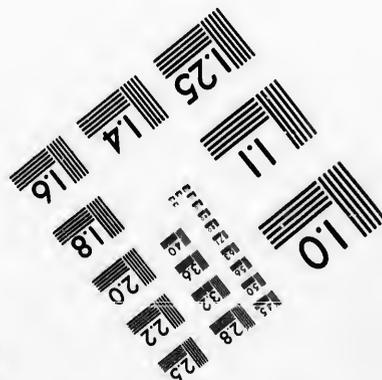
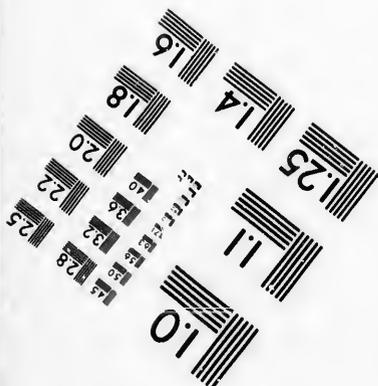
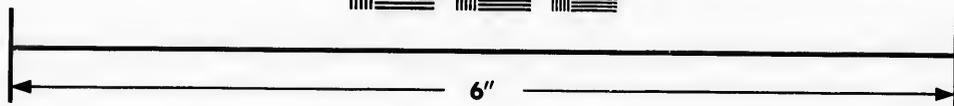
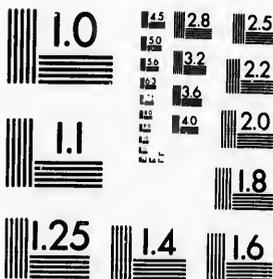


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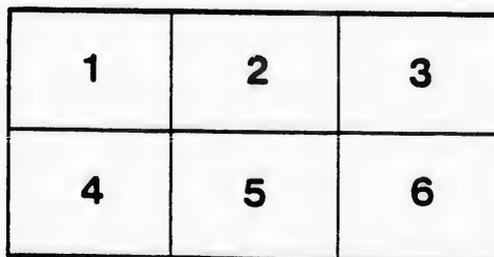
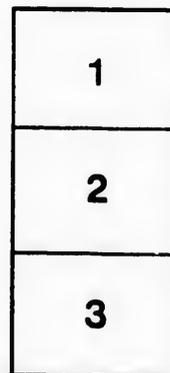
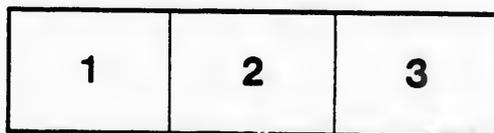
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DEPARTMENT OF AGRICULTURE

