, the returning of cultivated land to grass, and the improvements of grasses and other forage crops. These changes will mean more grass and other forage feeds. There is need for more information on breeding methods and selection techniques which will aid in the production of beef cattle of maximum usefulness in converting such feed crops and by product materials into human food. In these studies, we will be especially interested in economy of gain, type, conformation and carcass quality.

A project of this type will be of long duration and will be expensive, but we believe the possibilities are sufficiently great to amply justify us in undertaking the study. In setting up a study of this type, we must look forward not to one or two years, but to 15, 20 or 25 years. This project is looking forward not to the second or third generation of the cattle with which we will be working, but to the next generation of cattlemen.

Another research project which we hope to start during this year and which will be of interest to livestock men is entitled, "Marketing Feeder Cattle and Sheep in Kansas."

It is estimated that 615 thousand head of cattle and calves and 93 thousand head of sheep and lambs moved into Kansas for feeding and grazing during 1945. In addition, large numbers were moved from one area to another within the state. We recognize that methods of marketing feeder cattle and sheep have undergone considerable change and that little is known of costs of marketing through various channels. The information available to sellers and buyers on how, where, and when to buy and sell to best advantage is limited. It is anticipated that this project will supply information of value to livestock men on the specific sources of demand for and the supply of feeder cattle and sheep; costs of buying and selling feeder cattle and sheep through different types of markets, and factors affecting prices of feeder cattle and sheep.

It is evident that in the immediate future in agriculture, there will be increased emphasis on research that relates to quality of food products such as meat. We are becoming more conscious of quality and nutritional value of all of our foods, and this consciousness will force more attention to those phases of research that will result in higher quality foods reaching the consumer. In addition, more agricultural products will be sold on a graded basis and on quality in the future than has been the case in the past. This means research to establish facts upon which the grades will be based. It means research to establish practical and economic production, processing, and handling methods to aid in meeting the grade standards which will be more strict than those in effect today.

Closely related to the research for the purpose of providing higher quality food will be research in the entire field of marketing. This research will cover every phase of marketing from the producer to the consumer. It will be aimed toward reducing the losses and deterioration that occur between the time a product is produced and the time it is sold to the consumer. It will investigate packaging, refrigeration, etc. It should, by reducing losses in marketing, reduce the spread in price between producer and consumer.

Production costs of agricultural products will receive much attention during the next few years. It will in many cases be necessary to reduce production costs, and one of the most efficient methods of reducing production costs is to increase production through better feeding methods, better management, and the use of better types of livestock.

"Buckeye Beef Cattle Briefs"

Paul Gerlaugh
Ohio Agricultural Experiment Station
Wooster, Ohio

Choice steers are the most profitable grade of feeder steers for the ranchman to produce, but we don't find them the most profitable grade to fatten in our feed lots.

We have fed choice, medium, and common grades of yearling steers the same rations for a feeding period of five to seven months.

When these tests were timed to close, about the first of May, the common cattle gave us twice as much return per bushel of corn fed as the choice cattle, with the medium grade in the middle.

When similar tests were timed to close in August, the common grades proved the most profitable one year and the medium grade led in returns the second year.

The choice feeders cost us nearly twice as much per pound or per head. No question which grade was the most profitable for the ranchman to produce. Neither was there any question that the plainer grades were the most profitable for the corn belt cattle feeders to fatten for the beef trade.

That situation is not easy to solve. Do you have suggestions toward the solution?

Some of our Ohio feeders of choice cattle complain that they are not getting the feed lot gains they were getting a decade or two ago. They wonder if some of this apparent lack of satisfactory performance is not due to lack of size or substance in the feeder cattle they are buying.

We have had some experiences with different sizes of beef bulls that have given us an increase of seventy pounds per calf to the eight hundred pound weight, when we used ton bulls as compared with seventeen hundred pound bulls. Could it be that we are going too far in seeking pronounced beef type and losing out on some important production fundamentals?

May I ask if some of our show rings aren't parading before the ringside demonstrations of the art of fitting show cattle rather than seeking and demonstrating a more efficient machine to turn grass and hay and corn or other grains into beef.

Cutting costs of production is always a constructive goal. Market topping ability of steers is not necessarily associated with the most profitable feeding enterprise; neither can it be said that the fastest gaining steer is the most profitable. Let me explain what I mean by an example.

Several years ago we compared shelled corn and corn-and-cob meal from the same stock pile of corn for fattening calves and yearling steers. When we finished three tests with calves and two tests with yearlings we found no difference in rapidity of gains. We did find that we got nine-tenths of a pound more gain on the cattle and the pigs following the cattle per bushel of corn fed to the cattle when we fed the corn as corn-and-cob meal.

That is a big statement. A good question which arose was whether 56 pounds of ground shelled corn to 14 pounds of cobs was the best ratio to feed those ingredients of corn-and-cob meal.

We then started comparing ground shelled corn, regular corn-and-cob meal and corn-and-cob meal that contained double the normal amount of cob. The ground shelled corn fed cattle led the three rations in average daily gains, selling price, and dressing percentages. Their carcasses were fatter but did not grade higher.

When we figured the value of the cobs in terms of carcass weights of the steers we found that 100 pounds of cobs were worth as much as 50 pounds of shelled corn.

We then used ground shelled corn, regular corn-and-cob meal and corn and added cob meal to yearling steers getting twenty-five pounds of corn silage per steer per day with parallel results.

We know that nature put a rumen in cattle to handle so-called rough feeds. The more we can learn about how best to capitalize on the situation the better off our cattlemen will be and that can't help but be constructive so far as our soil conservation thinking is concerned. I imagine folks outside of the corn belt are better versed along those lines than some of us who call the corn belt home.

The consuming public likes beef. Why shouldn't they? We need concern ourselves as producers with cutting costs of production so that we can sell our product at a price that keeps beef moving into consumption and leave some profit for us. No one formula will do that job for all.

FATTENING HEIFERS FOR THE SUMMER OR EARLY FALL MARKET

A. G. Pickett

Experiment III - 1946-1947

1. Without Pasture
2. With Pasture
 - A. Full feeding on grass after grazing 100 days.
 - B. Full feeding in dry lot after grazing 100 days.

INTRODUCTION

The two preceding tests with heifer calves were conducted without the use of grass. Varying amounts of grain and protein supplement were fed with silage during the winter season and then a full feed of grain was used to finish these heifers for the summer or early fall market.

With experimental pastures available, grass is being used to the fullest extent in developing a system of deferred feeding for fattening heifers.

EXPERIMENTAL PROCEDURE

Wintering Phase

All five lots of heifers, numbered 3 to 7 inclusive, received a full feed of silage, 1/10 pound of ground limestone daily, and salt. Lot 3 was full fed ground shelled corn; 1 pound of cottonseed meal was fed the first 35 days and then increased to 1½ pounds. Lots 4 and 5 received a full feed of silage and ¼ feed of ground shelled corn. The only difference was that the cottonseed meal was increased from 1 pound daily to 1½ pounds daily in lot 4 at the same time it was increased in lot 3.

Mustard Seed Meal. Lots 6 and 7 were wintered on a full feed of silage, 1/10 pound of ground limestone and 1 pound protein supplement. Lot 6 received 1 pound mustard seed meal daily, while lot 7 was fed 1 pound of cottonseed meal daily.

Grazing and Full Feeding

At the close of the wintering phase, Lot 3 was continued on full feed in dry lot and marketed July 2. Likewise, lot 4 was not grazed but was placed on full feed in dry lot following the wintering period. This lot was marketed August 11, 1947.

Lots 5, 6, and 7 were grazed together on bluestem grass without grain until August 2. On August 2, lots 5 and 7 were full fed on grass until marketed October 25. Lot 6 was full fed in the dry lot for this same period.

OBSERVATIONS

Phase I-Wintering

1. Lot 3 heifers were fatter at the close of the wintering period than the other lots.
2. The extra 50 pounds of cottonseed meal, $\frac{1}{2}$ pound daily for 100 days, received by lot 4 over lot 5, accounted for 25 pounds of extra gain. The heifers also showed a slightly greater degree of finish and more bloom.
3. While consuming only 25 percent as much grain as lot 3, lot 4 gained approximately 80 percent as much as lot 3.
4. Mustard seed meal gave practically the same gains in lot 6 as did cottonseed meal in lot 7. More tests need to be made before definite conclusions are made but on the basis of this first test it appears that mustard seed meal is equal to cottonseed meal.
5. A study of the table will provide details of this wintering phase.

Phase II-Early Summer Period

1. Lots 6 and 7 wintered without grain gained about one pound per heifer daily, or slightly more than lot 5, the well wintered lot. Lot 5 still held a 40 pound gain advantage and appeared to be carrying more flesh.

