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## LAMB FEEDING EXPERIMENTS: Part I. Fattening Western Lambs. Part II. Fattening Native Lambs. Part III. A Comparison of Native and Western Lambs.

Howard J. Gramlich  
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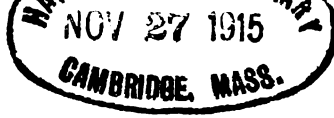
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THE UNIVERSITY OF NEBRASKA.

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**BULLETIN**

OF THE

**AGRICULTURAL EXPERIMENT STATION**

OF

**NEBRASKA.**

VOLUME XXVIII, ARTICLE I.

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**LAMB FEEDING EXPERIMENTS.**

- Part I. Fattening Western Lambs.**  
**Part II. Fattening Native Lambs.**  
**Part III. A Comparison of Native and Western Lambs.**

BY HOWARD J. GRAMLICH.

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DISTRIBUTED OCTOBER 25, 1915.



LINCOLN, NEBRASKA  
U. S. A.

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## SUMMARY OF PART I.

1. The addition of corn silage to a ration of shelled corn and alfalfa hay increased the daily gain 0.005 pound per lamb and increased the cost of producing 100 pounds gain 4 cents but did not affect the net profit per lamb. (Table 1.)

2. With shelled corn at 60 cents per bushel and alfalfa hay at \$10 per ton, lambs on a heavy feed of shelled corn (approximately 1.5 pounds) and 1 pound of alfalfa made gains at a cost of \$5.11 per 100 pounds. (Table 1.)

3. Lambs on ground corn and ground alfalfa consumed 0.126 pound more corn and 0.093 less alfalfa daily than lambs on shelled corn and whole alfalfa hay. (Table 2.)

4. Lambs on ground corn and ground alfalfa made daily gains of 0.371 pound at a cost of \$6.12 per 100 pounds, while those on shelled corn and alfalfa hay made daily gains of 0.393 pound at a cost of \$5.11 per 100 pounds. (Table 2.)

5. Grinding corn and alfalfa and feeding the two mixed together did not produce sufficient added gain to offset the labor cost of grinding.

6. In a test to compare good versus poor quality alfalfa as a supplement to shelled corn in producing mutton, it was found that good alfalfa was worth double the value of the poor alfalfa. (Table 3.)

7. Lambs on good alfalfa and shelled corn gained 0.035 pound more per head daily and at a cost of 17 cents per 100 pounds less than lambs on poor alfalfa and shelled corn. (Table 3.)

8. Lambs fed good alfalfa consumed more roughness than those fed hay of poor quality. (Table 3.)

9. The addition of 0.726 pound corn silage daily to a ration of ground corn and ground alfalfa did not increase the daily gain but did reduce the cost of 100 pounds gain 31 cents. (Table 4.)

10. A ration of shelled corn, alfalfa, and silage produced 100 pounds gain at a cost of \$5.15, whereas a ration of ground corn, ground alfalfa, and silage produced 100 pounds gain at a cost of \$5.81, thus indicating that the whole grain and hay in conjunction with silage was the more economical of the two rations. (Table 5.)

11. Valuing corn at 60 cents per bushel, good alfalfa at \$8 per ton, and poor alfalfa at \$4 per ton in this experiment, 100 pounds gain on a ration of corn and good alfalfa cost \$4.88, and on corn and poor alfalfa, \$4.90. (Table 7.)

# LAMB FEEDING EXPERIMENTS.

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BY HOWARD J. GRAMLICH.

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## INTRODUCTION.

During recent years much interest has developed in the fattening of lambs on Nebraska farms. For years this State has ranked as one of the foremost among those which furnish fat lambs for the markets of the country. However, in the past the feeding has been done mostly by speculators who have owned or rented yards at convenient points and shipped in lambs by the train load direct from the western ranges. These lambs were billed direct to the markets with the privilege of feeding in transit at any given feed yard. This method of feeding, however, has largely been superseded by the one-car feeder who purchases his lambs at the market and fattens them on feed raised upon his farm, thereby utilizing much cheap roughness which would be difficult to dispose of otherwise.

## **PART I. FATTENING WESTERN LAMBS.**

### **OBJECT.**

The purpose of this experiment was to secure experimental data regarding the comparative values of corn and alfalfa hay fed in various forms both with and without corn silage. It compared a ration containing good alfalfa hay for roughage with one containing a poor grade of hay, likewise a ration of corn and good alfalfa with one of the same feeds plus corn silage. A ration of shelled corn and alfalfa hay was compared with one in which both the hay and corn were ground. A ration of ground corn and ground alfalfa was compared with one of the same feeds with corn silage added.

### **DESCRIPTION OF THE LAMBS.**

The lambs used in this experiment were purchased on the Omaha market, October 28, 1914. They were of average quality and weighed 52 pounds. The cost price was \$6.65 per 100 pounds, whereas top feeder lambs brought \$7 per 100 pounds the same day.

They had been shipped from Wyoming, and judging by their appearance one would say they contained a little blood of some mutton breed crossed on a strong Merino foundation. There were 260 head purchased, this being 10 more than were placed on experiment, the desire being to have five lots of 50 each and have them as nearly uniform as possible at the opening of the experiment. Five died prior to the experiment, and the other five were sold later and credited in the financial statement.