CENTRAL EXPERIMENTAL FARM

OTTAWA, CANADA

EXPERIMENTS IN PORK PRODUCTION

BY

J. H. GRISDALE, B. AGR.
Agriculturist, Central Experimental Farm

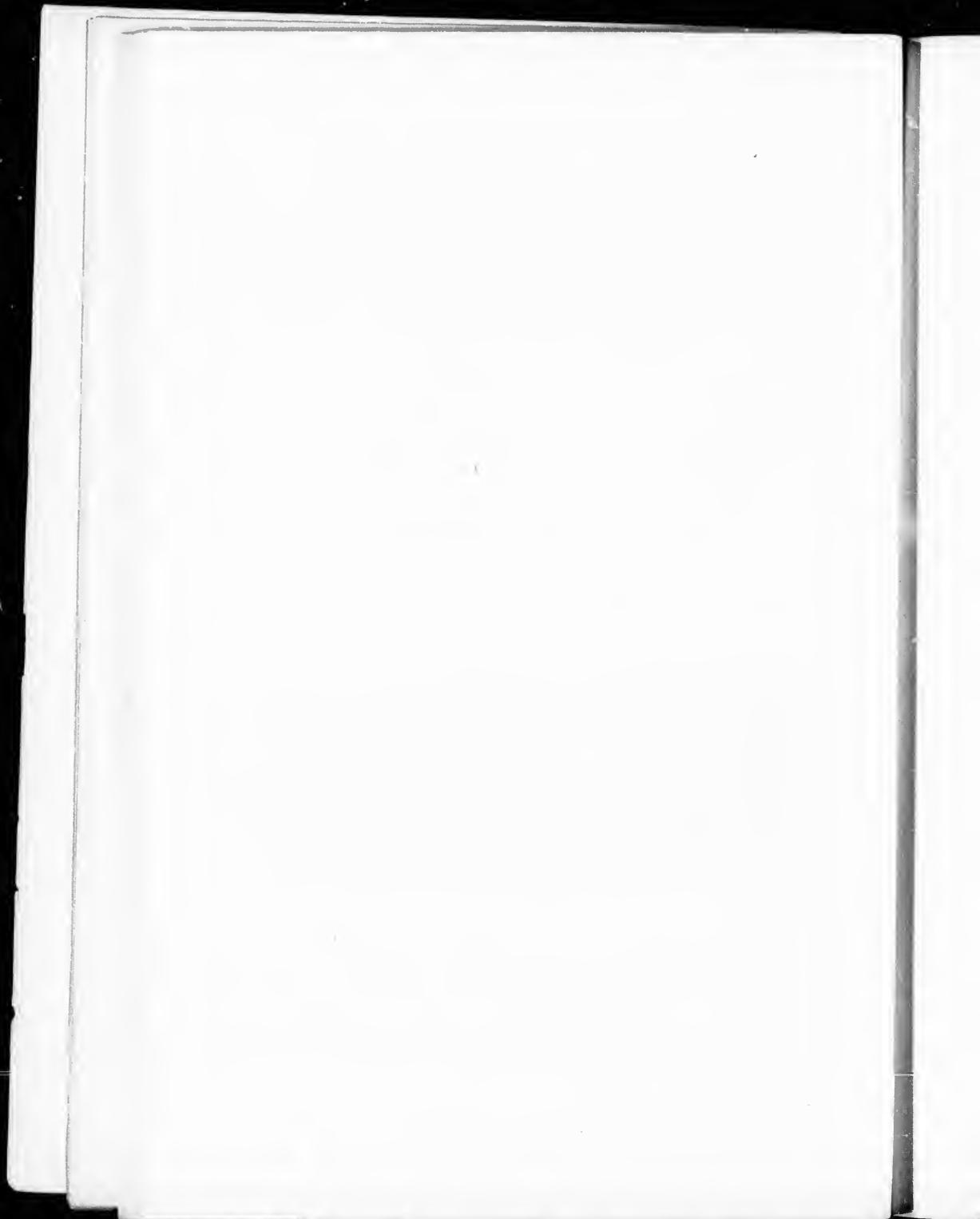


BACON HOGS.

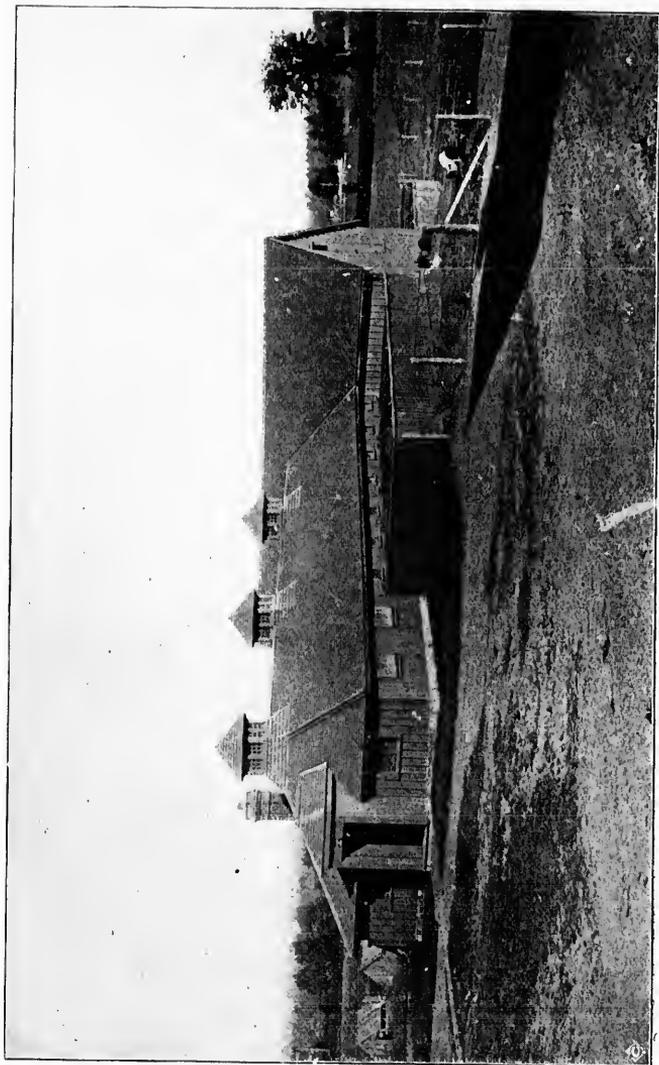
BULLETIN No. 33

JUNE, 1899

PUBLISHED BY DIRECTION OF THE HON. SYDNEY A. FISHER, MINISTER OF AGRICULTURE.







PIGGERY AT THE CENTRAL EXPERIMENTAL FARM.

To the Honourable
The Minister of Agriculture,

Sir,—I have the honour to submit for your approval Bulletin No. 33 of the Experimental Farm series on "Experiments in Pork Production". This has been prepared under my direction by Mr. J. H. Grisdale, the Agriculturist of the Central Experimental Farm.

In this bulletin all the experiments which have been conducted in the feeding and fattening of swine at the Central Experimental Farm for the past eight years have been tabulated and summarized so as to present in a condensed form the whole of the information which has been gained by the investigations made regarding pork production during that time. Useful conclusions are also drawn from the results of this work.

