EXPERIMENT STATION

OF THE

KANSAS STATE AGRICULTURAL COLLEGE,

MANHATTAN.

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FARM DEPARTMENT.

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FEEDING EXPERIMENTS.

I. Kaffir=Corn, Corn= and Soy=Bean Meal for Pigs.

An experiment with 12 pigs, divided into four lots of three pigs each, was carried out during the winter of 1895-'96. The object of the experiment was to test the value of Kaffir-corn meal and of soy-bean meal as food for hogs in comparison with corn-meal.

Character of the Pigs: Eight pure-bred Berkshire barrows were used in this experiment and four pure-bred Poland-China gilts. They were nearly of the same age; six of the Berkshires were farrowed May 21 and were of the same litter; two of the Berkshires were a little younger, being farrowed June 17. Three of the Poland-Chinas were of one litter, farrowed May 24, and one Poland-China was farrowed May 3. The average weight of the pigs when the experiment began was 63 pounds, the lightest being the two Berkshires farrowed June 17, which weighed 52 and 54 pounds respectively, and the heaviest being two of the Poland-Chinas, which weighed 75 and 77 pounds, respectively, and the others falling between these extremes.

Piggery and Conditions of the Experiment: The piggery where the experiment was carried out does not present the most favorable con-

ditions. It is a small stone structure which forms a wing to the main barn, and lighted by a skylight on the north side of the roof. The pens are 7x9 feet, provided with cement floor, but there is no yard attached to them. The pigs were, therefore, confined to the pens. Each pig was given a separate pen and fed individually throughout the experiment. Record was kept of the feed eaten by each pig, and the gain determined by weekly weighings.

The Feed: As stated, the feed consisted of Kaffir-corn, corn and soy-beans. The Kaffir-corn was of the red variety. All three feeds were ground and soaked before they were fed, the feed for the next day being put to soak in the evening when the last feed was given. They were fed three times daily, namely, at 6.30 a.m., 12 m., and at 5 p. m. Part of the feed was thus soaked only 13 to 14 hours while part of it was soaked from 6 to 12 hours longer. In addition to the feed, each pig was furnished with a box of wood ashes and salt, and some fine soft coal was put in the pens occasionally.

The experiment began November 7 and continued until March 12. The plan was to feed lot I exclusively on Kaffir-corn meal and lot III exclusively on corn-meal, and this plan was followed from November 7 until January 23. By that time it was found that the gains of these two lots continued so light that it seemed well-nigh impossible to fatten them on this diet, and the feed was, therefore, changed from pure Kaffir-corn and corn-meal, respectively, to two-thirds of these grains and one-third of shorts. This change improved the gain some, but not to any marked extent. Lot II was fed all through the experiment on two-thirds Kaffir-corn meal and one-third soy-bean meal, and lot IV was in like manner fed on two-thirds corn-meal and one-third soy-bean meal. The results of this treatment are set forth in the following

Tables: Tables I to IV show the weight of each pig in the respective lots at the beginning of the experiment, and the gain from week to week, and finally the total gain, and the average daily gain of each pig, as well as the total and average of the lot as a whole. They, further, show the weight and cost of feed from week to week, with the totals of these items at the end of the experiment; and finally, the five last columns in each of these tables show the number of pounds of grain eaten for each pound of gain, the increase in gain of the lot from week to week from November 7, the average daily gain of the lot from November 7, the average daily gain per head from November 7, and the cost per pound of gain from November 7. At the bottom of the table there is also a summary of these items, which will show the main points at a glance.

Table I. LOT I. FEED: KAFFIR-CORN MEAL.

WEEKLY ACCOUNT OF WEIGHT, GAIN, AND FEED EATEN, IN POUNDS, AND COST OF GAIN

DATE, 1895 '96.	Berkshire barrow Pig 15		Berkshire barrow Pig 18		Poland-China sow, Pig 31		Total.		Average		FEED.				Lbs grain eaten per lb of gain from Nov. 7	Gain of lot from Nov. 7, lbs	Av. daily gain of lot from Nov. 7, lbs.	Av. daily gain per head from Nov. 7, lbs	Cost per lb. of gain from Nov. 7, cts
											Kaffir-corn meal.		Shorts						
	Weight.....	Gain.....	Weight.....	Gain.....	Weight.....	Gain.....	Weight.....	Gain.....	Weight.....	Gain.....	Wt lbs.	Cost 35 cts. per cwt	Wt lbs	Cost 80 cts. per cwt					
Nov. 7	64		54		75		190		63										
" 14	68	7	59	5	89	14	216	26	72	9	77 09	$0 270			2 96	26	3 71	1 23	1 03
" 21	73	5	61	2	97	8	231	15	77	5	74 70	251			3 62	41	2 92	97	1 27
" 28	75	2	63	2	104	7	242	11	81	4	71 89	252			4 24	52	2 47	82	1 48
Dec. 5	76	1	63	0	115	11	254	12	85	4	80 19	280			4 70	64	2 28	76	1 61
" 12	79	3	65	2	120	5	264	10	88	3	74 46	260			5 05	74	2 11	70	1 77
" 19	81	2	68	3	127	7	276	12	92	4	67 03	235			5 14	86	2 04	68	1 80
" 26	80	1	66	2	134	7	280	4	93	1	58 75	206			5 56	90	1 83	61	1 94
Jan. 2	79	-1	68	2	137	3	284	4	94	1	58 10	203			5 91	94	1 67	55	2 08
" 9	79	0	68	0	143	6	290	6	96	2	53 17	187			6 12	100	1 58	52	2 14
" 16	77	2	68	0	150	7	295	5	98	2	51 01	178			6 32	105	1 50	50	2 21
" 23	77	0	68	0	155	5	300	5	100	2	52 03	182			6 50	110	1 42	47	2 27
" 30	78	1	69	1	164	9	311	11	104	4	37 81	132	18 92	$0 151	6 38	121	1 41	48	2 30
Feb 6	80	2	70	1	176	12	326	15	109	5	48 99	172	24 19	196	6 22	136	1 49	49	2 31
" 13	80	0	71	1	181	5	332	6	111	2	48 91	171	24 46	196	6 17	142	1 41	48	2 48
" 20	79	-1	71	0	196	15	346	14	115	4	46 00	161	22 99	184	6 33	156	1 48	49	2 47
" 27	82	3	72	1	201	8	358	12	119	4	45 08	158	22 51	180	6 28	168	1 50	50	2 50
Mar. 5	82	0	73	1	218	14	373	15	124	5	43 73	153	21 86	175	6 12	183	1 53	51	2 47
" 12	81	2	72	1	225	7	381	8	127	3	44 19	155	22 09	177	6 21	191	1 51	50	2 54
Totals		23		18		150		191		64	1,030 46	$3 606	457 35	$1 259					
Av. daily gain.		.18		.14		1.19		1 51		50									

Grain eaten, 1,187.81 pounds.
Total gain, 126 days, 191 pounds
Average gain per head, 63 66 pounds.
Average daily gain of lot, 1.51 pounds.
Average daily gain per head, .50 pound.

Average cost per pound of gain, 2.51 cents.
Total cost of feed, $4.865
Average cost of feed per head, $1 621.
Grain eaten per pound of gain, 6 21 pounds.

Table 11. LOT II. Feed: Kaffir-corn Meal 2/3; Soy-bean Meal 1/3.

WEEKLY ACCOUNT OF WEIGHT, GAIN, AND FEED EATEN, IN POUNDS, AND COST OF GAIN.

