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## Speltz vs. Barley - A Comparison of the Food Value of Speltz and Barley as a Single Grain Ration for Fattening Sheep

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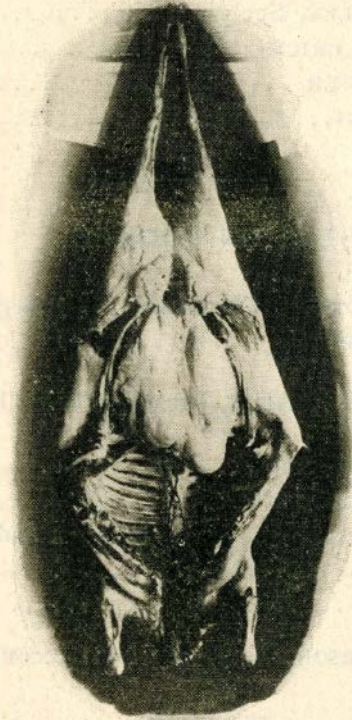
Bulletin 71.

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## U. S. Experiment Station, South Dakota.

In Connection With the South Dakota Agricultural College.



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SPELTZ VS. BARLEY—A Comparison of the Food Value of Speltz and Barley as a Single Grain Ration for Fattening Sheep.

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DEPARTMENT OF AGRICULTURE.

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BROOKINGS, SOUTH DAKOTA.



SIOUX FALLS, S. D.  
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# SPELTZ VS. BARLEY.

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## A Comparison of the Food Value of Speltz and Barley as a Single Grain Ration for Fattening Sheep.

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DEPARTMENT OF AGRICULTURE.

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E. C. CHILCOTT,  
Agriculturist.

W. T. THORNER,  
Herdsman.

The grain commonly called Speltz in this state, the two-grained Spelt wheat; known in Germany as Emmer (*Triticum dicoccum*), is becoming quite generally grown throughout this State and this Station has received many inquiries concerning its food value. Contrary to the popular belief, this grain is no new discovery or development, but is one of the oldest known cereals, probably having been grown in Egypt, Greece and the Roman Empire from the earliest time. It is now mainly grown in Southern Germany, Switzerland and Spain, on land too poor or at altitudes too great for the profitable raising of common wheat.

The following is a description of this grain, taken from Bulletin No. 69, of this Station, Shepard and Saunders:

### SPELTZ.

(*Triticum dicoccum*.)

"A simple, erect, smooth annual, two to three feet high; stem and leaves smooth and glabrous; spike short, compact, two to three inches long; spikelets two rowed; the glumes smooth, naked, slightly keeled, with a short, blunt middle tooth, outer flowering scale provided with an awn, two to four inches long, which is beset with sharp prickles.

"Speltz was first grown in South Dakota by the Russians who, doubtless, brought it over with them from the Fatherland. It has later been introduced by the Department of Agriculture. In the Northwestern part of the State it is

grown about as commonly as oats or barley, but is little known as yet in the Southern counties. It is more drought resistant than barley or oats and under similar conditions outyields either. In this vicinity it has, under unfavorable conditions of culture, given small yields, while even during the past trying season, on low land on the College farm, it gave a yield of sixty-three bushels per acre. Its feeding value is high, especially for milch cows and growing swine. For horses it is not preferable to oats. The grains are enveloped in a more or less persistent husk which constitutes approximately 25 per cent. of the threshed grain. Three analyses were made, one of the husk, one of the naked grain, and one of the husk and grain as they naturally cohere.

"There are good reasons for believing that the Speltz now in general cultivation is in reality, *Emmer* or *Triticum dicoccum*."