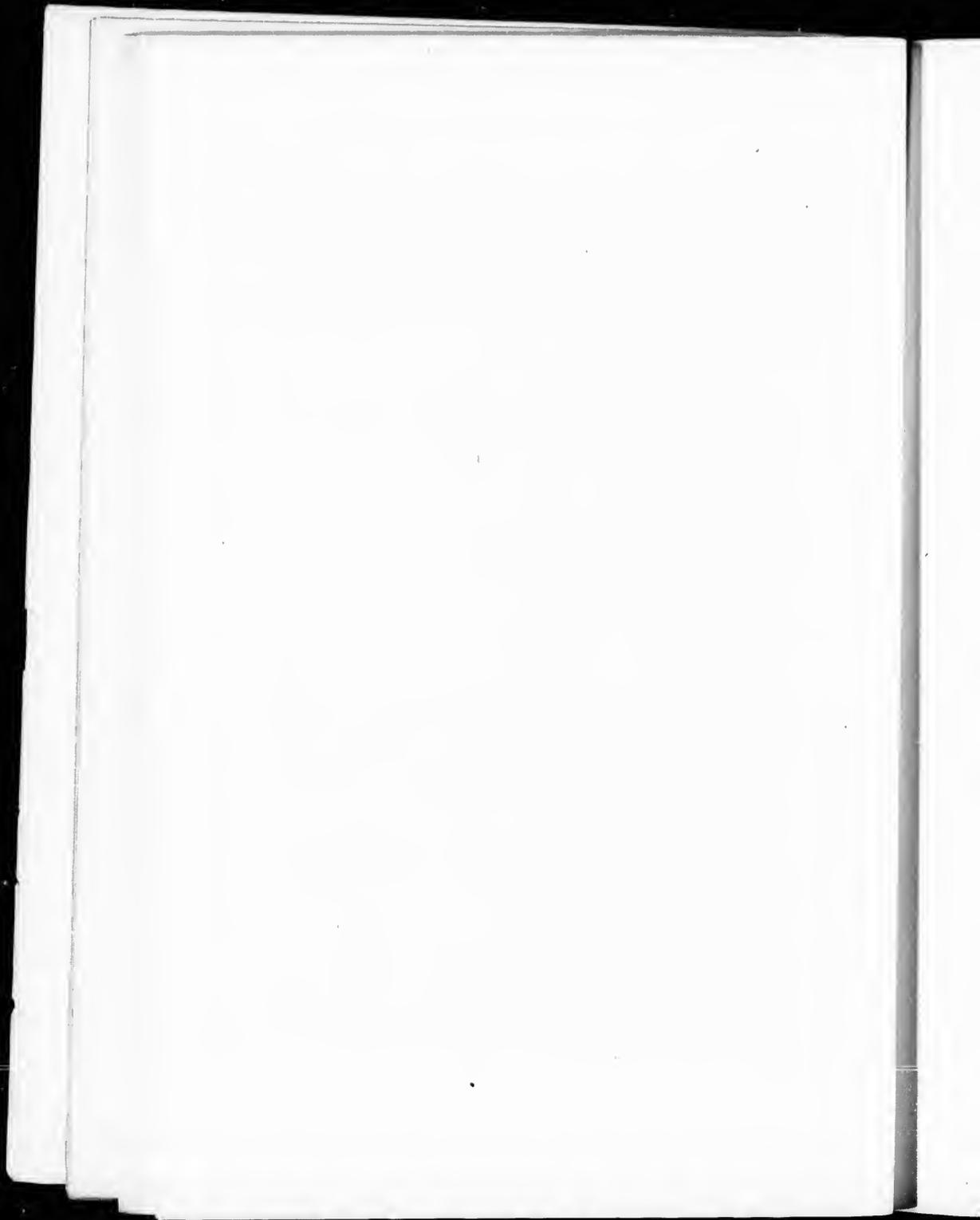
Information is also given in this bulletin in reference to the care of the breeding stock and the management and feeding of young pigs. It is hoped that the facts presented in this publication, based on the experience gained from many carefully conducted experiments, will prove useful to the farmers of Canada and aid in advancing the pork industry which has made such rapid progress during the past few years.

I have the honour to be

Your obedient servant,

WM. SAUNDERS,
Director, Experimental Farms.

OTTAWA, 20th June, 1899.



EXPERIMENTS IN PORK PRODUCTION.

BY J. H. GRISDALE, B. AGR.,

AGRICULTURIST, CENTRAL EXPERIMENTAL FARM.

Pigs were introduced upon the Central Experimental Farm in 1890. The breeds invested in were Berkshires, Improved Large Yorkshires and Essex. Since that time, Chester Whites, Poland-Chinas and Tamworths have been secured, while the Essex is no longer bred here. Owing to limited accommodation not many animals of each breed are kept, usually two sows and a boar.

Experimental work in breeding for hogs of a certain type has been carried on. As no other part of this bulletin will deal with the characteristics of the breeds and their crosses, it might be well here to say a few words upon this work.

The Yorkshire-Tamworth cross has proven to be a most excellent one. It is eminently fitted to suit the market of the present day.

The Yorkshire-Berkshire cross has also proven to be a growthy pig and well fitted for general use.

The Berkshire-Tamworth cross seems to be an excellent pig where quick growth and early maturity are especially desired.

Where these breeds have been crossed with the Chester White, the Poland-China or the Essex, the get, in most cases, has proven to be of a rather short, blocky type. They have, as a rule, exhibited a strong tendency to lay on fat rather than develop muscular tissue.

CARE OF BREEDING STOCK.

A few general statements might be made in this connection which would prove of some use. To begin with, the boar should be kept in fairly good flesh, care being taken to avoid fatness and some plan adopted to insure considerable exercise.

Brood sows likewise should be kept in fairly good flesh. The best method of keeping these animals is upon pasture in summer and in a large pen in winter feeding them upon roots very largely, with bran, shorts or oats added. As farrowing time approaches, care should be taken by the attendant to get on friendly terms with them, so that there may be no undue excitement at that critical juncture, should any assistance be necessary.

To prevent the sow crushing her young, a board, about eight inches wide placed flat horizontally about eight inches from the floor will prove of great value. A small enclosure in one corner of the pen, kept dry and well littered will also prove of great service in protecting the little ones as they will naturally go there to sleep.

The sow should be fed a plentiful ration of bran, shorts or oats, and milk while suckling her young.

The young pigs should be early taught to eat. This may be done by placing a small trough in the above-mentioned enclosure. For a few days a small supply of warm new milk might be placed in it, and later skim-milk warmed to blood heat. In two or three weeks or even less some shorts or oatmeal might be added to the milk. Great care must be taken to keep the trough scrupulously clean. It should be washed thoroughly every day.