Phase III-Late Summer or Full Feeding Period

1. Lot 6 fed in the dry lot showed a distinct advantage over lot 7 fed on grass.
 - a. Consumed almost $1\frac{1}{2}$ bushels less corn.
 - b. Gained 52.5 pounds more in the 84 day period.
 - c. Sold for \$1.50 more per cwt.
 - d. Graded approximately 1 grade higher in the carcass.
 - e. Shrank less in transit.
 - f. Dressed slightly higher.
2. This does not entirely agree with all past work done with steers and therefore future work should be carefully observed.
3. One cannot always rely on visual observations. The heifers being fed on grass appeared to be doing better than those in dry lot. The lack of finish however was readily noticeable at market, both on foot and in the cooler.
4. Unfortunately we did not have a well wintered lot to feed in dry lot to check against lot 5 fed on grass. This lot fell between lots 6 and 7 in gain and finish, grading approximately one-half grade below lot 6 and one-half grade above lot 7.
5. The well wintered lot sold \$1.00 per cwt. above lot 7 and \$.50 under lot 6.

SUMMARY

1. This test shows a definite advantage in favor of deferring the full feeding of grain and the use of roughage and grass in fattening heifer calves for an early market.

2. Where grass is not available a good wintering before full feeding grain is desirable.

3. Heifers full fed from the start required approximately 100% more corn than was required by heifers that were wintered, grazed and then full fed.

4. The importance of efficient gains is emphasized by comparing lots 6. and 7.

Table I

Phase I - Wintering
December 5, 1946 to April 24, 1947 - 140 Days

1. Lot Number	3	4	5	6	7
2. Number of heifers in lot	11	11	11	11	11
3. Level of grain feeding	Full Feed	$\frac{1}{2}$ Feed	$\frac{1}{2}$ Feed	No Grain	No Grain
4. Daily winter ration per heifer:					
Silage	10.66	24.90	25.32	26.63	26.69
Ground corn	8.69	2.17	2.17	—	—
Cottonseed meal	1.39	1.39	1.00	—	1.00
Mustard seed meal	—	—	—	1.00	—
Ground limestone	.09	.09	.09	.09	.09
Salt	.05	.05	.06	.07	.10
5. Average initial weight	407	400	401	405	406
6. Average final weight	665	605	580	531	544
7. Average gain	258	205	179	126	138
8. Average daily gain	1.84	1.46	1.28	.90	.96
9. Feed required per 100 pounds gain:					
Silage	578	1701	1980	2959	2789
Ground corn	472	148	170	—	—
Cottonseed meal	75	95	78	—	104
Mustard seed meal	—	—	—	111	—
Ground limestone	5	6	7	10	9
Salt	2	3	5	8	11

Table II

Phase 2 - Early Summer Period
April 24, 1947 to August 2, 1947 - 100 Days

10. Lot Number	3	4	5	6	7
11. Number of heifers in lot	11	11	11	11	10
12. Management followed	Continued on full feed in dry lot and marketed July 2	Placed on full feed in dry lot and marketed Aug. 11	Grazed without grain	Grazed without grain	Grazed without grain
13. Number of days in period	89	109	100	100	100
14. Average daily ration:					
Silage	3.38	5.38			
Alfalfa	3.48	5.01			
Ground corn	11.56	11.69	Grazed	Grazed	Grazed
Cottonseed meal	1.23	1.15			
Ground limestone	.07	.04			
15. Weight per heifer at beginning of early summer period	665	605	580	581	544
16. Weight per heifer at end of early summer period	778	808	665	628	644
17. Gain per heifer early summer period	113	203	85	97	100
18. Daily gain per heifer, early summer period	1.63	1.86	.85	.97	1.00
19. Total corn consumed per heifer-bushels	14.25	22.76	0	0	0

Table III

Phase 3 - Late Summer Period
August 2, 1947 to October 25, 1947 - 84 Days

20. Lot Number	3	4	5	6	7
21. Number of days fed	0	0	84	84	84 ✓
22. Where fed			Pasture	Dry lot	Pasture
23. Average daily ration:					
Alfalfa			—	7.77	—
Ground corn			12.37	11.40	12.37
Cottonseed meal			1.48	1.00	1.48
24. Weight per heifer at beginning of late summer period			665	628	644
25. Weight per heifer at end of late summer period			830	838	802
26. Gain per heifer, late summer period			165	210	158
27. Daily gain per heifer, late summer period			1.96	2.50	1.87
28. Corn consumed per heifer - bushels			18.56	17.11	18.55

Table IV

Summary of Phases 1, 2 and 3

29. Lot Number	3	4	5	6	7
30. Number of heifers in lot	11	11	11	11	11*
31. Date placed on test	12-5-46	12-5-46	12-5-46	12-5-46	12-5-46
32. Date taken off test	7-2-47	8-11-47	10-25-47	10-25-47	10-25-47
33. Date marketed	7-7-47	8-12-47	10-28-47	10-28-47	10-28-47
34. Duration of experiment in days	209	249	324	324	324
35. Average final weight	778	808	830	838	802
36. Total gain per heifer	371	408	429	433	396
37. Total feeds consumed per heifer:					
Ground shelled corn - bu.	35.98	28.19	23.99	17.11	18.56
Protein supplement-lbs.	273.40	319.68	264.90	224.09	253.54
Silage-lbs.	1725.00	4073.64	3544.55	3728.64	3737.27
Alfalfa hay-lbs.	240.45	546.36		652.72	
Ground limestone-lbs.	17.63	17.63	12.54	12.54	12.54
Grass			Apr. 24 to Oct. 25	Apr. 24 to Aug. 2	Apr. 24 to Aug. 2

* One heifer with calf removed from test on 6-24-47.

Table V

Financial Statement and Marketing Data

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38. Lot Number	3	4	5	6	7
39. Feed cost per heifer:					
Silage	\$ 6.38	\$ 15.07	\$ 13.11	\$ 13.79	\$ 13.63
Alfalfa hay	3.01	6.83		8.16	
Ground corn	86.35	67.65	57.58	41.06	44.54
Protein supplement	13.92	15.98	13.21	11.20	12.69
Ground limestone	.18	.18	.13	.13	.13
Grass			10.00	10.00	10.00
40. Total cost of feed and grass	\$109.84	\$105.71	\$ 94.03	\$ 84.34	\$ 81.18
41. Cost of feed per 100 pounds gain	\$ 29.60	\$ 25.90	\$ 21.92	\$ 19.48	\$ 20.53
42. Initial cost per heifer at \$17.40 per cwt.	\$ 70.82	\$ 69.60	\$ 69.77	\$ 70.47	\$ 70.64
43. Heifer cost plus feed cost	\$180.66	\$175.31	\$163.80	\$154.81	\$151.82
44. Selling price per cwt. at Kansas City	\$ 27.34	\$ 28.00	\$ 26.00	\$ 26.50	\$ 25.00
45. Necessary selling price per cwt. at Kansas City to cover initial cost plus feed cost	\$ 23.43	\$ 22.44	\$ 20.60	\$ 19.02	\$ 19.72
46. Selling price per heifer at Kansas City	\$210.79	\$218.68	\$208.70	\$215.71	\$192.50
47. Margin per heifer above feed cost and initial cost	\$ 30.13	\$ 43.37	\$ 42.90	\$ 60.90	\$ 40.68
48. Average weight at market	771.00	781.00	795.00	814.00	770.00
49. Shrink in transit					
Pounds per heifer	7.00	27.00	35.00	24.00	31.50
Per cent	.89	3.34	4.21	2.96	3.93
50. Dressing percentage	*	*	58.7	58.0	57.8
51. Carcass grades	*				
Choice					
high.....					
average.....					
low.....		1			
Good					
high.....		1			
average.....		7			
low.....		1	1	4	
Commercial					
high.....		1	4	4	1
average.....			4	3	6
low.....			2		3

* Not available

FATTENING HEIFERS FOR THE SUMMER OR EARLY FALL MARKET

A. G. Pickett - Ed F. Smith

Experiment IV - 1947-1948

1. Without Pasture
2. With Pasture
 - A. Full feeding on grass after grazing 100 days.
 - B. Full feeding in dry lot after grazing 100 days.
 - C. Feeding protein supplement on grass and full feeding later.
3. Comparing dehydrated Brome grass, dehydrated alfalfa pellets and mustard seed meal with cottonseed meal, soybean meal and linseed meal as a protein supplement for wintering heifer calves.

INTRODUCTION

Three preceding tests with heifer calves have been completed. The third test used pasture for the first time. Wintering with and without grain and then grazing together until August 2 followed by full feeding in dry lot and on grass has been the procedure followed.

With the experimental pasture more completely developed, plans are to make a more detailed comparison of dry lot versus pasture full feeding. The feeding of cottonseed meal on grass will also be used where heifers are to be full fed later.

EXPERIMENTAL PROCEDURE

Eight lots of heifers are being used in the current test. All eight lots have been wintered on a daily ration of 20 pounds Atlas sorgo silage, full access to prairie hay in racks, and a protein supplement. Dehydrated Brome grass and dehydrated alfalfa pellets and a combination of dehydrated Brome grass and cottonseed meal were compared with the standard oil seed meals and with mustard seed meal. In addition to the above ration, lots 1 to 6 inclusive received 2 pounds ground shell corn.