Date, 1895–96.	Berkshire barrow. Pig 14		Berkshire barrow. Pig 17.		Poland-China sow. Pig 36.		Total.		Average.		Feed.				Lbs. grain eaten per lb of gain from Nov 7.	Gain of lot from Nov 7, lbs.	Av. daily gain of lot from Nov. 7, lbs	Av. daily gain per head from Nov. 7, lbs.	Cost per lb. of gain from Nov. 7, cts
											Kaffir-corn meal.		Soy-bean meal						
	Weight	Gain	Weight	Gain	Weight	Gain	Weight	Gain	Weight	Gain	Wt. lbs.	Cost 35 cts. per cwt	Wt. lbs	Cost 200 cts. per cwt.					
Nov. 7	62	..	52	.	73	..	187	..	62	..	..	..	..	..	..	..	..	..	..
" 14	73	11	58	6	90	17	221	34	73	11	19 72	$0 174	24 87	$0 198	2 19	34	1 85	1 61	1 97
" 21	85	12	68	10	108	18	261	40	87	14	59 70	209	29 86	597	2 21	74	5 28	1 76	1 99
" 28	93	8	77	9	122	14	292	31	97	10	72 33	253	36 17	723	2 59	105	5 00	1 66	2 33
Dec 5	106	13	89	12	139	17	334	42	111	14	85 41	299	42 70	854	2 72	147	5 25	1 75	2 45
" 12	119	13	99	10	150	11	368	34	122	11	84 72	296	42 36	847	2 94	181	5 17	1 72	2 62
" 19	131	12	109	10	167	17	407	39	135	13	85 60	300	42 80	856	2 98	220	5 23	1 74	2 68
" 26	143	12	118	9	181	14	442	35	147	12	92 31	323	46 17	923	3 11	255	5 20	1 73	2 80
Jan. 2	149	6	126	8	191	10	466	24	155	8	90 80	318	45 40	908	3 33	279	4 98	1 66	3 00
" 9	163	14	139	13	205	14	507	41	169	14	91 00	319	45 50	910	3 33	320	5 07	1 69	3 00
" 16	175	12	150	11	217	12	542	35	181	12	90 61	317	45 30	906	3 38	355	5 07	1 69	3 05
" 23	185	10	158	8	224	7	567	25	189	8	87 59	307	43 79	876	3 51	380	4 93	1 64	3 16
" 30	197	12	170	12	238	14	605	38	202	13	91 97	322	45 99	920	3 52	418	4 97	1 65	3 17
Feb 6	210	13	181	11	249	11	640	35	213	11	89 92	315	44 96	899	3 54	453	4 97	1 65	3 19
" 13	215	5	185	4	257	8	657	17	219	6	77 15	270	38 57	771	3 66	470	4 79	1 59	3 30
" 20	222	7	191	6	263	6	676	19	225	6	72 15	252	36 07	722	3 74	489	4 65	1 55	3 37
" 27	233	11	199	8	267	4	699	23	233	8	79 36	278	39 67	793	3 80	512	4 57	1 52	3 42
Mar. 5	237	4	206	7	275	8	718	19	239	6	73 23	256	36 62	732	3 88	531	4 46	1 48	3 49
" 12	243	6	213	7	278	3	734	16	244	5	70 68	247	35 34	707	3 96	547	4 34	1 44	3 56
Totals .		181		161		205		547		182	1,414 28	$5 055	722 14	$14 442					
Av. daily gain,		1.42		1.27		1.62		4.34		1.44									

Grain eaten, 2,166 42 pounds.
Total gain, 126 days, 547 pounds.
Average gain per head, 182.33 pounds.
Average daily gain of lot, 4.34 pounds.
Average daily gain per head, 1.44 pounds

Average cost per pound of gain, 3.56 cents.
Total cost of feed, $19.497
Average cost of feed per head, $6 499
Grain eaten per pound of gain, 3.96 pounds.

Table III. LOT III. FEED: CORN-MEAL

WEEKLY ACCOUNT OF WEIGHT, GAIN, AND FEED EATEN, IN POUNDS, AND COST OF GAIN.

DATE, 1895–'96.	Berkshire barrow. Pig 10.		Berkshire barrow Pig 13.		Poland-China sow Pig 39.		Total.		Average.		FEED				Lbs grain eaten per lb. of gain from Nov. 7.	Gain of lot from Nov. 7, lbs.	Av. daily gain of lot from Nov. 7, lbs.	Av. daily gain per head from Nov 7, lbs.	Cost per lb. of gain from Nov. 7, cts.
											Corn-meal		Shorts.						
	Weight.....	Gain.....	Weight.....	Gain.....	Weight.....	Gain.....	Weight.....	Gain.....	Weight.....	Gain.....	Wt lbs	Cost 35 cts. per cwt.	Wt. lbs.	Cost 80 cts. per cwt.					
Nov. 7	57		59		77		193		64										
" 14	64	7	64	5	88	11	216	23	72	8	75 12	$0 263			3 26	23	3 28	1 09	1 14
" 21	71	7	70	6	100	12	241	25	80	8	76 16	266			3 15	48	3 42	1 14	1 10
" 28	77	6	73	3	111	11	261	20	87	7	90 11	315			3 55	68	3 23	1 07	1 24
Dec. 5	84	7	74	1	124	13	282	21	94	7	102 64	359			3 86	89	3 17	1 05	1 35
" 12	87	3	77	3	137	13	301	19	100	6	95 98	336			4 07	108	3 08	1 02	1 42
" 19	87	0	81	4	150	13	318	17	106	6	83 73	293			4.19	125	2 97	99	1 46
" 26	90	3	82	1	163	13	335	17	112	6	79 57	278			4 24	142	2 89	96	1 48
Jan. 2	92	2	84	2	170	7	341	9	115	3	78 88	276			4 51	151	2 69	89	1 58
" 9	95	3	85	1	180	10	359	15	120	5	72 73	255			4 54	166	2 61	87	1 59
" 16	97	2	86	1	180	0	362	3	121	1	70 51	247			4 86	169	2 41	80	1 70
" 23	98	1	90	4	193	13	377	15	126	5	73 03	256			1 88	184	2 38	79	1 70
" 30	102	4	92	2	206	13	398	24	133	7	51 08	178	25 51	$0 204	4 75	205	2 44	81	1 72
Feb. 6	107	5	92	2	215	9	414	16	138	5	59 63	209	29 81	239	1 81	221	2 42	80	1 79
" 13	110	3	94	2	229	14	433	19	144	6	51 59	181	25 79	206	1 75	240	2 44	81	1 84
" 20	115	5	98	4	232	3	445	12	148	4	48 87	171	24 43	196	4 82	252	2 40	80	1 87
" 27	120	5	101	3	237	5	458	13	152	4	55 08	193	27 54	220	1 89	265	2 36	78	1 91
Mar. 5	128	8	105	4	252	15	485	27	161	9	58 60	205	29 28	234	4 74	292	2 45	81	1 91
" 12	132	4	107	2	260	8	499	14	166	5	60 61	212	30 31	242	4 82	306	2 42	80	1 97
Totals		75		43		183		306		102	1,283 95	4 493	192 71	$1 541					
Av. daily gain,		.59		.38		1 45		2 42		.80									

Grain eaten, 1,476.66 pounds.
Total gain, 126 days, 306 pounds.
Average gain per head, 102 pounds.
Average daily gain of lot, 2 12 pounds
Average daily gain per head, .80 pound.

Average cost per pound of gain, 1.97 cents.
Total cost of feed, $6.034
Average cost of feed per head, $2.011.
Grain eaten per pound of gain, 1.82 pounds.

Table IV. LOT IV. FEED: CORN-MEAL $^2/_3$; SOY-BEAN MEAL $^1/_3$.

WEEKLY ACCOUNT OF WEIGHT, GAIN, AND FEED EATEN, IN POUNDS, AND COST OF GAIN.

DATE, 1895-96	Berkshire barrow. Pig 11.		Berkshire barrow. Pig 12		Poland-China sow. Pig 38		Total		Average.		FEED.				Lbs. grain eaten per lb. of gain from Nov. 7.	Gain of lot from Nov 7, lbs.	Av. daily gain of lot from Nov 7, lbs	Av. daily gain per head from Nov. 7, lbs.	Cost per lb of gain from Nov 7, cts
											Corn-meal.		Soy-bean meal						
	Weight.....	Gain.....	Weight.....	Gain.....	Weight.....	Gain.....	Weight.....	Gain.....	Weight.....	Gain.....	Wt. lbs.	Cost 35 cts per cwt.	Wt lbs	Cost 200 cts per cwt.					
Nov 7	57	..	66	..	64	..	187	..	62	..									
" 14	68	11	81	15	78	14	227	40	75	13	52 18	$0 184	26 24	$0 525	1 96	40	5 71	1 90	1 77
" 21	82	14	95	14	96	18	273	46	91	16	61 28	214	30 63	612	1 98	86	6 14	2 04	1 77
" 28	92	10	108	13	108	12	308	35	103	12	71 69	251	35 85	717	2 29	121	5 76	1 92	2 06
Dec. 5	101	9	118	10	120	12	339	31	113	10	76 96	269	38 48	770	2 58	152	5 42	1 80	2 33
" 12	112	11	130	12	133	13	375	36	125	12	77 22	270	38 60	772	2 70	188	5 37	1 79	2 13
" 19	125	13	147	17	146	13	418	43	139	14	82 17	288	41 08	822	2 73	231	5 50	1 83	2 46
" 26	133	8	151	7	160	14	447	29	149	10	89 06	312	44 52	890	2 94	260	5 30	1 76	2 65
Jan. 2	143	10	166	12	172	12	481	34	160	11	83 25	291	41 62	832	3 03	294	5 25	1 75	2 72
" 9	158	15	164	−2	179	7	501	20	167	7	74 18	261	37 24	745	3 19	314	4 98	1 66	2 87
" 16	172	14	180	16	192	13	544	43	181	14	80 63	232	40 32	806	3 14	357	5 10	1 70	2 83
" 23	179	7	188	8	204	12	571	27	190	9	80 72	283	40 35	807	3 24	384	4 98	1 66	2 91
" 30	195	16	200	12	210	6	605	34	201	11	86 65	303	43 33	866	3 28	418	4 97	1 65	2 95
Feb. 6	206	11	210	10	224	14	640	35	213	12	82 41	288	41 20	824	3 30	453	4 97	1 65	2 97
" 13	210	4	216	6	232	8	658	18	219	6	77 75	272	38 87	777	3 42	471	4 80	1 60	3 08
" 20	215	5	221	8	233	1	672	14	224	5	69 50	243	34 74	695	3 54	485	4 61	1 53	3 18
" 27	228	13	233	9	235	2	696	24	232	8	70 77	248	35 38	708	3 58	509	4 54	1 51	3 22
Mar 5	237	9	246	13	237	2	720	24	240	8	72 88	255	36 44	729	3 63	533	4 47	1 49	3 26
" 12	245	8	257	11	239	2	741	21	247	7	75 19	263	37 59	752	3 69	554	4 39	1 46	3 32
Totals		188		191		175		554		185	1,365 09	$4 777	682 48	$13 649					
Av daily gain,		1 49	.. ..	1 51	.. ..	1 38	.....	4 39		1.46	.....	.....	.....	.....	...	.....	.....	.....	.....