If the young are dropped in winter, it is well to give them a few sods to tear up in their pen. The roots and earth appear to serve the important ends of supplying vegetable and mineral matter so necessary to the health and development of young animals.

By pursuing this or some similar method of feeding the young they will, at from seven to nine weeks, be weaned. Care should be taken at this time to reduce the sow's ration, especially the bran, shorts, oats or milk.

Much of the trouble experienced in raising pigs arises from the feed and care given the sow. If these are what they should be, no sickness is likely to occur in the young. Do not feed the same mixture for long to either sow or young. Variety in feed aids digestion.

FATTENING SWINE.

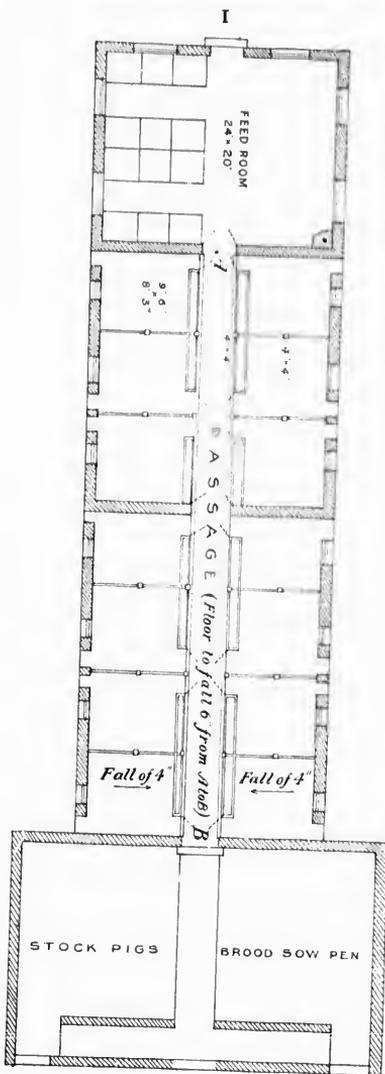
Experiments have been conducted with all the common cereals fed in different ways and in different mixtures to ascertain the amount of each required to make a pound of pork, when fed separately and when fed with other cereals. Extensive experiments with skim-milk have also been conducted and a number of tests have been made of feeds not commonly used by farmers. Below will be found a summary of the various experiments with a few comments by the compiler.

The work summarized was conducted from 1890 to 1895, inclusive, by Prof. J. W. Robertson, who during that time was agriculturist of the Central Farm; from 1896 to 1898, inclusive, by Dr. Wm. Saunders, Director, and this year's work has been conducted under my supervision. No further reference will be made to the experiments, but where quotations are made from the reports the year will be mentioned. Most of the data submitted have been collected from different years and classified under subjects rather than according to the date when obtained.

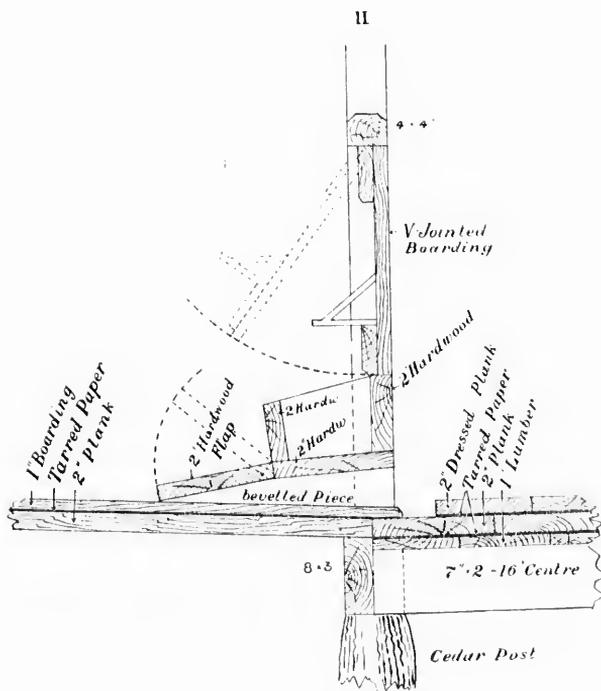
Below is a diagram of the piggery on the Central Experimental Farm. This piggery was planned by Prof. J. W. Robertson in 1890. On another page will be found an engraving showing the building and part of the yard as they now appear.

PLAN I: PIGGERY.

The following figures illustrate the plan of the pens :



PLAN II: PIGGERY



NOTE.—This figure shows the details of the placing of the feeding trough, the hinged foot-board in front of the trough, the swinging feeding-door over the trough, and the gutter which receives all the liquid from each Pen. The fall in the floor towards the feeding-trough permits the swine to lie on a dry bed at the back of each Pen.

COMPARISON OF BREEDS AS TO ECONOMY AS FEEDERS.

The following report is taken, with slight changes, from the report of 1894:—

Comparison of Breeds and Breeding.

The following tables show the quantities of feed consumed per pound of increase in live weight, by swine of different breeds or breeding during different feeding tests.

Table I. shows the quantities of frosted wheat, ground and soaked in cold water for an average period of eighteen hours, consumed by swine of different breeding per pound of increase in live weight. They were fed for a period of twelve weeks.

TABLE I.