### **TREATMENT PREVIOUS TO THE EXPERIMENT.**

The lambs were dipped at the stockyards, following their purchase, and were received at the University Farm, October 29. They were placed in a two-acre dry lot and remained there for nearly three weeks. The first few days, alfalfa was the only feed given. This was scattered on the ground, and the lambs ate it heartily from the start. Later, a little shelled corn and silage was fed in the same manner. The corn was eaten quite readily. However, they seemed to care but little for the silage and greatly preferred alfalfa. As the weather continued dry thruout this period, there was but very little grain or hay wasted as a result of feeding on the ground. A week previous to the opening of the experiment, the lambs were divided and placed in their respective pens. The corn was then increased quite

rapidly so that November 26, when the test began, a daily average of 1 pound per head was being consumed. The corn fed thru this preliminary period amounted to an average of a quarter of a pound per head daily, and this as well as all other feed given at this time was charged to the lambs.

#### RATIONS FED.

The following rations were fed:

Lot 1.—Ground corn, ground alfalfa, and corn silage.

Lot 2.—Ground corn and ground alfalfa.

Lot 3.—Shelled corn and good alfalfa hay.

Lot 4.—Shelled corn, good alfalfa hay, and corn silage.

Lot 5.—Shelled corn and poor alfalfa hay.

#### FEED YARDS AND EQUIPMENT.

The yards where this experiment was carried on are located on a gentle, southwest slope. A four-panel board fence was constructed around the outside with the exception of the north where a 58-inch woven wire fence had previously been placed. Three-board partitions were used to divide the lots. Each one was 16 feet wide by 80 feet long. Thus, there were 1,280 square feet in each lot, or 25.6 square feet per lamb.

No provision was made for shelter other than to rick some corn fodder for a windbreak along the woven wire fence bordering the lots on the north. As most sheep are fed in the open in this State, it was considered that this test would be of more actual value to feeders if carried on under similar conditions.

Water was supplied in galvanized-iron troughs, and a fresh supply was kept before the lambs during each day. The troughs were emptied each night to prevent freezing.

Lots 1 and 2, which were on ground feed, received their rations mixed in feed troughs. These troughs were made as follows: The floor of each consisted of a 1-inch board 12 inches wide and 16 feet long. Four-inch fence boards were used for sides and ends. Inverted V's were made of 2-by-4-inch material and placed at either end and in the middle of each trough. Crosspieces were put across these 14 inches from the ground and the box placed thereon. A 1-by-6-inch fence board was placed along the top of the V's to prevent the lambs getting into the box. Two such boxes were placed in each of the five lots. Lots 3 and 5 received their corn in these, while Lot 4 also received silage therein. These three lots were each equipped with a 32-foot hayrack for feeding the alfalfa.



#### WEATHER CONDITIONS.

As these lambs were fed with no shelter other than a wind-break on the north, it would be but fair to give a brief statement of weather conditions during the experimental period, namely, November 26, 1914, to January 31, 1915.

In December the rainfall amounted to 0.91 inch, and the snow-fall, 7.2 inches. In January the snow which fell aggregated 23 inches. Thus during the experiment over 30 inches of snow fell besides rain amounting to nearly an inch. In December the mean temperature was 18.1 degrees and in January, 21.9 degrees. In each month there were six days when the mercury fell below zero.

That the lambs made so good a gain in spite of adverse weather conditions seems to indicate that sheep are adapted to withstand a good many unfavorable climatic conditions and still thrive. Another year a check lot will be fed in a lot with a shed to see what effect the protection will have on gains. Former experiments at this Station showed but little advantage from the sheds. However, the season naturally affects this factor a great deal.

The lambs went thru even the most severe weather and storms in the best of health, and there was no mortality during the period. Practically none of the lambs had colds, and they were always ready for their feed.

#### DURATION OF EXPERIMENT.

The experiment opened November 26, 1914, and closed January 31, 1915, a total of 65 days.

#### PRICES OF FEEDS.

At the opening of the experiment, corn was worth 50 cents per bushel. However, by the close it was up to 65 cents and had been as high as 70 cents for a few days between times. The average cost of the corn actually fed was 60 cents, and that is the price used. Baled alfalfa was purchased, and, while it cost \$10, the same hay on the farm where produced was actually worth from \$6 to \$7.50 in the stack. Consequently, the \$10 price is higher than the producer would figure it. The poor grade alfalfa cost \$7 and in the stack could have been secured for \$4 to \$4.50. However, alfalfa was unusually cheap during the fall of 1914 and the \$10 and \$7 prices used for the two grades would be very fair to cover a series of years.

Corn silage was valued at \$3.50 per ton, as this was ascertained to be the actual cost of it in the silo when the corn it con-

tained was valued at market price and added to the labor of harvesting the crop.

A charge of 3 cents per bushel was made for grinding the corn fed to Lots 1 and 2 and \$2 per ton for grinding the alfalfa fed the same lots. These figures were found to be fairly accurate and represent several records made to secure labor and other costs in connection with each operation.

#### CORN AND ALFALFA VS. CORN, ALFALFA, AND CORN SILAGE.

For several years, corn and alfalfa has comprised the fattening ration for sheep in most Nebraska feed yards. With the advent of the silo, much has been written relative to silage as a supplement to the above ration. With a view of ascertaining the effect of corn silage added to a corn and alfalfa ration, Lots 3 and 4 were fed as indicated above. Table 1 shows the result of this trial.