Lot 4 will be finished in the dry lot without going to grass. Lot 5 will be full fed on Brome grass pasture. Lots 1, 2, 3, 6, 7, and lot 8 will be grazed together on bluestem pasture until August 1. The six lots of heifers will then be used to compare dry lot full feeding, full feeding on grass, and feeding a protein supplement on grass before full feeding.

Lots 4 and 5 were started last fall on 1 pound of the dehydrated Brome grass and 1 pound dehydrated alfalfa pellets respectively and then increased to 2 pounds on January 6 when weights showed these lots were not making gains comparable to the lot being fed 1 pound cottonseed meal.

The purpose was to determine the amount of these dehydrated feeds required to equal 1 pound of cottonseed meal or other comparable oil seed meals as a protein supplement.

OBSERVATIONS

1. All eight lots of heifers made exceptionally good gains:
2. Cottonseed meal, soybean meal, linseed meal and mustard seed meal fed as protein supplements produced approximately the same gain in wintering heifers.
3. Results of this test indicate it would take 2 pounds of the dehydrated Bromegrass or alfalfa pellets to equal 1 pound of the oil seed meals as protein supplements. After these dehydrated feeds were increased to 2 pounds daily per heifer the gain was only slightly less than for the oil seed meals.
4. Feeding 2 pounds of these dehydrated feeds resulted in a small decrease in total roughage consumption.
5. There was no apparent difference in condition or bloom between lots 1 to 5, inclusive, or lots 6 to 8 inclusive.
6. Results of this winter phase are only incidental. Final results after grazing and full feeding are the main objectives of this test.
7. Necessary selling price to pay initial heifer cost and feed costs are relatively low considering high feed costs. Relatively high gains are largely responsible and emphasize the importance of rate of gain in determining cost of production.

10-Cost of feed for 100 pounds gain	14.81 \$ 15.65	13.72 \$ 15.63	14.94 \$ 15.20	18.69 \$ 16.55	18.11 \$ 16.36	14.38 \$ 18.98	12.52 \$ 12.84	\$ 12.88 14.71
11-Feed cost per heifer	\$ 37.80 ^{25.37}	\$ 37.76 ^{25.10}	\$ 37.65 ^{25.40}	\$ 36.85 ^{26.35}	\$ 37.35 ^{27.16}	\$ 24.87 ^{19.28}	\$ 24.91 ^{19.28}	\$ 23.70 19.28
12-Initial cost of heifers at \$0.50 per cwt.	121.90 \$ 87.72	122.70 \$ 87.29	122.60 \$ 87.07	118.19 \$ 86.86	118.19 \$ 86.86	118.19 \$ 87.29	119.25 \$ 87.29	116.60 \$ 86.86
13-Heifer cost plus feed cost	\$125.52 147.22	\$125.05 147.80	\$124.72 148.00	\$122.71 144.74	\$124.17 145.35	\$112.16 137.47	\$112.20 138.53	\$110.65 135.88
14-Necessary selling price per cwt. to pay for feed and initial cost	23.33 \$ 19.83	22.88 \$ 19.40	23.38 \$ 19.11	24.62 \$ 19.75	24.39 \$ 19.65	23.70 \$ 18.48	22.94 \$ 18.70	23.80 \$ 18.77
15-Appraised value per cwt. May 1, 1948								limited meal, 30. per ton

FEEED PRICES: Ground shelled corn, \$2.40 per bushel; Cottonseed meal, soybean meal, linseed meal, mustard seed meal, \$100 per ton; Dehydrated alfalfa pellets, \$60 per ton; Prairie hay, \$15 per ton; Silage, \$7.50 per ton.

PROTEIN ANALYSIS: Dehydrated alfalfa pellets, 19.94%; dehydrated Brome grass, 20.9%.

INFLUENCE OF WINTER RATIONS AND GAINS ON SUBSEQUENT PASTURE GAINS

A. G. Pickett - Ed F. Smith

1. Relative values of Atlas silage, oats straw and combinations of these two roughages.
2. One pound of cottonseed meal versus four pounds of alfalfa hay as a supplement to the above feeds.
3. Feeding cottonseed meal on grass and its effect on late season gains and full feeding results following the grazing season.
4. Wintering yearling steers on bluestem pasture.

INTRODUCTION

This test began with good to choice steer calves. The purpose is to use bluestem grass to the best advantage in producing beef.

Two of the lots were fed out at the close of the first season's grazing and the other three lots have been wintered and will be grazed a second season.

EXPERIMENTAL PROCEDURE

Atlas silage, oats straw and a combination of these two roughages were used in wintering these steers as calves the winter of 1946 and 1947. Lot 1 was full fed silage, lots 2 and 3 were full fed oats straw alone and lots 4 and 5 were fed a one-half feed of silage plus oats straw. All five lots were grazed together on bluestem grass until August 2. From August 2 until October 29, lots 2 and 4 received $1\frac{1}{2}$ pounds cottonseed meal on grass while lots 1, 3, and 5 continued on grass the full season without supplementary feed.

Following the grazing period, lots 4 and 5 were full fed in dry lot. These lots had been wintered alike but lot 4 was fed cottonseed meal on grass.

Lot 3 was wintered on grass with 1 pound cottonseed cake per day until December 16 and $1\frac{1}{2}$ pounds cottonseed cake until May 1. A low grade of prairie hay was fed only when the grass was covered completely with snow. These steers were not fed daily, but only every second day.

Lots 1 and 2 were wintered on silage, prairie hay, and cottonseed meal. Lots 1, 2, and 3 will be grazed together during the summer of 1948. We did not have scales at the pasture during the 1947 grazing season and as a consequence, the steers were weighed only once during the summer, August 2.

OBSERVATIONS

Phase I-First Wintering

1. Silage and 1 pound cottonseed meal in lot 1 gave larger gains and the steers were showing more condition and much more bloom than the other four lots.

2. Lots 2 and 3, which received oats straw as the only roughage, finished in rather rough condition but all steers appeared to be strong and thrifty. There was a definite tendency for the steers to develop large paunchy middles.

Phase II-Early Summer Period

1. April 24th weights were taken with cattle full, while August 2nd weights were after gathering and trucking 5 miles.
2. All five lots gained practically the same to August 2 regardless of how they were wintered.
3. Lots 2 and 3 wintered on oats straw and gaining only 50 pounds during the winter were slow to start gaining on pasture and shed off late.
4. Lot 4, wintered on silage, was showing some finish and considerable bloom on August 2.
5. Grass was good and abundant.

Phase III-Late Summer Period

1. The level of wintering did not show up in early summer gains but lot 1, the better wintered steers, made only slightly more than one-half the gain made by lots 3 and 5 and also lost their bloom during August, September, and October.
2. One and one half pounds of cottonseed meal increased the gain more than one pound per day and also increased the appraised value per cwt. 50 cents.
3. Steers fed $1\frac{1}{2}$ pounds cottonseed meal on grass made approximately the same gain as comparable heifers fed $1\frac{1}{2}$ pounds cottonseed meal and a full feed of grain on grass.

Phase IV-Second Wintering Period

1. Lots 1 and 2 have arrived at about the same point as to weight and finish but by different methods of management.
2. Lot 2 steers were poorly wintered the first winter and then went ahead of lot 1 due to cake on grass last summer.
3. Lot 1 outgained lot 2 due to their thinner condition off grass and to the increase in cottonseed meal fed.
4. Prairie hay was bright, green, early-cut hay and proved to be an excellent roughage when fed with silage. The steers to which it was fed made good gains and are carrying considerable flesh.
5. Lot 3, wintered on bluestem pasture, finished in strong condition and made more gain than was expected.
6. A double ration every second day proved to be satisfactory for feeding cottonseed meal on grass.
7. Prairie hay fed lot 3 on winter pasture was exceedingly poor in quality. It was brown, coarse and had been in storage several years. Horses would not eat

this hay. Hay was fed only when grass was completely covered with snow.

8. Lots 4 and 5 were full fed and lot 4 fed cottonseed meal on grass came into the feedlot approximately 100 pounds heavier than lot 5 and carried more condition.

9. Lot 4 held the advantage in weight and finish the first 60 days in the feedlot and were 40 to 50 days ahead of lot 5 due to the fact that they had been fed cottonseed meal on grass.

10. Lot 4 went off feed and lost almost 30 days gain due to no fault of the steers and almost lost their advantage off grass.

11. A careful study of the accompanying tables must be made to get a complete picture of the results of this management test.