No. of Swine.	Breeding.	Date of Birth.	Average of live weight per head.		Feed consumed per lb. of increase.
			1892.		
			Oct. 3.	Dec. 26.	
3 Crossbreeds.	Berkshire sire and Poland-China dam	May 14.	109	210	5.03
4 Grades.	Improved Large Yorkshire sire and Berkshire Grade dam	June 13.	94	186	5.03
2 Crossbreeds.	Improved Large Yorkshire sire and Berkshire dam	May 1.	128	213	5.56
3 Purebreeds.	Improved Large Yorkshire.	Aug. 4.	91	157	5.87

Table II. shows the quantity of a mixture of equal parts by weight of barley and frosted wheat, both ground and soaked in cold water for an average period of thirty hours, plus pulped carrots, consumed by swine of different breeding per pound of increase in live weight. They were fed for a period of twelve weeks.

TABLE II.

No. of Swine.	Breeding.	Date of Birth.	Average of live weight per head.		Feed consumed per lb. of increase.	
			1892.		Grain Carrots.	
			Feb. 7 or 14.	May 2 or 9.	lbs.	lbs.
6 Crossbreeds.	Improved Large Yorkshire sire and Essex dam.	Sept. 23.	70	134	3.77	0.76
3 Purebreeds.	Berkshire	" 24.	117	186	4.17	0.76
4 Crossbreeds.	Improved Large Yorkshire sire and Poland-China dam.	Aug. 3.	119	189	4.42	0.89
4 Purebreeds.	Tamworth	" 30.	114	172	4.74	0.86
4 " "	Improved Large Yorkshire.	{ 2, May 17 2, Aug. 4 }	189	236	5.83	1.06

Table III. shows the quantity of a mixture composed of equal parts by measure of barley, rye, frosted wheat (all ground) and wheat bran, soaked in cold water for an average period of 8 or 18 hours, consumed per pound of increase in live weight by swine of different breeding. Some of them were fed for a period of fifteen weeks, and some of them for a period of twelve weeks.

TABLE III.

No. of Swine.	Breeding.	Date of Birth.	Average of live weight per head.		Feed consumed per lb. of increase.
			Aug. 23.	Dec. 6.	
		1893.	lbs.	lbs.	lbs.
5 Crossbreds.	Improved Large Yorkshire sire and Berkshire dam	June 9.	42	86	3.62
5 "	Berkshire sire and Improved Large Yorkshire dam	" 6.	49	108	3.72
5 "	Essex sire and Improved Large Yorkshire dam	May 31.	45	98	3.73
2 "	Berkshire sire and Tamworth dam	" 7.	94	173	4.03
5 "	Berkshire sire and Poland China dam	Apl. 27.	83	161	4.11
5 "	Essex sire and Improved Large Yorkshire dam	May 31.	41	83	4.27
4 Grades.	Tamworth sire and Berkshire grade dam	Sept. 6.		Nov. 29.	
5 Purebreds.	Improved Large Yorkshire	July 3.	52	113	3.24
		June 15.	48	82	3.90

Table IV. shows the quantity of a mixture of equal parts by measure of barley, rye, frosted wheat (all ground) and wheat bran, soaked in cold water for an average period of eighteen hours, plus 3 pounds of skim-milk per head per day, consumed per pound of increase in live weight by swine of different breeding. Some of them were fed for a period of 8 weeks, and some for a period of 12 weeks.

TABLE IV.

No. of Swine.	Breeding.	Date of Birth.	Average of live weight per head.		Feed consumed per lb. of increase.	
			Dec. 6.		Meal	Milk.
		1893.	lbs.	lbs.	lbs.	bs.
5 Crossbreds.	Improved Large Yorkshire sire, and Berkshire dam	June 9.	86	Jan. 31, 150	2.52	2.56
5 Purebreds.	Improved Large Yorkshire	" 15.	82	Feb. 28, 191	2.64	2.31
5 Crossbreds.	Essex sire and Improv'd Large Yorkshire dam	May 31.	98	Jan. 31, 169	2.88	2.32
4 Grades.	Tamworth sire and Berkshire grade dam	June 3.	117	" 31, 202	3.10	1.95
5 Crossbreds.	Berkshire sire, and Improved Large Yorkshire dam	June 6.	108	Feb. 28, 223	3.09	2.17
5 "	Essex sire, and Improved Large Yorkshire dam	May 31.	83	" 28, 192	3.23	2.53
2 "	Berkshire sire, and Tamworth dam	" 7.	173	" 28, 225	3.77	2.45

Conclusions. From these four series of tests it appears that:—

1. The breeding of the swine which gave the *largest increase* per pound of feed consumed was different in each of the four tests, viz.:—

- Table I. { Crossbreds, *Berkshire* sire and *Poland-China* dam;
 " II. { Grades, *Improved Large Yorkshire* and *Berkshire Grade* dam;
 " III. { Crossbreds, *Improved Large Yorkshire* sire and *Essex* dam;
 " IV. { Grades, *Tamworth* sire and *Berkshire Grade* dam;
 " V. { Crossbreds, *Improved Large Yorkshire* sire and *Berkshire* dam;

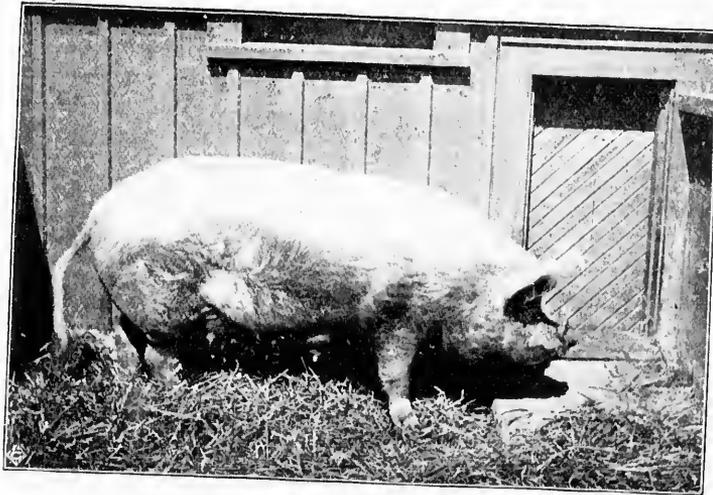
2. The breeding of the swine which gave the *least increase* per pound of feed consumed was :—