Below we give the average of a large number of analyses of barley from Bulletin No. 10, Office of Experiment Stations, the analysis of Speltz made by Shepard of this Station:

#### ANALYSES OF BARLEY AND SPELTZ.

	Air Dry Substance		Water Free Substance.	
	Barley.	Speltz.	Barley.	Speltz.
Water.....	10.85	10.172	.....	.....
Ash.....	2.41	2.956	2.7	3.29
Ether Extract.....	1.84	2.467	2.0	2.75
Crude Fibre.....	2.74	11.450	3.0	12.75
Crude Protein.....	12.37	11.577	13.9	12.90
N-free Extract.....	69.79	61.398	78.4	68.31

As is frequently the case where a new food stuff is discovered, a well known grain put to a new use, or an old grain introduced into a new locality, many extravagant claims have been made for the feeding value of Speltz. An examination of the accompanying analyses will show that there is nothing in the chemical composition of Speltz to warrant one in supposing that it is superior to Barley. In the air dry condition it contains .55 per cent. more ash, 8.71 per cent.

more crude fiber, .8 per cent. less protein, and 8.4 per cent. less nitrogen free extract, either extract or fats being the only group of nutrients found in greater quantity in Speltz than in Barley, and of that only .63 per cent.

As there are no published reports giving full results of feeding tests with Speltz the following experiment was conducted during the winter of 1900 and 1901:

### GENERAL PLAN OF EXPERIMENT.

A bunch of twenty-four Shropshire and Hampshire grade wethers were selected from the College farm for these experiments. Four of them were February lambs and the rest came in April and May. They had run with their dams at pasture during the summer and had also been given a light grain ration. They were separated from their dams on October 18, and turned upon good Brome grass pasture where they remained until November 20, when they were placed in the feeding pens and fed upon fine Brome hay. This hay was continued throughout the experiment. On November 20 they were weighed and the whole bunch was given a grain ration of Speltz and Barley mixed in equal parts. They were grained twice a day, at 7 A. M. and at 5 P. M., and the grain was carefully weighed when put into the feeding troughs, and if not all consumed before next feeding time, what remained was weighed and deducted from the amount fed, so the weights given represent the net amount consumed. It was the practice to give them just such an amount as they would eat up clean. The hay racks were filled with hay twice a day, just after feeding the grain, and were cleaned out every night. No record was kept of the hay consumed, but they were given all they would eat. The watering troughs were filled every morning and kept filled during the day, except during the freezing weather when they were filled three times a day. Salt was kept before them. They were weighed every Tuesday, beginning on November 27, between 11 A. M. and 12 M., each individual sheep being weighed separately.

The following table gives the weights, gain, grain consumed, and the ratio of grain to gain for the preliminary period of two weeks, during which time the whole bunch was kept together and fed upon a mixed ration of Barley and Speltz.

NUMBERS.	NOVEMBER 27. Wt. l. bs.	DECEMBER 4. Wt. Lbs.	DECEMBER 11. Wt. Lbs.
245	93	93.5	93
246	110.5	111	112
247	108.5	106.5	110
248	100	98	100.5
288	66.5	66.5	67.5
314	77	77.5	79
315	71.5	74	74.5
316	70.5	71	73.5
318	84	83	85.5
319	91.5	92.5	93
320	68.5	68.5	68.5
321	82.5	79	81.5
322	88	90.5	93.5
323	91.5	87.5	91.5
325	76.5	71.5	79.5
326	90.5	90.5	92
327	89	88.5	91
328	64.5	64	67.5
329	65	65	65
330	81	79.5	81.5
331	82.5	79.5	81
332	73.5	71.5	72.5
333	77	79.5	83.5
334	78	75.5	77
<b>Total</b> .....	1981	1961	2014
<b>Gain</b> .....		20	53
<b>Grain Fed</b> .....		72	108
<b>Pounds of Grain for one Pound of Gain</b> .....			2

On December 11, the bunch was divided into two lots of twelve each and placed in separate pens. Both lots were treated exactly alike, as described above, except that one lot was fed a grain ration of Speltz and the other of Barley. Neither the Speltz nor Barley was ground or crushed, but was fed whole.