Table I

Phase I - First Wintering
December 5, 1946 to April 24, 1947 - 140 Days

1-Lot Number	1	2	3	4	5
2-Number of steers in lot	10	10	10	10	10
3-Average daily winter ration:					
Atlas silage	27.46			13.75	13.75
Oats straw		9.18	7.31	4.81	2.20
Alfalfa hay			4.00		4.00
Cottonseed meal	1.00	1.00		1.00	
Salt	.14	.04	.07	.08	.06
4-Average initial weight	411	411	411	410	412
5-Average final weight	546	461	466	516	510
6-Average gain	135	50	55	106	98
7-Average daily gain	0.96	0.36	0.39	0.78	0.70
8-Cost of feed per 100 pounds gain-wintering phase	\$11.78	\$31.87	\$26.72	\$15.24	\$14.41
9-Feed cost per steer-wintering phase	\$15.91	\$15.94	\$14.71	\$16.17	\$14.12
10-Initial cost per steer	\$80.04	\$80.04	\$80.04	\$80.04	\$80.04
11-Initial cost per steer plus winter feed cost	\$95.95	\$95.98	\$94.75	\$96.21	\$94.16
12-Necessary selling price per cwt. to cover initial cost plus wintering cost	\$17.57	\$20.82	\$20.33	\$18.65	\$18.46
13-Appraised value per cwt. May 3, 1947	\$22.00	\$21.00	\$21.00	\$22.00	\$21.75

FIXED PRICES FOR 1946-1947: Cottonseed meal, \$90 per ton; silage, \$5 per ton; oats straw, \$15 per ton; alfalfa hay, \$25 per ton.

Table II

Phase 2 - Grazing, Early Summer Period
April 24, 1947 to August 2, 1947 - 100 Days

14-Lot Number	1	2	3	4	5
15-Number of steers in lot	10	10	10	10	10
16-Weight per steer at beginning of early summer period	546	461	466	516	510
17-Weight per steer at end of early summer period	653	588	586	624	624
18-Gain per steer, early summer period	107	107	120	108	114
19-Daily gain per steer, early summer period	1.07	1.07	1.20	1.08	1.14

Table III

Phase 3 - Grazing, Late Summer Period
August 2, 1947 to October 29, 1947 - 88 Days

20-Lot Number	1	2	3	4	5
21-Number of steers in lot	10	10	10	10	10
22-Amount of cottonseed meal fed per steer daily		1.46		1.47	
23-Total amount of cottonseed meal fed per steer in lbs.		129.50		129.50	
24-Total cost of cottonseed meal per steer		\$ 6.48		\$ 6.48	
25-Weight per steer at beginning of late summer period	653	568	586	624	624
26-Weight per steer at end of late summer period	684	726	645	770	677
27-Daily gain per steer, late summer period	.85	1.79	.71	1.65	.60
28-Total gain per steer, late summer period	31	158	59	146	53
29-Additional gain as a result of feeding cottonseed meal*		99		93	
30-Value of additional gain based on appraised value of steers		23.02		21.86	
31-Value of additional gain less cost of cottonseed meal		16.54		15.38	
32-Value of cottonseed meal per ton based on additional gain secured		\$356.00		\$338.00	

* Lots 2 and 3 were wintered the same and compared to obtain the 99 pound figure, while lots 4 and 5 were wintered the same and compared.

96.0 #
1.5
1.5 - 96 #
3/4 88

Table IV

Phases 2 and 3 - Summary of Grazing
 April 24, 1947 to October 29, 1947 - 188 Days

33-Lot Number	1	2	3	4	5
34-Number of steers in lot	10	10	10	10	10
35-Weight per steer April 24	546	481	486	516	510
36-Weight per steer Oct. 29	684	726	645	770	677
37-Gain per steer, grazing season	138	265	179	254	167
38-Daily gain per steer, grazing season	.73	1.41	.95	1.35	.89
39-Cost of grazing per steer	\$10.00	\$10.00	\$10.00	\$10.00	\$10.00
40-Initial steer cost plus feed cost to date	\$105.95	\$112.46	\$104.75	\$112.69	\$104.16
41-Necessary selling price per steer at home to cover initial cost plus feed cost	\$ 15.49	\$ 15.49	\$ 16.24	\$ 14.64	\$ 15.39
42-Appraised value per cwt. October 29, 1947	\$ 23.00	\$ 23.25	\$ 22.75	\$ 23.50	\$ 23.00

96# - 129.50

96# gain

150 / 175#

Table V

Phase 4 - Wintering and Full Feeding

Lots 1, 2, and 3, wintered October 29, 1947 to April 14, 1948
168 Days

Lots 4 and 5, full fed October 29, 1947 to February 18, 1948
112 Days

43-Lot Number	1	2	3	4	5
44-Number of steers in lot	10	10	10	10	10
45-Management followed	Wintered dry lot	Wintered dry lot	Grazed	Full fed in dry lot and marketed 2-18-48	Full fed in dry lot and marketed 2-18-48
46-Average daily ration:					
Alfalfa hay				2.02	2.02
Prairie hay	5.23	5.00	1.36		
Silage	38.25	38.25		16.20	14.88
Ground corn				13.70	14.36
Cottonseed meal	1.21	1.06	1.37	1.36	1.36
47-Initial weight per steer October 29, 1947	634	726	645	770	677
48-Final weight per steer, when marketed on April 14	945	935	711	983	970
49-Gain per steer	287	209	66	213	293
50-Daily gain per steer	1.59	1.24	.39	1.90	2.62
51-Total feed consumed per steer during this phase:					
Alfalfa hay				226	226
Prairie hay*	879	840.4	228.2		
Silage	6426	6426		1814	1636
Ground corn				1534.9	1608
Cottonseed meal	203.5	178	229.5	152.5	152.5

* This was bright, green, early-cut prairie hay.

**Phase 4 - Wintering and Full Feeding
(continued)**

52-Feed cost per steer for this phase:	Lot 1	Lot 2	Lot 3	Lot 4	Lot 5
Alfalfa hay				\$ 2.83	\$ 2.83
Prairie hay	\$ 6.59	\$ 6.30	\$ 1.72		
Silage	23.79	23.79		6.71	6.16
Ground corn				65.85	68.98
Cottonseed meal	10.18	8.90	11.48	7.63	7.63
Winter grass			6.00		
Total	\$40.55	\$38.98	\$19.20	\$83.02	\$85.60
53-Feed cost per steer to date	\$66.46	\$71.40	\$43.91	\$115.67	\$109.72
54-Initial cost per steer	\$80.04	\$80.04	\$80.04	\$80.04	\$ 80.04
55-Initial cost plus feed cost	\$146.50	\$151.44	\$123.95	\$195.71	\$189.76
56-Necessary selling price to cover initial cost plus feed cost	\$ 15.50	\$ 16.20	\$ 17.43	\$ 19.91	\$ 19.56
57-Appraised value or selling price per cwt.				\$ 26.50	\$ 26.00
58-Margin per cwt. above initial cost plus feed cost				\$ 6.59	\$ 6.44
59-Dressing percentage				59.7	58.5
60-Carcass grades					
Choice					
high.....					
average.....					
low.....					1
Good					
high.....				1	
average.....				4	2
low.....				3	4
Commercial					
high.....				1	2
average.....				1	1
low.....				1	1

FEED PRICES FOR 1947-1948: Ground corn, \$2.40 per bushel; cottonseed meal, \$100 per ton; silage, \$7.50 per ton; alfalfa hay, \$25.00 per ton; prairie hay (bright green, early cut), \$15.00 per ton.

FACTORS INFLUENCING RATE OF GAIN, QUANTITY OF FEED CONSUMED AND CARCASS GRADE

F. W. Bell - D. L. Mackintosh - A. G. Pickett

The two lots in this trial were selected from 75 range-bred heifer calves purchased in November, 1946, for feeding tests at this station. These calves were a uniform group classified as good to choice feeder calves.

Experimental Procedure

The 10 calves in lot 1 were selected as the probable poorer gainers, and the 10 calves in lot 2 as the probable better gainers. The sort was made on the evidences of probable gains as indicated by body capacity, chest room, muscling, bone, and general appearance. Sorting on the basis of these characteristics resulted in a heavier average initial weight of the calves in lot 2. The calves also were graded individually by using a standard feeder chart. Lot 1 graded average good, and lot 2 low choice.

The heifers in each lot received the same kinds of feed, consisting of ground corn, cottonseed meal, and silage. Silage was replaced by alfalfa hay during May and June. Both lots were self-fed grain. As much roughage was fed twice daily as the calves would consume.

