
Oregon Agricultural College

Experiment Station

Department of Animal Husbandry

Experiments in Swine Feeding

BY

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HOG FEEDING EXPERIMENTS AT THE OREGON EXPERIMENT STATION.

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INTRODUCTION.

In this bulletin we are publishing the results of the experiments in hog feeding that have been conducted at this Station since the publication of Bulletin 80, in April, 1904. We are not attempting a general treatise on the feeding and management of hogs, nor to cover all the points of interest to the hog feeders of Oregon and of the Northwest, but rather are publishing a record of the experiments actually performed during the past ten years. In Station Bulletin 131 we are publishing a brief popular summary of the experiments recorded in this bulletin, of the experiments performed at our various branch experiment stations, and of the experiments carried on at this Station, but published in previous bulletins.

The majority of the experiments listed in this bulletin deal with the fattening of pigs with the common feeds of Oregon. Following the usual practice of the Northwest, most of these pigs were put on full feed at an average live weight of approximately 100 pounds. They were then kept on feed for about 60 days. At the end of this time the pigs were expected to be in a marketable condition and to weigh approximately 200 pounds each.

The number of pigs in each lot is given for each experiment, and ranges ordinarily from five to ten. We find that with this number of pigs in each lot we must expect a variation of about 10 per cent, both in rate and economy of gain, even though the different lots be on the same feed, and under identical conditions. The reader should therefore hesitate at putting too much weight on differences amounting to less than 10 per cent. For example, where in a test comparing two different feeds, one lot gave results 8 per cent better than the other, the reader should remember that more difference than this might be due to individual variation of the pigs, and where differences less than 10 per cent were noticed the only safe conclusion to draw from the one test would be that as far as this particular test is concerned it was not proved that one feed was better than the other.

EXPERIMENT NO. 1.

Table I. Chopped Wheat vs. Chopped Barley.

FIVE PIGS PER LOT

September 1, 1904.

Lot No.	Av. Weight Per Head		Av. Daily Feed Per Head		Av. Daily Gain Per Head	Feed Per 100 lbs. Gain
	At Beginning	At Close	Chop'd Barley	Chop'd Wheat		
First Period - 14 days.						
I.	102	114		3.96	.86	460
II.	97	112	4.17		1.07	389
Second Period - 16 days.						
I.	114	131		5.70	1.44	597
II.	112	137	6.34		1.56	406
Third Period - 14 days.						
I.	131	158		7.27	1.50	485
II.	137	159	7.54		1.57	480
Fourth Period - 17 days.						
I.	158	183		7.36	1.47	500
II.	159	178	7.34		1.12	655
Fifth Period - 14 days.						
I.	183	205		8.43	1.57	537
II.	178	198	8.23		1.43	576
Entire Time - 75 days.						
I.	102	205		6.55	1.37	478
II.	97	198	6.74		1.35	500

In this test 100 pounds of gain was made with chopped wheat with 4.6 per cent less feed than with the chopped barley. Note that the barley proved superior to wheat during the first part of the test, but did not do so well during the latter part. Also note that during the first three periods the hogs ate rather more barley than wheat.

EXPERIMENT NO. 2.

Table II. Wheat vs. Barley vs. Vetch Seed, - All Ground.

FOUR PIGS PER LOT

December 1, 1905, to January 31, 1906.

Lot No.	Av. Weight Per Head		Av. Daily Feed Per Head			Av. Daily Gain Per Head	Feed Per 100 lbs. Gain
	At Beginning	At Close	Barley	Wheat	Vetch Seed		
First Period, December 1st to 15th - 14 days.							
I.	85	101	4.29			1.12	383
II.	85	100		4.29		1.07	401
III.	79	83			3.19	.27	1181
Second Period, December 15th to 30th - 15 days.							
I.	101	125	5.63			1.61	349
II.	100	119		5.63		1.28	440
III.	83	89			3.00	.42	714
Third Period, December 30th to January 15th - 16 days.							
I.	125	151	7.50			1.64	451
II.	119	144		7.50		1.56	481
III.	89	95			3.31	.39	849
Fourth Period, January 15th to 31st - 16 days.							
I.	151	165	6.87			.83	828
II.	144	155		6.87		.69	1009
III.	95	98			2.81	.20	1405
Entire Period, December 1st to January 31st - 61 days.							
I.	85	165	6.14			1.30	472
II.	85	155		6.14		1.15	534
III.	79	98			3.08	.32	963

In this test the lot on barley required 12% less feed for each 100 pounds gain than did the lot on wheat.

Vetch seed proved very unpalatable and entirely unsuited for hog feeding.

Note the lowering of the amount of feed in the fourth period. Evidently the pigs were over-fed in the third period.

EXPERIMENT NO. 3.

Table III. 1. Skim Milk and Chopped Wheat vs. Chopped Wheat Alone.
2. Plank Floor vs. Dirt Yard.

SIX PIGS PER LOT

May 1 to July 1, 1906.

Lot No.		Av. Weight Per Head		Av. Daily Feed Per Head		Av. Daily Gain Per Head	Feed Per 100 lb. Gain	
		At Beginning	At Close	Chop'd Wheat	Skim Milk		Wheat	Milk
		First Period, May 1 to 15 - 14 days.						
I.	On Plank Floor	87	110	4.97		1.66	299	
II.	In Dirt Yard	87	107	4.97		1.49	333	
III.	On Plank Floor	95	122	3.47	10.4	1.91	182	545
		Second Period, May 15 to June 1 - 17 days.						
I.		110	142	9.53		1.86	512	
II.		107	136	9.53		1.67	571	
III.		122	173	6.04	16.75	3.04	199	551
		Third Period, June 1 to 16 - 15 days.						
I.		142	166	7.41		1.66	466	
II.		136	154	5.94		1.22	487	
III.		173	210	8.75	15.60	2.44	360	639
		Fourth Period, June 16 to July 1 - 15 days.						
I.		166	196	8.00		1.94	413	
II.		154	185	7.47		2.06	366	
III.		210	253	8.53	14.40	2.83	301	510
		Entire Time, May 1 to July 1 - 61 days.						
I.		87	196	7.58		1.79	424	
II.		87	185	7.09		1.61	440	
III.		95	263	6.72	14.4	2.58	260	559

In this test 3.6% less feed for each 100 pounds gain was required with the plank floor than with the dirt floor.

331 pounds of skim milk were required to save 100 pounds of grain.

EXPERIMENT No. 4.

Table IV. Dry Chopped Barley vs. Dry Chopped Wheat vs. Wet Chopped Wheat.

SIX PIGS PER LOT

November 19, 1906.

No. Lot	Av. Weight Per Head		Av. Daily Feed per Head			Av. Daily Gain Per Head	Feed Per 100 lbs. Gain
	At Be- ginning	At Close	Chop'd Barley	Chop'd Wheat	Chop'd Wheat fed wet		
	First Period - 16 days.						
I.	111	133	4.41			1.35	326
II.	109	132		4.34		1.41	308
III.	97	120			4.34	1.46	297
	Second Period - 15 days.						
I.	133	165	5.70			1.39	410
II.	132	153		5.00		1.39	360
III.	120	138			4.77	1.22	391
	Third Period - 16 days.						
I.	163	173	6.00			1.25	480
II.	153	173		5.00		1.25	400
III.	138	153			4.75	.89	535
	Fourth Period - 14 days.						
I.	173	183	5.79			.71	810
II.	173	180		5.89		.57	1030
III.	153	162			3.68	.65	544
	Fifth Period - 16 days.						
I.	183	190	4.81			.42	1145
II.	180	191		5.21		.69	754
III.	162	170			4.00	.95	769
	Entire Time - 77 days.						
I.	111	190	5.32			1.015	524
II.	109	191		5.16		1.1	469
III.	97	170			4.32	.95	455

In this test the advantage of wheat over barley was 12% less feed for each 100 pounds gain.