Grain eaten, 2,047 57 pounds.
Total gain, 126 days, 554 pounds
Average gain per head, 184.66 pounds.
Average daily gain of lot, 4.39 pounds
Average daily gain per head, 1 46 pounds.

Average cost per pound of gain, 3 32 cents
Total cost of feed, $18.426.
Average cost of feed per head, $6.142.
Grain eaten per pound of gain, 3 69 pounds.

Attention is called to the fact that the soy-bean meal is valued at $2 per hundred pounds, while shorts have but a value of 80 cents a hundred. Kaffir-corn meal and corn-meal are valued alike at 35 cents per hundred pounds. The soy-bean meal has no market value. The beans were raised on the College farm, and the estimate put on the meal is doubtless too high in comparison with other feed stuffs. This, of course, increases the cost of the gain of the lots in which soy-bean meal forms part of the ration. As may be seen from the tables, the average cost per pound of gain at the close of the experiment of lot II was 3.56 cents, and of lot IV it was 3.32 cents. If the price of the soy-bean meal were reduced to $1 per hundred pounds, the cost of the gain of lot II would be 2.24 cents per pound, and of lot IV 2.09 cents per pound, which would perhaps be more equitable.

But the cost of the gain is not the most important feature of the present experiment, but rather to see how the gains of the several lots compare on the rations furnished. In this respect there is a very marked difference. Thus, lot I, fed on Kaffir-corn meal, and, part of the time, shorts, gained a total of 191 pounds in 126 days, or an average of just one-half a pound per day per head in that period. Lot II, also fed on Kaffir-corn meal, but with the addition of one-third by weight of soy-bean meal, made a total gain of 547 pounds, or an average daily gain of 1.44 pounds per head. But it should further be noted in this connection, that lot I, fed on Kaffir-corn meal, required 6.21 pounds grain to make a pound of gain, while lot II made a pound of gain on 3.96 pounds of the mixture of Kaffir-corn and soy-bean meal. When we compare the total grain eaten by the two lots, the story is a different one. Lot I ate 1,187.81 pounds grain, while lot II ate 2,166.42 pounds—not quite twice as much as lot I. This shows that lot II relished their food better, and, therefore, ate more, and consequently gained faster.

Nearly the same relation exists between lot III, fed on corn-meal and shorts, and lot IV, fed on two-thirds corn-meal and one-third soy-bean meal. Lot III made a total gain of 306 pounds in the 126 days, while lot IV gained 554 pounds, a difference in favor of the soy-bean meal of 248 pounds. Lot III required 4.82 pounds of grain to make a pound of gain, while lot IV required only 3.69 pounds. But when we compare the total grain eaten, we find that, as in the former case, the soy-bean meal had a stimulating effect on the appetite, so that while lot III ate a total of only 1,476.66 pounds corn-meal and shorts, lot IV ate a total of 2,047.57 pounds of corn-meal and soy-bean meal. It is doubtless true that, while the greater amount of feed consumed by lot IV is largely responsible for the increased gain of this lot, the credit of the gain is not due solely to the quantity, but to the quality

as well. In the case of lot III, which was fed on corn-meal exclusively during 11 weeks and two-thirds corn-meal and one-third shorts for seven weeks, it had required at the close of the experiment 4.82 pounds feed to make a pound of gain. If the same ratio between gain and feed were applied to lot IV, this lot should have eaten 2,670 pounds feed to account for the gain it made, on the supposition that the better gain is due solely to the greater quantity of feed; or, if you look at it another way, lot IV gained 248 pounds more than lot III, but it ate only 571 pounds more than lot III. This would make the ration in excess of feed and gain of lot IV over lot III stand as 2.3 pounds feed is to 1 pound of gain, whereas the figures show that that lot required 3.69 pounds feed for each pound of gain. The difference in these ratios represents, so to speak, the better quality of the feed as compared with the feed of lot III.

The same holds true of lots I and II. Lot II ate 978 pounds feed more than lot I but it gained 356 pounds more than lot I. The ratio of gain to feed in this excess over lot I, is as 1 is to 2.7—not greatly different from that in the excess of gain and feed of lot IV over lot III; but lot II required 3.96 pounds feed to make a pound of gain, which is 1.25 pounds more than the ratio in the excess gain; in other words, one-third of the gain may be ascribed to the difference in quality of the feed and two-thirds to the difference in quantity.

If we next compare the effect of Kaffir-corn meal with the corn-meal, as fed to lots I and III, respectively, we find that the corn-meal produced the best gain. Up to January 23 neither lot was fed any shorts (see tables I and III), but on that date lot III had gained 74 pounds more than lot I, and it had also eaten 232 pounds grain more than lot I. Up to that date it had required lot III 4.88 pounds corn meal to make a pound of gain, while it had required 6.5 pounds Kaffir-corn meal to make a pound of gain. With the addition of the shorts to the rations of both lots in equal proportions, after January 23, the gains improved slightly, but they were not satisfactory in either case. Before the shorts were added, it required 1.62 pounds more of Kaffir-corn to make a pound of gain than of corn, and at the close of the experiment it had required 1.39 pounds feed more for lot I than for lot III to make a pound of gain.

On the basis of the gains of these two lots, red Kaffir-corn proved to be decidedly inferior to corn as a pork producer. But, as we shall see presently, the very poor gains of these pigs were due, at least in part, to the individuality of some of the pigs.

Lot II was fed on a ration consisting of two-thirds Kaffir-corn meal and one-third soy-bean meal, and lot IV was fed on a ration of two-thirds corn-meal and one-third soy-bean meal. These rations

remained constant throughout the experiment. In both cases the pigs made excellent gains, and, remarkably enough, the two lots came within seven pounds of making equal gains. Lot II gained 547 pounds and lot IV 554 pounds, but lot II ate 118 pounds more than lot IV; so that in this case also the Kaffir-corn was not quite equal to corn, although the soy-bean meal almost obliterated the difference.

All lots were alike in that they made the most rapid gains, and gained more in proportion to the feed eaten, at the beginning of the experiment, and as the feeding progressed it gradually required more and more feed to make a pound of gain. It has been pointed out in preceding bulletins that the same law also governs the gains of steers.

Turning now to tables V, VI, VII, and VIII, we will briefly note the effect of the treatment on individual pigs. It has already been stated that each lot was made up of two Berkshire barrows and one Poland-China sow. All the lots were, therefore, alike in composition. Moreover, the pigs were nearly alike in age and weight when the experiment began. The differences which developed under similar treatment may, therefore, fairly be ascribed to differences in individuality. The most noted difference occurs in lot I. table V. It is there shown that the two Berkshire barrows, Nos. 15 and 18, gained respectively but 23 and 18 pounds, while the Poland-China sow No. 34, under the same treatment, gained 150 pounds. I can offer no explanation for this, except it be that the Berkshires were inferior feeders to the Poland-Chinas. It is usually supposed, and in fact is ordinarily true, that open sows do not gain as well as barrows. In this case the sow made a fairly good gain while the barrows made very inferior gains. The supposition that the Berkshires were inferior feeders in this case is borne out also by the results of lots II and III, in which the Poland-China sows in like manner made better gains than the Berkshire barrows, and in case of lot IV the sow fell but little behind the barrows. Now, if the Kaffir-corn could produce a gain of 150 pounds in a Poland-China sow, with a consumption of but 4.47 pounds grain for each pound of gain, the question arises whether it is fair to blame the Kaffir-corn for the poor gains of the Berkshires and of the lot as a whole. If it possessed qualities which would make one hog gain well, the meal fed to the other hogs must have possessed the same qualities, but the hogs did not possess the qualities necessary to utilize the nutrition the feed contained.