Table	I.,	Purebreds,	<i>Improved Large Yorkshire</i> ;
"	II.,	"	"
"	III.,	Crossbreds,	<i>Essex</i> sire and <i>Improved Large Yorkshire</i> dam ;
"	IV.,	"	<i>Berkshire</i> sire and <i>Tamworth</i> dam ;

3. There was *no constant* or appreciable *superiority* in the breeds and breeding tested, in respect to the quantity of feed consumed per pound of increase in live weight ;

4. The difference in the thriftiness, or power to increase in live weight per pound of feed consumed, was greater between *different animals* in the same litter than between breeds or breeding as such, in different litters ;

5. On the whole, for fattening purposes *crossbred* swine and *grades* gave better results than purebreds.



IMPROVED LARGE YORKSHIRE SOW.

EXPERIMENTS WITH DIFFERENT KINDS OF GRAIN FED IN DIFFERENT WAYS.

A large number of experiments have been conducted with the view of determining the relative and actual feeding values of some of the feeding stuffs available to the average feeder. No positive values may be assigned to any food as a pork producer, but the average of a large number of experiments, some of them involving a good many animals of different weights and breeding, may be taken as a fairly good indication of the values of the grains or feeds tested.

To economize space, as many results as possible have been placed in the subjoined table.

The numbers are prefixed for reference merely.

Feed consumed per lb. of increase.

lbs
3.62
3.72
3.73
4.03
4.11
4.27

3.24
3.90

Measure of in cold milk-y swine litters, and

consumption per lb. increase.

Milk.
bs.
2.56
2.31
2.32
1.95
2.17
2.53
2.45

pound

dam ;
dam ;
dam ;

TABLE V.

Experiments.	Feed.	How Prepared.	No. of Swine.	Average weight at start.		Average weight at finish.		Average net gain.	Number of Days fed.	Average daily gain.	Average amount fed eaten.		Average amount fed for 1 lb gain.	Per cent dressed weight.
				lbs.	lbs.	lbs.	lbs.				lbs.	lbs.			p. c.
1	Oats.....	Whole, soaked 54 hrs.	4	97	170	73	84	87	307	4.21	74	67		
	Skim-milk.....								252	3.45				
2	Oats.....	Ground, soaked 51 hrs.	4	54	181	130	126	1.03	424	3.26	74	87		
	Skim-milk.....								756	5.81				
3	Barley.....	Ground, soaked 54 hrs.	4	73	184	111	112	1.00	483	4.35	74	56		
4	Barley.....	Whole, soaked 54 hrs.	4	59	199	100	81	1.19	364	3.64	74	19		
	Skim-milk.....								252	2.52				
5	Corn.....	Ground, soaked 30 hrs.	4	71	172	98	112	.87	408	4.16	76	89		
6	Corn.....	Whole, soaked 54 hrs.	3	72	190	118	91	1.30	343	2.90	81	74		
	Skim-milk.....								273	2.31				
7	Pease.....	Whole, soaked 54 hrs.	4	100	207	107	84	1.27	356	3.33	75	43		
	Skim-milk.....								252	2.35				
8	Pease.....	Ground, soaked 51 hrs.	4	62	224	162	126	1.28	446	2.76	76	07		
	Skim-milk.....								756	4.68				
9	Oats and pease	Ground, soaked 54 hrs.	3	61	226	165	126	1.31	503	3.00	75	15		
	Skim-milk.....								756	4.51				
10	Oats, barley and pease.	Whole, soaked 54 hrs.	3	71	176	105	91	1.15	306	3.20	79	08		
	Skim-milk.....								273	2.60				
11	Shorts.....	Soaked 36 hrs.	4	72	156	84	112	.75	372	4.42	77	73		
12	Meal.....	Soaked 30 hrs.	5	60	175	115	81	1.37	349	3.10	77	79		
	Skim-milk.....								504	4.35				
13	Meal.....	Soaked 30 hrs.	5	61	151	93	84	1.11	179	1.92	74	40		
	Skim-milk.....								504	5.40				
	Sunflowers.....	Soaked.....							197	2.11				
14	Potatoes.....	Raw.....	3	56	153	97	110	.70	133	1.37	76	58		
	Meal.....	Soaked 30 hrs.							365	3.72				
	Skim-milk.....								105	1.08				
15	Potatoes.....	Cooked.....	3	53	171	115	140	.82	831	7.18				
	Meal.....	Soaked 30 hrs.							177	1.52				
	Skim-milk.....								315	2.72				
16	Potatoes.....	Raw.....	3	55	192	137	110	.98	98	.71	76	99		
	Meal.....	Cooked.....							332	2.41				
	Skim-milk.....	Soaked 30 hrs.							314	2.28				
									210	1.52				
17	Potatoes.....	Cooked.....	3	55	195	140	110	1.00	712	5.63				
	Meal.....								280	2.05				
	Skim-milk.....								105	.74				
18	Potatoes.....	Cooked.....	3	50	192	142	140	1.01	1,031	7.29	78	30		
	Meal.....								140	.98				
	Skim-milk.....								420	2.96				
19	Oats, pease and barley.	Ground, soaked 30 hrs.	4	66	190	124	119	1.04	467	3.76				
20	$\frac{2}{3}$ oats, pease and barley.	Ground and soaked.....	4	68	137	69	119	.58	247	3.60				
	$\frac{1}{3}$ clover.....								82	1.20				

Meal in each case in the above table means a mixture, equal parts by weight, of barley, rye, wheat (frozen) and bran, the first three being ground.

