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Digestion Coefficients with Sheep

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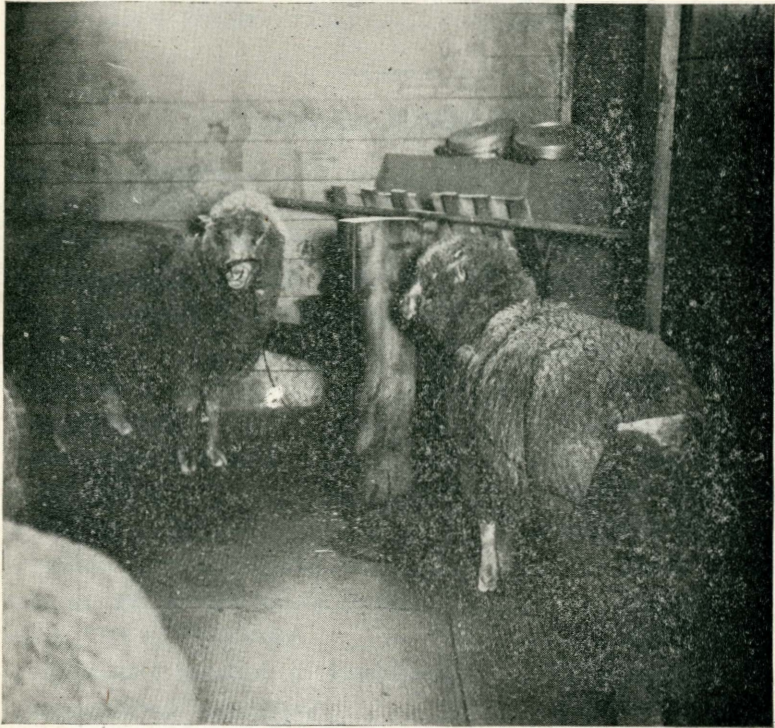
BULLETIN NO. 114

MAY, 1909

AGRICULTURAL EXPERIMENT STATION

South Dakota State College
of Agriculture and Mechanic Arts

CHEMICAL DEPARTMENT



Digestion Coefficients of Grains and Fodders for South Dakota Experiments with Sheep

BROOKINGS, SOUTH DAKOTA

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DIGESTION COEFFICIENTS WITH SHEEP.

Department of Chemistry,

James H. Shepard, Chemist.

A. E. Koch, Assistant Chemist.

This work in determining Digestion Coefficients with South Dakota grown forage plants and feeding stuffs was commenced in the Fall of 1905. Six grade Merino wethers were secured for this purpose. They were taken up and handled daily until they were perfectly accustomed to their attendant before the feeding trials were started.

They were kept in a box stall during each trial and were so tied that no one of them could reach the feed box of another. Harnesses were provided by means of which sacks were attached to each sheep to receive the faeces. The arrangement is shown by the cut on the title page. The sheep soon became accustomed to the harnesses and care was taken that they should be perfectly contented with their surroundings before the actual experiments commenced.

In the case of hays and fodders the feed was run through a cutting machine reducing it to half inch lengths. Any refuse was carefully saved, weighed back and analyzed. Each feeding stuff was analyzed and the faeces were also analyzed. Careful moisture determinations were made on the feeding stuff as fed and on the faeces. From these data the digestion coefficients have been determined.

In each trial the actual feeding time was divided into two periods. The preparatory period lasted five days. During this time the proper amount of feed for each sheep was determined during the first two days and this weighed amount was then fed during the remainder of the preparatory period and also through

the actual feeding period which lasted five days more. During this latter period the faeces were saved and stored in tight tin cans until the total faeces were collected. Since the trials took place during the winter months no difficulty was experienced in preserving the faeces during the five day feeding period. At the close of this period the faeces were thoroughly mixed, sampled and weighed for analysis.

The sheep were watered twice daily during the preparatory and feeding periods and were given salt frequently so that the conditions were as similar as possible to those in actual farm practice. After each trial the sheep were given a resting period during which they were allowed complete freedom and a variety of foods. This period was at least five days and sometimes longer in case the condition of the sheep demanded. In no case were the sheep placed on feeding in an unhealthy condition.

In feeding the grains it was found unsatisfactory in most cases to feed a grain ration alone. The sheep exhibited functional derangements. They craved roughage, chewing at their rope halters and even eating their own wool. In such cases it was found necessary to feed some roughage of which the digestion coefficients had been determined and from the weights of roughage and grain digested the coefficients were calculated. It may throw some light on the physical condition of the sheep to state that during the entire three years they were used none of them were sick. But in a few instances noted farther on a sheep went off feed once in a while and the results were rejected. At the end of the three years they were put in the fattening pens and went to market in first class condition. At the beginning of the experiments the sheep were fed in pairs on the same feeding material. But as time elapsed it became evident that greater progress and

more accuracy could be obtained by feeding more than two sheep on the same material. Accordingly this plan was later adopted. But no results are given where from any reason the trial was not satisfactory.

The experiments are described in detail in the pages which follow.

LOW LAND PRAIRIE HAY.

This was nice bright hay purchased from a farmer and consisted of a variety of our native grasses. Some large weeds were in the hay but these were sorted out. The sheep ate the fodder all up clean.

Two sheep were fed on this hay. No. 1 was fed 4276.9 grams dry matter and voided 1984.5 grams dry matter. No. 2 consumed 3565.5 grams dry matter and voided 1674.5 g. The analysis of the hay is as follows:

	Air Dry	Water Free
Moisture	7.03	.....
Ash	11.21	12.06
Ether Extract	2.64	2.84
Crude Fibre	27.26	29.32
Crude Protein	6.27	6.74
N-free Extract	45.59	49.04
Total Nitrogen	1.003	.....
Albuminoid Nitrogen .....	.93	.....

Note—Moisture as fed 14.29 per cent.

The nutrients in the dry matter consumed and voided and the percents digested are shown in the following table:

	E.	C.	C.	N-free
	Ext.	Fibre	Prot.	Ext.
Sheep No. 1—				
Consumed ..	121.5	1254	288.3	2097.3
Voided ..	73.4	487.6	160.5	912.9
Digest. Coef....	39.59	61.12	44.33	56.47
Sheep No. 2—				
Consumed ..	101.3	1045.4	240.3	1748.5
Voided ..	60.6	427.2	142.7	759.0
Digest. Coef.	40.18	59.14	40.61	56.59
Av. Digest. Coef....	39.9	60.1	42.5	56.5

CORN STOVER.

In this experiment two sheep were used. In each case a portion of the pithy stalk was rejected. This was weighed back and analyzed. Sheep No. 1 was fed 2945 g dry matter. He rejected 627.5 g, consumed 2317.5 g., and voided 896.1 g. Sheep No. 2 was fed 2945 g. dry matter. He rejected 456.6 g., 2489.6 g. were consumed and he voided 966.3 g. The analysis of the corn stover follows:

	Air Dry	Water Free
Moisture	4.51	.....
Ash	6.46	6.76
Ether Extract	1.20	1.26
Crude Fibre	32.62	34.16
Crude Protein	7.91	8.29
N-free Extract ..	47.30	49.53
Total Nitrogen	1.28	.....
Albuminoid Nitrogen .....	.91	.....