The following tables give the weights, grain consumed, gains made and ratio of grain to gain for the average of fifteen weeks, beginning on December 11 and ending on March 26, when the feeding experiments proper were brought to a close. The sheep were not, however, sold at this time but were retained for five weeks longer to test the effects of shearing upon food consumption and mutton production. This second

experiment will be discussed in the latter part of this same Bulletin. We will now examine the table giving the weights and gains for the fifteen weeks period and see what conclusions can be drawn from the results obtained:



# LOT ONE—SPELTZ.

Period of Fifteen Weeks.

Number.	Dec. 11	Dec. 18	Dec. 25	Jan. 1	Jan. 8	Jan. 15	Jan. 22	Jan. 29	Feb. 5	Feb. 12	Feb. 19	Feb. 26	Mar. 5	Mar. 12	Mar. 19	Mar. 26	Total Gain Per Head —Pounds.	Gain Per Head Per Week—Pounds.	
	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.			
247	110	117	114	118	121	125.5	126.5	129	133	136.5	137.5	143	143	148.5	147.5	148	38	2.53	
248	100.5	104.5	106	108.5	108.5	112.5	114.5	113	119.5	123.5	125	127.5	128.5	130	130	133	32.5	2.17	
316	73.5	77	77.5	80.5	80	85	88.5	89	95	99	99.5	104	103.5	107	108.5	108.5	3.5	2.33	
319	93	95	93.5	99.5	98	104.5	102	104	109	113.5	115	117	111.5	119	118.5	117.5	24.5	1.63	
327	91	95.5	94	97	100	98	104	103	107	110	112.5	113.5	115	114.5	115.5	113.5	22.5	1.50	
330	81.5	83.5	84.5	87	86.5	84.5	90.5	90	91.5	95	94.5	98.5	98	99.5	103	104.5	23	1.53	
288	67.5	66	64.5	64.5	65	67.5	71.5	70.5	72	76.5	72.5	75.5	75	73.5	76	77.5	10	.67	
325	79.5	77	72.5	80	80	83	83	81	86	88	91.5	92	94.5	95.5	99	97	17.5	1.17	
321	81.5	82.5	83	81	83.5	86	92	93	96.5	97.5	102	106.5	105.5	110	110.5	114	32.5	2.17	
323	91.5	95.5	97.5	98	102.5	101.5	107.5	105.5	108.5	110	113	116	118.5	118	123	125	33.5	2.27	
332	72.5	75	78.5	78	78.5	82	85.5	84.5	88	91	91.5	93.5	89.5	92	92.5	97	24.5	1.63	
329	65	64.5	65.5	67	68.5	70	69	70.5	74.5	78	73	72.5	71.5	70.5	70	72	7	.47	
Total .....	1007	1033	1031	1039	1072	1106	1134.5	1133	1184.5	1218.5	1227.5	1259.5	1254	1279	1294	1307.5	300.5	20.07	} Average gain Per week.
Gain per wk. ....		26	—2	28	13	34	28.5	—1.5	51.5	34	9	32	—5.5	25	15	13.5	300.5	25.04	
Grain Fed .....		75	104	133.5	160.5	163.5	166.5	170	174.75	177.5	179	177	155.25	145.5	137.25	125	2244.25	1.67	} Average gain Per head per week.
Lbs. of grain for 1 lb. gain.....																	7.47		