The advantage of wet wheat over dry was negligible.

Test was apparently normal except for irregularities in feeding. Note the failing appetites and lower gains at close of test.

EXPERIMENT NO. 5.

Table V. Chopped Wheat vs. Chopped Barley Alone and with Skim Milk.

SEVEN PIGS PER LOT

This test was made in 1907 by two students—Lake and Reynolds.

Lot No.	Total Feed per Lot				Total Gain	Feed Per 100 lb. Gain	
	Barley	Wheat	Skim	Milk		Grain	Milk
	The test lasted 60 days.						
I.	2476				568	435	
II.	2264			1619	669	338	242
III.		2476			506	489	
IV.		2264		1619	756	300	214

Advantage of barley over wheat when fed alone: 12%.

Advantage of wheat over barley when fed with skim milk: 13%.

Skim milk required to save 100 lbs. grain: With barley, 236 lbs; with wheat, 113 lbs.

Cost per 100 lbs. gain with grain at \$1.25 and milk at 25 cents per 100 lbs: Lot I, \$5.44; Lot II, \$4.83; Lot III, \$6.11; Lot IV, \$4.28.

EXPERIMENT NO. 6.

Table VI. Chopped Wheat vs. Chopped Barley Alone and with Skim Milk.

SEVEN PIGS PER LOT

November 1, to December 31, 1907.

Lot No.	Av. Weight Per Head		Av. Daily Feed per Head			Av. Daily Gain Per Head	Feed Per 100 lbs. Gain	
	At Beginning	At Close	Chop'd Wheat	Chop'd Barley	Skim Milk		Grain	Skim Milk
First Period, November 1 to 18 - 17 days.								
I.	125	144		4.81		1.12	429	
II.	126	152		4.81	3.07	1.55	310	198
III.	128	146	4.81			1.06	464	
IV.	124	152	4.81		3.07	1.60	300	192
Second Period, November 18 to December 1 - 13 days.								
I.	144	162		5.54		1.43	388	
II.	152	179		5.54	3.73	2.09	265	178
III.	146	166	5.54			1.48	374	
IV.	152	181	5.54		3.73	2.25	246	166
Third Period, December 1 to 14 - 13 days.								
I.	162	188		7.69		1.98	388	
II.	179	206		6.46	5.38	2.03	318	265
III.	166	189	7.69			1.76	437	
IV.	181	209	6.46		5.38	2.14	302	251
Fourth Period, December 14 to 31 - 17 days.								
I. Off feed & lame	188	206		5.88		1.05	560	
II. "	206	222		5.04	3.57	.96	525	372
III. "	189	201	5.88			.71	828	
IV. "	209	232	5.04		3.57	1.39	363	257
Average of first three periods - 43 days.								
I.	125	188		5.9		1.47	401	
II.	126	206		5.53	3.97	1.86	297	213
III.	128	189	5.9			1.40	422	
IV.	124	209	5.53		3.97	1.96	282	202

In the average, the fourth period was discarded because of the irregularity of the results.

The advantage of barley over wheat when fed alone was 6%. When fed with skim milk the advantage of wheat over barley was 5%. Skim milk required to save 100 lbs. of grain when fed with barley was 200 lbs.; when fed with wheat, 139 lbs.

Cost for each 100 lbs. gain with grain at \$1.25 and milk at 25 cents per 100 lbs.: Lot I, \$5.00; Lot II, \$4.24; Lot III, \$5.28; Lot IV, \$4.03.

The lameness was rheumatic arthritis due to heavy feeding in close confinement.

EXPERIMENT NO. 7.

Kale for Brood Sows.

Lot I, consisting of 3 sows, was fed 10 lbs. of kale per sow daily for 2 months, from February 23 to April 23, 1909.

Weight at beginning 785 lbs. per lot. Weight at close 800 lbs. Gain per lot, 15 lbs. Gain per sow, 5 lbs. In this case 10 lbs. of kale per day proved a bare maintenance for 265 lbs. sows.

EXPERIMENT NO. 8.

Table VII. Kale vs. Beets for Growing Shoats.

February 23 to April 23, 1909.

Lot No.	Weight		Av. Daily Feed Per Head			Daily Gain Per Head	Feed Per 100 lbs. Gain	
	At Beginning	At Close	Kale	Beets	Shorts		Kale or Beets	Grain
I. 6 Shoats	402	505	4 2-3		.57	.29	1574	197
II. 6 Shoats	442	500		4 2-3	.57	.16	2793	350

Kale in this case proved superior to the beets. The gains were too slow to be considered satisfactory in either case.

EXPERIMENT NO. 9.

Table VIII. Chopped Wheat vs. Chopped Barley Alone and with Skim Milk

FOUR PIGS PER LOT

October 7 to December 5, 1909.

Lot No.	Av. Weight Per Head		Av. Daily Feed Per Head			Av. Daily Gain Per Head	Feed per 100 lbs. Gain	
	At Beginning	At Close	Chop'd Wheat	Chop'd Barley	Skim Milk		Grain	Skim Milk
First Period - 15 days.								
I.	231	281	5.07		9.58	2.03	249	472
II.	228	250	6.40			1.45	441	
III.	208	231		5.07	9.58	1.38	368	694
IV.	221	243		6.40		1.46	438	
Second Period - 15 days.								
I.	281	289	5.83		5.75	1.88	311	306
II.	250	271	6.43			1.38	466	
III.	231	266		5.83	5.75	2.29	254	251
IV.	243	271		6.43		1.88	342	
Third Period - 15 days.								
I.	289	318	6.60		5.83	1.88	351	310
II.	271	293	6.60			1.46	452	
III.	266	290		6.60	5.83	1.63	406	358
IV.	271	289		6.60		1.21	546	
Fourth Period - 15 days.								
I.	318	348	8.00		5.83	2.00	400	292
II.	293	304	8.00			.75	1066	
III.	290	322		8.00	5.83	2.16	375	274
IV.	289	315		8.00		1.75	457	
Entire Time - 60 days.								
I.	231	348	6.38		6.75	1.95	327	346
II.	228	304	6.86			1.26	544	
III.	208	322		6.38	6.75	1.91	332	354
IV.	221	315		6.86		1.58	434	

Advantage of barley over wheat when fed alone: 20%.

Advantage of wheat over barley when fed with skim milk: 2%.

Note that Lot II did poorly in the fourth period. The reason for this is not recorded.

EXPERIMENT NO. 10.

Table IX. Digester Tankage vs. Green Alfalfa.

SIX PIGS PER LOT

May 2, 1910, to July 1, 1910, 60 days.

Lot No.	Av. Weight Per Head		Av. Daily Feed Per Head			Feed per 100 lb. Gain		
	At Beginning	At Close	Grain, Shorts and Chop'd Barley 1:1	Tankage	Green Alfalfa	Av. Daily Gain Per Head	Grain	Alfalfa or Tankage
I.	First Period, May 2 to 16 - 14 days.							
II.	117	132	3.57		2.14	1.09	327	196
	103	123	3.57	.53		1.43	250	38
I.	Second Period, May 16 to June 1 - 16 days.							
II.	132	148	4.69		2.34	1.02	459	229
	123	154	4.69	.52		1.93	243	27
I.	Third Period, June 1 to 15 - 14 days.							
II.	148	158	4.76		2.14	.67	710	321
	154	175	4.76	.83		1.49	319	56
I.	Fourth Period, June 15 to July 1 - 16 days.							
II.	158	181	4.17		1.88	1.40	298	134
	175	197	4.17	.73		1.35	309	54
I.	Entire Period, May 2 to July 1 - 60 days.							
II.	117	181	4.30		2.13	1.06	408	201
	103	197	4.30	.65		1.55	277	42

In this test 100 pounds of tankage was equal to 300 pounds of barley and 465 pounds of green alfalfa.