Note.—This is the analysis of a laboratory dried sample. The stover as fed contained 22.5 per cent moisture.

The data for this trial are given in the following table:

		E.	C.	C.	N.free
	Ash	Ext.	Fibre	Prot.	Ext.
Sheep No 1—					
Fed ..	199.1	37.1	1006.0	244.1	1458.7
Rejected	37.7	6.3	256.1	40.8	286.6
Consumed	161.4	30.8	749.9	203.3	1172.1
Voided	150.5	19.8	211.8	94.7	419.2
Digest. Coef. ....	.....	35.71	71.76	53.42	64.24
Sheep No. 2—					
Fed ..	199.1	37.1	1006.0	244.1	1458.7
Rejected ..	27.4	4.6	186.4	29.7	208.5
Consumed	161.7	32.5	819.6	214.4	1250.2
Voided	153.8	20.5	226.6	104.0	461.3
Digest. Coef. ....	.....	36.92	72.35	52.46	63.11
Av. Digest. Coef.....	.....	36.3	72.1	52.5	63.7

BROMUS INERMIS HAY.

Two sheep were used in this determination on Bromus inermis hay grown on the College farm. Sheep No. 1 consumed 4313.1 g. dry matter and voided 1923.5 g. Sheep No. 2 consumed 4358 g. dry matter and voided 1803.6 g. The analysis of the air dry hay is as follows:

	Air Dry	Water Free
Moisture	7.71	.....
Ash	9.71	10.52
Ether Extract	2.27	2.46
Crude Fibre	25.56	27.70
N—free Extract	48.59	52.65
Crude Protein	6.16	6.67
Total Nitrogen .....	.986	.....
Albuminoid Nitrogen .....	.855	.....

Note.—Moisture as fed, 12.05 per cent.

The nutrients etc. in the dry matter are as follows:

	Ash	E. Ext.	C. Fibre	C. Prot.	N.free Ext.
Sheep No 1—					
Consumed ..	453.7	106.1	1194.7	287.7	2270.9
Voided	380.9	87.7	535.3	149.1	770.5
Digest. Coef....		17.34	55.19	48.17	66.07
Sheep No. 2—					
Consumed ..	458.5	107.2	1207.2	290.7	2294.4
Voided ..	371.0	82.2	468.2	142.9	739.1
Digest. Coef.....		23.13	61.22	50.85	67.79
Average Digest. Coef.....		20.2	58.2	49.5	66.9

It soon became apparent that grains could not be fed alone, consequently it was thought best to have a larger number of determinations on *Bromus inermis*, as that hay was chosen to accompany the grains.

BROMUS INERMIS HAY—Second Trial.

In this trial two sheep, Nos. 3 and 4 were used. Sheep No. 3 consumed 2018.5 g. dry matter and voided 858 g. Sheep No. 4 consumed 1957 g. dry matter and voided 796.6 g.

The following data show the nutrients involved:

	Ash	E. Ext.	C. Fibre	C. Prot.	N-free Ext.
Sheep No. 3—					
Consumed ..	212.3	49.7	559.1	134.6	1062.8
Voided ..	163.9	34.3	239.7	74.0	346.1
Digest. Coef.		30.99	57.13	45.02	67.41
Sheep No. 4—					
Consumed ..	205.9	48.1	542.1	130.5	1030.4
Voided	173.3	36.7	211.6	62.3	312.7
Digest. Coef.		23.70	60.98	52.26	69.65
Average Digest. Coef.....		27.4	59.1	48.6	68.5
Average of all four Sheep....		23.8	58.6	49.1	67.7

In the grain trials this average of the four sheep was employed. During the second year trials all six sheep were fed brome grass hay and the following digestion coefficients were obtained:

	Ash	E. Ext.	C. Fibre	C. Prot.	N.free Ext.
Sheep No 1—					
Digest. Coef.	23.21	47.65	58.31	47.39	63.79
Sheep No. 2.....	22.69	47.85	59.80	45.78	62.48
Sheep No. 3.....	20.94	46.86	58.25	46.50	59.36
Sheep No. 4.....	22.10	46.25	59.76	49.60	61.87
Sheep No. 5.....	19.59	48.55	60.63	47.74	60.67
Sheep No. 6.....	17.47	46.77	59.14	48.41	58.85
Av. Digest. Coef.—Six	21.00	47.32	59.31	47.57	61.17
Av. Digest. Coef. All Determinations		35.56	58.97	48.34	64.44

The hay used in the last six trials analyzed as follows:

	Air Dry	Water Free
Moisture	5.13	.....
Ash	10.77	11.36
Ether Extract	2.94	3.10
Crude Fibre	29.82	31.43
Crude Protein	6.80	7.17
N—free Extract	44.54	46.94
Total Nitrogen	1.09	.....

Note.—Moisture as fed, 14.4 per cent.

SIXTY DAY OATS.

Two sheep were fed in this experiment, but sheep No. 2 was off feed part of the time passing some whole grains and some mucus. No. 1 gave a fair run, so his results alone will be recorded. He consumed 2862.1 g. dry matter and voided 598.2 g. The analysis of the Sixty Day Oats follows:

	Air Dry	Water Free
Moisture	7.98	.....
Ash	3.31	3.59
Ether Extract	4.32	4.70
Crude Fibre	10.45	11.36
Crude Protein	14.14	15.36
N—free Extract	59.80	64.99
Total Nitrogen	2.26	.....
Albuminoid Nitrogen	2.18	.....

The nutrients etc. in the dry matter follows:

	Ash	E. Ext.	C. Fibre	C. Prot.	N-free Ext.
Sheep No 1—					
Consumed	102.7	134.5	325.1	439.6	1860.2
Voided	76.6	27.9	163.6	63.8	266.3
Average Digest. Coef.....		79.3	49.7	85.5	85.7

SWEDISH SELECT OATS.

Two trials were made with these oats using two sheep each time. But three of these were failures as the sheep promptly went off feed. In the first trial sheep No. 1 did fairly well, eating 1214.2 g. dry matter and voiding 277.2 g. The analysis of the Swedish Select oats follows:

	Air Dry	Water Free
Moisture	7.71	....
Ash	3.04	3.29
Ether Extract	5.14	5.57
Crude Fibre	11.45	12.41
Crude Protein	13.20	14.30
N—free Extract	59.46	64.43
Total Nitrogen	2.11	....
Albuminoid Nitrogen	1.96	

The nutrients in the dry matter, percents digested, etc., follow:

	Ash	E. Ext.	C. Fibre	C. Prot.	N-free Ext.
Sheep No. 1—					
Consumed	39.9	67.6	150.7	173.7	782.3
Voided	36.1	11.4	68.4	33.0	128.3
Average Digest. Coef.....		83.20	54.6	81.0	83.6

Other trials were made with Swedish Select oats in which roughage was used. In one of these trials two sheep were fed and Brome grass hay was used for roughage. In the second oat straw was used for roughage with two sheep. In the third alfalfa was used as roughage with six sheep. In each case the nutrients for the roughage were calculated and subtracted from the total nutrients fed thus obtaining the data for the oats. The digestion coefficients thus obtained are given in the following order, brome grass hay roughage, oat straw and alfalfa:

SWEDISH SELECT OATS WITH BROME ROUGHAGE.