TABLE 1.—*Shelled corn and alfalfa hay vs. shelled corn, alfalfa hay, and silage.*

Lot.....	3	4
Ration.....	Shelled corn, whole alfalfa	Shelled corn, whole alfalfa, silage
Average initial weight, lbs.....	53.32	53.14
Average final weight, lbs.....	78.91	78.98
Average gain per lamb, lbs.....	25.59	25.84
Average daily gain, lb.....	.393	.398
Average daily ration {		
corn.....	1.444	1.453
alfalfa.....	.938	.818
silage.....		.473
Feed per 100 lbs. gain {		
corn.....	366.84	365.67
alfalfa.....	238.22	204.70
silage.....		120.58
Cost of 100 lbs. gain.....	\$5.11	\$5.15
Average weight per head at Omaha, lbs.....	75.91	75.98
Net selling price per 100 lbs. at Lincoln.....	\$8.38	\$8.38
Average selling price per head at \$8.38 per 100 lbs.....	6.36	6.37
Average cost of feed per head.....	1.31	1.33
Average cost per head at beginning of experi- ment.....	3.95	3.94
Cost of lamb and feed.....	5.26	5.27
Average profit per head.....	1.10	1.10

By referring to Table 1 we see that Lot 4, which is the lot that received the silage, made a slightly larger gain. The corn consumed was practically the same in each lot. However, the lambs in Lot 3 consumed 0.94 pound alfalfa daily, while those

in Lot 4 ate only 0.81 pound but took in addition 0.47 pound corn silage. Thus the total dry matter consumed was practically the same. One hundred pounds of gain on Lot 3 cost but \$5.11 and on Lot 4, \$5.15. At the prices which these feeds cost, no advantage was gained from the use of silage. It should be said that the lambs in Lot 4 seemed to possess a dislike for the silage and failed to relish it as they should.

**SHELLED CORN AND WHOLE ALFALFA VS. GROUND CORN AND GROUND ALFALFA.**

It has always been the contention that sheep could grind their feed much cheaper than man could do it for them. Despite this, there are a number of feeders who have equipped their plants with grinding outfits and are fattening sheep on a mixture of ground corn and ground alfalfa. By grinding both materials and feeding them mixed together, it is believed that the mass is more penetrable to the digestive juices in the alimentary tract than where the grain is consumed before the hay. Also, it is popular opinion that animals will consume more feed where fed the mixture, and do proportionately better. With a view of testing these beliefs, Lot 2 was put on a ration of ground corn and ground alfalfa in order to secure a direct comparison with Lot 3, on shelled corn and alfalfa hay. The results appear in Table 2.

TABLE 2.—*Shelled corn and alfalfa hay vs. ground corn and ground alfalfa hay.*

Lot.....	3	2
Ration.....	Shelled corn, whole alfalfa	Ground corn, ground alfalfa
Average initial weight, lbs.....	53.32	53.26
Average final weight, lbs.....	78.91	77.41
Average gain per lamb, lbs.....	25.59	24.15
Average daily gain, lb.....	.393	.371
Average daily ration { corn.....	1.444	1.57
{ alfalfa.....	.938	.845
Feed per 100 lbs. gain { corn.....	366.84	422.68
{ alfalfa.....	238.22	227.41
Cost of 100 lbs. gain.....	\$5.11	\$6.12
Average weight per head at Omaha, lbs.....	75.91	74.41
Net selling price per 100 lbs., Lincoln.....	\$8.38	\$8.38
Average selling price per head at \$8.38 per 100 lbs.....	6.36	6.23
Average cost of feed per head.....	1.31	1.48
Average cost per head at beginning of experi- ment.....	3.95	3.95
Cost of lamb and feed.....	5.26	5.37
Average profit per head.....	1.10	.80

The lambs in Lot 2 went on feed quicker than those of Lot 3 and never failed to clean up their rations, altho they were given about all they cared for. To start with, they were fed 1 pound of corn and a like amount of alfalfa per day. The corn was increased and the alfalfa decreased so that by the end of three weeks they were consuming 1.6 pounds corn and 0.8 pound alfalfa daily. At the close of the experiment, their daily ration was 1.8 pounds corn and 0.88 pound alfalfa. Lot 3 did not eat quite so much corn. At the start the lambs were given 1 pound of both grain and hay daily, but at the end of the third week they were consuming only 1.4 pounds corn and 1 pound alfalfa. At the close, their ration consisted of 1.6 pounds corn and 1 pound alfalfa.

Considering the grain consumption in Lot 2 and the fact that none of the lambs went off feed, the gain made by this lot was not up to expectations. One hundred pounds of gain cost \$6.12 in Lot 2 as against \$5.11 in Lot 3. A charge of 3 cents per bushel for grinding the corn and \$2 per ton for grinding the hay was made against the feed consumed by Lot 2. Without charging Lot 2 for the grinding of the feed, their gains would still cost 56 cents per 100 pounds more than those made by Lot 3. The result of this test would tend to verify the belief that sheep do better and produce considerably cheaper gains on unground feed.

#### COMPARISON OF GOOD ALFALFA HAY AND POOR ALFALFA HAY WHEN FED IN CONJUNCTION WITH SHELLED CORN.

Every year the farmers of Nebraska have large quantities of off-colored, poor quality alfalfa hay. Generally this is the first cutting, and aside from being quite woody, it is often badly bleached and has lost many of its leaves. The Experiment Station receives numerous requests as to the feeding value of such hay. It is practically valueless on the city markets and as a rule is not worth in excess of 50 per cent of the price of good, green hay if sold upon the farm where produced.