The individuals in lot II (see table VI), which were fed on a mixture of two-thirds Kaffir-corn meal and one-third soy-bean meal, made on the whole satisfactory gains, as already noted, and the two Berkshire barrows, Nos. 14 and 17, gained respectively only 181 and

161 pounds, while the Poland-China sow gained 205 pounds. They ate also less, however, than the sow did. No. 14 made a pound of gain on 3.8 pounds of the mixed feed, and No. 17 made a pound of gain on 4 pounds of feed, while the Poland-China sow required slightly more than 4 pounds for each pound of gain. In this case, then, the better gain of the sow pig was due to the fact that she had a better appetite than the barrows had, and, indeed, the same holds true in lot I, where No. 34 ate considerably more than twice as much as either No. 13 or 18.

Lot No. III (see table VII) shows the same phenomena. The two Berkshire barrows, Nos. 10 and 13, gained respectively but 75 and 48 pounds, while the Poland-China sow gained 183 pounds. This is again due to the delicate appetite of the Berkshires as compared with the Poland-China. No. 10 ate 368 pounds of feed and made one pound of gain for each 4.91 pounds of meal. No. 13 ate 341 pounds of feed, and made a pound of gain on 7.11 pounds of meal; while No. 39 ate 766 pounds of feed—more than twice as much as any of the others—and made a pound of gain for every 4.19 pounds of meal eaten. The Poland-China sow here made a normal gain. A pound of gain on four pounds of corn for any considerable period is a good gain. That the Berkshires did not do so well, must be ascribed to the fact that they did not eat as much.

The individuals in lot No. IV, as already noted (see table VIII), made almost equal gains, and they consumed also nearly equal quantities of feed. In this case the two Berkshire barrows, Nos. 11 and 12, gained respectively 13 and 16 pounds more than the Poland-China sow, while they ate but 25 and 2 pounds respectively more than she did. The mixture of two-thirds corn-meal and one-third soy-bean meal seemed to have suited the Berkshires exactly, and the gains of the barrows compared with the sow are more in accordance with common experience.

Table V. LOT I. Feed: Kaffir-corn Meal.

WEEKLY ACCOUNT OF FEED EATEN AND COST OF GAIN.

Date, 1895–'96.	PIG No 15. Berkshire Barrow.								PIG No 18. Berkshire Barrow.								PIG No. 34. Poland-China Sow.							
	Feed.				Lbs grain eaten per lb. of gain from Nov 7.	Gain from Nov. 7, lbs.	Av. daily gain from Nov. 7, lbs.	Cost per lb of gain from Nov. 7, cts.	*Feed*				Lbs. grain eaten per lb. of gain from Nov. 7.	Gain from Nov. 7, lbs.	Av. daily gain from Nov. 7, lbs.	Cost per lb. of gain from Nov. 7, cts.	*Feed.*				Lbs. grain eaten per lb. of gain from Nov. 7.	Gain from Nov. 7, lbs.	Av. daily gain from Nov. 7, lbs.	Cost per lb. of gain from Nov 7, cts
	Kaffir-corn meal.		Shorts.						Kaffir-corn meal.		Shorts.						Kaffir-corn meal.		Shorts.					
	Wt. lbs.	Cost 35 cts per cwt.	Wt. lbs.	Cost 80 cts. per cwt.					Wt. lbs.	Cost 35 cts. per cwt.	Wt. lbs.	Cost 80 cts. per cwt.					Wt. lbs.	Cost 35 cts. per cwt.	Wt. lbs.	Cost 80 cts. per cwt.				
Nov. 7	24 58	$0 086			3 51	7	1 00	1 22	22 76	$0 080			1 55	5	71	1 60	29 75	$0 104			2 12	14	2 00	74
" 14	19 82	069			3 70	12	85	1 29	15 70	055			5 49	7	50	1 92	36 18	127			2 98	22	1 57	1 05
" 21	22 23	078			4 75	14	66	1 66	16 16	057			6 06	9	42	2 13	33.50	117			3 42	29	1 38	1 20
" 28	19 88	070			5 76	15	53	2 02	18 02	063			8 07	9	32	2 83	42 29	148			3 54	40	1 42	1 22
Dec. 5	18 84	066			5 85	18	51	2 05	18 93	066			8 32	11	31	2 91	36 69	128			3 96	45	1 28	1 38
" 12	15 90	056			6 06	20	.47	2 12	16 63	058			7 72	14	33	2 70	34 50	121			4 09	52	1 23	1 43
" 19	12 40	043			7 03	19	38	2 46	12 31	043			10 04	12	21	3 51	34 04	119			4 18	59	1 20	1 46
" 26	11 97	042			8 09	18	32	2 83	12 52	044			9 50	14	25	3 32	33 61	118			4 52	62	1 10	1 58
Jan 2	11 31	040			8 71	18	28	3 05	10 85	038			10 27	14	22	3 60	31 31	110			4 58	68	1 07	1 60
" 9	9 22	032			10 38	16	22	3 63	10 81	038			11.04	14	20	3 87	30 98	108			4 57	75	1 07	1 60
" 16	9 22	032			10 96	16	20	3 83	11 15	039			11 81	14	18	4 15	31 66	111			4 60	80	1 03	1 63
" 23	9 22	032			10 92	17	20	3 91	7 83	027	3 91	$0 031	11 83	15	17	4 26	23 07	081	11 54	$0 092	4 59	89	1 05	1 66
" 30	6.91	024	3 47	$0 028	10 45	19	20	3 84	10 92	038	5 16	044	12 12	16	17	4 50	29 50	103	14 75	118	4 18	101	1 10	1 68
Feb. 6	8 57	030	4 28	034	11 01	19	.19	1 12	9 86	035	4 93	039	12 27	17	17	4 67	32 01	112	16 01	.128	4 73	106	1 08	1 83
" 13	7 01	025	3 52	028	11 01	19	.19	1 12	9 41	033	4 70	038	13.10	17	16	5 09	29 31	.103	14 66	117	4 50	121	1 15	1.78
" 20	7 25	025	3 63	029	12 22	18	17	4 65	9 41	033	4 70	038	13 14	18	16	5 19	27 71	097	13 86	111	4 55	129	1 15	1 83
" 27	8 21	029	4 10	.033	11 06	21	18	4 28	9 16	032	4 58	037	13 08	19	15	5 23	28 45	099	14 23	114	4.40	143	1 20	1 80
Mar. 5	7 21	025	3 60	029	11 57	21	17	4 53	8 07	028	4 03	032	14 54	18	14	5 88	27 94	098	13 97	112	4 47	150	1 19	1 86
" 12	7 57	.026	3 78	030	11 06	23	18	4 38	8 68	030	4 34	035												
Totals,	228.16	$0.798	26.38	$0.211	.....	.....	.....	.....	229.77	$0.804	31.95	$0.256	.....	.....	.....	.....	572.53	$2.004	99.02	$0.792	.....	.....	.....	.....

Grain eaten, 254 54 pounds.
Total gain, 126 days, 23 pounds.
Average daily gain, 18 pound.
Cost per pound of gain, 4 38 cents.
Total cost of feed, $1 009.
Grain eaten per pound of gain, 11 06 pounds.

Grain eaten, 261 72 pounds.
Total gain, 126 days, 18 pounds.
Average daily gain, 14 pound.
Cost per pound of gain, 5 88 cents.
Total cost of feed, $1 060.
Grain eaten per pound of gain, 14 54 pounds.

Grain eaten, 671 55 pounds
Total gain, 126 days, 150 pounds.
Average daily gain, 1.19 pounds.
Cost per pound of gain, 1 86 cents
Total cost of feed, $2 796.
Grain eaten per pound of gain, 4 47 pounds.

Table VI. LOT II. FEED: KAFFIR-CORN MEAL ⅔; SOY-BEAN MEAL ⅓.

WEEKLY ACCOUNT OF FEED EATEN AND COST OF GAIN.