Preparation of the Feed.

It will be observed from a study of experiments 1 and 2, and 7 and 8, that ground grain gives better returns for the amount fed than whole grain. Soaking, while not equivalent to grinding, still adds materially to the value of the feed. On page 27 will be found an experiment where whole grain dry was compared with ground grain dry. It is highly probable that the extra returns from ground grain will more than pay for the cost of grinding. The work in feeding at the Central Experimental Farm would seem to indicate that the most economical method of feed preparation is that of soaking for 24 hours or longer.

Values of food.—Experiments with oats fed as the sole grain and skim-milk added would indicate that as a feed for pork production they are, unless comparatively low priced, rather expensive, ground or whole.

Barley also seems to be a rather more expensive feed than the farmer would care to use, but when fed in conjunction with milk it would seem to be profitable.

The value of corn also appears to be very materially influenced by the addition of skim-milk to the ration.

Pease seem to be profitable whether ground or whole. The addition of an extra supply of milk in Experiment 8 over Experiment 7, gave an apparently remarkable increase in gain, but it will be observed that the pease were ground in Experiment 8, and whole in Experiment 7.

The mixture of oats and pease in Experiment 9, and the mixture of oats, pease and barley in Experiment 10, both gave most excellent returns, proving these grains when fed in conjunction, to constitute a good ration. This exemplifies and emphasizes a fact familiar to all good feeders that a mixed ration gives better results than a ration consisting of one variety of feed only.

Shorts fed alone has proven to be a rather expensive ration for this part of Canada.

Sunflower seed was fed with meal (barley, rye, wheat and bran) and skim-milk, but it is not possible to draw any conclusions from this experiment as to the value of this seed as a feed for swine.

It will be observed from a study of Experiments 3 and 4, and 5 and 6, that skim-milk is a very valuable adjunct to any grain ration, but for a fuller discussion of the value of this by-product in the feeding of swine see pages 17 and 18.

Potatoes are frequently available for feeding to pigs, especially small potatoes. Experiments 14 and 16 illustrate in some measure the value of this tuber when fed raw. In Experiment 14 the swine were given all they would eat of raw potatoes for some time, when it was found that they were not making any gain. Meal was then given for the rest of the experiment and the potatoes discontinued. In Experiment 16 raw potatoes were fed for a time and later they were cooked as it was found they did not cause any increase in size. All work here with potatoes seems to indicate that fed raw they are of very little nutritive value, but when cooked they are worth about one quarter as much as mixed grain.

Wheat has been fed alone and so has buckwheat, while sugar beets have formed part of the rations in a number of experiments.

Wheat values may be ascertained from Experiments 1 to 6, page 16.

Buckwheat is shown in table XVIII, page 30.

Sugar Beets as part of a fattening ration is illustrated in Experiment 13, page 25.

feed in 1 lb		Percent dressed weight.
gals.	lbs.	
4.21	74.67	
3.45	.....
3.26	74.87	
5.81	.....
4.35	74.56	
3.64	74.19	
2.52	.....
1.16	76.89	
2.90	81.74	
2.31	.....
3.33	75.43	
2.35	.....
2.76	76.07	
4.68	.....
3.00	75.15	
4.51	.....
3.20	79.08	
2.60	.....
4.42	77.73	
3.10	77.79	
4.35	.....
1.92	74.40	
5.40	.....
2.11	.....
1.37	76.58	
3.72	.....
1.08	.....
7.18	.....
1.52	.....
2.72	.....
7.71	76.99	
2.41	.....
2.28	.....
1.52	.....
5.63	.....
2.05	.....
74	.....
7.29	78.39	
3.98	.....
2.96	.....
3.76	.....
3.60	.....
1.20	.....

Mangels constitute a very important part of our feed for the breeding stock in winter and have been found to be of very great value as a feed for stockers.

Clover when used as part of a ration for fattening swine, has shown itself (one experiment only) to be of very small value, apparently about $\frac{1}{10}$ as valuable as an equal weight of mixed meal.

The influences affecting the relations between the dressed weight of a hog and its live weight are numerous. The average percentage which a large number of dressed carcasses constituted of the fasted weight of the living animals was 76.34 per cent.

Frozen Wheat Experiments.

The unsaleable character of some of the wheat which has been occasionally more or less affected by frost in some parts of Manitoba and the Territories led to some experiments being carried on to ascertain the approximate value of this injured grain as a feed for swine. It was fed alone, ground and unground, soaked in either case. It was also fed in conjunction with other cereals and along with skim-milk.

The following table gives in condensed form a summary of this series of experiments.

TABLE VI.