In order to ascertain the value of such hay in fattening lambs, Lot 5 was placed on a ration consisting of shelled corn and some very typical first cutting alfalfa in order to compare with Lot 3 which received corn and green, leafy alfalfa of second and third cutting.

TABLE 3.—*Comparison of good alfalfa and poor alfalfa when fed with shelled corn.*

Lot.....	3	5
Ration.....	Shelled corn, good alfalfa	Shelled corn, 1st cutting alfalfa
Average initial weight, lbs.....	53.32	53.16
Average final weight, lbs.....	78.91	76.44
Gain per lamb, lbs.....	25.59	23.28
Daily gain, lb.....	.393	.358
Average daily ration { corn.....	1.444	1.472
{ alfalfa.....	.938	.901
Feed per 100 lbs. gain { corn.....	366.84	411.13
{ alfalfa.....	238.22	251.85
Cost of 100 lbs. gain.....	\$5.11	\$5.28
Average weight per head at Omaha, lbs.....	75.91	73.44
Net selling price per 100 lbs., Lincoln.....	\$8.38	\$8.38
Average selling price per head at \$8.38 per 100 lbs.....	6.36	6.15
Average cost of feed per head.....	1.31	1.23
Average cost per head at beginning of experi- ment.....	3.95	3.94
Cost of lamb and feed.....	5.26	5.17
Average profit per head.....	1.10	.98

By referring to Table 3, we see that the lambs in Lot 3 made an average gain of 2.31 pounds more than those in Lot 5 during the 65-day test. The daily corn consumption per lamb per day in Lot 5 was 0.03 greater than in Lot 3 while the hay consumption was 0.04 less. Hence, the total feed consumed per day was practically the same. The cost of 100 pounds gain in Lot 5 was \$5.28, while in Lot 3 it was but \$5.11. However, the poor hay was charged at \$7 per ton as against \$10 for the good hay. These figures were actual cost on the Lincoln market. If one were buying the hay it would pay well to buy the good hay at the prices mentioned. However, if a person had the poor hay on his farm and no other disposition for it, he certainly would not be warranted in discarding the poor hay and purchasing good hay even tho the above figures might seem to indicate such a procedure as economical. By referring to Table 7 where costs of gains with feeds at varying prices are given we find that when corn is figured at 60 cents per bushel, it cost \$4.90 to put on 100 pounds gain in Lot 5 with the alfalfa valued at \$4 per ton, \$5.15 where the alfalfa is valued at \$6, and \$5.41 where a valuation of \$8 is placed upon it. In Lot 3, we find that 100 pounds gain cost \$4.88 where the alfalfa is valued at \$8. Thus a ton of the

poor hay proved to be worth \$4 when the good hay was valued at \$8, or in other words just 50 per cent of the value of the good hay. With corn at 70 cents and good hay at \$10, 100 pounds gain in Lot 3 cost \$5.78, while allowing \$5 for the hay in Lot 5 with corn at 70 cents 100 pounds gain would cost \$5.67.

**GROUND CORN AND GROUND ALFALFA WITH AND WITHOUT CORN SILAGE.**

In order to ascertain the effect of adding silage to a ration of ground corn and ground alfalfa and thereby have results comparable with those sought where silage was added to shelled corn and whole alfalfa, Lots 1 and 2 were compared. The lambs in Lot 1 did not care for the silage and were inclined to muss over their feed and leave the larger pieces of silage. It was only by forcing that they were finally up to 1 pound per day by the close of the experiment. The lambs in Lot 4 took to the silage much more readily than did those in Lot 1. As to why this should be, it would be hard to assign a cause. The silage was of average quality and always fed fresh from the silo. It was placed in the troughs on top of the ground mixture of corn and alfalfa. Some

TABLE 4.—A ration of ground corn and ground alfalfa with and without corn silage.

Lot.....	2	1
Ration.....	Ground corn, ground alfalfa	Ground corn, ground alfalfa, silage
Average initial weight, lbs.....	53.26	53.14
Average final weight, lbs.....	77.41	77.27
Total gain per lamb, lbs.....	24.15	24.13
Daily gain, lb.....	.371	.371
Daily ration { corn.....	1.57	1.49
{ alfalfa.....	.845	.596
{ silage.....		.726
Feed per 100 lbs. gain { corn.....	422.68	400.57
{ alfalfa.....	227.41	160.55
{ silage.....		195.75
Cost of 100 lbs. gain.....	\$6.12	\$5.81
Average weight per head at Omaha, lbs.....	74.41	74.27
Net selling price per 100 lbs., Lincoln.....	\$8.38	\$8.38
Average selling price per head at \$8.38 per 100 lbs.....	6.23	6.22
Average cost of feed per head.....	1.48	1.40
Average cost per head at beginning of experi- ment.....	3.95	3.94
Cost of lamb and feed.....	5.43	5.34
Average profit per head.....	.80	.88

feeders in using this ration mix the three feeds together and permit it to stand from one feed to the next. Possibly the moistening of the ground feed in this manner would produce a beneficial effect upon the ration.