	E.	C.	C.	N-free
Sheep No. 1—	Ext.	Fibre	Prot.	Ext.
Digestion Coefficient	82.28	16.14	75.41	79.42
Sheep No. 2.....	83.76	27.18	76.78	87.29
Average Digest. Coef.....	83.00	21.66	76.10	83.36

SWEDISH SELECT OATS WITH OAT STRAW.

Sheep No. 1.....	87.60	51.34	79.32	84.92
Sheep No. 2.....	88.87	52.92	79.33	85.10
Average Digest. Coef.....	88.24	52.13	79.33	85.01

SWEDISH SELECT OATS WITH ALFALFA.

Sheep No. 1.....	92.38	35.80	76.61	77.14
Sheep No. 2.....	96.79	24.04	77.69	79.48
Sheep No. 3.....	94.88	23.35	78.53	81.50
Sheep No. 4.....	.....	45.24	84.98	77.64
Sheep No. 5.....	88.70	35.45	66.55	75.51
Sheep No. 6.....	88.96	.....	72.09	80.75
Av. Digest. Coef.....	92.34	32.74	76.08	78.67
Grand Av. Digest. Coef.....	87.86	35.51	77.17	82.34

CORN ENSILAGE.

Two sheep were put on ensilage. No. 1 consumed 1930.2 g. dry matter and voided 550.3 g. The analysis of the ensilage which was taken from the center of the silo follows:

	Air Dry	Water Free
Moisture	6.55	.....
Ash.... ..	4.96	5.31
Ether Extract	1.92	2.05
Crude Fibre	20.90	22.37
Crude Protein	7.91	8.46
N-free Extract	57.76	61.81
Total Nitrogen	1.28	
Albuminoid Nitrogen .....	.83	

NOTE—This analysis is from a laboratory dried sample. The water in the ensilage as fed was 71.85 per cent.

The nutrients and their digestion are shown in the following table:

		E.	C.	C.	N.free
Sheep No 1—	Ash	Ext.	Fibre	Prot.	Ext.
Consumed	102.5	39.6	431.8	163.3	1193.0
Voided	67.5	13.6	136.5	73.6	259.1
Digest. Coef.... ..		65.66	68.39	54.93	78.28
Sheep No. 2—					
Consumed	101.8	39.3	428.7	162.1	1184.6
Voided	67.0	12.9	136.4	67.4	255.3
Digest. Coef.....		67.17	68.18	58.42	78.45
Average Digest. Coef.....		66.4	68.3	56.7	78.4

SPELTZ OR EMMER.

In this experiment two sheep were fed. In addition to the speltz 1000 grams brome grass hay was fed to each sheep as roughage during each period. The nutrients consumed and voided arising from the use of the brome grass were calculated and deducted from the total nutrients. The analysis of the speltz follows:

	Air Dry	Water Free
Moisture	8.67	.....
Ash.. ..	3.16	3.46
Ether Extract	2.18	2.39
Crude Fibre	8.76	9.60
Crude Protein	11.29	12.36
N-free Extract	65.94	72.19
Total Nitrogen	1.71	
Albuminoid Nitrogen	1.46	

Sheep No. 1 consumed of the dry matter in the speltz 2210.6 g, and voided 324 g. Sheep No. 2 consumed 1110.1 g. dry matter and voided 106.5 g. The data follow:

	Ash	E. Ext.	C. Fibre	C. Prot.	N.free Ext.
Sheep No 1—					
Consumed	76.5	52.8	212.2	273.2	1595.9
Voided		6.0	122.2	46.0	149.8
Digest. Coef		88.64	42.41	83.17	90.61
Sheep No. 2—					
Consumed	38.4	26.5	106.6	137.2	801.4
Voided .....		.3	42.2	21.0	43.0
Digest. Coef		98.87	60.41	84.69	94.64
Average Digest. Coef.....		93.8	51.4	83.9	92.6

In addition to the foregoing two other trials with speltz have been made. The first of these was with four sheep and the roughage was oat straw. The second was with six sheep and the roughage was alfalfa hay. Difficulty was experienced in the crude fibre determinations owing to the small percent of fibre in the speltz and the large amount in the roughage. But this was unavoidable not only with the speltz but also with the other grains. In the trial with six sheep Nos. 3,

5 and 6 went off feed. Their results were rejected. Nos. 2 and 4 gave bad results on fibre. The coefficients obtained with the oat straw roughage and with the alfalfa follow in order.

SPELTZ WITH OAT STRAW.

	E. Ext.	C. Fibre	C. Prot.	N-free Ext.
Sheep No. 1—				
Digest. Coef.....	86.57	.....	80.21	88.05
Sheep No. 2.....	79.00	.....	70.22	82.14
Sheep No. 3.....	74.09	.....	74.24	80.66
Sheep No. 4.....	84.90	.....	68.04	81.79
Average Digest. Coef.....	81.14	.....	73.18	83.16

SPELTZ WITH ALFALFA ROUGHAGE.

Sheep No. 1.....	94.74	49.56	85.24	89.11
Sheep No. 2.....	83.76	.....	75.17	87.70
Sheep No. 4.....	90.19	.....	84.30	89.84
Average Digest. Coef.....	89.56	49.56	81.57	88.88
Grand Av. Digest. Coef....	88.2	50.5	79.6	88.2

OAT STRAW.

Four digestion experiments were made with oat straw, using four sheep. The first consumed 1694.8 g. dry matter and voided 761.2 g. Sheep No. 2 consumed 1694.8 g. dry matter and voided 816.2 g. Sheep No. 3 consumed 1159.6 g. and voided 490.0 g. No. 4 consumed 1159.6 g. and voided 493.2 g. The analysis of the oat straw follows:

	Air Dry	Water Free
Moisture ..	8.02	.....
Ash	6.29	6.84
Ether Extract	1.91	2.08
Crude Fibre	38.28	41.61
Crude Protein	4.83	5.25
N-free Extract	40.67	44.22
Total Nitrogen .....	.772	
Albuminoid Nitrogen. ....	.579	

The nutrients consumed, voided, etc., follows:

	Ash	E. Ext.	C. Fibre	C. Prot.	N.free Ext.
Sheep No 1—					
Consumed	115.9	35.25	705.2	88.98	749.44
Voided	90.2	23.14	210.84	57.39	379.67
Digest. Coef.... .	22.24	34.35	70.1	35.5	49.34
Sheep No. 2—					
Consumed	115.9	35.25	705.2	88.98	749.44
Voided	90.19	23.59	230.09	80.32	392.03
Digest. Coef.. . . .	22.18	33.08	67.37	9.73	47.69
Sheep No. 3—					
Consumed	79.32	24.12	482.51	60.88	592.78
Voided	60.86	16.17	130.14	56.55	226.28
Digest. Coef.... .	23.27	32.96	73.03	7.11	55.87
Sheep No. 4—					
Consumed	79.32	24.12	482.51	60.88	512.78
Voided	62.73	18.3	116.84	59.28	236.05
Digest. Coef... . .	20.91	24.13	75.78	2.63	53.97
Average Digest. Coef.	22.15	31.13	71.57	13.74	51.7)

Note—These four determinations were all good ones and the sheep showed no digestional derangements. The wide variation on the crude protein can only be accounted for by the individual idiosyncrasies of the different sheep. Consequently the average of the crude protein is given.