The lot on tankage showed better appetite throughout the test and was in better market condition at the close. The feeding was rather irregular as will be noted by the higher feeding in the third period. Otherwise the test was apparently normal in every respect.

EXPERIMENT NO. 11.

Self Grinder.

Lot I was fed wheat through a self grinder. This grinder was a cylindrical arrangement so made that the hogs rooting in the trough around the bottom for their feed would turn the machine and so grind their feed.

Lot II was fed ground wheat in the usual manner.

There were six 145-lb. pigs in each lot and the test lasted 60 days, August 6 to October 5, 1910. The first lot gained .612 lbs. daily at a cost of 630 lbs wheat for each 100 lbs. gain. The second lot gained .847 lbs. daily at a cost of 542 lbs. wheat for each 100 lbs. gain. The ready-ground wheat showed an advantage of 16% in economy of gain and 36% in rate of gain. Both lots gained slowly and at considerable expense. During the first part of the test Lot II was fed only the amount consumed by Lot I. Later they were fed in accordance with their demands.

Following the test both lots were fed on ground wheat and made practically the same gains showing the two lots to have about the same feeding capacity.

Aside from the differences shown in the figures, the self grinder was a constant source of trouble and annoyance.

EXPERIMENT NO. 12.

Table X. Second-Growth Vetch Pasture vs. Skim Milk.

July 1 to July 30, 1911.

Total No	Av. Weight Per Head		Daily Feed per Head			Av. Daily Gain Per Head	Feed per 100 lbs. gain				
	At Be- ginning	At Close	Shorts	Barley	Milk		Shorts	Barley	Milk	Barley & Shorts	
First Period, 30 days.											
I.		110	150	4.17	.76	9.65	1.33	314	57	727	371
II.		110	143	4.27	.76	....	1.09	391	70	...	461
Second Period, 15 Days.											
I.		150	176	5.21	...	9.66	1.75	297	..	460	...
II.		143	156	5.68	...	....	.88	639	..	...	...
Total 45 Days.											
I.		110	176	4.51	.51	6.66	1.47	307	34	657	341
II.		110	156	4.85	.51	....	1.12	464	50	...	514
Extra 16 days.											
II.		156	182	5.62	...	10.00	1.72	276	..	490	...

Lot I made fairly rapid and satisfactory gains, although the amount of feed required for each hundred pounds gain was rather large. These pigs sold at 6¼c per pound, at which price they did not make a profit. Lot II made unsatisfactory gains and what gain they did make went largely into growth rather than into finish. At the end of the 45 days Lot I was in good marketable condition, so they were sold and the experiment proper concluded. Lot II were then taken off the pasture and put on a ration of shorts and skim milk such as had previously been fed to Lot I. They were kept on this ration for 16 days, during which time they made very heavy gains and required a very small amount of feed for each pound of gain. They also took on finish quite rapidly and at the end of the 16 days were in fairly marketable condition, so that they were sold at the same price as Lot I.

This experiment would indicate that second-growth vetch pasture during midsummer is not satisfactory as a supplement for grain in pig fattening.

EXPERIMENT NO. 13.

Skim Milk vs. Shorts as a Supplement to Ground Wheat.

Scrubs vs. Cross Breds.

November 8, 1911 to January 9, 1912.

The first object of this experiment was to compare shorts and skim milk as a supplement to wheat for feeding pigs. The experiment was especially intended to find out whether the digestible nutrients in these two feeds could be taken as a true ratio of their feeding value when fed to pigs in connection with ground wheat. The different lots were so fed that the rations all had about the same nutritive ration. It was also the intention to feed each lot approximately the same total nutrients; it was soon found, however, that the scrub pigs would not eat as much as the cross bred.

Lot I.

This lot consisted of 8 very high-class pigs, from good pure-bred Yorkshire sows and sired by a pure-bred Berkshire boar. These pigs

were selected from two litters, farrowed June 14 and June 21 respectively. A complete history of these pigs is given in the Cost of Production Test, Experiment No. 14. These pigs were all exceptionally thrifty and all of the very best type. The ration for this lot was shorts and wheat.

Lot II.

This lot consisted of 8 pigs, the same in every way as Lot I except that they were fed skim milk and wheat. It was the intention to feed this lot 10 pounds of milk per head daily but this exact amount was not always available. The ration for Lot I was kept adjusted so as to furnish about the same digestible nutrients as was given Lot II.

Lot III.

This lot consisted of 7 pigs, six of which were from razor-back sows and apparently by a grade Chester White boar. These pigs were long of nose and leg and very thin in flesh. They were inclined to pot bellies and poor backs. They were slightly older than Lots I and II but not so large. The other pig was a cross bred selected from the same bunch as Lots I and II but was the poorest of the cross-bred bunch. This lot was fed shorts and wheat.

Lot IV.

This lot consisted of 7 pigs, all of which were scrubs the same as Lot III and appeared no worse at the beginning of the test, although it developed in the course of the test that there were more good pigs and less bad ones than in Lot III.

Table XI. Skim Milk vs. Shorts as a Supplement to Ground Wheat.

Scrubs vs. Cross Breds.

Lot No.	Av. Weight Per Head		Av. Daily Feed Per Head			Av. Daily Gain Per Head	Feed per 100 lbs. Gain		
	At Beginning	At Close	Shorts	Wheat	Milk		Shorts	Wheat	Milk
First Period 15 Days									
I. 8 pigs cross-bred	106	121	1.87	2.5	....	.99	189	253	...
II. 8 pigs cross-bred	103	125	....	3.15	5.93	1.95	...	162	304
III. 7 pigs, scrubs	89	100	1.42	2.30	....	.762	186	307	...
IV. 7 pigs, scrubs	92	108	....	2.90	4.86	1.11	...	261	438
Second Period 15 Days.									
I.	121	137	1.75	3.45	....	1.08	162	319	...
II.	125	152	....	3.98	6.57	1.52	...	261	432
III.	100	114	1.25	2.85	....	.92	136	310	...
IV.	108	132	....	3.79	5.19	1.92	...	198	312
Third Period 15 Days.									
I.	137	156	1.75	4.0	....	1.25	140	320	...
II.	152	173	....	4.55	7.50	1.51	...	301	497
III.	114	123	1.3	2.25	....	.69	145	341	...
IV.	132	156	....	4.4	6.75	1.55	...	284	435
Fourth Period 17 Days.									
I.	156	181	1.75	4.01	....	1.48	118	271	...
II.	173	205	....	4.50	8.76	1.88	...	239	466
III. 6 days only	123	124	.98	1.72	....	.17	576	112	...
IV.	156	172	....	4.16	7.49	1.81	...	230	414
Entire Time 62 Days.									
I.	106	181	1.76	3.5	....	1.21	145	290	...
II.	103	205	....	4.1	7.2	1.64	...	246	440
III. 51 days	89	124	1.38	2.37	....	.69	183	341	...
IV.	92	172	....	3.82	6.0	1.52	...	250	394

In this experiment, Lots I and II were very thrifty. Throughout the experiment none of the pigs were off feed at any time and there is nothing to indicate that any differences in the gains of the two lots could not rightly be attributed to the feed used. Between these two lots we find quite a marked difference in the rate and economy of gain. The lot receiving skim milk gained about one-third more and was considerably better finished at the end of the test. The two lots were sold together, but if they had been separated Lot II would undoubtedly have sold for a rather higher price. In economy of gain we find that 440 pounds of skim milk saved 44 pounds of wheat and 145 pounds of shorts, or a total of 189 pounds of grain; or that 233 pounds of milk saved 100 pounds of shorts and wheat.