In both lots the average daily gain was 0.371 pound. However, owing to the heavy grain consumption and increased cost due to grinding, these two lots showed the highest cost per 100 pounds gain and consequently the lowest profit per head. In Lot 2, 100 pounds gain cost \$6.12, while in Lot 1 it cost \$5.81. Lot 2 averaged 1.57 pounds corn per day and 0.845 alfalfa while Lot 1 consumed 1.49 pounds corn, 0.596 pound alfalfa, and 0.726 pound silage. The addition of silage to this ration cheapened the cost of producing 100 pounds gain by 31 cents.

**CORN SILAGE WHEN FED WITH SHELLED CORN AND WHOLE ALFALFA AND WHEN FED WITH GROUND CORN AND GROUND ALFALFA.**

Lot 4, fed whole alfalfa and shelled corn with silage, made a daily gain 0.027 pound per lamb in excess of that made by Lot 1 on the ground feed and silage. Owing to the cost of feed preparation in Lot 1 and the lighter gains, we find that 100 pounds gain cost \$5.81 as against \$5.15 in Lot 4. The corn consumption was somewhat greater in Lot 1, while the alfalfa consumed amounted to only three-fourths as much as that consumed by Lot 4. On the other hand, Lot 4 consumed only two-thirds as much silage as Lot 1. Thus, the total feed per lamb per day in Lot 4 amounted to 2.739 pounds against 2.812 pounds in Lot 1, the dry matter being again practically identical in amount in each lot. This test seemed to favor the feeding of silage with shelled corn and whole alfalfa by a rather decisive margin.

TABLE 5.—Comparison of corn silage when fed with a ration of shelled corn and whole alfalfa and when fed with ground corn and ground alfalfa.

Lot.....	4	1
Ration.....	Shelled corn, whole alfalfa, silage	Ground corn, ground alfalfa, silage
Average initial weight, lbs.....	53.14	53.14
Average final weight, lbs.....	78.98	77.27
Average gain per lamb, lbs.....	25.84	24.13
Average daily gain, lb.....	.398	.371
Average daily ration {		
corn.....	1.453	1.49
alfalfa.....	.813	.596
silage.....	.473	.726
Feed per 100 lbs. gain {		
corn.....	365.67	400.57
alfalfa.....	204.70	160.55
silage.....	120.58	195.75
Cost of 100 lbs. gain.....	\$5.15	\$5.81
Average weight per head at Omaha, lbs.....	75.98	74.27
Net selling price per 100 lbs., Lincoln.....	\$8.38	\$8.38
Average selling price per head at \$8.38 per 100 lbs.....	6.37	6.22
Average cost of feed per head.....	1.33	1.40
Average cost per head at beginning of experi- ment.....	3.94	3.94
Cost of lamb and feed.....	5.27	5.34
Average profit per head.....	1.10	.88



TABLE 6.—Summary of entire feeding trial with five lots of 50 lambs each.

Lot	1	2	3	4	5
Ration	Ground corn, ground alfalfa, silage	Ground corn, ground alfalfa	Shelled corn, good alfalfa	Shelled corn, good alfalfa, silage	Shelled corn, poor alfalfa
Average initial weight, lbs.	53.14	53.26	53.32	53.14	53.16
Average final weight, lbs.	77.27	77.41	78.91	78.98	76.44
Average total gain, lbs.	24.13	24.15	25.59	25.84	23.28
Average daily gain, lb.	.371	.371	.393	.398	.358
Average daily ration, lbs.	1.49	1.57	1.444	1.453	1.472
	{ grain	.596	.938	.813	.901
	{ alfalfa	.726		.473	
	{ silage				
Feed per 100 lbs. gain	400.57	422.68	366.84	365.67	411.13
	{ grain	160.55	238.22	204.70	251.85
	{ alfalfa	195.75		120.58	
	{ silage				
Cost of 100 lbs. gain, c. 60c, c. s. \$3.50, alf. \$10, gr. alf. \$12, gr. c. 63c, p. alf. \$7	\$5.81	\$6.12	\$5.11	\$5.15	\$5.28
Net selling price per head at Lincoln	6.22	6.23	6.36	6.37	6.15
Average cost of feed per head	1.40	1.48	1.31	1.33	1.23
Cost of lamb and feed	5.34	5.43	5.26	5.27	5.17
Average profit per head	0.88	0.80	1.10	1.10	0.98

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TABLE 7.—Cost of 100 pounds of gain with corn and alfalfa hay at varying prices.

Lot	Corn per bushel.....	50c			56c			60c			65c			70c							
		\$4	\$6	\$8	\$4	\$6	\$8	\$4	\$6	\$8	\$4	\$6	\$8	\$4	\$6	\$8					
	Hay per ton.....																				
	Ration																				
1	Ground corn, ground alfalfa, silage.....	4.61	4.77	4.93	5.10	5.05	5.21	5.37	5.53	5.49	5.65	5.81	5.69	5.85	6.01	6.17	6.05	6.21	6.37	6.53	
2	Ground corn, ground alfalfa.....	4.68	4.91	5.14	5.36	5.14	5.36	5.59	5.82	5.44	5.66	5.89	6.12	5.81	6.04	6.27	6.50	6.19	6.42	6.65	6.88
3	Shelled corn, good alfalfa.....	3.75	3.99	4.23	4.47	4.14	4.38	4.62	4.86	4.40	4.64	4.88	5.11	4.73	4.97	5.21	5.45	5.06	5.30	5.54	5.78
4	Shelled corn, good alfalfa, silage.....	3.89	4.09	4.30	4.50	4.28	4.48	4.69	4.89	4.53	4.74	4.94	5.15	4.86	5.07	5.27	5.48	5.19	5.40	5.60	5.81
5	Shelled corn, poor alfalfa.....	4.18	4.43	4.68	4.93	4.62	4.87	5.12	5.37	4.90	5.15	5.41	5.66	5.27	5.52	5.78	6.03	5.64	5.89	6.15	6.40