## LOT TWO—BARLEY.

Period of Fifteen Weeks

Number.	Dec. 11	Dec. 18	Dec. 25	Jan. 1	Jan. 8	Jan. 15	Jan. 22	Jan. 29	Feb. 5	Feb. 12	Feb. 19	Feb. 26	Mar. 5	Mar. 12	Mar. 19	Mar. 26	Total Gain Per Head —Pounds.	Gain Per Head Per Week—Pounds.
	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.	Weight, lbs.			
245	93	97.5	99	102.5	105	106.5	104.5	109	112	113	117.5	121	124.5	130	132.5	131	38	2.53
246	112	109	113	118	117.5	120.5	124	130.5	134	143	144	148	150	150.5	150.5	155.5	46.5	3.10
315	74.5	79	78.5	84	84	98.5	92	93	97	100.5	99.5	101	96	96.5	94	19.5	1.30	2.83
322	93.5	97.5	98.5	106.5	106	113	117	120.5	126.5	132	132	135.5	128	136	139	136	42.5	2.83
326	92.5	96.5	97	104	106.5	112	112.5	113.5	116.5	121	123	126	127	134	137.5	146	48	3.26
333	82.5	84.5	87	95	90	92.5	97.5	100	103	109	110.5	113.5	115	116	116	114.5	31	2.07
320	68.5	70	69.5	78	79.5	81.5	81.5	83.5	87.5	92.5	91.5	96	100.5	106.5	105.5	105.5	37	2.47
314	70	83.5	88.5	91	93	95.5	102	103	108.5	113.5	114.5	119	123	125	129	129	56	3.33
318	85.5	84.5	88.5	90.5	95	95	93	94	9	101	101	105	106	112	112	114.5	29	1.93
331	81	85	85.5	91	97	98.5	101	104	104.5	108	109.5	112	115.5	118.5	117	118.5	37.5	2.50
328	68	75	72	77	77.5	77	80.5	80	80	83.5	89	94	94.5	101	101.5	104.5	37	2.47
334	77	80	80.5	84	86.5	85.5	86	85.5	91.5	95	99	104	101	113	116	116	39	2.60
Total	1007	1037	1050	1114.5	1133	1173	1191.5	1216.5	1257	1312	1331	1377	1381	1430	1463	1462	455	30.33
Gain		30	13	64.5	18.5	40	18.5	25	40.5	55	19	46	4	69	13	—1	455	37.91
Grain Fed		75	104	133.5	160.5	168	174	171.5	162.5	163.5	174	191.5	171.5	156.5	156.5	155.25	2317.75	2.53
lbs. of grain for 1 lb. gain																	5.09	

An examination of the column of weights under the date of December 11 will show that the two lots were very evenly divided both as to individual sheep and the aggregate weights, which latter were identical, being 1,007 pounds in each lot. Upon referring to the column of weights, under the heading, March 26, the date at which the experiment was closed, we find that the aggregate weights of Lot One was 1,307½ pounds, and that the gain for the fifteen week period was therefore 300½ pounds; while Lot Two weighed 1,462, thus giving a gain of 455 pounds. From this it will be seen that Lot Two fed upon Barley gained a trifle over 1½ times as much as Lot One which was fed upon Speltz. An examination of the weekly gains for each lot will show that Lot Two gave more uniform as well as greater gains than Lot One. Lot Two shows no loss for any week except the last week of the experiment, while Lot One shows a loss during three different weeks, namely, the second, seventh and twelfth weeks of the experiment, the losses being 2, 1½, and 5½ pounds respectively. The greatest gain made by Lot One during any week of the experiment was during the eighth week when it gained 51½ pounds. The greatest gain made by Lot Two during any week was 69 pounds, made during the thirteenth week of the experiment.

It will be noticed that both these large gains were made during weeks that followed those in which, in the case of Lot One, a loss occurred, and in the case of Lot Two a gain of only 4 pounds was made. At first thought it might appear that some error was made in weighing, but when we consider that each sheep was weighed separately and that therefore the weights for each week represent twenty-four separate weighings that theory fails and we are forced to the conclusion that these lambs were subject to periods of rapid gains following periods of small gains, an experience that practical feeders are familiar with and one that is often very difficult to account for. It is probable that the condition of the weather has much more to do with the gain in fattening sheep than is generally supposed, steady cold weather being favorable and warm weather unfavorable for rapid gains

where comfortable quarters are provided. The average gain per week for Lot One was 20.7 pounds and per head 25.04 pounds. For Lot Two 30.33 pounds per week and 37.91 pounds per head. The average gain per week per head for Lot One was 1.67 pounds and for Lot Two 2.53 pounds.