Since these two lots of pigs received rations with a similar nutritive ratio and also with about the same total nutrients for each day, it will be seen that as a supplement to wheat for fattening purposes, the digestible nutrients in skim milk and shorts were not, in this test, a true measure of their feeding value and that the digestible nutrients in the skim milk gave much greater gains than a similar amount of digestible nutrients from shorts.

Lots III and IV were greatly lacking in uniformity. Some of the pigs had tremendous appetites and became easily fat. Others ate very well but put their feed into growth rather than fat, while others did not eat well at any time and never made satisfactory gains. Nearly all of the pigs in Lot IV were of the easy-fattening kind and when the test was finished several of these pigs were much fatter than any in even Lots I and II. It will be noted also that these pigs made almost as large daily gains as Lot II and that the feed required for each pound of gain was, perhaps, slightly less. Lot III had a few good pigs and several bad ones. Two of these pigs in Lot III took rheumatism and on this account the lot was sold before the close of the experiment. Very little definite conclusions can be drawn as to the comparative merits of the scrubs and the cross breds. Lot IV was an uneven, unattractive looking bunch, but as some of them were very fat they sold well and made satisfactory gains. Lot III was, of course, unsatisfactory, having two pigs which made little or no gain. Aside from these two the others did about as well as the cross breds.

EXPERIMENT NO. 14.

Cost of Production.

Beginning March 11, 1911.

In this test records were kept of the cost of production of the two litters of cross-bred Berkshire-Yorkshire pigs used in wheat-and-shorts vs. wheat-and-skim-milk test, Experiment No. 13.

On March 11, 1911, two young sows were selected from the lots which had been used in the tankage vs. milk experiments of the previous winter. On this date these sows weighed 495 pounds or an average of

247½ pounds. From this date until the end of March they were fed 5 pounds of barley and 10 pounds of skim milk each, at the end of which time they had gained 50 pounds each. During the months of April and May they were run on pasture with no grain. The pasture was rape for the most part with some vetch at the close. The rape was over-ripe owing to the wetness of the lands which had made it impossible to use sooner. These sows were in with others and the exact amount of rape consumed cannot be told, but as nearly as can be estimated, they ate about one-eighth acre each. Beginning with June 1 they were fed a small grain ration of from 2 to 4 pounds each. Sow No. 4 farrowed June 14 and sow No. 5, June 21. The two farrowed 23 pigs, 19 of which reached maturity, and in this test the entire cost is divided equally between the 19 which lived.

During this period of a little over four months prior to farrowing these two sows ate 587 pounds of grain, practically all barley, 1300 pounds of skim milk and ¼ acre of pasture.

The birth cost of each pig, not counting the three dead ones, was 29 pounds grain; 65 pounds of skim milk, 1-80 acre of pasture. This feed at that time had a value of about 70c. This value, however, includes feed only and does not count interest, housing, labor, service of the boar, etc. It should also be noticed that it includes maintenance of the sows for only 4 months prior to farrowing, which would be fair only where two litters a year were being raised. The number of pigs in each litter is also large. On the other hand, these sows were young and were gaining in flesh and of course eating more feed than would have been required by mature sows.

After farrowing these pigs were raised almost altogether on milk and grain since the pasture season was over before they were large enough to profit by it. From birth until Nov. 8, at which time they weighed 104 pounds each, they required for each 100 pounds gain 228.1 pounds of skim milk and 257.5 pounds of grain, mostly shorts. In this 100 pounds of gain is included the maintenance of the sow while suckling (74 days). At current prices for feed, \$1.40 for grain and 25c for skim milk, it cost \$4.24 to make the first 100 pounds. This added to the birth cost makes the total feed cost for each pig at 100 pounds (fattening time) \$4.94 or practically five dollars.

Fattening. As 3 of the pigs were removed from the main test, the figures of fattening will be for the 16 remaining. These 16 were separated into lots (Lots I and II in experiment on shorts vs. skim milk as a supplement for wheat). Lot I required 435 pounds of shorts and wheat for each 100 pounds gain and Lot II required 246 pounds of wheat and 440 pounds of skim milk for each 100 pounds. The cost for each 100 lbs. gain was \$6.09 for Lot I and \$4.54 for Lot II.

The total feed cost of each 200-pound finished pig fattened on shorts and wheat was \$11.03, each pig fattened on skim milk and wheat, \$9.48. This cost includes in both cases the birth cost as outlined above, but no other items than those indicated.

EXPERIMENT NO. 15.

Ground Wheat and Tankage vs. Ground Wheat Alone.

Self Feeder vs. Hand Feeding.

The object of this experiment was to test the value of tankage for feeding pigs when mixed with ground wheat in the proportions of 8% tankage and 92% ground wheat. A second object was to compare the merits of feeding by hand with the self-feeder. The pigs fed by hand were fed as much as they would clean up readily. In the case of the self-feeder the hopper was filled up and the pigs allowed to have all they wished at all times except for the first 15 days when they were fed by hand and the ration gradually increased until brought up to the limit of their appetites.

Seventeen of these pigs were pure-bred Yorkshires and 7 were scrubs from razor-back sows. These pigs had been raised exclusively on wheat and shorts under somewhat unfavorable conditions and had never shown very much thrift. They tended to be long and narrow in body and light in the heart girth. They were divided into four lots of approximately the same weight and apparently of equal thrift and fattening ability. The test began on December 1, but Lots III and IV on the self-feeder were fed by hand until December 15, by which time their feed had been increased until they could safely be allowed all they wished. At no time did these pigs eat as much as they should. Four pounds per day seemed to be the greatest amount of feed, but they did not get fat at any time. On account of these difficulties the test was given up on January 15, and not continued for the entire 60 days.

Table XII. Ground Wheat and Tankage vs. Ground Wheat Alone.

Self Feeder vs. Hand Feeding.

December 1, 1911 to January 15, 1912.

Lot No.	Av. Weight Per Head		Av. Daily Feed Per Head		Feed per 100 lbs. Gain		
	At Beginning	At Close	Ground Wheat 92 per cent & tankage 8 per cent	Ground Wheat	Av. Daily Gain Per Head	Ground Wheat & Tankage	Ground Wheat
First Period 15 Days.							
I. Hand fed	64	76	3.5	...	.77	455	...
II. Hand fed	60	73	...	3.5	.86	...	407
III. Self-feeder	61	73	3.9	...	.86	453	...
IV. Self-feeder	62	64	...	3.7	.014	...	2643
Second Period 15 Days.							
I. Hand fed	76	83	3.5	...	.45	778	...
II. Hand fed	73	77	...	3.7	.26	...	142
III. Self-feeder	73	84	4.5	...	.68	662	...
IV. Self-feeder	64	80	...	4.2	1.0	...	420
Third Period 15 Days.							
I. Hand fed	83	94	3.0	...	.74	405	...
II. Hand fed	77	83	...	2.8	.36	...	778
III. Self-feeder	84	97	4.1	...	.82	500	...
IV. Self-feeder	80	91	...	3.3	.77	...	428
Entire Time 45 Days.							
I. Hand fed	64	76	3.4	...	.65	510	...
II. Hand fed	60	73	...	3.3	.49	...	670
III. Self-feeder	61	73	4.0	...	.76	506	...
IV. Self-feeder	62	64	...	3.7	.61	...	569

On account of the poor gains made by these pigs the data are not very satisfactory. In comparing the self feeder with hand feeding there was no difference noticeable during the progress of the experiment. Lots I and III gave about the same results, as far as economy of gain was concerned. Lot II, however, gave the poorest returns of all. This, however, was due to the fact that one pig became affected with rheumatism and had to be killed shortly after the test proper was abandoned. There was also one other pig in this lot which was in bad condition. It may be said that there is nothing in this test to indicate that the self feeder was either better or worse than the old system of feeding by hand, aside from the labor saved.