<sup>1</sup> Above prices are on shelled corn and whole alfalfa hay. In Lots 1 and 2, the cost per 100 pounds gain includes customary charges for grinding both feeds, namely, 3 cents per bushel for corn and \$2 per ton for alfalfa.

**COST OF 100 POUNDS GAIN WITH CORN AND ALFALFA AT  
VARYING PRICES.**

In Table 7 is given the cost of producing 100 pounds gain in the various lots where corn and alfalfa are charged at varying prices. These prices represent the approximate limits which have existed during the past several years for these two feeds on Nebraska farms. A careful study of this table will disclose some interesting and useful facts regarding the cost of producing gain with fluctuating prices of feeds. For instance, in Lot 3 with alfalfa at \$10 and corn at 50 cents, 100 pounds gain cost but \$4.47, while with hay at the same price and corn at 70 cents, the cost rises to \$5.78, or a difference of \$1.31. In Lot 5 with corn at 50 cents and alfalfa at \$10, the cost is \$4.93, and with corn at 70 cents and hay at \$10 the cost is \$6.40, or a spread of \$1.47.

With corn high and alfalfa cheap, the cheapest gains can undoubtedly be made by feeding a medium corn ration and heavy feed of alfalfa. Vice versa where corn is cheap and alfalfa very high. At the Illinois Agricultural Experiment Station<sup>1</sup> it was found that lambs consumed about the same amount of dry matter per day whether fed light, medium, or heavy rations of corn in conjunction with alfalfa hay. In other words, as the corn consumption increased, the hay consumption decreased in the same proportion and vice versa.

<sup>1</sup>Illinois Bulletin 167.

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**FINANCIAL STATEMENT.**

Purchasing expenses, October 28, 1914—		
255 lambs, 13,328.65 lbs. at \$6.65 per		
100 lbs.....	\$886.35	
Commission for buying.....	15.00	
Freight, Omaha to Lincoln.....	19.72	\$921.07
	<hr/>	
Feed consumed previous to experiment—		
10,500 lbs. alfalfa hay at \$10.....	52.50	
1,312.5 lbs. corn at 60c.....	14.04	66.54
	<hr/>	
Feed consumed during experiment—		
5,693 lbs. alfalfa hay at \$10.....	28.47	
4,683.25 lbs. alfalfa hay ground at \$12..	28.10	
14,186 lbs. corn, shelled, at 60c.....	151.98	
9,937.75 lbs. ground corn at 63c.....	111.80	
2,931.25 lbs. poor alfalfa hay at \$7.....	10.26	
3,919.25 lbs. silage at \$3.50.....	6.86	337.47
	<hr/>	
Selling expenses, February 1, 1915—		
Freight, Lincoln to Omaha.....	27.10	
Yardage.....	13.55	
Insurance.....	.20	
Commission.....	25.00	65.85
	<hr/>	
Interest—		
\$921.07 at 8 per cent for 90 days.....		18.42
Receipts—		
247 lambs, wt. 18,390 lbs., sold at Omaha		
at \$8.75 per 100 lbs.....		\$1,609.12
3 slipped-wool lambs, wt. 210 lbs. at		
\$7.25.....		15.22
Net profit.....	214.99	
	<hr/>	
	<u>1,624.34</u>	<u>1,624.34</u>

## **PART II. FATTENING NATIVE LAMBS.**

This experiment was conducted during the same months that the one described in Part I was in operation.

The object in this experiment was to test common rations on native lambs to ascertain the cost of producing gains on each. Lot 1, on corn and alfalfa, was compared with Lot 2, fed the same feeds with silage added, and also with Lot 3, on ground corn and ground alfalfa. Lot 4 was fed shelled corn, oil meal, and prairie hay, a ration which is used by many feeders who purchase all of their feed. As three of the lots in this experiment were fed on the same rations as three lots of the western lambs a comparison of economy of gains between the two kinds of sheep is given in Part III of this bulletin.

### **DESCRIPTION OF THE LAMBS.**

The lambs used in this test were produced on the University Farm and were all either pure-breds or crosses between pure-bred animals of two different breeds. There were 28 head used in the test. They were divided into four groups of seven each. In each lot were 2 Shropshires, 2 Hampshires, 1 cross-bred Merino-Shropshire, 1 cross-bred Cotswold-Shropshire and 1 cross-bred Leicester-Shropshire. They were nine months old when the experiment began and weighed a trifle over 91 pounds. They had been fed a corn silage and alfalfa hay ration with a medium feed of corn and oats mixed, up to the opening of the experiment. They were in a good, thrifty condition but not fat.