It will be seen from the two columns headed respectively, "Total Gains per Head," and "Gains per Head per Week," that, in spite of the fact that these two lots of sheep were more even than the ordinary run of sheep that are being fed in this country, the differences in gains between the different individuals were considerable. It will be noticed that sheep No. 288, gained but 10 pounds and sheep No. 329 7 pounds during the entire experiment of fifteen weeks, while the average for the whole lots, as above stated, was 25.04 pounds. These were the lightest two sheep in this lot at the beginning of the experiment, but there was nothing about their appearance to indicate at that time that they were not in thrifty condition, but it is very evident that if profit had been the main object of the experiment it would have been much better to have disposed of these two as soon as they showed that they were not making satisfactory gains. This fact is well worth careful consideration by practical feeders as it is undoubtedly true that it very seldom happens that so even a lot of sheep can be obtained that there will not be some of the kind that will not pay for feeding. In Lot Two we were more fortunate, the lowest gain being 19½ pounds. Of course it is impossible to determine just how much of this difference was due to the feed and how much to the individuality of the sheep, so it would not be safe to draw any very definite conclusions from this particular point.

The sheep were not brought up to full feed until the fourth week of the experiment when each lot was fed 160½ pounds. From that time on each lot was fed all that it would consume. It will be seen that Lot One reached its maximum consumption upon the tenth week, when it consumed 179 pounds of Speltz. Lot Two reached its maximum consumption upon the eleventh week when it consumed

19¼ pounds. After this the amount consumed steadily declined. The aggregate amount of Speltz consumed by Lot One was 2,244.25 pounds, very nearly 50 bushels; that of Lot Two was 2,317.75 pounds, about 48 bushels. The number of pounds of Speltz required to produce one pound of gain was 7.47 and of Barley 5.09.

In order to reduce the problem to a financial basis the following Financial Statement has been drawn:

### FINANANCIAL STATEMENT No. ONE.

#### LOT 1, SPELTZ.

##### Debit—

To 12 lambs, 1,007 lbs. at 3c.....	\$30.21
To 1,200 lbs. hay (estimated at \$3 per ton.....)	1.80
To 2,244.25 lbs. Speltz at .904c per lb. or 40.68c per bushel .....	20.29
	<hr/>
Total .....	\$52.30

##### Credit—

By 1,307.5 lbs. of lamb at 4c.....	\$52.30
------------------------------------	---------

#### LOT 2, BARLEY.

##### Debit—

To 12 lambs, 1,007 lbs. at 3c.....	\$30.21
To 1,200 lbs. of hay (estimated) at \$3 per ton.....	1.80
To 2,317.75 lbs. of barley at 1.14c per lb. or 54.72c per bushel.....	26.47
	<hr/>
Total .....	\$58.48

##### Credit—

By 1,462 lbs. of lamb at 4c.....	\$58.48
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It will be noticed that each lot has been charged with 1,200 pounds of hay although the exact amount consumed is not known, but from other experiments that have been conducted at this Station for periods of about the same length with sheep of similar character, we believe that the amount given is very close to the amount actually consumed. It

will be seen from this statement that, allowing nothing for the labor involved in feeding and caring for the sheep, the Speltz fed to Lot One brought .904c per pound, or 40.68c per bushel, while the Barley fed to Lot Two brought 1.14c per pound, or 54.72c per bushel. In order to place these same facts before the reader in a somewhat different light it has been assumed in the following Financial Statement No. Two, that Speltz and Barley can usually be bought upon the market for about equal prices per pound, which at the present time is about  $\frac{2}{3}$  of a cent per pound, or 30 cents per bushel for Speltz and 32 cents per bushel for Barley. Using these figures and omitting the fractions of a bushel it will be seen that the profit of Lot One, calculated as before to make no allowance for labor involved, was \$5.29, or 44c per lamb, while in Lot Two the profit was \$11.11 or 92c per lamb.