In comparing the wheat and tankage with the wheat alone the difference is more apparent. In both cases those receiving the tankage gave better results. It was found on the average that 1 pound of tankage saved $3\frac{1}{4}$ pounds of wheat.

On January 28 the lots were combined and they were all then fed a slop of ground wheat and 10% tankage. By February 1 the proportion of tankage has been increased to 15%. The pigs did better on this new ration and seemed to have better appetites and to be more thrifty. In spite of appearances, however, they did not give satisfactory results and during the first 15 days of February could only be made to consume 3.6 pounds of feed a day, and gained about .8 of a pound a day. None of these pigs finished fit for slaughter and they were finally traded off.

These pigs were a splendid illustration of what a bad start in life may do to prevent a pig from ever making satisfactory progress.

EXPERIMENT NO. 16.

Shelter for Fattening Pigs.

The object of this test was to determine the influence of letting pigs run in the rain and mud while fattening in winter in the Willamette Valley.

On December 4, 9 pigs were purchased from L. W. Rhode. The lot consisted of 8 Durocs and 1 Berkshire. The 9 pigs weighed 625 pounds, or an average of 69 pounds each. They were April pigs which had received very little grain and were consequently much stunted. They had indications of good blood but were very rough with too much belly and head. They were at once put on a ration of wheat and tankage (tankage 8%) gradually increasing from 2 pounds each daily. During the next 11 days they gained .77 of a pound per head daily, requiring 367 pounds of feed per 100 pounds gain. At this time (December 15) they were divided into 2 lots, Lot I containing 5 pigs, 4 Durocs and 1 Berkshire, while Lot II contained 4 pigs, all Durocs. The pigs in Lot I were fed in the large hog house and were allowed the run of an 8x12 outside floored pen, but were not allowed in the mud. They were fed in troughs inside. The pigs in Lot II were fed outside in a muddy lot. They had, however, good shelter in the form of a 7x7 "A" house with a floor. The

feed trough was put on a small floor about 7x8, but was not under cover.

In quality, thrift, or other points there was no noticeable difference in the two lots, either at the beginning or close of the test. Both lots did remarkably well as will be seen in the small amount of feed required for each pound of gain.

At each weighing time the pigs were weighed for three consecutive days and the average taken as the true weight for the middle day. All of the weights given below were taken in this way. The pigs were weighed on January 15, but the weights recorded for Lot III were very plainly inaccurate, and as the hogs were weighed but once at this date it seemed advisable to leave out these weights and make no effort to distinguish between the first and second parts of January.

Table XIII. Shelter Test for Fattening Pigs.

December 15, 1911 to February 15, 1912.

Lot No	Average Weight Per Head		Av. Daily Feed Per Head		Av. Daily Gain Per Head	Feed per 100 lbs. Gain.
			Grain & Tankage			
First Period 17 Days.						
I. Inside	77	105	4.21		1.62	260
II. Outside	79	105	4.23		1.53	277
Second Period 31 Days.						
I. Inside	105	152	5.0		1.52	331
II. Outside	105	150	5.0		1.43	350
Third Period 14 Days.						
I. Inside	152	166	5.0		1.09	459
II. Outside	150	167	5.0		1.02	490
Entire Time, 62 Days.						
I. Inside	77	166	4.78		1.44	333
II. Outside	79	167	4.81		1.42	339

These pigs had been very poorly fed before coming to the College, but were in good condition, apparently just right to make the best possible gains. This perhaps accounts in a measure for the exceptional results attained during the first six weeks of the test. It is possible that if they had been held back much longer on scant feed they would not have come out so well, as was the case in Experiment No. 15. It should also be noted that they did not do as well during the last two weeks of the test. This was perfectly logical, of course, as they had then been on full feed for some time and had a pretty good finish. Even during this poorest period, however, the results were very satisfactory.

This small test can not be accepted as final but the results as far as they go seem perfectly consistent. The slight differences between the two lots is too small for consideration and the only conclusion, not only from the figures in the final result, but from constant observation of the pigs during the test is that the two methods of shelter gave equally satisfactory results.

EXPERIMENT NO. 17.

Tankage vs. Skim Milk as Supplements to Ground Barley.

August 16 to October 16, 1912.

The hogs used were 14 pure-bred Duroc Jerseys about five months of age. The lots were uniform and were thrifty and healthy throughout the test. It will be noted that the feed was lighter than usual during the first portion of the test. All lots had been fed tankage from weaning until the beginning of the test.

Both lots were fed the same amount of digestible nutrients, 10 pounds of skim milk being considered as equal in nutrients to $\frac{1}{2}$ pound of barley and $\frac{1}{2}$ pound of tankage. On these same nutrients those getting skim milk gained 9.1% more than those getting tankage. Allowing \$1.25 per 100 pounds for barley and \$50 per ton for tankage and 25c per 100 pounds for skim milk, Lot I cost \$4.93 per 100 pounds gain and Lot II, \$4.92. At the prices given there was no difference in the economy of gains. Lot I was a little fatter than Lot II, but both were in condition to bring top prices.

Table XIV. Tankage vs. Skim Milk as Supplements to Ground Barley.

August 16, 1912 to October 16, 1912.

No. Lot	Average Weight per Head		Average Daily Feed per Head			Av. Daily Gain Per Head	Feed per 100 lbs Gain		
	At Be- ginning	At Close	Skim Milk	Barley	Tank- age		Skim Milk	Barley	Tank- age
First Period, 16 Days.									
I.	96	115	9.58	2.68	...	1.16	825	246	....
II.	91	105	....	3.22	.50	.90	...	322	50
Second Period, 15 Days.									
I.	115	135	10.0	3.29	...	1.36	734	230	....
II.	105	125	....	3.74	.50	1.34	...	279	36.9
Third Period, 15 Days.									
I.	135	166	10.0	4.57	...	2.02	495	227	....
II.	125	153	....	5.07	.50	1.85	...	274	21.9
Fourth Period, 15 Days.									
I.	166	192	10.0	6.42	....	1.75	561	366	....
II.	153	178	....	6.89	.50	1.65	...	420	30.3
Entire Time, 61 Days.									
I.	96	192	9.9	4.22	...	1.57	612	269	....
II.	91	178	....	4.7	.50	1.43	...	331	35.1

After the close of the experiment the hogs were kept for 6 days longer during which time they were fed the usual ration. On October 23 they were shipped to Portland together with 20 others. Both lots together weighed 2783 pounds before shipping, showing a gain of 2.33 pounds daily for the 60 days. They were weighed in the forenoon instead of afternoon as usual and this perhaps accounts for the large gains. The hogs sold in Portland for \$8.06 per 100 and shrunk 6 pounds each. They netted \$7.65 on their Corvallis weights and at the prices listed for feed made a profit of \$2.45 per head on the flesh put on during the experiment.

The test showed that under these conditions skim milk was 9% better than tankage on the basis of the digestible nutrients contained

but that on a basis of the usual prices for each there was no difference in the economy of the two feeds. All pigs had been fed tankage from weaning until the beginning of the test and the skim milk was therefore a change for the lot receiving that feed.

EXPERIMENT NO. 18.

Self Feeder vs. Hand Feeding.

These two tests were designed to throw further light on the self feeder as a means for fattening hogs. Lots consisted of 7 pigs which were uniform in age, size, and sex. The feed used was a mixture of 5 parts wheat, 4 parts shorts, and 1 part tankage.

First Trial.

Table No. XV.

February 1 to March 31, 1913.