December 5, 1946 to July 2, 1947 - 209 days

1. Lot number	1	2
2. Number of heifers in lot	10	10
3. Average daily ration:		
Ground shelled corn	9.14	9.48
Atlas sorgo silage	7.56	10.51
Cottonseed meal	1.31	1.31
Alfalfa hay	.86	1.27
Ground limestone	.09	.09
4. Average initial weight	383	454
5. Average final weight	706	825
6. Average total gain	323	371
7. Average daily gain	1.54	1.77
8. Feed required for 100 pounds gain:		
Ground shelled corn	591	534
Atlas sorgo silage	489	592
Cottonseed meal	85	74
Alfalfa hay	56	71
Ground limestone	6	5
9. Pounds of digestible nutrients required for 100 pounds gain	655	627

Observations

1. Both lots of calves ate practically the same amount of corn (self-fed).
2. Lot 2 consumed more roughage than lot 1.
3. Lot 2 gained 48 pounds more per head than lot 1.
4. Lot 1 required 28 pounds more total digestible nutrients per 100 pounds gain than lot 2.
5. The carcasses of both lots showed practically the same degree of finish.
6. One carcass of each lot graded choice. Seven carcasses of lot 1 graded good, and 2 commercial. Nine carcasses graded good in lot 2.
7. This test indicates that feeder cattle can be selected which in addition to making faster gains, will also utilize a greater proportion of roughages to concentrates per hundred pounds of gain.

**FACTORS INFLUENCING RATE OF GAIN, AMOUNT OF FEED
CONSUMED AND CARCASS GRADE**

F. W. Bell - D. L. Mackintosh - A. G. Pickett

Experiment II - 1947-1948

Preliminary Report

This is the second trial to study the effect of differences which can be observed in feeder calves classified as good to choice. The two lots in this trial were sorted from the 100 range-bred heifer calves purchased last November for feeding experiments at this station. This was a very uniform shipment of calves with no plain ones in the group.

Experimental Procedure

Sorting for the two lots of calves was made on apparent differences in capacity for feed, chest room, muscling, bone, and general appearance. The individual calves also were graded by using a standard feeder chart.

Both lots are receiving the same kinds of feed, consisting of ground corn, cottonseed meal, silage, and alfalfa hay. Each lot has received the same amount of corn, cottonseed meal, and alfalfa. Silage is fed in the amount that each lot will consume.

Preliminary Report - November 11, 1947 to April 14, 1948 - 154 days

1-Lot number	1	2
2-Number of heifers in lot	10	10
3-Average daily ration:		
Ground shelled corn	8.37	8.37
Silage	10.28	17.85
Cottonseed meal	1.10	1.10
Alfalfa hay	1.76	1.76
Ground limestone	.10	.10
4-Average initial weight	378	455
5-Average final weight	658	764
6-Average total gain	285	309
7-Average daily gain	1.85	2.00
8-Feed required for 100 pounds gain:		
Ground shelled corn	452	417
Silage	545	890
Cottonseed meal	60	55
Alfalfa hay	96	88
Ground limestone	5	5

Observations to Date

- Both lots of calves have consumed the same amounts of corn, cottonseed meal and alfalfa hay. The calves in lot 2 have consumed an average of 345 pounds more silage.
- The calves in lot 2 have made an average gain of 23 pounds more per head.

**EFFECT OF GRINDING ON THE
NUTRITIVE VALUE OF GRAIN SORGHUMS
FOR FATTENING STEER CALVES**

Ed. F. Smith

Livestock feeders have often called attention to the large amount of sorghum grains passing through cattle when the whole grain is fed. Small hard grain, when not broken by chewing, seems to escape digestion altogether. The question, therefore, has arisen as to the best method of feeding grain sorghums for the most efficient utilization by fattening cattle.

In three experiments conducted at the Texas Station involving milo heads and threshed milo, it was found that for fattening calves followed by pigs, grinding threshed milo increased its value 41 per cent, and grinding milo heads increased their value 62 per cent. In experiments at the Kansas Station special silage (in which the grain was ground) was compared to normal silage. The special silage fed to calves during the winter produced in one experiment 12 per cent more gain than normal silage and in another experiment 19 per cent more gain.

As early as 1906 at this station ground kafir was found to be about equal in feeding value to corn and cob meal. Ground milo was about equal to ground kafir for fattening calves in an Oklahoma test, and cracked hegari was equal to rolled barley in two Arizona trials.

Experiments conducted at the Kansas Agricultural Experiment Station have shown that ground Wheatland, Westland, and Colby milo and Blackhull kafir compare favorably to ground corn for fattening cattle. To determine the value of grinding Atlas sorghum grain for dairy cows, a test was conducted at this station in which the feces were collected and washed to recover the grain voided. The results show that feeding whole grain resulted in excessive waste while coarse grinding was more satisfactory than fine grinding, considering the cost of grinding and consistency of the feed. For the check group of cows the recovery of grain in the feces averaged 42 per cent of whole grain, 4.8 per cent of coarsely ground, and 1.5 per cent of finely ground grain.

Table 1 shows the results of a digestion trial conducted at the Kansas Agricultural Experiment Station in 1941 in which whole Milo and ground Milo grain were fed with cottonseed meal to determine the effect of grinding on digestibility.

Table 1 - Effect of grinding Wheatland Milo

	Digestion Coefficients*				
	Dry matter	Crude protein	Ether extract	Crude fiber	N-free extract
Whole Milo C. S. meal	58.2	53.3	66.2	50.3	64.0
Ground Milo C. S. meal	67.3	54.2	70.3	42.3	76.6

* The average percentage of each nutrient digested in a feeding stuff is termed the digestion coefficient.

The digestibility of all the nutrients except crude fiber was increased by grinding. Digestibility of crude protein was increased, 1.1 per cent; ether extract or fat, 4.1 per cent; and nitrogen free extract, 12.6 per cent. Grinding decreased the digestibility of the fiber 8 per cent.

Thus there appears to be conclusive evidence that the grain sorghums should be ground for fattening cattle. Data are lacking, however, with reference to the degree of fineness that these grains should be ground for best results. In order to obtain information on this point, a feeding trial is in progress in which whole Milo, coarsely ground Milo, and finely ground Milo are being fed. Digestion coefficients for each ration will be determined during the course of the experiment.

Twelve grade Hereford steers purchased on the Kansas City market are being used in this feeding trial. Their average initial weight on March 18 was 468 pounds. They were started on a full feed of silage, 2 pounds of coarsely ground Milo, 1 pound of cottonseed meal, and one-tenth pound of ground limestone daily per steer. The Milo will be increased about 1 pound per head weekly until each steer is consuming about 8 pounds daily. Silage consumption obviously will be decreased as the grain is increased. After this initial feeding phase, which is necessary to get the steers on a full feed of grain, the digestion trial will be conducted. The steers are stanchioned in the nutrition barn.

When on a full feed of grain, 12 steers will be divided into three groups of four steers each. One group will receive a full feed of whole Milo as the grain portion of the ration, another coarsely ground Milo, and the third finely ground Milo. A chemical analysis of each feed will be made to determine the percentage of nutrients. The same amounts of weighed feed will be fed to each steer throughout the digestion trial, the feces voided will be collected, weighed, and representative samples analyzed. Digestion coefficients will be calculated to determine whether the degree of fineness of grinding affects nutritive value.

Following the digestion trial, the steers will be continued on full feed in order to observe differences in gains, if any, attributable to grinding the grain to different degrees of fineness.

SHEEP INVESTIGATIONS - 1947-48

The Effect of Bicarbonate of Soda In Reducing Digestive Disorders and Death Losses In Feeder Lambs

Rufus F. Cox

Among a number of means tested in an effort to minimize digestive disorders and death losses in lambs caused by "over-eating disease" baking soda appeared to be effective to some extent. At the Garden City Branch Agricultural Experiment Station, two lots of lambs recently were put on feed to check this. This experiment was completed in March and a detailed report of the results appears in Table III of the Sheep Investigations section of this bulletin.

In order further to confirm these results two lots of lambs were placed on experiment at the Manhattan station. These two lots are receiving corn in the amount of approximately two pounds per head daily at the present time, which is considered a very heavy feed of concentrates. Alfalfa is also being fed to both lots. The rations of the two are identical except that the lambs in one lot receive approximately 8 grams of sodium bicarbonate per head daily.

As soon as the results of this test become apparent, they will be announced. Many feeders already are watching the outcome of this test. If former results are confirmed, the findings should be quite useful to feeders who find it necessary to feed rather concentrated rations in an effort to get rapid gains and shorten the feeding period.