DATE, 1895–'96	PIG No. 14. BERKSHIRE BARROW.								PIG No. 17 BERKSHIRE BARROW.								PIG No. 36. POLAND-CHINA SOW.							
	Feed				Lbs. grain eaten per lb. of gain from Nov. 7.	Gain from Nov. 7, lbs.	Av. daily gain from Nov. 7, lbs.	Cost per lb of gain from Nov. 7, cts.	*Feed.*				Lbs. grain eaten per lb of gain from Nov 7	Gain from Nov. 7, lbs.	Av. daily gain from Nov. 7, lbs.	Cost per lb of gain from Nov. 7, cts.	*Feed.*				Lbs. grain eaten per lb of gain from Nov. 7.	Gain from Nov. 7, lbs.	Av. daily gain from Nov. 7, lbs.	Cost per lb of gain from Nov. 7, cts.
	Kaffir-corn meal.		Soy-bean meal.						Kaffir-corn meal.		Soy-bean meal						Kaffir-corn meal.		Soy-bean meal.					
	Wt. lbs.	Cost 35 cts. per cwt.	Wt. lbs.	Cost 200 cts per cwt.					Wt. lbs.	Cost 35 cts per cwt.	Wt. lbs.	Cost 200 cts per cwt.					Wt. lbs.	Cost 35 cts. per cwt.	Wt. lbs	Cost 200 cts per cwt.				
Nov. 7																								
" 14	17 27	$0 060	8.64	$0 173	2 35	11	1 57	2 11	12 62	$0 044	6.31	$0 126	3 15	6	85	2 83	19 83	$0 069	9.92	$0 198	1 75	17	2 42	1 57
" 21	18 87	066	9 44	189	2 35	23	1 64	2 12	14 83	052	7.42	148	2 57	16	1 14	2 31	26 00	091	13 00	260	1.96	35	2 50	1 76
" 28	20 33	071	10.17	203	2 73	31	1 47	2 45	19.83	069	9.92	.199	2 83	25	1 19	2 55	32 47	113	16 08	322	2 38	49	2 33	2 14
Dec. 5	25 50	089	12.75	255	2.79	44	1 57	2 51	24 67	086	12 33	247	2 91	37	1 32	2 62	35.24	123	17 62	352	2 57	66	2 35	2 31
" 12	25 64	090	12.82	256	2 83	57	1 62	2 54	25 03	088	12,52	250	3 09	47	1 34	2 78	34 05	119	17 02	340	2 86	77	2 20	2 58
" 19	26 00	091	13.00	260	2 90	69	1 64	2 61	24.43	086	12,22	244	3 19	57	1 35	2 87	35 17	123	17 58	351	2 91	94	2 23	2 61
" 26	28 33	099	14.17	283	2 99	81	1 65	2 69	26 60	093	13.30	266	3 36	66	1 34	3 02	37 11	131	18 70	374	3 05	108	2 20	2 74
Jan. 2	27 83	097	13.92	279	3 27	87	1 55	2 94	26 64	093	13,31	266	3 51	74	1 32	3 18	36 33	127	18 17	363	3 25	118	2 10	2 92
" 9	29 00	102	14.50	290	3 24	101	1 60	2 92	26 33	092	13.17	263	3 46	87	1 38	3 11	35 67	125	17 83	357	3 31	132	2 09	2 98
" 16	28 17	099	14.08	282	3.27	113	1 61	2 95	28 17	099	14.08	282	3 50	98	1 40	3 15	34 27	120	17 14	343	3 39	144	2 05	3 05
" 23	28 19	099	14.09	282	3 35	123	1 59	3 02	27 73	097	13.87	277	3 63	106	1 37	3 27	31 67	111	15 83	317	3 55	151	1 96	3 19
" 30	31 30	110	15.65	313	3 40	135	1 60	3 06	28 11	098	14.06	281	3 62	118	1 40	3 25	32 56	114	16 28	326	3 54	165	1 96	3 19
Feb. 6	30 14	105	15.07	301	3 41	148	1 62	3 07	27 15	095	13.57	271	3 62	129	1 41	3 26	32 63	114	16 32	326	3 60	176	1 93	3 24
" 13	27 83	097	13.91	278	3 57	153	1 56	3 21	21 67	076	10.83	217	3 76	133	1 35	3 38	27 65	097	13 83	277	3 67	184	1 87	3 30
" 20	21 64	076	10.82	216	3 61	160	1 52	3 25	22 84	080	11.42	229	3 84	139	1 32	3 46	27 67	097	13 83	277	3 77	190	1 80	3 39
" 27	26 31	092	13 15	263	3 61	171	1 52	3 25	25 26	089	12,63	253	3 89	147	1 31	3 50	27 79	097	13 89	278	3 91	194	1 73	3 52
Mar. 5	23 49	082	11.75	235	3 73	175	1 47	3 36	24 04	084	12,02	240	3 95	154	1 29	3 55	25 70	090	12 85	257	3 94	202	1 69	3 55
" 12	22 85	080	11.43	229	3 80	181	1 43	3 42	24 11	084	12.05	241	4 00	161	1 27	3 60	23 72	083	11 86	237	4 06	205	1 62	3 65
Totals,	458 69	$1.605	229.36	$4.587					430.06	$1.505	215.03	$4.300					555.53	$1.944	277.75	$5.555				

Grain eaten, 688.05 pounds
Total gain, 126 days, 181 pounds
Average daily gain, 1.43 pounds.
Cost per pound of gain, 3.42 cents.
Total cost of feed, $6.192.
Grain eaten per pound of gain, 3.8 pounds.

Grain eaten, 645.09 pounds.
Total gain, 126 days, 161 pounds.
Average daily gain, 1.27 pounds.
Cost per pound of gain, 3.60 cents.
Total cost of feed, $5 805.
Grain eaten per pound of gain, 4 pounds.

Grain eaten, 833.28 pounds.
Total gain, 126 days, 205 pounds.
Average daily gain, 1.62 pounds.
Cost per pound of gain, 3 65 cents.
Total cost of feed, $7.499.
Grain eaten per pound of gain, 4.06 pounds.

Table VII. LOT III. FEED: CORN-MEAL.

WEEKLY ACCOUNT OF FEED EATEN AND COST OF GAIN.

DATE, 1895–'96.	PIG No. 10. BERKSHIRE BARROW.								PIG No. 13. BERKSHIRE BARROW.								PIG No. 39. POLAND-CHINA SOW.							
	Feed.				Lbs. grain eaten per lb. of gain from Nov. 7.	Gain from Nov. 7, lbs.	Av. daily gain from Nov. 7, lbs.	Cost per lb of gain from Nov. 7, cts.	*Feed.*				Lbs. grain eaten per lb of gain from Nov. 7.	Gain from Nov. 7, lbs.	Av. daily gain from Nov. 7, lbs.	Cost per lb of gain from Nov. 7, cts.	*Feed.*				Lbs. grain eaten per lb of gain from Nov. 7.	Gain from Nov. 7, lbs.	Av. daily gain from Nov. 7, lbs.	Cost per lb of gain from Nov 7, cts
	Corn-meal.		Shorts.						Corn-meal.		Shorts.						Corn-meal.		Shorts.					
	Wt. lbs.	Cost 35 cts. per cwt.	Wt. lbs.	Cost 80 cts. per cwt.					Wt. lbs.	Cost 35 cts. per cwt.	Wt. lbs.	Cost 80 cts. per cwt.					Wt. lbs.	Cost 35 cts. per cwt	Wt. lbs.	Cost 80 cts. per cwt.				
Nov. 7																								
" 14	23 05	$0 081			3 29	7	1 00	1 15	22 32	$0 078			4 46	5	70	1 56	29 75	$0 104			2 70	11	1 57	94
" 21	21 75	076			3 20	14	1 00	1 12	16 66	058			3 54	11	.78	1 23	37 75	132			2 93	23	1 64	1 02
" 28	27 64	097			3 62	20	95	1 27	19 75	069			4 19	14	66	1 46	42 75	150			3 24	34	1 61	1 13
Dec 5	29 04	102			3 75	27	96	1 31	23 68	083			5 49	15	.53	1 92	49 92	175			3 40	47	1 67	1 19
" 12	23 82	083			4 17	30	85	1.16	20 84	073			5 73	18	51	2 00	51 32	180			3 52	60	1 71	1 23
" 19	14 57	051			4 66	30	71	1 63	20 09	070			5 60	22	52	1 95	49 07	172			3 56	73	1 73	1 25
" 26	14 27	050			4 67	33	67	1 63	18 48	065			6 16	23	.46	2 15	46 82	164			3 57	86	1 75	1 25
Jan. 2	18.71	065			4 93	35	62	1 72	16 96	059			6 90	23	41	2 41	43 21	151			3 76	93	1.66	1 32
" 9	13'80	048			4 91	38	60	1 71	14 91	052			6 94	25	39	2 42	44 02	154			3 83	103	1.63	1 31
" 16	14 07	049			5 01	40	57	1 75	17 50	061			7 35	26	37	2 56	38 94	136			4 20	103	1 47	1 47
" 23	15 43	054			5 27	41	53	1 84	17 98	063			7 74	27	35	2 70	39 62	138			4 07	116	1 50	1 42
" 30	10 32	036	5 16	$0 041	5.14	45	53	1 85	11 43	040	5 71	$0 046	7 30	31	36	2.63	29 33	103	11 67	$0 117	4 00	129	1 53	1 45
Feb. 6	13 40	047	6 70	.054	5 03	50	54	1 86	13 17	046	6 58	052	7 45	33	36	2 77	33 06	116	16 53	132	4 10	138	1 51	1 53
" 13	12 49	044	6 24	050	5 10	53	54	1 93	11 37	010	5 68	045	7 51	35	35	2 85	27 73	097	13 87	111	4 00	152	1 55	1 53
" 20	12 56	044	6 28	050	4 98	58	55	1 93	11 83	041	5 92	047	7 20	39	37	2 78	24 48	086	12 23	098	4 16	155	1 47	1 62
" 27	15.27	053	7 64	061	4 95	63	56	1 96	14 14	050	7 07	057	7 19	42	37	2 84	25 67	090	12 83	103	4 27	160	1 42	1 69
Mar. 5	18 49	065	9 24	074	4 78	71	59	1 93	13 94	049	6 97	056	7 02	46	38	2 82	26 17	091	13 08	104	4 13	175	1 46	1 65
" 12	18 87	066	9 43	076	4 91	75	59	2 02	12 41	044	6 21	050	7 11	18	.38	2 90	29 33	102	14 67	117	4 19	183	1 45	1 70
Totals,	317.55	$1.111	50.69	$0.406	...	...	...	...	297.46	$1.041	44.14	$0.353	.....	.....	.....	.....	668.94	$2.341	97.88	$0.782	.....	.....	.....	.....