No. Lot		Weight at Beginning	Weight at Close	Average Da. Feed	Average Da. Gain	Feed per 100 lb. Gain	No. of Pigs
	February 1 to 28, 28 Days.						
I.	Hand Fed	114.43	164.29	5.77	1.78	329.51	7
II.	Self-feeder	112	159	6.56	1.62	391.2	7
	March 1 to 15, 15 Days.						
I.		164.29	191.43	7.43	1.80	408.94	
II.		159	185.9	7.99	1.78	448.66	
	March 16 to 31, 16 Days.						
I.		191.43	210.00	7.41	1.16	639.23	
II.		185.9	209.43	6.75	1.35	497.36	
	Entire Period, 59 Days.						
I.		114.43	210.	6.64	1.61	410.76	7
II.		112.00	207.43	6.97	1.61	431.43	7

This table shows that the lot fed with the self feeder made an average daily gain of 1.61 pounds, consumed daily 6.98 pounds of feed, and required 431.4 pounds of feed to produce 100 pounds of gain. The hand-fed lot gained 1.62 pounds daily, consumed 6.64 pounds of feed daily, and required 410.7 pounds of feed to produce 100 pounds of gain.

EXPERIMENT NO. 19.
Self Feeder vs. Handfeeding
Second Trial.

Table No. XVI.

April 1 to May 31, 1913.

Lot No.	Weight at Beginning	Weight at Close	Average Daily feed per head	Average Daily Gain	Feed per 100 pounds Gain
April 4 to 15, 12 Days.					
I. Hand Fed	113.8	132.8	6.02	1.58	380.7
II. Self-feeder	111.3	137.0	7.80	2.14	303.5
April 16 to 30, 15 Days.					
I. Hand Fed	132.8	153.9	6.66	1.37	497.2
II. Self-feeder	137.0	176.5	7.01	1.46	480.3
May 1 to 15, 15 Days.					
I. Hand Fed	153.9	176.6	6.97	1.58	440.2
II. Self-feeder	176.5	185.0	7.40	1.74	425.3
May 16 to 31, 16 Days.					
I. Hand Fed	176.6	186.0	6.98	.58	1197.6
II. Self-feeder	185.0	205.3	6.16	1.26	485.7
Entire Time, 58 Days.					
I. Hand Fed	113.8	186.0	6.70	1.24	536.7
II. Self-feeder	111.3	205.5	6.77	1.62	417.9

In this test the hand-fed lot consumed 6.70 pounds of feed per day, gained 1.24 pounds daily, and required 536.7 pounds of feed to make 100 pounds gain. The self-feeder lot consumed 6.77 pounds of feed daily, gained 1.62 pounds per day, and required 417.9 pounds of feed to produce 100 pounds gain.

EXPERIMENT NO. 20.

Cost of Production.

April 1, 1912.

To get a start in determining the cost of producing pigs, or of the first 100 pounds of a pig's growth, two Duroc Jersey sows with 18 seven-day-old pigs were purchased on April 1, 1912. The sows were figured at \$20 each, and the pigs at \$3 each. This is assuming at the start a very high birth cost, but in lieu of a more accurate figure this is taken, because it is the price at which the pigs were purchased. The results show that unless this birth cost can be just about cut in half the cost of producing not only the first 100 pounds, but the market pig as well, is too high. The Station is collecting data to determine the actual birth cost of pigs under conditions existing at the Station; while these are not yet completed, the figures herewith given are presented as throwing further light on the subject of cost of production.

Feed eaten by 15 pigs,.....	3436.3 lbs.
Feed eaten by dams while suckling pigs	1220 lbs.
Total	4656.3 lbs.

Figuring the feed at 1.475c a pound the cost of the feed consumed by the pigs and by the sows while suckling them is \$68.68. The cost of the pigs when purchased was \$54; total cost of the 15 pigs weighing 93.57 pounds each, \$112.68; cost per pound of pigs weighing 93.57 pounds, 8.74c. Three of the 18 pigs died during the test, hence the cost of the fifteen remaining pigs is somewhat higher, though very slightly, since the little pigs were quite young when they died. The cost of the pig at this weight, exclusive of items considered under birth cost is 4.05c per pound. In these calculations tankage is figured at \$45 a ton, wheat at \$26, and shorts at \$30. The ration consisted of wheat 5 parts, shorts 4 parts, and tankage 1 part by weight. From the previous calculations it appears that the great cost in producing pigs is the birth cost. Assuming a birth cost of only \$1.50 for the pigs, the cost of production is cut to \$6.81 per hundred, for a hundred-pound pig.

EXPERIMENT NO. 21.

Self Feeder vs. Hand Feeding.

Soaked Feed vs. Dry Feed.

September 1, 1913.

Thirty pigs were put on feed to test the efficiency of the self feeder, as compared with hand feeding. Barley 90 per cent and tankage 10 per cent were fed to three lots of ten pigs each as follows: Lot 1, hand fed, twice daily, ration dry; Lot 2, fed with self feeder, ration dry; Lot 3, hand fed, twice daily, ration soaked twelve hours. It was thought that soaking might have some effect on this ration which might impair the conclusions regarding the self feeder unless a check was kept on the effect of soaking, as only dry feed could be run through the self feeder. The lots were practically even as regards weights, sex, and breeding. It was also deemed advisable to make division in these lots on the basis of relationship, so that records could be obtained on the rate of gain of individual pigs in litters and the pigs from different sows. All the lots ate well from the start and looked thrifty.

All the pigs were a little too old to make their most economical gains. The self-feeder lot looked rather better than either of the hand-fed lots. This difference remained the same throughout the experiment, the dry-fed lot, though not gaining so rapidly or so economically as the wet-fed lot, looked more smooth and trim,—less poddy than the wet-fed lot.

A table showing the results of the experiment follows:

Table XVII. Self Feeder vs. Hand Feeding.

Soaked vs. Dry Feed.

Lot No.	Average Weight per Head		Average daily feed per head	Average daily gain	Feed per 100 pounds gain	
	At Beginning	At Close				
First Period, September 1 to 15, 15 days.						
I.	Dry Feed	101	122	5.24	1.4	374.28
II.	Self Feeder	101.5	129.5	5.61	1.93	290.34
III.	Soaked Feed	98.9	120.5	5.24	1.44	363.88
Second Period, September 16 to 30, 15 days.						
I.	Dry Feed	122.	140.16	6.64	1.21	548.45
II.	Self Feeder	129.5	151.66	7.75	1.47	520.30
III.	Soaked Feed	120.5	141.16	6.74	1.37	494.19
Third Period, October 1 to 16, 16 Days.						
I.	Dry Feed	140.16	163.3	7.12	1.44	492.01
II.	Self Feeder	151.66	182.66	8.31	1.93	472.7
III.	Soaked Feed	141.16	163.16	7.25	1.37	527.2
Fourth Period, October 16 to 31, 15 days.						
I.	Dry Feed	163.33	191.7	8.5	1.91	449.4
II.	Self Feeder	182.66	213.0	9.33	2.02	500.0
III.	Soaked Feed	163.16	193.0	8.5	1.98	463.6
Entire Feeding Period, September 1 to October 31, 61 Days.						
I.	Dry Feed	101.0	191.7	6.88	1.48	462.73
II.	Self Feeder	101.5	213.0	7.71	1.82	421.07
III.	Soaked Feed	98.9	193.0	6.93	1.54	449.84

From the above table it appears that the greatest gain, 1125 pounds, was made by the self-feeder lot. This was true of each period in the test. The next greatest gain, 941 pounds, was made by the lot receiving the soaked ration. However, during the third period, a slightly better showing was made by the dry-fed lot. In regard to the feed per lot, and per head, the self-feeder lot ate most, 4705 pounds; the wet-fed lot ate slightly more than the dry-fed lot. It appears that the feed required per 100 pounds gain is least with lot which ate the most feed, and next with the lot which ate an intermediate amount of feed, and greatest with the lot which ate least feed.