ALFALFA HAY.—(*Medicago Sativa L.*)

Six sheep were fed on alfalfa hay. No. 1 consumed 3595 g. dry matter and voided 1257.2 g. No. 2 ate 2976 g. dry matter and voided 1243.8 g. No. 3 consumed 2976 g. and voided 1152.1 g. No. 4 ate 2351 g. and voided 894.2 g. No. 5 ate 2645.3 g. and voided 929.6 g. No. 6 ate 3422.4 g. and voided 1324.3 g. The analysis of the alfalfa hay follows:

	Air Dry	Water Free
Moisture	4.10	.....
Ash	7.94	8.28
Ether Extract	2.59	2.70
Crude Fibre	25.19	26.26
Crude Protein	19.66	20.50
N—free Extract	40.52	42.26

Note.—Moisture as fed, 17.33 per cent.

The nutrients consumed and voided by the six sheep are as follows:

	Ash	E. Ext.	C. Fibre	C. Prot.	N-free Ext.
Sheep No 1—					
Consumed	246.41	80.35	781.50	610.08	1257.66
Voided	158.99	49.31	439.19	136.08	368.57
Digest. Coef....	35.43	38.63	43.80	77.69	70.69
Sheep No. 2—					
Consumed	194.66	63.48	617.37	481.96	993.53
Voided	122.50	41.67	359.20	106.77	264.06
Digest. Coef..	37.07	34.35	41.81	77.84	73.52
Sheep No. 3—					
Consumed	297.66	97.06	944.05	736.98	1519.25
Voided	184.47	57.90	964.27	146.61	378.95
Digest. Coef....	38.03	40.34	50.29	80.16	75.05
Sheep No. 4—					
Consumed	246.41	80.35	781.50	610.08	1257.66
Voided	176.99	54.10	467.30	159.33	386.08
Digest. Coef....	28.17	32.67	40.20	73.88	69.71
Sheep No. 5—					
Consumed	219.03	71.42	694.66	542.29	1117.90
Voided	131.63	41.37	384.95	109.50	262.15
Digest. Coef....	39.90	42.07	44.56	79.80	76.55
Sheep No. 6—					
Consumed	283.37	92.41	898.72	701.59	1146.31
Voided	195.07	58.67	517.67	156.13	396.76
Digest. Coef....	31.16	36.51	42.39	77.74	65.39
Average Digest. Coef.	34.99	37.44	43.84	77.85	71.75

HANNA BARLEY.

Six trials were made with sheep and Hanna barley using 1000 g. Brome hay, two trials were made with 500 g. oat straw roughage and six with 2000 g. alfalfa roughage. In the brome trials sheep No. 1 consumed 1420 g. dry matter in the barley and voided 501.7 g. No. 2 consumed 1854 g. and voided 722.9 g. No. 3 consumed 1282.8 g. and voided 600.7 g. No. 4 consumed 1282.8 g. and voided 546.4 g. No. 5 consumed 1715.8 g. and voided 439.2 g. No. 6 consumed 1715.8 g. and voided 297 g.

In the oat straw trials No. 1 consumed 1287 g. dry matter and voided 524.8 g. No. 2 consumed 1287 g. and voided 373.5 g.

The analysis of the Hanna barley follows:

	Air Dry	Water Free
Moisture	9.64	.....
Ash ..	2.29	2.53
Ether Extract	1.94	2.15
Crude Fibre	4.05	4.48
Crude Protein	14.31	15.84
N-free Extract	67.77	75.00
Total Nitrogen	2.29	
Albuminoid Nitrogen..	2.01	

The nutrients involved for the brome hay and oat straw roughage are given below. In the case of the Hanna barley also, owing to the small amount of crude fibre, when fed with roughage the crude fibre determinations were often faulty.

HANNA BARLEY WITH BROME HAY.

	E. Ext.	C. Fibre	C. Prot.	N-free Ext.
Sheep No. 1—				
Consumed ..	30.5	63.6	224.9	1065.0
Voided	1.9	23.7	22.4	37.8
Digest. Coef..	93.77	62.74	90.09	96.45
Sheep No. 2—				
Consumed ..	39.8	83.0	293.8	1390.5
Voided	7.2	77.6	69.5	150.2
Digest. Coef....	81.91	....	76.35	89.2
Sheep No. 3—				
Consumed ..	27.58	57.48	203.19	962.1
Voided	12.35	34.19	52.83	78.98
Digest. Coef.....	55.22	38.77	74.00	91.79
Sheep No. 4				
Consumed ..	27.58	57.48	203.19	69.74
Voided ..	12.99	.61	57.36	69.74
Digest. Coef..	59.97	97.78	79.77	92.75
Sheep No. 5—				
Consumed ..	36.89	76.87	279.78	1286.85
Voided	13.99	17.00	56.97	105.46
Digest. Coef	62.7	77.89	79.03	91.02
Average Digest. Coef.....	70.71	69.29	79.85	92.24

No. 6 went off feed completely.

HANNA BARLEY AND OAT STRAW.

Sheep No. 1—				
Consumed	27.67	57.66	203.86	965.25
Voided	10.37	72.25	65.50	127.53
Digest. Coef.	62.52	.....	67.87	86.78
Sheep No. 2—				
Consumed	27.67	57.66	203.86	965.25
Voided	7.19	27.51	42.32	71.31
Digest. Coef.	74.01	52.28	79.23	92.61
Average Digest. Coef.	68.26	52.28	73.55	89.69

DIGESTION COEFFICIENTS FOR HANNA BARLEY

WITH ALFALFA HAY.

	E.	C.	C.	N-free
	Ext.	Fibre	Prot.	Ext.
Sheep No. 1—				
Digest. Coef.—.....	83.01	49.99	75.42	91.64
Sheep No. 2.....	85.01	32.50	77.33	90.56
Sheep No. 3.....	85.22	15.16	71.30	90.84
Sheep No. 4.....	98.59	68.81	82.80	94.54
Sheep No. 5.....	87.77	68.19	76.90	93.36
Sheep No. 6.....	85.43	49.12	74.28	93.06
Average Digest. Coef.	87.50	47.29	76.34	92.33
General Av. Digest. Coef.	75.49	56.29	76.58	91.42

MANCHURIA BARLEY NO. 133.