### **EQUIPMENT.**

The shed used for the experiment was of frame construction and had windows on the north, south, and west sides. These were kept partially opened thruout the entire test. Panel partitions divided the shed into four oblong pens, each 12 by 22 feet in size, thus providing 38 square feet per lamb. Water was supplied in galvanized-iron troughs, while grain was fed in low boxes along the edge of each pen. Hayracks were provided with tight bottoms and vertical slats 4 inches apart. As bedding became wet, more straw was added, the desire being to keep the pens as dry as possible.

### **PLAN OF EXPERIMENT.**

Feeding was done regularly at 7 a. m. and 5 p. m. As the desire was to put on maximum gains in a short period, a heavy grain ration was fed from the start.

The rations fed were as follows:

- Lot 1.—Corn and alfalfa hay.
- Lot 2.—Corn, alfalfa hay, and corn silage.
- Lot 3.—Ground corn and ground alfalfa.
- Lot 4.—Corn, oil meal, and prairie hay.

Lots 1, 2, and 3 were started on a daily ration of 2 pounds corn and 1 pound alfalfa supplemented in Lot 2 with 1 pound silage. Lot 4 started on 2 pounds corn, 1 pound oil meal, and 1 pound prairie hay. However, the lambs did not care for the prairie hay, and it was later reduced to what they would consume. Likewise they were unable to handle 2 pounds of corn every day, as the average daily ration consumed will show. The plan was to divide the sheep evenly as to weight, quality, and breed, thereby making the only apparent difference one of rations fed.

**DURATION OF EXPERIMENT.**

The experiment opened on December 2, 1914, and closed January 30, 1915, a period of 59 days. Hence, it covered six days less time than the experiment with western lambs. As these lambs were under cover, the weather conditions during the experiment would not be of so much importance. Windows were left open even in the most severe weather in order to provide ample ventilation at all times.

**FEEDS AND PRICES.**

The following prices for feeds used in the experiment were considered as fair as could be determined for the period. They represent actual cost.

Shelled corn, per bushel.....	\$0.60
Ground alfalfa, per bushel.....	.63
Alfalfa, per ton.....	10.00
Ground alfalfa, per ton.....	12.00
Silage, per ton.....	3.50
Oil meal, per ton.....	35.00
Prairie hay, per ton.....	10.00

These are the same as those used in Part I, with prices on oil meal and prairie hay additional.

TABLE 8.—*Summary of 59-day experiment with native lambs.*

Lot.....	1	2	3	4
Ration.....	Corn, alfalfa	Corn, alfalfa, silage	Ground corn, ground alfalfa	Corn, oil meal, prairie hay
Average initial weight, lbs.....	91.00	91.00	91.14	91.86
Average final weight, lbs.....	127.43	121.86	120.00	121.14
Average total gain, lbs.....	36.43	30.86	28.86	29.28
Average daily gain, lb.....	.632	.523	.486	.496
Average daily ration—				
Corn.....	2.20	2.14	2.08	1.78
Alfalfa.....	.96	1.03	1.19	....
Silage.....	....	.62	....	....
Prairie hay.....	....	....	....	.56
Oil meal.....	....	....	....	1.01
Feed per 100 lbs. gain—				
Corn.....	348.04	408.53	425.00	357.63
Alfalfa.....	151.77	195.93	242.39	....
Silage.....	....	118.39	....	....
Prairie hay.....	....	....	....	112.46
Oil meal.....	....	....	....	204.19
Cost of 100 lbs. gain.....	\$4.48	\$5.56	\$6.24	\$6.96

By referring to Table 8, we find that Lot 1, fed shelled corn and alfalfa hay, produced 100 pounds gain at a cost of \$4.48, the cheapest; whereas gains on Lot 4, fed corn, oil meal, and prairie hay, cost \$6.96, the most expensive. Lot 1 gained daily per lamb 0.632 pound, the best; whereas in Lot 3, fed ground corn and ground alfalfa, the daily gain was 0.486, the least.

In Lot 1 we find a daily corn consumption per lamb of 2.20 pounds, the greatest; while in Lot 4 the corn consumption is only 1.78 pounds, but added to this is a daily consumption of 1.01 pounds oil meal.

Lot 2, fed corn, alfalfa, and silage, made gains at a cost of \$5.56 per 100 pounds, or \$1.08 greater than Lot 1, fed corn and alfalfa. This is rather surprising inasmuch as the lambs were all accustomed to silage prior to the experiment, and one would naturally expect Lot 2 to have shown up better as a consequence.

As in Part I of this bulletin, the lot on ground corn and ground alfalfa (Lot 4), consumed more corn than any other lot and made a relatively poor gain, indicating that grinding does not pay.

Lot 4 appeared to be doing very well thruout the experiment. However, the cost of producing gain was so great that the other lots all show better financially, altho daily gains were slightly greater in this lot than in Lot 3, fed ground feed.

**FINANCIAL STATUS.**

As these lambs were not purchased prior to the experiment it would be difficult to place an accurate valuation on them at the opening of the test. Likewise at the close, some of them were reserved for class use in the University School of Agriculture. Hence, their sale value was indefinite.

Twenty-one head were marketed in Omaha, February 1, which was the day the western lambs were sold. These brought \$8 per hundred pounds, whereas the westerns sold for \$8.75. The natives were classed and sold as yearlings on account of their extreme weight, altho the buyers were unable to discover any yearling teeth in their mouths. As the actual shipping and selling expenses on these lambs amounted to 32 cents per 100 pounds aside from the shrink in transit, it does not take much figuring to see that the finishing of them was unprofitable; they would have brought at least 7 cents at the time they went on test.