From this one test it appears that the palatability of a ration of 9 parts rolled barley and 1 part tankage is increased by soaking for 12 hours before feeding. The pigs, however, had all been fed soaked feed before the beginning of the test. The palatability of the soaked ration is indicated by the greater amount eaten by Lot 3 as compared with Lot 1. Its digestibility may have been increased as shown by the smaller requirement of feed per 100 pounds gain.

Individual and Sex Variation.

Individual weights were taken at the beginning and at the close of Experiment No. 21 to determine the difference in rate of gain of the litters from different sows.

The variation between the individual pigs was naturally wider than that between litters. The best pig gained 2.44 pounds daily during the 61-day feeding test and the poorest gained only 1 pound daily during that time. Both were barrows. But of the best ten pigs, seven were barrows and three gilts. Of the last ten, they were evenly divided, and

of the middle ten, only two were barrows. While the numbers are too small to be given much weight in a statistical way, the following diagram illustrates the greater variability of males in general as compared with the females.

30 pigs					
Daily gains		Daily gains		Daily gains	
Best Ten		Middle Ten		Lowest Ten	
(2.44	1.75)	(1.73	1.56)	(1.56	1.)
Seven Barrows		Two Barrows		Five Barrows	
Three Gilts		Eight Gilts		Five Gilts	

From this table it appears that one-half of all the gilts in the test gained within .17 of a pound of each other, and were in the middle one-third when arranged in order of gains made. As many barrows as gilts fall into the poorest one-third; although there are but fourteen barrows and sixteen gilts in all, only three gilts got into the best ten.

COST AND PROFIT.

Expressed in cost per hundred pounds of gain the self-feeder lot produced a hundred pounds of pork at \$6.31, counting barley at \$28.00 and tankage at \$45.00 a ton; the lot receiving the soaked ration cost \$6.65 for each hundred pounds gain, and the dry-ration lot cost \$6.82 for each hundred pounds gain. The labor item is not counted here, but taking this into account makes a still better showing for the self-feeder, for one man can easily handle twice the number of pigs in this way as compared with handfeeding, twice daily. The labor item being taken into account also tends to lessen any advantage which has been gained by soaking the feed.

METHOD OF FIGURING COST OF RATION.

Those interested in knowing how to figure the cost of a mixture of feeds when the price of each is different, will find this a good method. When feed is quoted by the ton, divide the price by twenty to get the cost by the hundred. Add up the several parts of the ration to determine of how many integral parts it consists. Multiply the price per hundred for each feed by the number of integral parts which that feed forms of the whole ration. Repeat the operation with each feed using the price per hundred and the number of parts it forms of the whole ration, as factors.

Add up the values thus obtained and the result will be the cost of as many hundred pounds of the mixture as there were parts in the

ration. Divide the sum by the number of parts in the ration and the quotient will be the price of one hundred pounds of the mixture.

A few examples may make this formula clearer.

Wheat \$31.00 per ton; Shorts \$32.00; Tankage \$47.00. A ration of seven parts wheat, four parts shorts and two parts tankage would be estimated as follows:

7 parts wheat & 4 parts shorts & 2 parts tankage equal 13 parts in ration.

Divide to determine price per 100 lbs.

20 into (hundred wt. in ton)	{	price tankage \$47.00 equal \$2.35 cost of 100 lbs. tankage.
		price shorts \$32.00 equal \$1.60 cost of 100 lbs. shorts.
		price wheat \$31.00 equal \$1.55 cost of 100 lbs. wheat.

Multiply each by the number of parts it forms of the whole ration.

1.55	1.60	2.35
7	4	2
<hr/>	<hr/>	<hr/>
10.85	6.40	4.70

\$10.85 Cost of 700 lbs wheat.

6.40 Cost of 400 lbs. shorts.

4.70 Cost of 200 lbs. tankage.

\$21.95 Cost of 1300 lbs mixture.

\$21.95 divided by 13 equals \$1.68, cost of 100 pounds of the mixture.

EXPERIMENT NO. 22.

Soaked Feed vs. Dry Feed.

October 1, 1913.

This test was to determine the effect of soaking a ration of ground barley 90.9% and tankage 9.1%, a further check on Experiment No. 21, just recorded. On October 1, 1913, 20 pigs were divided into two lots of ten each; Lot IV had their feed soaked 12 hours before feeding. Lot V received the same ration dry. Both lots were fed by hand. These pigs were not as good as those previously tested, being the smaller and less growthy ones of the previous litters. That is, these pigs had been 30 days longer in coming to the feeders' pen than had the pigs in the previous experiment. The results are tabulated in the following table.

Table XVIII. Soaked Feed vs. Dry Feed.

TEN PIGS PER LOT

October 1 to November 30, 1913.

Lot No.	Average Weight per Head		Average Daily Feed per Head	Average Daily Gain per Head	Feed per 100 lbs. gain
	At Be- ginning	At Close			
First Period, October 1 to 16, 15 days.					
4. Soaked 12 hr.	94	113	5.01	1.17	428
5. Fed Dry	96	115	4.57	1.21	378
Second Period, October 16 to 31, 15 days.					
4. Soaked 12 hr.	113	137	6.63	1.60	414
5. Fed Dry	115	140	6.63	1.70	390
Third Period, November 1 to November 15, 15 days.					
4. Soaked 12 hr.	137	164	7.65	1.82	420
5. Fed Dry	140	167	7.05	1.78	429
Fourth Period, November 15 to 30, 15 days.					
4. Soaked 12 hr.	164	194	9.29	1.98	469
5. Fed Dry	167	199	9.29	2.13	436
Entire Time, 60 days					
4. Soaked 12 hr.	94	194	7.23	1.66	436
5. Fed Dry	96	199	7.11	1.72	413

From the table it appears that the lot fed the dry feed gained better during every period except the third, and during this time the difference in rate of gain was very slight. The lot receiving soaked feed gained 1.66 pounds a day, ate an average of 7.23 pounds of feed daily, and required 436 pounds of feed to produce 100 pounds gain. The lot receiving dry feed required 413 pounds of feed to produce 100 pounds of gain, gained 1.72 pounds a day, and ate an average of 7.11 pounds of feed daily. The results are not in harmony with those of the previous experiment, but the variation is comparatively slight, only about what might be expected in lots of pigs receiving the same ration. In the previous test 13 pounds of feed were saved by soaking, while in this test 23 pounds of feed were lost by soaking. This is considered in connection with the requirement for 100 pounds gain. The conclusion is that with barley ground or crushed comparatively fine and mixed with tankage no saving is made by soaking the ration or if any saving is made it is not sufficient to pay for the extra trouble and equipment required for soaking the ration. As in the previous test, records were kept of the individual gains of the pigs, with the view of further establishing the variation which may be expected in the litters of pigs from different sows.

Table XIX. Showing the Difference in Gain of Litters
from Different Sows.

Figures show gains per head in 60 days test.

B. indicates barrow.

G. indicates gilt.

Dam No.	9	11	15	F	31	12	7	13	14
Lot I			61.5B	79 G 91 B		98.5B	82 B 85 G 95.5B		94 G 97 G 129 B
Gains of Pigs									
Lot II	100 G		114 G	102 B		118.5G	107.5B 123.5B	106 G	132.5B 149 B 127.5G
Lot III	74 G			88 B		99.5G	115 B 96.5G 101.1G	102.5G 97 G	107 B 84 G
Lot IV	45.5G 76.5G	73 B 73 B		92 G 77 G	92 G	71 G 71.5B	64 G		
Lot V	66 B	80.5B 77 G 71 B 81.5G		94 G 69.5B 85 B	87.5B 98 G				
Ave. gain per head	72.4	76.	87.7	86.4	92.5	93.0	96.6	101.8	115.
Average daily gain per head	1.2	1.27	1.46	1.46	1.54	1.53	1.61	1.69	1.91

Average daily gain of 27 sows 1.52. Average daily gain of 23 barrows 1.56. Sows gained 97% as much as barrows.