Two experiments were run with Manchuria barley, using 1000 g. brome grass hay for roughage. Sheep No. 1 consumed 1405.2 g. dry matter and voided 564.4 g. No. 2 consumed 1665.5 g. and voided 691.8 g. Sheep No. 2 gave no results on crude fibre, otherwise the determination was very satisfactory. The analysis of the Manchuria barley follows:

	Air Dry	Water Free
Moisture	8.08	.....
Ash	2.66	2.89
Ether Extract	1.80	1.95
Crude Fibre	5.77	6.28
Crude Protein	14.15	15.39
N—free Extract	67.54	73.49
Total Nitrogen	2.26	
Albuminoid Nitrogen	2.11	

The nutrients concerned in the determinations follow:

MANCHURIA BARLEY WITH BROME GRASS ROUGHAGE

	E.	C.	C.	N-free
	Ext.	Fibre	Prot.	Ext.
Sheep No. 1—				
Consumed	27.4	88.2	216.3	1032.7
Voided	6.1	40.3	34.3	73.0
Digest. Coef.	77.81	54.31	84.14	92.93
Sheep No. 2—				
Consumed	48.61	104.6	256.3	1254.0
Voided	5.8	96.8	42.0	138.5
Digest. Coef.	82.15	.....	83.62	88.96
Average Digest. Coef.	79.98	54.31	83.88	90.94

DURUM WHEAT WITH BROME GRASS ROUGHAGE.

Two trials were made with Durum wheat using 1000 g. brome grass roughage. Barring the crude fibre results with No. 2 the determinations were acceptable. Sheep No. 1 consumed 1115.4 dry matter in the wheat and voided 542.3 g. No. 2 consumed 900.9 g. and voided 493.6 g. The analysis of the Durum wheat follows:

	Air Dry	Water Free
Moisture	12.00	.....
Ash	1.70	1.93
Ether Extract	2.57	2.92
Crude Fibre	3.06	3.47
Crude Protein	12.41	14.10
N-free Extract	68.26	77.58
Total Nitrogen	1.99	
Albuminoid Nitrogen	1.81	

The nutrients in the dry matter consumed, etc., are shown in the appended table:

DURUM WHEAT WITH BROME GRASS ROUGHAGE.

	E.	C.	C.	N-free
	Ext.	Fibre	Prot.	Ext.
Sheep No. 1—				
Consumed	32.6	38.7	157.3	865.3
Voided	10.2	23.3	37.9	69.8
Digest. Coef....	68.7	39.80	75.91	91.93
Sheep No. 2—				
Consumed	26.3	31.3	127.0	698.9
Voided	10.2	28.7	25.1	54.9
Digest. Coef....	61.22	.....	80.22	92.15
Average Digest Coef.....	64.96	39.80	78.06	92.04

BLACK VORONEZH MILLET.

Eight trials were made with Black Voronezh millet. Four were made with 1000 g. brome roughage, in two of which the millet was fed whole and in the other two it was ground. Four were made with 1000 g. oat straw roughage, two with whole and two with ground millet.

In the brome trials with whole millet sheep No. 1 consumed 1112.7 g. dry matter in the millet and voided 595.8 g. No. 2 consumed 1112.7 g. and voided 706 g. In the ground millet sheep No. 1 consumed 1112.7 g. and voided 488.6 g. Sheep No. 2 consumed 1112.7 g. and voided 552.8 g

In the oat straw trials with whole millet sheep No. 1 consumed 1314 g. and voided 792.7 g. Sheep No. 2 consumed 1314 g. and voided 777.7 g. With the ground millet sheep No. 1 consumed 1316.7 g. and voided 709.5 g. Sheep No. 2 consumed 1316.7 g. and voided 756.3 g. The analysis of the millet follows:

	Air Dry	Water Free
Moisture	9.18	.....
Ash	2.24	2.47
Ether Extract	4.26	4.69
Crude Fibre	8.65	9.52
Crude Protein	11.29	12.43
N-free Extract	64.38	70.89
Total Nitrogen	1.71	
Albuminoid Nitrogen	1.63	

The nutrients involved in these trials are as follows:

BLACK VORONEZH MILLET WITH BROME ROUGHAGE.

Whole Millet.

	E. Ext.	C. Fibre	C. Prot.	N-free Ext.
Sheep No. 1—				
Consumed ..	52.2	105.9	138.3	788.8
Voided	9.4	37.3	36.6	93.3
Digest. Coef.....	81.99	64.78	73.74	88.17
Sheep No. 2—				
Consumed ..	52.2	105.9	138.3	788.8
Voided ..	16.7	60.7	44.8	190.2
Digest. Coef....	68.01	42.69	67.60	75.89
Average Digest. Coef.....	75.00	53.73	70.67	82.03

Ground Millet.

	E. Ext.	C. Fibre	C. Prot.	N-free Ext.
Sheep No. 1—				
Consumed	52.2	105.9	138.3	788.8
Voided ..	4.9	37.1	12.0	38.5
Digest. Coef.....	90.61	64.97	92.48	95.19
Sheep No. 2—				
Consumed ..	52.2	105.9	138.3	788.8
Voided ..	7.2	63.2	35.8	56.0
Digest. Coef.....	86.19	40.32	74.11	92.90
Average Digest. Coef.....	88.40	52.65	83.30	94.05

**BLACK VORONEZH MILLET WITH OAT STRAW ROUGH-
AGE.—Whole Millet.**

	E.	C.	C.	N-free
	Ext.	Fibre	Prot.	Ext.
Sheep No. 1—				
Consumed	61.63	125.09	163.33	931.49
Voided	10.49	127.23	57.06	148.57
Digest. Coef.....	82.97	.....	65.06	84.05
Sheep No. 2—				
Consumed	61.63	125.09	163.33	931.49
Voided	17.42	107.34	75.03	97.35
Digest. Coef.....	71.73	14.19	54.06	89.55
Average Digest. Coef.....	77.35	14.19	59.56	86.83

Ground Millet.

	E.	C.	C.	N-free
	Ext.	Fibre	Prot.	Ext.
Sheep No. 1—				
Consumed	61.75	125.36	163.37	933.40
Voided	7.54	127.50	53.03	79.41
Digest. Coef.....	87.78	.....	67.59	91.49
Sheep No. 2—				
Consumed	61.75	125.36	163.67	933.40
Voided	10.43	119.07	55.51	117.50
Digest. Coef.. . . .	83.11	.....	66.08	87.41
Average Digest Coef.....	85.45	.....	66.83	89.45
Grand Av. Digest. Coef....	81.55	40.19	70.09	88.09

RED ORENBURG MILLET WITH OAT STRAW ROUGHAGE

Four determinations were made with Red Orenburg millet, using 1000 g. oat straw roughage. In the first two trials the millet was whole and in the second two it was ground into meal. In the whole millet trials sheep No. 1 consumed 1317.75 g. dry matter in the millet and voided 849.2 g. Sheep No. 2 consumed 1317.15 g. dry matter and voided 809.79 g. With the millet meal sheep No. 1 consumed 1625 g. dry matter and voided 798.8 g. Sheep No. 2 ate 1289.7 g. and voided 606.3 g. The analysis of the millet follows:

	Air Dry	Water	Free
Moisture	9.59	.....
Ash	2.93	3.24	
Ether Extract	4.13	4.55	
Crude Fibre	7.51	8.31	
Crude Protein	8.80	9.77	
N—free Extract	67.04	74.13	
Total Nitrogen	1.41		
Albuminoid Nitrogen	1.38		

The nutrients involved in these determinations follow.