#### FINANCIAL STATEMENT No. TWO.

##### LOT 1, SPELTZ.

###### Debit—

To 12 lambs, 1,007 lbs. at 3c.....	\$30.21
To 1,200 lbs. of hay (estimated) at \$3 per ton.....	1.80
To 50 bu. of Speltz at 30c per bu.....	15.00
To profit on investment.....	5.29

Total.....\$52.30

###### Credit—

By 1,307.5 lbs. of lamb at 4c.....	\$52.30
Profit on one lamb.....	44

##### LOT 2, BARLEY.

###### Debit—

To 12 lambs, 1,007 lbs. at 3c.....	\$30.21
To 1,200 lbs. of hay (estimated) at \$3 per ton.....	1.80
To 48 bu. of Barley at 32c per bu.....	15.36
To profit on investment.....	11.11

Total.....\$58.48

## Credit—

By 1,462 lbs. of lamb at 4c.....	\$58.48
Profit on one lamb.....	.92

From all the above facts the conclusion seems inevitable that Speltz is worth about two-thirds as much per bushel as Barley for feeding to fattening lambs as a single grain ration, and that about twice the profit can be realized from fattening sheep upon Barley as can be obtained from feeding upon Speltz under the same conditions where the expense of caring for the sheep is disregarded. In order to ascertain as near as possible the average cost per head of caring for a flock of fattening lambs for six months, we asked Mr. Frank Sherwin, a very successful sheep feeder of this city, who has had many years experience in feeding lambs, to submit an estimate of the same, which is as follows:

Estimates of the cost of feeding 2,500 lambs *for six months, exclusive of feed:*

## COST OF OUTFIT.

Cost of shedding .....	\$1,350 00
Cost of granaries.....	400 00
Cost of troughs, racks, etc.....	150 00
Cost of water works.....	300 00
Cost of 1 wagon.....	75 00
Cost of 2 horses and harness.....	225 00
	<hr/>
Total.....	\$2,500 00
Interest on cost of outfit as above at 8 per cent. . . . .	\$ 200 00
Wear and tear on plant at 8 per cent.....	200 00
Death loss, 3 per cent.....	200 00
Two men and board 6 months.....	360 00
One team and feed 6 months.....	135 00
Interest on cost of 2,500 sheep at 8 per cent.....	300 00
	<hr/>
Total.....	\$1,395 00

This amount divided by 2,500, the number of sheep, gives about .56 cents per head, cost of labor and interest on investment. We believe that these estimates are as trustworthy as can be obtained, as they are based upon actual, practical experience extending over a term of years.

From this it can be seen that the cost of caring for each lot, in this experiment, would be \$6.70. It seems, therefore, that Lot One lacks \$1.41 of paying for feed, labor, interest, etc., and that Lot Two yielded a profit of \$4.41 over and above all costs of feed, labor, interest on investment, etc.

It should be constantly borne in mind that the results obtained in this experiment apply to these grains only when fed as a single grain ration and fed whole, and should not be used without modification in determining the value of these grains when used as a part of the ration together with other grains. Nor can we predict what the results would have been if both grains had been ground. We believe, however, that it is perfectly safe to assume that in no case will Speltz be found superior to Barley, even when fed with other grains.

In some parts of this State during some seasons it has been found possible to obtain a much greater yield of Speltz than of Barley. In fact, in some instances, a fair crop of Speltz has been raised where Barley was a complete failure. From this it might appear, at first thought, that although a bushel of Barley produced about one and one-half times as much gain when fed to lambs, it might be more profitable to raise Speltz than to raise Barley. This might be true if the differences in the ratio which exists between the number of pounds of gain required for a pound of gain in Speltz and Barley was due to the greater consumption of Speltz. Such, however, is not the case, this difference being due to the less gains made by the sheep. As was noted in table two, Lot One fed upon Speltz, gained but 300 ½ pounds, while Lot Two gained 455 pounds. Lot One consumed 2,244.25 of Speltz, while Lot Two consumed 2,317.75 pounds of Barley. From this we can see that the difference in gains is due entirely to the inability of the sheep to convert as large an amount of