GARDEN CITY BRANCH AGRICULTURAL EXPERIMENT STATION

Garden City, Kansas

Table I - Grain and Other Concentrate Comparisons For Fattening Lambs

Rufus F. Cox and L. M. Sloan

December 2, 1947 to March 15, 1948 - 105 Days

1-Lot number	1	2	5	6	7	8	10
2-Ration fed	Westland milo Axtell stover C.S. Cake Gr. Limestone	Axtell grain Axtell stover C.S. Cake Gr. Limestone	Westland milo Axtell stover Dehyd. alfalfa Gr. Limestone	Westland milo & Beet pulp & Axtell stover C.S. Cake Gr. Limestone	Westland milo & Beet pulp & Axtell stover C.S. Cake Gr. Limestone	Beet pulp Axtell stover C.S. Cake Gr. Limestone	Westland milo Beet molasses * Axtell stover C.S. Cake Gr. Limestone
3-Number lambs per lot	51	52	52	52	52	52	50
4-Number of days	105	105	105	105	* 105	105	105
5-Initial weight	75.75	75.75	75.81	75.71	75.56	75.75	75.78
6-Final weight	100.47	99.46	103.19	101.10	100.90	101.60	99.72
7-Total gain	24.72	23.71	27.38	25.39	25.34	25.85	23.94
8-Daily gain	.24	.23	.25	.24	.24	.25	.23
9-Feed per lamb daily:							
Grain	1.07	1.07	1.07	.53	.27	1.05	1.06
Pulp or molasses				.53	.79		.10 *
Protein supplement	.25	.25	.57	.25	.25	.25	.25
Roughage	2.55	2.39	2.43	2.39	2.38	2.24	2.43
Mineral	oz. .25	oz. .25	oz. .25	oz. .25	oz. .25	oz. .25	oz. .25
10-Feed per cwt. gain:							
Grain	447.21	472.29	408.98	220.52	113.99	426.96	467.00
Pulp or molasses				220.52	327.07		44.70
Protein supplement	106.47	110.21	216.95	102.91	103.12	101.08	109.23
Roughage	1084.26	1053.61	892.10	927.98	985.00	908.94	1033.49
Mineral	6.58	6.83	5.92	6.36	6.39	6.27	6.77
11-Gain per 100 lbs. DIGESTIBLE NUTRIENTS	11.71	11.50	12.94	12.37	12.43	12.38	11.06
12-Feed cost per cwt. gain	\$25.84	\$26.59	\$27.01	\$24.66	\$24.53	\$23.84	\$27.34
13-Final cost per cwt.	\$21.09	\$21.22	\$21.52	\$20.84	\$20.33	\$20.64	\$21.41

* Fed last 60 days only.

NOTE: These lambs were sold April 13, 1948 on the Wichita market to a New York shipper for \$23.25 per cwt., the extreme market top for that day.

GARDEN CITY BRANCH AGRICULTURAL EXPERIMENT STATION

Garden City, Kansas

Table II. - Roughage Comparisons For Fattening Lambs

Rufus F. Cox and L. M. Sloan

December 2, 1947 to March 15, 1948 — 105 Days *

1-Lot Number	1	3	4	9
	Westland milo Axtell stover	Westland milo Sumac stover	Westland milo Dehyd. sumac**	Westland milo Alfalfa
2-Ration fed	C.S. Cake Gr. Lime- stone	C.S. Cake Gr. Lime- stone	C.S. Cake Gr. Lime- stone	C.S. Cake Gr. Lime- stone
3-Number lambs per lot	51	52	51	51
4-Number of days	105	105	49	105
5-Initial weight	75.75	75.46	75.54	75.53
6-Final weight	100.47	100.56	83.92	110.41
7-Total gain	24.72	25.10	8.38	34.88
8-Daily gain	.24	.24	.17	.33
9-Feed daily:				
Grain	1.07	1.07	.83	1.07
Protein supplement	.25	.25	.23	.25
Roughage	2.55	2.55	** 1.87	2.32
Mineral	oz. .25	oz. .25	oz. .25	oz. .25
10-Feed per cwt. gain:				
Grain	447.21	446.14	437.47	321.22
Protein supplement	106.47	104.10	134.96	74.97
Roughage	1084.26	1064.74	1092.84	696.90
Mineral	6.58	6.45	9.31	4.73
11-Gain per 100 lbs. digestible nutrients.	11.71	11.71	9.34	16.84
12-Feed cost per cwt. gain	\$25.84	\$25.47		\$20.75
13-Final cost per cwt.	\$21.09	\$21.09		\$19.96

NOTE: These lambs were sold April 13, 1948 on the Wichita market to a New York shipper for \$23.25 per cwt., the extreme market top for that day.

* Lot 4 fed 49 days only.

** The roughage fed Lot 4 included some Sumac stover also. It became necessary to feed some additional roughage after the lambs refused to eat dehydrated Sorgo.

GARDEN CITY BRANCH AGRICULTURAL EXPERIMENT STATION

Garden City, Kansas

Table III - Sodium Bicarbonate For The Control
of
Digestive Disorders and Death Loss
In Fattening Lambs

Rufus F. Cox and L. M. Sloan

January 19, 1948 to March 15, 1948 — 56 Days

1-Lot Number	4-A	44
	Westland milo	Westland milo
	Cottonseed cake	Cottonseed cake
2-Ration fed	Alfalfa hay	Alfalfa hay
	Axtell stover	Axtell stover
		Bicarbonate of Soda
3-Number of lambs starting experiment	25	26
4-Number of lambs finishing experiment	20	26
5-Death loss (percent)	20%	0
6-Feed per lamb daily		
Concentrates	1.7 lbs.	1.7 lbs.
Roughage	1.2	1.2
Bicarbonate of Soda	—	.012
7-Lot weight at beginning of experiment	2094 lbs.	2186 lbs.
8-Lot weight at end of experiment	2105	2682
9-Lot value of lambs at beginning of experiment (@ \$.20 per pound)	\$418.80	\$437.20
10-Feed cost per lot	89.60	104.83
11-Total final cost per lot	508.40	542.03
12-Lot value of lambs at end of experiment (@ \$.22 per pound)	463.10	590.04
13-Margin per lamb	- 2.27 (Loss)	1.85

NOTE: These lambs were sold April 13, 1948 on the Wichita market to a New York shipper for \$23.25 per cwt., the extreme market top for that day.

GARDEN CITY BRANCH AGRICULTURAL EXPERIMENT STATION

Garden City, Kansas

Summary - 1947-48 Lamb Feeding Experiments

Rufus F. Cox and L. M. Sloan

Table I

1. Westland milo grain proved to be slightly better than Axtell grain from the standpoint of both rate and economy of gains. Compare Lots 1 and 2.
2. Dried beet pulp used to replace one-half, three-fourths, and all of the Westland milo grain in the ration respectively proved equal to, or slightly superior to the grain it replaced in these tests. Compare Lots 1, 6, 7, and 8.
3. When the price per pound is comparable to that of grain, some saving will result by using beet pulp to replace a part of the grain. Previous tests indicate that replacing all of the grain usually results in a decrease in the rate of gain.
4. Dehydrated alfalfa fed as a protein supplement produced larger but more expensive gains than cottonseed cake. This is not in agreement with results of a similar test last year. Compare Lots 1 and 5.
5. Adding beet molasses to a ration of Westland milo, Axtell stover and cottonseed cake during the last 60 days of feeding did not increase the rate of gain and increased materially the cost of gain. Compare Lots 1 and 10.

Table II

6. Sumac stover gave slightly better results than Axtell stover. Compare Lots 1 and 3.
7. Sumac and Axtell stover produced only about seventy-three percent as much gain as alfalfa. Compare Lots 1, 3, and 9.
8. Lambs refused to eat dehydrated sumac roughage, and produced poor and expensive gains on it. Compare Lots 1 and 4.

Table III

9. Baking soda fed at the rate of less than one-fifth ounce per lamb daily (1.2 pounds per 100 lambs daily) appeared to prevent death losses due to Enterotoxemia (over-eating) and no symptoms of any digestive disorder appeared in the lot fed soda. Compare Lots 4-A and 44.
10. Lambs full fed on grain without soda (Lot 4-A) vomited grain frequently, scoured freely, and during these digestive upsets had a dull and listless appearance. Twenty percent of them died.
11. The lambs in Lot 44 fed soda, but otherwise receiving the same ration as those in Lot 4-A, never showed any diarrhea, and never threw up any grain. Furthermore, their droppings were always dry and well formed, in sharp contrast to those in Lot 4-A.
12. While this is a small scale test of bicarbonate of soda, these results are being checked in commercial feedlots and preliminary observations confirm these findings.

SHEEP INVESTIGATIONS - 1947-48

The Relationship of Physical Balance To Energy Value
and Tissue Formation in Sheep

Rufus F. Cox, D. L. Mackintosh, Ed F. Smith, J. S. Hughes

Several years of physical balance studies with sheep rations have been completed. During the course of these years, more than 2,500 lambs have been used in the experiments. A wide variety of feeds have been employed in these tests also. The feeds composing the experimental rations have varied widely in nutritive value and palatability. In spite of this fact, the results of these experiments have been in agreement with remarkable consistency. While many levels of physical balance have been studied, recent trials have been limited to proportions of concentrates to roughage ranging from extremes of 35 percent to 65 percent up to 55 percent to 45 percent. Paper pulp and ground wood pulp have been fed as the only source of bulk in the rations in an effort to vary the physical properties without affecting seriously the nutritive value of the ration. Finally, in a move to accomplish this and to obtain more accurate control the experimental rations were adjusted on the basis of ratio of crude fiber to total digestible nutrients. It is felt that this constitutes as good an expression of concentration and bulkiness as any method, and would result in a comparable basis of physical properties between rations even though they varied widely in the kind and nature of feeds composing them.