Whole Millet.

	E.	C.	C.	N-free
	Ext.	Fibre	Prot.	Ext.
Sheep No. 1—				
Consumed	59.93	109.45	128.69	976.40
Voided	8.29	153.71	78.71	157.07
Digest. Coef.....	86.16	.....	38.84	83.91
Sheep No. 2—				
Consumed	59.93	109.45	128.69	976.40
Voided ..	8.07	137.17	60.37	146.76
Digest. Coef....	86.53	.....	53.08	84.96
Average Digest. Coef.....	86.35	.....	45.96	84.44

Ground Millet.

	E.	C.	C.	N-free
	Ext.	Fibre	Prot.	Ext.
Sheep No. 1—				
Consumed ..	73.94	134.04	159.76	1204.61
Voided ..	8.93	155.68	58.26	126.22
Digest. Coef... ..	87.90	.....	63.53	89.52
Sheep No. 2—				
Consumed ..	58.68	107.17	126.00	956.06
Voided	5.03	81.15	45.61	51.75
Digest. Coef....	91.43	24.27	63.80	94.58
Average Digest. Coef.....	89.66	24.27	63.66	92.05
Av. Digest. Coef. all Tirals.	88.00	24.27	54.81	88.23

MINNESOTA NO. 13 CORN WITH BROME ROUGHAGE.

Two trials were made with this corn, using 1000 g. brome grass hay for roughage. Sheep No. 1 consumed 1035.3 g. dry matter in the corn and voided 508.8 g. Sheep No. 2 consumed 1264.9 g. and voided 459 g. The analysis of the corn follows:

	Air Dry	Water Free
Moisture	13.97	.....
Ash	1.27	1.47
Ether Extract	4.29	5.00
Crude Fibre	1.90	2.21
Crude Protein	8.96	10.41
N-free Extract	69.61	80.91
Total Nitrogen	1.43	
Albuminoid Nitrogen	1.38	

The nutrients involved in these determinations are as follows:

	E.	C.	C.	N-free
	Ext.	Fibre	Prot.	Ext.
Sheep No. 1—				
Consumed ..	51.8	22.9	107.8	837.7
Voided ..	6.3	43.2	20.7	48.6
Digest. Coef.	87.83	.....	80.80	94.20
Sheep No. 2—				
Consumed	63.2	28.0	131.7	1023.4
Voided	8.3	19.8	33.7	23.2
Digest. Coef.	86.86	29.28	74.41	97.73
Average Digest. Coef.	87.35	29.28	77.60	95.97

UPLAND PRAIRIE HAY.

Six trials were made on high upland prairie hay. Sheep No. 1 consumed 5899.8 g. dry matter and voided 3216.2 g. No. 2 consumed 5104.8 g. dry matter and voided 2757.4 g. Sheep No. 3 consumed 4266.7 g. and voided 2052 g. Sheep No. 4 consumed 4259.8 g. and voided 2439.8 g. Sheep No. 5 consumed 4952.4 g. and voided 2517.8 g. Sheep No. 6 consumed 4663.5 g. and voided 2655.4 g. The analysis of the hay follows:

	Air Dry	Water Free
Moisture	3.99	.....
Ash	8.00	8.33
Ether Extract	2.84	2.96
Crude Fibre	30.40	31.66
Crude Protein	5.69	5.93
N-free Extract	49.08	51.12
Total Nitrogen .....	.91	
Albuminoid Nitrogen .....	.70	

Note.—Moisture as fed 12.44 per cent.

The nutrients involved in these trials are as follows:

UPLAND PRAIRIE HAY.

	Ash	E. Ext.	C. Fibre	C. Prot.	N.free Ext.
Sheep No 1—					
Consumed	491.4	174.6	1867.9	349.9	3016.0
Voided	429.7	130.3	906.6	249.2	1500.4
Digest. Coef.	12.55	25.38	51.46	28.77	50.25
Sheep No. 2—					
Consumed	425.2	151.1	1616.2	302.7	2609.6
Voided	388.8	105.3	790.0	218.1	1255.2
Digest. Coef.	8.56	30.31	51.12	27.95	51.13
Sheep No. 3—					
Consumed	355.5	126.3	1350.8	253.0	2181.1
Voided	293.6	82.1	520.4	157.4	990.5
Digest Coef.	17.12	34.99	61.47	37.78	54.23
Sheep No. 4—					
Consumed	358.8	126.1	1348.7	252.6	2177.6
Voided	338.2	91.0	608.0	183.4	1219.2
Digest Coef.	4.67	27.85	54.99	27.78	44.00
Sheep No. 5—					
Consumed	412.5	146.6	1567.9	293.7	2531.7
Voided	342.2	98.2	759.9	176.5	1141.0
Digest Coef.	16.55	32.95	52.16	39.90	54.96
Sheep No. 6—					
Consumed	388.5	138.0	1476.5	276.5	2384.0
Voided	358.5	84.7	811.5	193.8	1206.9
Digest. Coef.	7.72	38.63	45.03	29.91	49.37
Average Digest Coef. .	11.19	31.68	52.70	32.01	50.66

CORD GRASS HAY.

(Spartina Cynosuroides (L.) Willd.)

Six sheep were fed with cord grass hay. Sheep No. 1 consumed 3068.1 g. dry matter and voided 1532.9 g. Sheep No. 2 consumed 2954.6 g. and voided 1520.8 g. Sheep No. 3 consumed 1596.1 g. and voided 808.4 g. Sheep No. 4 consumed 2315.9 g. dry matter and voided 1188 g. Sheep No. 5 consumed 2793.3 g. and voided 1381.3 g. Sheep No. 6 consumed 2650.8 g. and voided 1252.3 g. The analysis of the cord grass hay follows:

	Air Dry	Water Free
Moisture	4.74	.....
Ash	6.35	6.67
Ether Extract	1.80	1.89
Crude Fibre	36.17	37.96
Crude Protein	5.94	6.24
N—free Extract	45.00	47.24
Total Nitrogen .. . . . .	.95	
Albuminoid Nitrogen .. . . . .	.82	

Note.—Moisture as fed, 18.94 per cent.

The nutrients involved in the determinations are as follows:

	Ash	E. Ext.	C. Fibre	C. Prot.	N.free Ext.
Sheep No 1—					
Consumed	204.6	58.0	1164.7	191.4	1499.4
Voided ..	126.6	29.0	533.9	111.6	695.8
Digest. Coef.	38.12	50.00	54.16	41.68	51.99
Sheep No. 2—					
Consumed	197.1	55.8	1121.6	184.4	1395.7
Voided ..	155.7	26.4	476.4	107.0	755.3
Digest. Coef.	21.00	50.89	57.52	41.98	45.88
Sheep No. 3—					
Consumed	106.5	30.2	605.9	99.6	753.9
Voided ..	87.8	13.7	259.3	65.6	382.0
Digest. Coef.	17.56	54.63	57.20	34.13	49.33
Sheep No. 4—					
Consumed	154.5	43.8	879.1	144.5	1094.0
Voided ..	122.9	24.5	401.0	87.6	552.0
Digest. Coef.	20.45	46.60	54.40	39.38	49.54
Sheep No. 5—					
Consumed ..	186.3	52.8	1060.3	174.3	1319.6
Voided ..	140.2	26.2	459.8	110.5	644.6
Digest. Coef.	24.80	50.38	56.63	36.03	51.15
Sheep No. 6—					
Consumed ..	176.8	50.1	1006.2	165.4	1252.3
Voided ..	148.0	26.0	437.4	96.2	672.8
Digest. Coef.	16.28	48.10	56.53	41.23	46.27
Average Digest. Coef.	23.03	50.10	56.07	39.07	49.03

SLOUGH GRASS HAY.