Grain eaten, 368.21 pounds
Total gain, 126 days, 75 pounds.
Average daily gain, 59 pound
Cost per pound of gain, 2.02 cents.
Total cost of feed, $1.517.
Grain eaten per pound of gain, 4 91 pounds.

Grain eaten, 341.60 pounds.
Total gain, 126 days, 48 pounds
Average daily gain, .38 pound.
Cost per pound of gain, 2.90 cents.
Total cost of feed, $1.391.
Grain eaten per pound of gain, 7.11 pounds.

Grain eaten, 765.82 pounds
Total gain, 126 days, 183 pounds
Average daily gain, 1.45 pounds.
Cost per pound of gain, 1 70 cents.
Total cost of feed, $3.123.
Grain eaten per pound of gain, 4.19 pounds.

Table VIII. LOT IV FEED: CORN-MEAL 2/3; SOY-BEAN MEAL 1/3

WEEKLY ACCOUNT OF FEED EATEN AND COST OF GAIN.

DATE, 1895 '96,	PIG No. 11. BERKSHIRE BARROW.							PIG No 12. BERKSHIRE BARROW.							PIG No. 38. POLAND-CHINA SOW.						
	Feed.				Lbs. grain eaten per lb. of gain from Nov. 7	Gain from Nov. 7, lbs.	Av. daily gain from Nov. 7, lbs	Cost per lb. of gain from Nov. 7, cts.	*Feed.*				Lbs grain eaten per lb. of gain from Nov 7.	Gain from Nov. 7, lbs.	Av. daily gain from Nov. 7, lbs.	Cost per lb. of gain from Nov. 7, cts.	*Feed*				Lbs. grain eaten per lb of gain from Nov. 7.	Gain from Nov. 7, lbs.	Av. daily gain from Nov. 7, lbs.	Cost per lb. of gain from Nov. 7, cts
	Corn-meal.		Soy-bean meal.						Corn-meal.		Soy-bean meal.						Corn-meal.		Soy-bean meal					
	Wt. lbs.	Cost 35 cts per cwt.	Wt. lbs.	Cost 200 cts. per cwt.					Wt. lbs.	Cost 35 cts. per cwt.	Wt. lbs.	Cost 200 cts. per cwt.					Wt. lbs.	Cost 35 cts. per cwt.	Wt. lbs.	Cost 200 cts. per cwt.				
Nov. 7																								
" 14	16 98	$0 059	8 49	$0 170	2 31	11	1 57	2 08	17 67	$0 062	8 83	$0 177	1 76	15	2 14	1 59	17 83	$0 062	8 92	$0 178	1 91	14	2 00	1 71
" 21	19 17	067	9 58	192	2 16	25	1 78	1 95	20 61	.072	10 30	206	1 98	29	2 07	1 78	21 50	075	10 75	215	1 84	32	2 28	1 65
" 28	21 83	076	10 92	218	2 48	35	1 66	2 23	25 50	089	12 75	255	2 27	42	2 00	2 05	24 36	085	12 18	244	2 17	44	2 09	1 95
Dec. 5.	23 79	083	11 90	238	2 78	44	1 57	2 50	27 26	095	13 63	273	2 62	52	1 85	2 36	25 94	091	12 95	259	2 40	56	2 00	2.15
" 12	24 67	086	12 33	247	2 90	55	1 57	2 61	25 38	089	12 69	254	2 72	64	1 82	2 45	27 17	095	13 58	272	2 53	69	1 97	2 28
" 19	25 00	088	12 50	250	2 89	68	1.61	2 60	28 17	099	14 08	282	2.67	81	1 92	2 41	29 00	.102	14 50	290	2.66	82	1 95	2 40
" 26	28 41	099	14 20	284	3 15	76	1 55	2 83	29 98	105	14 99	300	2 97	88	1 79	2 67	30 67	107	15 33	307	2 75	96	1 95	2 48
Jan. 2	25 72	090	12 86	257	3 23	86	1 53	2 91	25 03	088	12 51	250	2 99	100	1 78	2 69	32 50	114	16 25	325	2 90	108	1 92	2 64
" 9	26 50	093	13 25	265	3 14	101	1 60	2 83	15 73	055	7 87	157	3 29	98	1 55	2 96	32 25	113	16 12	322	3 14	115	1 82	2 83
" 16	29 31	103	11 66	293	3 14	115	1 64	2 83	23 24	081	11 61	232	3 13	111	1 62	2 82	28.11	098	14 05	281	3 15	128	1 82	2 83
" 23	27 55	096	13 77	275	3 30	122	1 58	2 97	24 67	086	12 33	247	3 23	122	1 58	2 91	28 50	100	14 25	285	3 19	140	1 81	2 87
" 30	30 19	106	15 10	302	3 25	138	1 64	2 92	26 83	094	13 42	268	3 24	134	1 59	2 92	29 63	104	14 81	296	3 36	146	1 73	3 02
Feb. 6	29 79	104	14 89	298	3 31	149	1 63	2 97	26 83	094	13 12	268	3 30	144	1 58	2 97	25 79	090	12 89	258	3 31	160	1 75	2 98
" 13	26 79	094	13 40	268	3 48	153	1 56	3 13	23 24	081	11 61	232	3 40	150	1 53	3 06	27 72	097	13 86	277	3 40	168	1 71	3 06
" 20	24 53	086	12 26	245	3 60	158	1 50	3 24	22 35	078	11 17	223	3.44	158	1 50	3 09	22 62	079	11 31	226	3 58	169	1 60	3 22
" 27	28 21	.099	14 10	282	3 58	171	1 52	3 22	26 67	093	13 33	267	3 49	167	1 49	3 14	15 89	056	7 95	159	3 67	171	1 52	3 31
Mar. 5	29 11	102	14 55	291	3 64	180	1 51	3 28	29 94	105	14 97	299	3 49	180	1 51	3 14	13 83	048	6 92	138	3.75	173	1 45	3 38
" 12	27 99	098	14 00	280	3 71	188	1 49	3 34	31 34	110	15 66	313	3 53	191	1 51	3 18	15 86	056	7 93	159	3 84	175	1 38	3 46
Totals,	465.54	$1.629	232.76	$4.655	.....	.....	.....	...	450 41	$1.576	225.17	$4.503	.....	.....	.....	...	449.14	$1.572	224.55	$4.491	.....	.....	.....	...

Grain eaten, 698.30 pounds.
Total gain, 126 days, 188 pounds.
Average daily gain, 1 49 pounds.
Cost per pound of gain, 3.34 cents.
Total cost of feed, $6 284.
Grain eaten per pound of gain, 3.71 pounds

Grain eaten, 675.58 pounds.
Total gain, 126 days, 191 pounds.
Average daily gain, 1.51 pounds.
Cost per pound of gain, 3.18 cents.
Total cost of feed, $6 079.
Grain eaten per pound of gain, 3.53 pounds.

Grain eaten, 673.69 pounds.
Total gain, 126 days, 175 pounds.
Average daily gain, 1 38 pounds.
Cost per pound of gain, 3.46 cents.
Total cost of feed, $6.063.
Grain eaten per pound of gain, 3.84 pounds

II. Kaffir=Corn and Corn=Meal as Fattening Feeds for Aberdeen=Angus Heifers.

During the same period which covers the experiment with hogs just detailed, we also fed three Aberdeen-Angus heifers for market. Having a little red Kaffir-corn on hand, it was concluded to feed one of them on Kaffir-corn meal and the other two on corn-meal, and compare results. The animals, however, are too few to afford any reliable conclusions, and the results are given here simply for what they are worth.

The heifer in lot I was a year and six months old, and the heifers in lot II were two years and four months old, both being about the same age. All three were pure-bred. The experiment began November 6 and continued until February 26, 112 days. The feed consisted of Kaffir-corn meal and cut corn-fodder for the heifer in lot I, and of corn-meal and cut corn-fodder for lot II, from November 6 until December 18. But the gains on these rations were not altogether satisfactory; so the feed was changed as follows: Lot I got a mixture of Kaffir-corn meal 17 parts and oil-meal 1 part, and the fodder was changed from cut corn-fodder to alfalfa hay; the same ration was given lot II, with the exception that corn-meal took the place of Kaffir-corn meal. A week later, December 25, the meal for both lots was reduced to 16 parts and the oil-meal was increased to two parts. This continued until January 22, when the feed was again changed for both lots to 16 parts of the meal with three parts oil-meal.