Speltz into mutton as they can of Barley; that, therefore, Speltz is not a proper food for fattening sheep when fed as a single grain ration. In Financial Statement No. Two, it will be seen that the net profit on Lot Two, fed Barley, was more than twice as much as upon Lot One, fed Speltz, even though no allowance was made for the labor involved in feeding. It can be easily seen that if a fair allowance was made in each case for this labor, the difference in the profit between the two lots would be considerably greater, and it is doubtful in this experiment whether any profit whatever would have been made on Lot One, had a fair allowance been made for the labor, figured on a basis of the average cost of caring for the sheep in large numbers, as is usually done when feeding in a commercial way.

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#### EFFECT OF SHEARING FATTENING LAMBS.

After the close of the feeding experiment which has been described in the preceding pages of this Bulletin it was decided to use the same sheep that had been used in that experiment for the purpose of determining the effect of shearing sheep that had been carried to about the limit of fattening. Many practical feeders claim that sheep may be fed up to the limit of profitable feeding with their fleeces on, and that if at this time they are shorn it will tend to increase the amount of food consumed and also the amount of gain made, but there were no definite experiments on record to prove the practical value of this theory and it was for this purpose that the following experiment was conducted.

The two lots used in the previous experiment were allowed to remain in the feeding pens and were treated exactly as they had been during the previous experiment, No. One being fed upon Speltz and No. Two upon Barley. On March 28 and 29, the sheep were all sheared and the following table gives the weight of the fleece of each sheep:

## WEIGHT OF FLEECES MARCH 28 AND 29.

LOT ONE—SPELTZ		LOT TWO—BARLEY.	
NUMBER.	WEIGHT OF FLEECE.	NUMBER.	WEIGHT OF FLEECE.
330	6 lbs 8 oz	322	4 lbs 12 oz
323	7 lbs 8 oz	318	7 lbs 12 oz
288	5 lbs 4 oz	328	5 lbs 4 oz
329	5 lbs ....	320	7 lbs 8 oz
316	6 lbs 4 oz	334	7 lbs 12 oz
248	7 lbs 8 oz	246	8 lbs ....
332	6 lbs 8 oz	326	6 lbs 8 oz
325	6 lbs 12 oz	314	8 lbs ....
319	6 lbs 12 oz	245	7 lbs 8 oz
321	6 lbs 8 oz	331	5 lbs 4 oz
247	8 lbs 12 oz	315	5 lbs 8 oz
327	5 lbs 12 oz	353	6 lbs 12 oz
Total .....	79 lbs ....	Total .....	60 lbs 8 oz

Weekly weighings of the sheep were made the same as during the previous experiment, and the weight of the fleece of each sheep was added to the actual weight of the sheep, so that the weights given in the following table are comparable with the weights of the sheep in the previous experiment:

LOT ONE—SPHILTZ.							LOT TWO—BARLEY.								
NUMBER.	March 26.	April 2.	April 9.	April 16.	April 23.	April 30.	Total Gain Per Head.	NUMBER.	March 26.	April 2.	April 9.	April 16.	April 23.	April 30.	Total Gain Per Head.
	Wt. lbs	Wt. lbs	Wt. lbs	Wt. lbs	Wt. lbs	Wt. lbs			Wt. lbs	Wt. lbs	Wt. lbs	Wt. lbs	Wt. lbs	Wt. lbs	
247	148	145.75	150.25	147.25	148.25	139.25	2.25	245	131	134	138	140	142	135	4
248	133	133.5	138.5	139	141.5	140.5	7.5	246	158.5	157	159	164	168	163	4.5
316	168.5	164.75	167.75	168.75	112.25	104.25	-4.25	315	94	90.5	92.5	91.5	93.5	91	-3
319	117.5	117.75	121.75	117.75	120.25	115.25	-2.25	322	136	130.75	132.25	132.25	134.25	129.25	-2.75
327	113.5	110.25	117.75	114.75	114.25	112.25	-1.25	326	140	138	141.5	142.5	146.5	142.5	2.5
330	104.5	100.5	103.5	104	108.5	101.5	-3	333	114.5	111.25	113.25	117.25	112.25	116.25	1.75
288	77.5	72.75	78.25	79.75	85.75	75.25	-2.25	330	105.5	108.5	109.5	111	112.5	112	6.5
325	97	98.25	106.25	103.75	112.75	108.25	-1.25	314	129	130.5	132.5	133.5	131	126	-3
321	114	109.5	111	106	108	106	-8	318	114.5	114.25	121.75	123.75	128.25	125.75	10.25
323	125	122.5	129	129	130.5	126.5	1.5	331	118.5	111.25	108.75	116.25	118.25	113.75	-4.75
332	97	97.5	102	103.5	106.5	98.5	1.5	328	104.5	101.25	103.25	105.25	102.25	102.75	-1.75
329	72	67	71.5	72.5	78.5	76.5	4.5	334	116	108.75	112.25	115.75	117.25	116.75	-5.25
<b>Total gain, lbs.</b>	.....	1280	1339.5	1326	1367	1315	.....	<b>Total gain, lbs.</b>	.....	1436	1464.5	1493	1513	1468	.....
<b>Grain fed..</b>	.....	-27.5	59.5	-13.5	41	-52	7.5	<b>Grain fed..</b>	.....	-26	28.5	28.5	20	-45	6
	.....	115.75	105.5	96	92.75	77.25	487.25		.....	138.5	115	98.25	77.5	96.5	525.75

The general plan of this table is the same as that used in the previous experiment and needs no further explanation.

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It will be noticed that during the first week of the experiment, which included the date upon which the shearing was done, Lot One lost 27 ½ pounds; Lot Two 26 pounds. On the week following Lot One gained 59 ½ pounds, Lot Two gained 28 ½ pounds. The next week Lot One lost 13 ½ pounds while Lot Two gained 28 ½ pounds. On the fourth week Lot One gained 41 and Lot Two 20 pounds, while on the fifth week Lot One lost 52 pounds and Lot Two lost 45 pounds. The total gain during the five weeks for Lot One was 7 ½ pounds and for Lot Two 6 pounds.

It will be noticed that it is a somewhat remarkable fact that six sheep out of each lot made a gain and six a loss during this period. The greatest gain made by any sheep was 11.25 pounds in lot one followed closely by one making a gain of 10.26 pounds in lot two. No sheep in either lot however made a steady gain for the whole period of five weeks, and even the gains noted in these two instances were insufficient to pay for the food and labor involved.

It will also be noticed that the consumption of grain steadily decreased for each successive week during the period; until Lot One was consuming but 77.25 pounds during the last week of the experiment and Lot Two but 96 ½ pounds. This decline in consumption was quite steady and uniform and was not due to injudicious or careless feeding. The lambs were not cloyed but had simply reached the limit of their ability to profitably convert grain into mutton. The results of this part of the experiment are very conclusive and plain. Practically, no returns whatever were obtained from the grain fed after the sheep were shorn, and consequently, all the food, labor and risk involved in keeping the sheep during this period was a total loss.

These sheep had undoubtedly been fed up to the limit before they were shorn and the effect of the shearing, if there was any beneficial effect, was entirely insufficient to materially effect their ability to lay on more flesh at a profit, or in some instances to retain what they had already acquired. What the effect would have been had this shearing been done ear-

lier, before they had reached the limit of profitable feeding, we cannot of course determine from this experiment, nor can we say what the effect would have been had the grain ration been changed. Enough has been learned from this experiment to show that feeders should be very cautious about attempting to get profitable gains from sheep that have nearly quite reached the limit of profitable feeding, or are "finished" by simply taking their fleeces off, believing, as some feeders claim, that this will give them a new lease of life.