This hay contained a number of grasses growing in low damp runs. In dry seasons this hay is an important item to the Western stockmen.

Six sheep were fed for the Slough Grass hay. Sheep No. 1 consumed 4431.3 g. dry matter in the hay and voided 2197 g. No. 2 consumed 3880.2 g. and voided 1881.9 g. No. 3 ate 3200 g. and voided 1219.2 g. No. 4 ate 2658.3 g. and voided 1258.9 g. No. 5 ate 3958.5 g. and voided 1869.9 g. No. 6 ate 3960.8 g. and voided 2042.4 g. The analysis of the slough grass hay follows:

	Air Dry	Water Free
Moisture	4.34	.....
Ash .. .	8.67	9.06
Ether Extract	2.17	2.27
Crude Fibre	31.86	33.31
Crude Protein	6.56	6.86
N-Free Extract	46.40	48.50
Total Nitrogen	1.05	
Albuminoid Nitrogen .....	.74	

Note.—Moisture as fed, 16.01 per cent.

The nutrients involved appear in the following table:

	Ash	E. Ext.	C. Fibre	C. Prot.	N.free Ext.
Sheep No 1—					
Consumed	401.5	100.6	1476.1	304.0	2149.1
Voided	310.4	50.8	627.9	181.7	1026.2
Digest. Coef.	22.44	49.50	57.46	40.26	52.25
Sheep No. 2—					
Consumed	351.5	88.1	1292.5	266.2	1881.9
Voided	282.6	49.7	562.2	159.8	958.6
Digest Coef.	19.6	43.59	56.50	39.97	49.01
Sheep No. 3—					
Consumed	289.9	72.7	1065.9	219.5	1552.0
Voided	179.4	29.1	342.7	121.7	546.3
Digest. Coef.	30.77	59.97	67.83	44.56	64.80
Sheep No. 4—					
Consumed	240.8	60.3	855.5	182.4	1289.3
Voided	185.0	30.2	366.6	102.5	574.6
Digest. Coef.	23.16	49.91	58.59	43.80	55.43
Sheep No. 5—					
Consumed	358.6	89.9	1318.6	271.6	1919.9
Voided	263.0	41.7	548.1	147.9	868.8
Digest. Coef.	26.65	53.61	58.43	45.54	54.74
Sheep No. 6—					
Consumed	359.9	89.9	1319.3	271.7	1921.0
Voided	288.3	39.2	610.5	174.7	929.7
Digest. Coef.	19.89	67.51	53.72	35.70	51.60
Average Digest. Coef.	23.75	54.01	58.75	41.64	54.64

KENTUCKY BLUE GRASS HAY

(Poa pratensis L.)

Six sheep were fed in these trials. No. 1 ate 2787.1 g. and voided 1071.8 g. No. 2 ate 3758.8 g. and voided 1831.6 g. No. 3 ate 2375.6 g. and voided 1050.7 g. No. 4 ate 2287.4 g. and voided 762.8 g. No. 5 ate 2691.8 g. and voided 1174.6 g. No. 6 ate 2719.6 g. and voided 1040.3 g. dry matter. The analysis of the Blue Grass hay follows.

	Air Dry	Water Free
Moisture	3.85	.....
Ash	9.20	9.57
Ether Extract.	2.72	2.83
Crude Fibre	29.50	30.69
Crude Protein	10.31	10.71
N-free Extract	44.42	46.20
Total Nitrogen	1.65	
Albuminoid Nitrogen	1.54	

Note.—Moisture as fed 20.55 per cent.

The nutrient consumed, etc., are given below.

Sheep No 1—	Ash	E. Ext.	C. Fibre	C. Prot.	N.free Ext.
Consumed	266.7	78.9	855.4	298.5	1287.6
Voided	202.7	35.2	291.0	115.3	427.6
Digest. Coef... ..	20.24	55.51	65.98	61.34	66.79
Sheep No. 2—					
Consumed	359.7	106.4	1153.6	402.6	1736.5
Voided ..	322.2	56.6	431.9	211.9	809.0
Digest. Coef.. ..	10.42	47.83	62.56	47.37	53.46
Sheep No. 3—					
Consumed	227.4	67.2	729.1	254.4	1097.5
Voided	186.3	33.2	262.3	111.7	457.2
Digest. Coef....	18.07	50.59	64.02	56.09	58.34
Sheep No. 4—					
Consumed	218.9	64.7	702.0	245.0	1056.8
Voided ..	143.6	24.8	181.6	18.9	323.6
Digest. Coef... ..	34.40	61.67	74.13	63.45	69.28
Sheep No. 5—					
Consumed ..	256.6	76.2	826.1	288.3	1243.6
Voided ..	234.0	39.3	288.6	139.8	472.9
Digest. Coef... ..	9.2	48.85	65.06	51.51	61.96
Sheep No. 6—					
Consumed ..	260.3	77.0	834.6	291.3	1256.4
Voided ..	183.0	34.9	248.6	116.8	457.0
Digest. Coef....	29.69	54.68	70.21	59.90	63.62
Average Digest. Coef.	20.34	53.19	66.99	56.61	62.24

WESTERN WHEAT GRASS HAY.

(Agropyrum glaucum occidentale Scribn.)

Six sheep were fed in this trial. No. 1 ate 5474 g. and voided 2300 g. No. 2 ate 4610.8 g. and voided 2050.5 g. No. 3 ate 3949.5 g. and voided 1902.2 g. No. 4 ate 4139 g. and voided 1556.8 g. No. 5 ate 5129.4 g. and voided 1746.7 g. No. 6 ate 5126.7 g. and voided 2468.2 g. The analysis of the Western Wheat Grass follows:

	Air Dry	Water Free
Moisture	4.56	.....
Ash	8.50	8.91
Ether Extract	2.90	3.04
Crude Fibre	29.81	31.23
Crude Protein	7.44	7.80
N-free Extract	46.79	49.02
Total Nitrogen	1.19	.....
Albuminoid Nitrogen .....	.98	

Note.—Moisture as fed 11.18 per cent.

The nutrients concerned in this trial are given below.