Although these heifers had been reared in the College herd and had been tied up before, they were wild and nervous, as is the character of the breed, and it took some time before they overcame this nervousness. Each animal was given all it would eat, and with some slight variations in appetite they ate fairly regular quantities throughout the experiment.

Table I gives the weekly weights and gains of the three heifers from beginning to end. It will be noticed that the heifer in lot I gained 154 pounds, or an average of 1.37 pounds daily; those in lot II averaged 190 pounds, or 1.7 pounds daily. The larger gains of lot II might be expected from the fact that they were older and larger.

Table II shows the amount and cost of the feed eaten weekly by the heifer in lot I, also the number of pounds of grain and roughness eaten per pound of gain weekly throughout the period. It further

shows the average daily gain and the cost per pound of gain from November 6. It will be noticed that the first week this heifer lost 57 pounds and that it took nearly two weeks more to make up this loss; so, at the end of three weeks, she was but a few pounds heavier than she was when the experiment began. The total grain eaten was 1,693 pounds, of which the oil-meal weighed 129 pounds and the Kaffir-corn meal 1,564 pounds. She ate 74.5 pounds corn-fodder and 193 pounds of alfalfa. On this she gained 154 pounds. She made a pound of gain on 10.99 pounds grain and 1.73 pounds roughness. This ratio of feed to gain is somewhat higher than the steers fed heretofore on an equally nutritive ration have required.

Table I. ABERDEEN-ANGUS HEIFERS.
WEEKLY ACCOUNT OF WEIGHT AND GAIN, IN POUNDS.

DATE, 1895–'96.	LOT I.		LOT II.				Total.		Average.	
	No. 93.		No. 91.		No. 92.					
	Weight	Gain.	Weight	Gain.	Weight	Gain.	Weight	Gain.	Weight	Gain.
November 6	845	.....	996	.....	1030	.....	2026	.....	1013	.....
" 13	788	—57	973	—23	1015	—15	1988	—38	994	—19
" 20	805	17	1026	53	1005	—10	2031	43	1015	21
" 27	866	61	1040	14	1039	34	2079	48	1039	24
December 4	882	16	1054	14	1055	16	2109	30	1054	15
" 11	892	10	1057	3	1037	—18	2094	—15	1047	—7
" 18	890	—2	1050	—7	1054	17	2104	10	1052	5
" 25	873	—17	1077	27	1066	12	2143	39	1071	19
January 1	868	—5	1092	15	1083	17	2175	32	1087	16
" 8	907	39	1096	4	1116	33	2212	37	1106	19
" 15	904	—3	1110	14	1138	22	2248	36	1124	18
" 22	943	39	1132	22	1143	5	2275	27	1137	13
" 29	954	11	1142	10	1175	32	2317	42	1158	21
February 5	954	0	1179	37	1172	—3	2351	34	1175	17
" 12	961	7	1190	11	1178	6	2368	17	1184	9
" 19	981	20	1190	0	1187	9	2377	9	1188	4
" 26	999	18	1195	5	1212	25	2407	30	1203	15
Totals	.....	154	.....	199	.....	182	.....	381	.....	190
Average daily gain.	.....	1.37	.....	1.77	.....	1.62	.....	3.40	.....	1.70

Total gain of lot I, 154 pounds.
Average daily gain, 1.37 pounds.

Total gain of lot II, 381 pounds.
Average daily gain, 3.40 pounds.
Average daily gain per head, 1.70 pounds.

Table II. LOT I. ABERDEEN-ANGUS HEIFER, No. 93.

WEEKLY ACCOUNT OF FEED EATEN AND THE COST OF GAIN.

DATE, 1895–'96.	GRAIN.					ROUGHNESS.							
	Kaffir-corn meal.		Oil-meal.		Pounds grain eaten per lb. of gain from Nov. 6.	Cut corn-fodder		Alfalfa.		Pounds roughness eaten per lb. of gain from Nov 6.	Gain from Nov 6, lbs.	Average daily gain from Nov. 6, lbs.	Cost per lb. of gain from Nov. 6, cts.
	Weight, lbs.	Cost 35 cts. per cwt	Weight, lbs.	Cost 88 cts. per cwt.		Weight, lbs	Cost 15 cts. per cwt.	Weight, lbs.	Cost 20 cts. per cwt				
November 6													
" 13	98 00	$0 343				24 00	$0 032				—57	—8 14	All loss.
" 20	99 00	347				9 50	014				—40	—2 85	All loss.
" 27	113 00	396			14 76	13 00	020			2 07	21	1 00	5 48
December 4	124 00	434			11 73	12 00	018			1 50	37	1 32	4 33
" 11	132 00	462			12 04	11 50	017			1 12	47	1 34	4 13
" 18	130 00	455			15 46	7 50	011			1 65	45	1 07	5 66
" 25	89 53	313	4 97	$0 044	28 23			23 50	$0 047	3 50	28	57	10 54
January 1	66 66	233	7 84	069	37 60			22 00	044	5 22	23	41	14 34
" 8	68 90	241	8 10	071	15 19			25 50	051	2 31	62	98	5 90
" 15	87 68	307	10 32	091	17 62			27 50	055	2 93	59	84	6 97
" 22	91 26	319	10 74	095	11 65			20 50	041	1 97	98	1 27	4 66
" 29	89 26	312	16 74	147	11 44			13 00	026	1 89	109	1 29	4 63
February 5	93 05	326	17 15	151	12 16			11 00	022	1 99	109	1 19	5 09
" 12	93 05	326	17 15	154	12 66			12 50	025	1 98	116	1 18	5 22
" 19	94 31	33	17 69	155	11 62			20 00	040	1 83	136	1 29	1 84
" 26	94 34	330	17 69	155	10 99			17 50	035	1 73	154	1 37	4 61
Totals	1,564.01	$5.474	128 99	$1 135		74.50	$0.112	193.00	$0.386				

Grain eaten, 1,693 pounds.
Total food eaten, 1,960.5 pounds
Average daily gain, 1.37 pounds.
Total cost of feed, $7.107
Roughness eaten per pound of gain, 1 73 pounds.

Roughness eaten, 267.5 pounds.
Total gain, 112 days, 154 pounds.
Cost per pound of gain, 1 61 cents.
Grain eaten per pound of gain, 10.99 pounds.
Total food eaten per pound of gain, 12.72 pounds.

Table III. LOT II. Aberdeen-Angus Heifer, No. 91.

WEEKLY ACCOUNT OF FEED EATEN AND THE COST OF GAIN.

Date, 1895-'96	Grain.					Roughness.							
	Corn-meal		Oil-meal.		Pounds grain eaten per lb of gain from Nov. 6.	Cut corn-fodder.		Alfalfa.		Pounds rough-ness eaten per lb. of gain from Nov. 6.	Gain from Nov. 6, lbs.	Average daily gain from Nov. 6, lbs.	Cost per lb. of gain from Nov. 6, cts.
	Weight, lbs.	Cost 35 cts. per cwt.	Weight, lbs.	Cost 88 cts. per cwt		Weight, lbs	Cost 15 cts. per cwt	Weight, lbs.	Cost 20 cts. per cwt.				
November 6						21 00	$0 036				- 23	—3 28	All loss.
" 13	102 00	$0 357				11 50	017			1 18	30	2 14	2 85
" 20	127 00	445			7 63	19 50	029			1 25	44	2 09	3 02
" 27	127 00	445			8 09	15 00	022			1 20	58	2 07	3 16
December 4	138 00	483			8 51	10 50	016			1 32	61	1 74	3 83
" 11	139 50	488			10 38	18 50	028			1 83	54	1 28	4 92
" 18	84 00	294			13 28					1 83	54	1 28	4 92
" 25	110 84	388	6 16	$0 054	10 30			35 00	$0 070	1 65	81	1 65	3 91
January 1	112.74	395	13 26	117	10 00			37 50	075	1 78	96	1 71	3 91
" 8	117 66	412	13 84	122	10 92			33 00	066	2 01	100	1 58	4 35
" 15	113 18	396	13 32	117	10 68			32 00	064	2 07	114	1 62	4 32
" 22	113 63	397	13 37	117	9 89			38 50	077	2 02	136	1 76	4 06
" 29	105 68	370	19 82	174	10 07			36 50	073	2 13	146	1 73	4 20
February 5	117 05	409	21 95	193	8 79			31 50	063	1 87	183	2 01	3 72
" 12	117 47	411	22 03	194	9 01			30 50	061	1 92	194	1 97	3 85
" 19	102 31	358	19 19	169	9 64			31 00	062	2 08	194	1 84	4 15
" 26	93 89	329	17 61	155	9 96			28 50	057	2 17	199	1 77	4 32
Totals	1,821.95	$6.377	160.55	$1.412		99.00	$0.148	334.00	$0.668				

Grain eaten, 1,982 5 pounds.
Total food eaten, 2,115.5 pounds
Average daily gain, 1.77 pounds.
Total cost of feed, $8 605.
Roughness eaten per pound of gain, 2 17 pounds.