**PART III. COMPARISON OF NATIVE LAMBS FED IN A SHED WITH WESTERN LAMBS FED IN AN OPEN LOT.**

Inasmuch as the lambs in Part I were fed in open pens whereas those in Part II were fed in a shed, it is hardly fair to draw a comparison between the economy of gains with each and say the difference is entirely due to the lambs. However, Lots 1, 2, and 3 of the native lambs were fed on identical rations with Lots 3, 4, and 2 respectively of the western lambs. Hence, a comparison of daily food consumption and cost of gains should prove of interest. In each table there is only a very slight difference in the grain and roughness consumed per 100 pounds gain. The native lambs averaged approximately 91 pounds at the beginning as against 53 pounds for the western lambs.

**TABLE 9.—Comparison of western lambs fed in the open with native lambs which were shed fed.**

Ration, shelled corn and alfalfa hay.

	Westerns (Lot 3)	Natives (Lot 1)
Average initial weight, lbs.....	53.32	91.00
Average daily gain, lb.....	.393	.632
Average daily ration—		
Corn.....	1.444	2.20
Alfalfa.....	.938	.96
Feed per 100 pounds gain—		
Corn.....	366.84	348.04
Alfalfa.....	238.22	151.77
Cost of 100 pounds gain.....	\$5.11	\$4.48

In Table 9 we find a daily gain on the native lambs of 0.632 pound, whereas the western lambs gained only 0.393 pound. A portion of this difference may be ascribed to the greater size of the natives and consequent increased food consumption. While both consumed about the same amount of alfalfa daily, yet the corn consumption with the natives was 2.2 pounds as against 1.444 pounds with the westerns. This means that the westerns consumed only 66 per cent as much corn per day and gained 62 per cent as much in weight per day as did the natives. As the corn consumption and gain bear the same proportionate difference, we find the cost of 100 pounds gain to be very similar.

The natives were somewhat the more economical gainers, their cost of producing 100 pounds being just 88 per cent of that of the westerns.

TABLE 10.—*Comparison of western lambs fed in the open with native lambs which were shed fed.*

Ration, shelled corn, alfalfa, and silage.

	Westerns (Lot 4)	Natives (Lot 2)
Average initial weight, lbs.....	53.14	91.00
Average daily gain, lb.....	.398	.523
Average daily ration—		
Corn.....	1.453	2.14
Alfalfa.....	.813	1.03
Silage.....	.473	.62
Feed per 100 lbs. gain—		
Corn.....	365.67	408.53
Alfalfa.....	204.70	195.93
Silage.....	120.58	118.39
Cost of 100 lbs. gain.....	\$5.15	\$5.56

In this comparison we find the westerns gaining 0.398 pound, a trifle more per day, and the natives gaining 0.523 pound, a trifle less than the lambs in Table 13. The addition of corn silage increased the cost of 100 pounds gain in both instances when we compare with the corn and alfalfa lots. The westerns produced 100 pounds gain at a cost of \$5.15, whereas the same gain cost \$5.56 on the natives. The natives consumed 43 pounds more corn to produce 100 pounds gain but a trifle less alfalfa and silage than the westerns. Inasmuch as the natives were thoroly accustomed to the silage prior to the experiment, it would be but natural to have expected them to make a better showing in this test than did the westerns. The westerns gained 76 per cent as much per day on 68 per cent as much corn, 79 per cent as much alfalfa, and 76 per cent as much silage as the natives received. As the westerns weighed at the opening of the experiment but 58 per cent as much as the natives, they made a higher proportionate gain in spite of poorer breeding and the lack of protection from storms.

TABLE 11.—*Comparison of western lambs fed in the open with native lambs which were shed fed.*

## Ration, ground corn and ground alfalfa.

	Westerns (Lot 2)	Natives (Lot 3)
Average initial weight, lbs. ....	53.26	91.14
Average daily gain, lb. ....	.371	.486
Average daily ration—		
Ground corn. ....	1.57	2.08
Ground alfalfa. ....	.845	1.19
Feed per 100 lbs. gain—		
Ground corn. ....	422.68	425.00
Ground alfalfa. ....	227.41	242.39
Cost of 100 lbs. gain. ....	\$6.12	\$6.24

In comparing these two lots, we find less spread between the daily gains than in the other groups. The natives gained only 0.486 pound daily while the westerns gained 0.371, or 77 per cent as much. The cost of producing 100 pounds gain, however, is practically the same, that of the natives being \$6.24 and of the westerns \$6.12. The reason for this must lie in the food consumption. The natives ate daily 2.08 pounds corn, while the westerns averaged 1.57 pounds, or 75 per cent as much. The natives consumed 1.19 pounds alfalfa per day and the westerns 0.845 pound, or 71 per cent of the former.

Summing up, we would have the westerns weighing 58 per cent as much as the natives at the start, gaining per day 77 per cent as much, on a ration amounting to 75 per cent as much corn and 71 per cent as much alfalfa, at a cost of 98 per cent of that for producing gain on the natives.

The corn consumed per 100 pounds gain was practically the same, being less than 0.5 per cent difference. The alfalfa consumed per 100 pounds gain was approximately the same, the westerns consuming a trifle less in producing 100 pounds gain, namely, 94 per cent that consumed by the natives.