	Ash	E. Ext.	C. Fibre	C. Prot.	N-free Ext.
Sheep No. 1					
Consumed ..	487.7	166.4	1709.5	427.0	2683.4
Voided ..	414.0	96.1	542.6	192.5	1054.8
Digest. Coef.	15.11	42.25	68.26	54.92	60.69
Sheep No. 2—					
Consumed ..	410.8	140.2	1440.0	359.6	2260.2
Voided ..	375.6	88.6	455.6	185.6	945.1
Digest. Coef.	8.57	36.80	68.36	48.36	58.18
Sheep No. 3—					
Consumed ..	351.9	120.1	1233.4	308.1	1936.0
Voided ..	330.2	79.1	462.6	177.7	852.6
Digest. Coef.	6.16	34.14	62.49	42.32	55.96
Sheep No. 4—					
Consumed ..	368.8	125.8	1292.6	322.9	2028.9
Voided ..	285.7	71.3	363.8	144.5	691.5
Digest. Coef.	22.53	43.32	71.85	55.24	65.91
Sheep No. 5—					
Consumed ..	457.0	155.9	1601.9	400.1	2514.5
Voided ..	320.0	79.8	424.3	155.3	767.3
Digest. Coef.	30.00	48.81	73.51	61.18	69.48
Sheep No. 6—					
Consumed ..	456.8	155.9	1601.0	399.9	2513.1
Voided ..	448.0	107.6	567.2	212.8	1132.6
Digest. Coef.	1.92	30.98	64.57	46.79	54.93
Average Digest Coef.	14.05	39.38	68.17	51.47	60.86

SORGHUM FODDER.

Six sheep were fed in these trials. No. 1 ate 3445 g. dry matter and voided 1343.7 g. No. 2 ate 3289.2 g. and voided 1217.1 g. No. 3 ate 2596.5 g. and voided 1003 g. No. 4 ate 3398 g. and voided 1123.8 g. No. 5 ate 2893 g. and voided 1549.5 g. No. 6 ate 3457.5 g. and voided 669.6 g. The analysis of the Sorghum follows:

	Air Dry	Water Free
Moisture	7.15	.....
Ash	5.00	5.38
Ether Extract	2.05	2.21
Crude Fibre	33.15	35.70
Crude Protein	7.81	8.41
N-Free Extract	44.84	48.30
Total Nitrogen	1.25	
Albuminoid Nitrogen	1.00	

Note.—Moisture as fed 27.55 per cent.

The nutrients involved appear below.

	Ash	E. Ext.	C. Fibre	C. Prot.	N-free Ext.
Sheep No 1—					
Consumed	185.3	76.1	1229.9	289.7	1664.0
Voided	168.1	20.8	382.7	154.5	617.6
Digest. Coef.	9.28	72.66	68.88	46.67	62.94
Sheep No. 2—					
Consumed	177.0	72.7	1174.2	276.6	1588.7
Voided	148.6	16.2	328.4	119.5	604.4
Digest. Coef.	16.04	77.71	72.02	56.79	61.95
Sheep No. 3—					
Consumed	139.6	57.4	927.0	218.4	1254.1
Voided	126.9	13.8	266.6	106.4	489.3
Digest. Coef.	9.09	75.96	71.24	51.28	60.98
Sheep No. 4—					
Consumed	182.8	75.1	1213.1	285.8	1641.2
Voided	133.1	14.6	337.3	110.0	528.8
Digest. Coef.	27.18	80.56	72.19	61.51	67.78
Sheep No. 5—					
Consumed	155.7	63.9	1032.8	243.3	1397.3
Voided	195.1	21.8	448.3	171.2	713.1
Digest. Coef. . . . .	.....	66.0	56.69	29.63	48.97
Sheep No. 6—					
Consumed	186.0	76.4	1234.3	290.8	1670.0
Voided	83.4	9.6	200.5	74.6	301.4
Digest. Coef.	55.16	87.43	83.67	74.34	81.95
Average Digest. Coef.	23.35	76.72	70.78	53.37	64.09

Note.—No. 5 excreted some mucus in faeces.

SUMMARY OF DIGESTION COEFFICIENTS

	No. Det.	E. Ext.	C. Fibre	C. N-free Prot.	N-free Ext.
Low Land Prairie Hay.....	2	39.9	60.1	42.5	56.5
Bromus Inermis Hay	10	35.6	59.0	48.3	64.4
Sixty Day Oats	1	79.3	49.7	85.5	85.7
Swedish Select Oats.....	1	83.2	54.6	81.0	83.6
Swedish Select Oats	2	83.0	21.7	76.1	83.4
(Brome roughage)					
Swedish Select Oats.....	2	88.2	52.1	79.3	85.0
(Oat straw roughage)					
Swedish Select Oats	6	92.3	32.7	76.1	78.7
(Alfalfa roughage)					
Swedish Select Oats	11	87.9	35.5	77.2	82.3
(Average all determinations)					
Emmer or Speltz	2	93.8	51.4	83.9	92.6
(Brome roughage)					
Emmer or Speltz	4	81.1	....	73.2	83.2
(Oat straw roughage)					
Emmer or Speltz..	3	89.6	49.6	81.6	88.9
(Alfalfa roughage)					
Emmer or Speltz	9	88.2	50.5	79.6	88.2
(Average all determinations)					
Oat Straw	4	31.1	71.6	13.7	51.7
Alfalfa Hay	6	37.4	43.8	77.9	71.8
Hanna Barley	5	70.7	69.3	79.9	92.2
(Brome roughage)					
Hanna Barley	2	68.3	52.3	73.6	89.7
(Oat Straw roughage)					
Hanna Barley	6	87.5	47.3	76.3	92.3
(Alfalfa roughage)					
Hanna Barley	13	75.5	56.3	76.6	91.4
(Average all determinations)					
Manchuria Barley	2	80.0	54.3	83.9	90.9
(Brome roughage)					
Durum Wheat	2	65.0	39.8	78.1	92.0
(Brome roughage)					
Black Voronezh Millet	2	75.0	53.7	70.7	82.0
(Brome roughage)					
Black Voronezh Millet	2	88.4	52.7	83.3	94.1
(Ground, brome roughage)					
Black Voronezh Millet	2	77.4	14.2	59.6	86.8
(Whole, oat straw roughage)					
Black Voronezh Millet	2	85.5	....	66.8	89.5
(Ground, oat straw roughage)					
Black Voronezh Millet	8	81.6	40.2	70.1	88.1
(Average all determinations)					
Red Orenburg Millet	2	86.4	....	46.0	84.4
(Whole, oat straw roughage)					
Red Orenburg Millet	2	89.7	24.3	63.7	92.1
(Ground, oat straw roughage)					
Red Orenburg Millet	4	88.0	24.3	54.8	88.2
(Average all determinations)					
Minnesota No. 13 Corn	2	87.4	29.3	77.6	96.0
(Brome roughage)					
Upland Prairie Hay	6	31.7	52.7	32.0	50.7

SUMMARY OF DIGESTION COEFFICIENTS
(CONTINUED)

	No.	E.	C.	C. N-free	
	Det.	Ext.	Fibre	Prot.	Ext.
Cord Grass Hay	6	50.1	56.1	39.1	49.0
Slough Grass Hay	6	54.0	58.8	41.6	54.6
Kentucky Blue Grass Hay	6	53.2	67.0	56.6	62.2
Western Wheat Grass Hay	6	39.4	68.2	51.5	60.9
Sorghum Fodder	6	76.7	70.8	53.4	64.1