Even though the gains of lambs have consistently been in favor of those receiving rations midway between wide extremes of concentration and bulkiness, and the efficiency of feed utilization as measured by the gains made per unit of digestible nutrients consumed has also favored this group, little information has been obtained regarding the degree of finish of the lambs fed at different levels. It may be that an optimum physical balance favors more rumination, greater micro-organic activity in the rumen and other factors causing greater efficiency of feed use. There is a limited amount of evidence from experiments completed that the lambs fed the more highly concentrated rations had more finish. It was to check this point that the present experiment was begun.

Two lots of lambs, each divided into three series, are being fed in this year's tests. Lot 1 is being fed corn and alfalfa hay, the three series each receiving these feeds so that the ratios of crude fiber to total digestible nutrients are approximately 1 to 3, 1 to 4, and 1 to 5 respectively. Lot 2 also is divided into three series which receive oat groats (instead of corn) and alfalfa hay with the ratios of fiber to digestible nutrients corresponding to those of the three series of lot 1.

The plan of the experiment calls for the slaughter of most or all of the lambs so a detailed study of tissue formation can be made. The carcass grades will be studied by the usual methods and in addition a sample, probably from the rib, will be taken to determine whether the carcass grades are consistently correlated with degree of finish and of tissue growth. Some complete body analyses may be made in an effort to determine specifically what is the cause of greater gains in body weight if these gains in weight are not fat formation.

SWINE FEEDING EXPERIMENTS

Experiment I -- Summer 1947

C. E. Aubel

Mustard Seed Oil Meal* As A Protein Supplement For Fattening Pigs On Alfalfa Pasture

Last year at the Livestock Feeders' Day, results of experiments were given on the use of mustard seed oil meal as a protein supplement for fattening pigs in the dry lot. The results showed that mustard seed oil meal was an excellent protein feed when mixed with tankage and other protein supplements and self fed free choice. Generally the gains were somewhat cheaper than where tankage alone was fed, but the gains were not quite so rapid.

In the tests reported last year the mustard seed meal made up as much as 50 percent of the protein mixtures in some of the lots.

With mustard seed meal proving to be so satisfactory for dry lot feeding, it was thought desirable to obtain data on its efficiency in the pasture feeding of spring pigs.

Experimental Procedure:

In the experiment reported herewith, five lots of pigs were self fed shelled corn, on a good stand of alfalfa pasture. The protein supplement mixtures aside from tankage in the control lot, Lot 1, were as follows, all self-fed. Lot 2 received a protein mixture of tankage 90 percent, and mustard seed meal, 10 percent. Lot 3 received tankage 75 percent, and mustard seed meal 25 percent and Lot 4 received tankage 50 percent, and mustard seed meal 50 percent. Lot 5 received a more complex protein supplement mixture of tankage, 40 percent; mustard seed meal, 40 percent; cottonseed meal, 10 percent, and linseed meal, 10 percent.

The following table gives a summary of the feeding record of this experiment.

* The mustard seed oil meal used in this experiment was furnished through the courtesy of the Kansas Soybean Mills, Inc., Emporia, Kansas.

EXPERIMENT I -- SUMMER 1947

The Value of Mustard Seed Oil Meal in Protein Feed Mixtures
As a Supplement to Shelled Corn for Fattening Spring Pigs
on Alfalfa Pasture.

C. E. Aube1

(July 1, 1947 to October 28, 1947 — 120 Days)

Ration	Shelled Corn (self-fed)		Alfalfa Pasture		
	Tankage (self- fed)	Tankage 90% Mustard seed meal 10% (self- fed)	Tankage 75% Mustard seed meal 25% (self- fed)	Tankage 50% Mustard seed meal 50% (self- fed)	Tankage 40% Mustard seed meal 40% Cottonseed meal 10% Linseed meal 10% (self-fed)
Lot number	1	2	3	4	5
Number pigs in lot	10	10	9	10	10
Av. initial weight per pig	Pounds 67.26	Pounds 67.63	Pounds 67.36	Pounds 68.50	Pounds 68.70
Av. final weight per pig	256.53	260.10	258.66	263.23	260.66
Av. total gain per pig	188.27	192.47	191.30	194.73	191.96
Av. daily gain per pig	1.56	1.60	1.59	1.62	1.59
Av. daily ration per pig:					
Shelled corn	5.53	5.45	5.25	5.13	5.17
Tankage	.33	.33	.36	.27	—
Protein supplement	—	—	—	—	.56
Mustard seed meal	—	.03	.12	.27	—
Feed consumed per 100 pounds gain:					
Shelled corn	352.52	340.31	339.79	316.59	313.82
Tankage	21.24	26.42	22.91	17.07	—
Protein supplement	—	—	—	—	41.31
Mustard seed meal	—	2.93	7.64	17.07	—
Feed cost per 100 pounds gain:	\$16.68	\$16.68	\$16.64	\$15.68	\$15.90

FEED PRICES CHARGED: Shelled corn, \$2.40 per bushel; Tankage, \$150.00 per ton; Mustard seed meal, \$100.00 per ton; Protein supplement, \$6.00 per hundred pounds, (used in Lot 5)

METHODS OF FEEDING: All lots were self-fed shelled corn. The protein supplements were mixed in the proportions indicated and self-fed in a separate compartment.

OBSERVATIONS AND CONCLUSIONS

1. Mustard seed oil meal when mixed with tankage and other protein supplements and self-fed free choice proved to be an excellent protein feed for fattening pigs.
2. In all lots where the mustard seed meal was fed, the cost of gains was the same or somewhat cheaper than where tankage alone was fed; and the daily gains were somewhat more rapid, with a lower feed consumption.
3. The mustard seed meal mixtures seemed equally palatable to the pigs at all times. No mixture seemed to be in any way neglected nor did any seem to be especially preferred by the pigs throughout the experiment.
4. Lot 4 receiving the mixture of tankage, 50 percent and mustard seed meal, 50 percent made the most economical and rapid gains of all.
5. Lot 6, which received the more complex protein mixture with mustard seed meal, made the second most economical gain. The daily gains were somewhat faster than those of the lot receiving tankage alone as the supplement.

EXPERIMENT III -- WINTER 1948

The Use Of Loose Salt For Fattening Pigs In The Dry Lot

C. E. Aube1

At the Livestock Feeders' Day last year, data were presented on the use of loose salt in swine fattening rations when the pigs were self-fed free choice a ration of shelled corn, tankage, and alfalfa hay. It was shown that loose salt self-fed to pigs provided no advantage in producing faster gains or in improving the efficiency of the ration. In the test reported on last year the entire protein supplement, aside from the alfalfa hay, was of animal protein.

Since present-day hog supplements are largely mixtures of plant and animal protein feeds, it was thought that information would be desirable on the influence of feeding salt when a supplement of such a composition was fed.

EXPERIMENTAL PROCEDURE

The protein supplement selected for self-feeding with shelled corn was made up of 40 percent tankage, 40 percent soybean oil meal, 10 percent linseed oil meal and 10 percent alfalfa meal. This provided a protein supplement of about 46 percent. This was self-fed free choice in the same feeder with the shelled corn to two lots of pigs. Lot 2 only received the loose salt. It was self-fed free choice in a separate compartment of the same feeder. The initial weight of the pigs was 61 pounds and they were fed 94 days.

The following table gives a summary of the feeding record of this experiment.

(January 13, 1948 to April 16, 1948 - 94 Days)

Ration	Shelled Corn (self-fed)	
	Tankage 40% Soybean Oil Meal 40% Linseed Oil Meal 10% Alfalfa Meal 10% (self-fed)	Tankage 40% Soybean Oil Meal 40% Linseed Oil Meal 10% Alfalfa Meal 10% Loose Salt (self-fed)
Lot Number	1	2
Number pigs in lot	10	10
Average initial weight per pig	Pounds 61.33	Pounds 61.53
Average final weight per pig	238.26	230.20
Average total gain per pig	176.93	168.77
Average daily gain per pig	1.88	1.79
Average daily ration per pig:		
Shelled corn	5.84	5.55
Protein Supplement	.66	.61
Loose salt	—	.05
Feed consumed per 100 pounds gain:		
Shelled corn	310.29	305.59
Protein supplement	35.15	45.20
Loose salt	—	3.02
Feed cost per 100 pounds gain	\$15.49	\$15.81

FEED PRICES CHARGED: Shelled corn, \$2.40 per bushel; Protein supplement, \$6.00 per cwt; Salt, \$1.00 per cwt.

OBSERVATIONS AND CONCLUSIONS

1. The addition of loose salt self-fed free choice to pigs receiving shelled corn and a mixed protein supplement made up of 40 percent animal protein feed and 60 percent plant protein feeds in a dry lot, proved to be of no advantage whatsoever.
2. The daily gains were lower and the feed cost per 100 pounds gain was greater with the lot receiving the loose salt than with an identically fed lot which received no salt.
3. The salt-fed pigs consumed .05 of a pound of salt daily. Its ingestion apparently did not aid the pigs in making faster gains, nor did it decrease the cost of the gains.