Roughness eaten, 133 pounds.
Total gain, 112 days, 199 pounds.
Cost per pound of gain, 4.32 cents.
Grain eaten per pound of gain, 9.96 pounds.
Total food eaten per pound of gain, 12.13 pounds.

Table IV. LOT II. ABERDEEN-ANGUS HEIFER, No. 92.

WEEKLY ACCOUNT OF FEED EATEN AND THE COST OF GAIN.

DATE, 1895 '96.	GRAIN.					ROUGHNESS.							
	Corn-meal.		Oil-meal.		Pounds grain eaten per lb. of gain from Nov. 6.	Cut corn-fodder.		Alfalfa.		Pounds roughness eaten per lb of gain from Nov 6.	Gain from Nov. 6, lbs	Average daily gain from Nov 6, lbs.	Cost per lb of gain from Nov 6, cts.
	Weight, lbs.	Cost 35 cts. per cwt	Weight, lbs.	Cost 88 cts per cwt.		Weight, lbs.	Cost 15 cts per cwt.	Weight, lbs.	Cost 20 cts. per cwt.				
November 6													
" 13	108 00	$0 378				34 00	$0 051				—15	—2 14	All loss
" 20	115 50	404				9 50	014				—25	—1 78	All loss.
" 27	127 00	445			38 91	18 50	028			6 88	9	42	14 66
December 4	129 00	452			19 18	6 50	010			2 74	25	89	7 12
" 11	126 00	441			86 50	12 00	018			11 50	7	20	32 01
" 18	120 00	420			30 22	9 50	014			3 75	24	57	11 11
" 25	119 37	418	6 63	$0 058	23 65			34 50	$0 069	3 45	36	73	8 94
January 1	119 90	420	14 10	124	18 59			30 00	060	2 91	53	94	7 24
" 8	129 74	454	15 26	134	13 14			25 00	050	2 08	86	1 36	5 18
" 15	122 13	427	14 37	126	11 73			24 00	048	1 88	108	1 54	1 68
" 22	125 26	438	14 74	130	12 15			22 50	045	2 90	113	1 46	5 02
" 29	111 57	391	23 93	184	10 61			18 50	037	1 68	145	1 72	1 33
February 5	100 64	352	18 86	136	11 68			19 00	038	1 85	112	1 56	1 81
" 12	105 27	368	19 73	174	12 05			15 00	030	1 88	148	1 51	5 01
" 19	106 10	371	19 90	175	12 16			20 50	041	1 90	157	1 19	5 09
" 26	97 26	340	18 24	161	11.12			16 00	032	1 73	182	1 62	4 69
Totals	1,862.74	$6 519	162 76	$1 432		90.00	$0 035	225.00	$0.450				

Grain eaten, 2,025 5 pounds.
Total food eaten, 2,340.5 pounds
Average daily gain, 1.62 pounds.
Total cost of feed, $8.536.
Roughness eaten per pound of gain, 1.73 pounds.

Roughness eaten, 315 pounds.
Total gain, 112 days, 182 pounds.
Cost per pound of gain, 4 69 cents
Grain eaten per pound of gain, 11.12 pounds.
Total food eaten per pound of gain, 12.85 pounds

Table V. Totals of Lot II.

WEEKLY ACCOUNT OF FEED EATEN AND THE COST OF GAIN.

Date, 1895-'96.	Grain.					Roughness.								
	Corn-meal.		Oil-meal.		Pounds grain eaten per lb. of gain from Nov. 6.	Cut corn-fodder.		Alfalfa		Pounds roughness eaten per lb of gain from Nov. 6.	Gain of lot from Nov 6, lbs	Average daily gain of lot from Nov 6, lbs.	Average daily gain per head from Nov. 6, lbs.	Cost per lb of gain from Nov. 6, cts.
	Weight, lbs.	Cost 35 cts. per cwt.	Weight, lbs.	Cost 88 cts. per cwt.		Weight, lbs.	Cost 15 cts per cwt	Weight, lbs.	Cost 20 cts. per cwt					
November 6														
" 13.	210 00	$0 735				58 00	$0 087				—38	—5 12	—2 71	All loss.
" 20..	242 50	849			90 50	21 00	031			15 80	5	35	17	34 04
" 27.	254 00	889			13 33	38 00	057			2 20	53	2 52	1 26	4 99
December 4.	267 00	934			11 72	21 50	032			1 66	83	2 96	1 48	4 35
" 11..	265 50	929			18 22	22 50	034			2 36	68	1 94	97	6 73
" 18.	201 00	714			18 50	28 00	042			2 42	78	1 85	92	6 83
" 25.	230 21	806	12 79	$0 113	14 11			69 50	$0 139	2 20	117	2 38	1 19	5 46
January 1	232 64	814	27 36	241	13 06			67 50	135	2 18	119	2 66	1 33	5 08
" 8	247 40	866	29 40	256	11 94			58 00	116	2 06	186	2 95	1 47	4 71
" 15	235 31	824	27 69	241	11 19			56 00	112	1 98	222	3 17	1 58	4 50
" 22	238 89	836	28 11	247	11 05			61 00	122	2 01	249	3 23	1 61	4 49
" 29.	217 25	760	40 75	359	10 31			55 00	110	1 91	291	3 46	1 73	4 27
February 5	217 69	762	40 81	359	10 05			50.50	101	1 86	325	3 57	1 78	4 20
" 12	222 74	780	41 76	367	10 33			45 50	091	1 90	342	3 48	1 74	4 35
" 19	208 41	729	39 09	344	10 77			51 50	103	2 00	351	3 34	1 67	4 57
" 26	191 15	669	35 85	315	10 51			44 50	089	1 96	381	3 40	1 70	4 49
Totals	3,684 69	$12 896	323.31	$2.845		189 00	$0 283	559.00	$1 118					

Grain eaten, 4,008 pounds.
Total food eaten, 4,756 pounds
Average gain per head, 190 5 pounds
Average daily gain per head, 1 70 pounds.
Total cost of feed, $17.142
Grain eaten per pound of gain, 10.51 pounds.
Total food eaten per pound of gain, 12 47 pounds

Roughness eaten, 748 pounds.
Total gain, 112 days, 381 pounds
Average daily gain of lot, 3.40 pounds.
Cost per pound of gain, 4 49 cents.
Average cost of feed per head, $8 57.
Roughness eaten per pound of gain, 1 96 pounds.

Table III gives similar details concerning heifer No. 91, in lot II. She made 1 pound of gain on 9.96 pounds grain and 2.17 pounds roughness. Heifer No. 92, whose record is given in the table IV, required more feed to make a pound of gain than either of the others, consuming 11.12 pounds grain for each pound of gain.

Table V gives the the average of the two heifers in lot II, with a summary of the results at the bottom of the table. If it may be assumed that the heifer in lot I made a normal gain for the feed consumed, and that the average of the two heifers in lot II likewise represents a normal animal, then we find that the corn-meal ration was slightly more effective than the Kaffir-corn ration in the production of beef. Yet the difference is but small. The cost of a pound of gain in lot I was 4.61 cents, and the cost of a pound of gain in lot II was 4.49 cents, Kaffir-corn and corn being valued alike at 35 cents per hundredweight. The results certainly show that Kaffir-corn can be used as a substitute for corn in a fattening ration when oil-meal forms part of that ration.

Summary of Results in Pig=Feeding.

1. Red Kaffir-corn meal did not prove to be quite equal to corn-meal as a fattening food for hogs. The poor gains of the Berkshires in lots I and III are, however, in the main due to inferior feeding qualities. The Poland-China gilt in lot I, fed on Kaffir-corn, made a fairly good gain on this feed.

2. A mixture of two-thirds Kaffir-corn meal and one-third soy-bean meal produced excellent gains. The soy-bean meal apparently supplemented the defects of the Kaffir-corn meal in such a way as to make the mixture a desirable feed.

3. The pigs in lot III, fed at first on corn-meal and later on corn-meal and shorts, made better gains than the pigs in lot I, but in this case also the Berkshires in the lot did not prove to be as good feeders as the Poland-China gilt.

4. A mixture of two-thirds corn-meal and one-third soy-bean meal gave slightly better results than Kaffir-corn meal and soy-bean meal. The conclusion to be drawn from this experiment is, that red Kaffir-corn meal is not as good a feed for hogs as corn-meal, but that when either Kaffir-corn meal or corn-meal is mixed with soy-bean meal the results are highly satisfactory.

Summary for Cattle=Feeding.

While the experiment with cattle here recorded cannot have great weight, owing to the small number in the test, as well as the age and condition of the animals, it would, as far as it goes, in like manner indicate that red Kaffir-corn meal is not quite equal to corn-meal for fattening cattle, though the difference in favor of the corn is less marked than in the case of the hogs.