From the table it appears that the average gain per head for the different litters varied from 1.2 pounds to 1.91. Two of the nine litters represented averaged less than the poorest lot, while one litter averaged better than the best lot. This shows in a striking manner the error of conclusion which may be drawn from feeding tests where small numbers are involved and no account is taken of the breeding of the animals under test. If ability to make rapid gains is transmitted to offspring by animals possessing this ability an easy and profitable point for selecting breeding sows and boars is available. A test of this point is now under solution at this Station. The gains by barrows and by sows were determined in this test, and the results combined with those of the preceding test. Twenty-three barrows and twenty-seven gilts gained 1.56 pounds and 1.52 pounds respectively per day, a difference of only .04 pounds daily in favor of barrows. Further data on this point is being secured. Feeders in general are inclined to credit barrows with greater advantage over gilts in the feed lot. In terms of per cent the gilts gained 97% as much as the barrows. The best pig in the test, a barrow, gained 2.44 pounds per day, and the poorest pig, a sow, gained .75 of a pound per day during the 60 days feeding test. The best pig was a member of the best litter, and the poorest pig a member of the poorest litter. No data was taken as to the amount of feed required by these pigs to produce 100 pounds of gain, but data are now being collected to determine the individual requirements of feed for gain in pigs.

EXPERIMENT NO. 23.

Clover Pasture for Growing Pigs.

On April 16, 1914, seventeen winter pigs weighing 1350 pounds were turned on about an acre of clover pasture to determine whether clover is a profitable feed for pigs. No other pigs were available as a check, and the number was considered too small to divide.

When the pigs were turned to pasture they were receiving 28 pounds for the lot or 1.647 pounds of grain per head daily. They took readily to clover and the amount of feed was decreased after three days to 24 pounds for the lot, or 1.411 pounds per head daily. The feed consisted of 92% ground barley and 8% tankage. No further change in the feed was made until May 17, when it was increased to 30 pounds for the lot, and on May 25 it was increased to 31 pounds or 2 pounds per head.

Table XX Showing Feed and Gains of 17 Pigs on Clover Pasture with an Adjunct of Grain and Tankage.

	Average Weight per Head		Ave. Daily Feed per H.		Total	Ave. Daily Gain per Head	Feed per 100 lbs. Gain		
	Beginning	Close	Bar	Tank.			Barley	Tankage	Total
First Period Apr. 16-30	60	74.7	1.34	.116	1.458	.98	136.896	11.904	148.8
Second Period May 1-16	74.7	82.9	1.298	.112	1.411	.477	271.353	23.630	295.384
Third Period May 17-31	82.9	95.3	1.724	.149	1.874	.823	209.309	18.209	227.619
Entire Period Apr. 16 - May 31	60	95.3	1.449	.126	1.576	.767	184.520	16.045	200.566

Summary

From the table it appears that pigs with an initial weight of 60 pounds each made their gains at the rate of 100 pounds gain for 148.8 pounds feed consumed, this with an average daily feed of 1.458 pounds in addition to clover. During the next period with a slight cut in the daily ration, 295.384 pounds of feed were required to produce 100 pounds of gain and during the next period with a daily allowance of 1.874 pounds feed, a gain of 100 pounds was secured for each 227.619 pounds of feed consumed. It seems evident that no cut should have been made in the feed, but instead a slight increase in the feed from the start might have been more profitable. The gains for the entire period, however, were made at the rate of 100 pounds gain for each 200.566 pounds of feed consumed; counting 400 pounds as the straight grain and tankage requirement for producing 100 pounds of pork, the clover used by these pigs during the six weeks would have the value of 366 pounds of the grain mixture, or \$5.40.

EXPERIMENT NO. 24.

Clover for Fattening Pigs.

On June 1, 1914, twenty pigs farrowed the previous winter were separated into two lots of ten pigs each and gradually accustomed to full feed. Both lots had previously had the run of approximately an acre of a good clover field, and had been getting about two pounds of feed per head daily, additional. Their feed, both before and after the test began, consisted of 92% ground barley and 8% tankage. Both lots were given access to self feeders after they were on full feed, and the feeders were kept open and well filled.

The pigs were divided evenly as to size, sex, breeding and quality. The lots were therefore fairly uniform, and comparable, but the pigs in either lot were far from uniform. Hence it was found after about six weeks that some of the pigs from each lot were ready for market while some still weighed only about 115 pounds per head. The experiment was therefore terminated after 44 days feeding instead of being extended to sixty days, as is customary at this Station.

The reason for the lack of uniformity in the pigs was primarily in the constitutions of the mothers of the pigs. One sow, which was the mother of eight of the pigs has uniformly produced excellent feeders while another sow, the mother of nine of the pigs, has uniformly produced inferior feeders. The other three pigs in the test were pigs of rather poor feeder type and were slow in maturing.

The pasture lot had the shade of a grove and during part of the time had a wallow in the pasture. The dry lot was confined to a covered pen, of about 10 ft. x 18 ft., and doubtless the pigs were less comfortable than those of the pasture lot.

Table XXI. Clover for Fattening Pigs.

	Average Weight per Head		Average Daily Feed per Head		Ave. Daily Gain per Head	Feed per 100 lbs. Gain		
	Begin.	Close	Barley	Tank Clover		Barley	Tank	Total
June 1-15								
Lot 1, Dry	89	117	.469	5.403	1.86	289.468	25.17	314.64
Lot 2, Clover	89	121	5.403	.469 Ad lib*	2.133	253.286	22.024	275.31
June 16-30								
Lot 1, Dry	117	140.5	6.145	.534	1.56	432.124	37.576	469.7
Lot 2, Clover	121	152.5	7.176	.624 Ad lib*	2.10	341.688	29.712	371.4
July 1-14								
Lot 1, Dry	140.5	157	5.00	.430	1.65	425.313	35.896	461.21
Lot 2, Clover	152.5	173	7.00	.600 Ad lib*	2.05	459.802	39.960	499.51
June 1 to July 14 - Entire Period.								
Lot 1, Dry	89	157	5.530	.480	1.545	357.524	31.117	388.97
Lot 2, Clover	89	173	6.429	.559 Ad lib*	1.909	336.784	29.285	366.07

* The pigs ate clover in the pasture at will.

The table shows that, starting with the same initial weight, 89 pounds, the pigs in the pasture lot ate more feed each period during which they had constant access to the feed, and made more gain. During the first two periods the pasture-lot pigs required less feed per

100 pounds gain, but during the last period, they required more than the dry-lot pigs. This latter fact was true doubtless owing to the fact that the pasture lot was so much heavier and more nearly mature during the third period, and moreover they had practically ceased eating clover.

During the entire period it appears that the clover saved 22.9 pounds of grain in producing each 100 pounds of pork, which gives it a value of 33.7c for each 100 pounds of pork produced. Or, stated differently, each pig in the pasture lot returned a value of 38.887c for the pasture during the 44 days of the test. No inference as to the value of an acre of clover pasture for fattening pigs can be drawn, since the pasture had been previously stocked by 17 pigs for 1½ months and some other stock had been run on it for a shorter period of time. The pasture was splendid throughout the season and the ten pigs made little impression on its growth while they were the only stock on it.