EXPERIMENT II - Winter - 1948

The Comparative Value of Mustard Seed Oil Meal
And Dehydrated Brome Grass Meal in Protein Feed Mixtures
As a Supplement to Shelled Corn for Fattening Fall Pigs
In The Dry Lot

C. E. Aibel

Swine experiment I, page 43 reported the results of feeding mustard seed oil meal to fattening pigs on alfalfa pasture, when mixed with tankage and other protein supplements. Pigs were fed with protein supplement mixtures in which the mustard seed oil meal composed as much as 50 percent of the supplement. The results of feeding it in such large proportions were so satisfactory that it was desired to ascertain whether it were possible to increase further the amount of mustard seed meal in the mixture with tankage and still get good results. Consequently two lots of pigs were fed with an increased percentage of mustard seed oil meal.

In addition last year in connection with some other studies there was produced at the Kansas Experiment Station some dehydrated brome grass meal. This meal had a protein content of about 20.9 percent. As there was no information at hand concerning the use and palatability of brome grass meal in swine feeding, it was thought advisable to compare it with dehydrated alfalfa meal.

EXPERIMENTAL PROCEDURE

In the experiment reported herewith, two lots of pigs were used to test the dehydrated brome grass meal and two lots were used with which to test the increased amounts of mustard seed oil meal in protein supplements. The four lots were self-fed shelled corn in the dry lot. Lot 1 received a protein supplement of 90 percent tankage and 10 percent dehydrated alfalfa meal, Lot 2 received tankage 90 percent and dehydrated brome grass meal 10 percent. These supplements were self-fed free choice. Lot 3 received a protein supplement of tankage 25 percent and mustard seed meal 75 percent. Lot 4 received tankage 15 percent and mustard seed oil meal 85 percent. Lots 3 and 4 also were self-fed alfalfa hay.

The following table gives a summary of the feeding record of this experiment:

EXPERIMENT II - Winter - 1948

The Comparative Value of Mustard Seed Oil Meal
And Dehydrated Brome Grass Meal in Protein Feed Mixtures
As a Supplement to Shelled Corn for Fattening Fall Pigs
In The Dry Lot

C. E. Aubel

(January 13, 1948 to April 16, 1948 - 94 Days)

Ration	Shelled Corn (self-fed)			
	Tankage 90% Alfalfa meal 10% dehyd. (self-fed)	Tankage 90% Brome Grass Meal dehyd. 10% (self-fed)	Tankage 25% Mustard seed meal 75% Alfalfa hay (self-fed)	Tankage 15% Mustard seed meal 85% Alfalfa hay (self-fed)
Lot number	1	2	3	4
Number pigs in lot	10	10	10	10
Av. initial weight per pig	Pounds 62.70	Pounds 62.40	Pounds 61.76	Pounds 61.10
Av. final weight per pig	223.56	226.16	208.73	221.83
Av. total gain per pig	160.86	163.76	136.97	160.73
Av. daily gain per pig	1.71	1.74	1.45	1.71
Av. daily ration per pig:				
Shelled corn	5.39	5.48	4.82	5.30
Tankage	.73	.58	.60	.63
Mustard seed meal	—	—	.20	.11
Brome Grass meal	—	.06	—	—
Alfalfa meal	.08	—	—	—
Alfalfa hay	—	—	.17	.16
Feed consumed per 100 pounds gain:				
Shelled corn	315.18	314.78	331.09	310.14
Tankage	43.30	33.90	13.75	6.23
Mustard seed meal	—	—	41.23	36.96
Brome grass meal	—	3.76	—	—
Alfalfa meal	4.81	—	—	—
Alfalfa hay	—	—	12.11	9.89
Feed cost per 100 pounds gain:	\$16.66	\$15.96	\$17.34	\$15.68

FEED PRICES CHARGED: Shelled corn, \$2.40 per bushel; Tankage, \$140.00 per ton; Alfalfa meal, \$60.00 per ton; Mustard seed meal, \$100.00 per ton; Brome grass meal, \$60.00 per ton; Alfalfa hay, \$25.00 per ton.

METHODS OF FEEDING: All lots were self-fed shelled corn; alfalfa hay was self-fed in lots 3 and 4. The protein supplements were mixed in the proportions indicated and self-fed in a separate compartment.

OBSERVATIONS AND CONCLUSIONS

1. Mustard seed oil meal when mixed with tankage at the rate of 85 percent mustard seed meal and 15 percent tankage and fed as a protein supplement proved to be an excellent protein feed for fattening pigs in the dry lot. The pigs made rapid and economical gains, and consumed the mixture in such an amount that it could not be construed that the large amount of mustard seed meal in the mixture was in any way objectionable.
2. In this experiment the pigs receiving mustard seed oil meal in the proportion of 75 percent to 25 percent tankage in the protein supplement, did not do so well in the rapidity or the economy of gains, as the lot that received the mustard seed meal in the larger proportion of 85 percent. There is no explanation to offer for this as the protein mixture was consumed in large amounts and seemed palatable.
3. In this test the dehydrated brome grass meal fed pigs slightly excelled the dehydrated alfalfa meal fed pigs in the rapidity and economy of gains.
4. For a hundred pounds of gain there was a little less consumption of the protein supplement made up of brome grass meal and tankage than of the alfalfa meal and tankage. This might indicate that the brome grass meal was somewhat more efficient, probably because of its high protein content, (20.9 percent).

J. W. Robison
First President of The Kansas Livestock Association

C. W. McCampbell

A research project was established in the Animal Husbandry Department of Kansas State College in 1946 primarily for the purpose of recording and preserving the achievements of outstanding pioneer Kansas livestock men. For the present the work of this project is being limited to a study of pioneers who started in Kansas prior to 1880. Today I bring you a brief summary of the story of one of Kansas' outstanding farmers and livestock men and the first president of the Kansas Livestock Association - Mr. J. W. Robison.

Mr. Robison was born in Aberdeenshire, Scotland, in 1831 and came to the United States with his parents when one year of age. The family settled in Pennsylvania but a few years later moved to a farm in Michigan where they remained only a short while before locating permanently on a farm near Peking, Illinois. As a young man, Mr. Robison chose farming as a life work and in a few years after leaving College he owned a good farm adjoining his father's. In 1879 he purchased 1120 acres near Towanda, Kansas, and named this acreage Whitewater Falls Farm. In 1881 he harvested 600 acres of wheat and hauled 10,000 bushels by wagon to Wichita, a distance of 30 miles. This was a large amount in those early days and won him the name of "Wheat" Robison. He, however, was a livestock man at heart and it was not long until the production of feed crops and livestock replaced wheat production to a very large extent. In 1901, a press story stated that "1200 acres are devoted to corn, 1000 acres to alfalfa and 1500 cattle are on feed at Whitewater falls Farm."

Late in life Mr. Robison won nation-wide fame as a breeder and dealer in Percheron horses. He made his start in this business with the purchase of the mare Rosalie 4894 from Henry Avery of Wakefield, Kansas, in 1897. The Robison Percheron herd increased rapidly and in 1905, Whitewater Falls Farm ranked second in the number of Percherons registered by one person or firm in the United States.

The Percheron show at the Louisiana Purchase Exposition at St. Louis in 1904 was the greatest that had been held in America up to that time. Whitewater Falls Farm was one of the exhibitors. The Kansas Farmer of September 15, 1904, states the "The Robison herd consisted of seven head and won more prizes than any other farm."

Mr. Robison's ability and leadership received state-wide recognition in Kansas as it had in Illinois. He served as president of the Kansas Improved Livestock Breeders' Association, president of the Kansas State Board of Agriculture, vice-president of the Kansas Horticultural Society, chairman of the Kansas Railroad Commission and trustee for Washburn College; but his most valuable service, in the interest of Kansas livestock producers, was as president of the Kansas Livestock Association from the time it came into existence in 1894 to the time of his death in 1909.

Comments following his death indicate the kind of man he was and the esteem in which he was held. A few excerpts follow:

"He was El Dorado's most prominent citizen, known throughout the State for his wisdom in agriculture, horticulture, and stock raising."

"He was considered a wealthy man, his land holdings aggregating thousands of acres in Kansas and Texas."

"Mr. Robison was distinctly a self-made man. He inherited nothing but a sturdy physical constitution, a fine mind, and tireless energy. He accumulated his wealth by careful and exact business methods. He was widely read and in those things in which he was interested was well informed, a veritable text book and encyclopedia."

"He was an unusual and remarkable man. He was a leader and teacher in whatever he undertook."

"He died rich in the possession of a well earned popularity and in the esteem which comes from honorable living."

The early extensive and successful cattle feeding and hog raising operations of J. W. Robison attracted state-wide attention and his later outstanding achievements as a Percheron breeder, dealer and exhibitor brought nationwide fame but his most worthwhile achievement was his effective leadership for better things for agriculture in his community, in his county and in his State.