Experiment.	Feed.	How prepared.	No. of Swine.	Average weight		Average net gain.	Number of days fed.	Average daily gain.		Average amount of feed eaten.	Average amount of feed for 1 lb. gain.
				at start	at finish.			lbs.	lbs.		
1	Wheat.	Ground and soaked 12 hrs..	4	185	275	90	77	1.17	479	5.30	
2	Wheat.	Whole, soaked 42 hrs.	4	186	273	86	77	1.11	570	6.59	
3	Wheat, barley and pease.	Whole, soaked 42 hrs.	4	187	278	92	77	1.19	557	6.07	
4	Wheat.	Ground and soaked 12 hrs..	5	61	165	104	120	0.87	441	4.23	
5	Wheat Skim-milk.....	Ground and soaked 12 hours.	4	104	192	88	56	1.57	233 1011	2.65 12.51	
6	Wheat..	Ground and soaked 18 hrs..	12	103	187	84	84	1.00	442	5.26	
7	Wheat and barley. Carrots.....	Ground and soaked 30 hours.	21	117	179	62	84	0.73	326 53	4.45 0.85	
8	Barley, rye, wheat and bran.	Ground and soaked 12 hours.	36	54	108	54	105	0.51	207	3.85	
9	Barley, rye, wheat and bran. Skim-milk.	Ground and soaked 12 hours.	31	108	191	83	83	1.00	268 250	3.23 3.00	

All wheat fed was more or less injured by frost. It will be observed that the wheat when fed whole and soaked gave rather poorer results than when fed ground and soaked. The comparatively large amount of wheat required for a pound of increase in Experiments 1, 2 and 3 exemplifies very clearly the disadvantage of feeding swine after a weight of 175 to 200 pounds has been attained. This is seen very clearly when we compare lots 2 and 3 with lots 4 and 8. In lot 2, where swine weighing 186 pounds to begin with were fed, an average of 6.59 lbs. was required to produce one pound of pork, while in lot 4, where the pigs weighed 61 lbs. to begin with, only 4.23 lbs. feed was required for the same increase. Of course it will be observed that in lot 2 the wheat was fed whole while it was ground in lot 4, the difference in the amounts of grain required, however, (2.36 lbs.) is much too great to be accounted for in this way.

A comparison of Experiments 4 and 5 shows the value of skim-milk to be about $\frac{1}{7}$ of the frozen wheat, pound for pound.

In comparing Experiments 8 and 9 however, it will be seen that skim-milk is apparently worth $\frac{1}{5}$ as much as the mixture of barley, rye, wheat and bran. This is explained by the smaller proportion of skim-milk in the ration. (See page 20.)

Experiments 8 and 9 exemplify the importance of feeding a mixed ration as a means of economizing feed.

Experiments in feeding Skim-milk.

The value of skim-milk as a feed for pork production has always been well known and the following experiments were devised for the purpose of giving some exact data which might be used as a guide to the feeder rather than for the purpose of settling some disputed question or establishing some doubtful feed on better grounds. Some of the experiments summarized in the following table were conducted with the sole purpose of determining the value of this by-product, while others have been introduced as illustrating to a greater or less extent the value of this feed. The very great value of this substance must not be measured by its chemical composition solely; but its peculiar, apparently stimulating action upon the growth of animals must be considered. The following data are accordingly submitted.

Average amount of feed eaten.		Average amount of feed for 1 lb. gain.	
lbs.	lbs.	lbs.	lbs.
479	5.30		
570	6.59		
557	6.07		
441	4.23		
233	2.65		
1011	12.51		
442	5.26		
326	4.45		
53	0.85		
207	3.85		
268	3.23		
250	3.00		

TABLE VII.

Experiment.	Feed.	How Prepared.	No. of Swine.		Average weight at start.		Average weight at finish.		Average net gain.	Number of days fed.	Average daily gain.		Average amount feed eaten.		Average amount feed for 1 lb. gain.
			lbs.	lbs.	lbs.	lbs.	lbs.	lbs.			lbs.	lbs.			
1	Meal	Soaked 30 hours.	3	117	230	113	112	1'00	48	1	27				
2	Meal (half quantity fed in expt. 1).	Soaked 30 hours.	4	103	240	113	112	1'27	181	1	26				
	Skim-milk								3,631	25	39				
3	Wheat shorts.	Soaked 30 hours.	5	179	261	82	56	1'46	709	3	80				
	Skim-milk								526	4	10				
4	Meal; pease, wheat and rye.	Ground and soaked 18 hrs.	2	123	196	73	56	1'30	250	3	43				
5	Meal, as in 4 (but only $\frac{2}{3}$ amount).	Soaked 18 hours.	2	120	206	86	56	1'51	188	2	17				
	Skim-milk								960	11	10				
6	Meal, as in 4 (but only $\frac{1}{2}$ amount).	Soaked 18 hours.	2	116	202	86	56	1'54	125	1	45				
	Skim-milk								1,332	15	49				
7	Corn	Ground and soaked 30 hrs.	4	74	172	98	112	'87	408	4	16				
8	Corn.	Whole, soaked 54 hours.	3	72	190	118	91	1'30	343	2	90				
	Skim-milk								273	2	31				
9	Pease.	Whole, soaked 54 hours.	4	100	207	107	84	1'27	356	3	33				
	Skim-milk								252	2	35				
10	Barley.	Ground, soaked 54 hours.	4	73	184	111	112	1'00	483	4	35				
11	Barley.	Whole, soaked 54 hours.	4	99	199	100	84	1'19	364	3	64				
	Skim-milk								252	2	52				
12	Pease, barley and rye.	Whole, soaked 48 hours.	5	69	156	87	119	'73	386	4	45				
13	Pease, barley and rye.	Whole, soaked 48 hours.	5	69	204	135	119	1'13	330	2	46				
	Skim-milk								1,869	13	92				
14	Pease, barley and rye.	Ground and soaked 12 hours.	5	69	173	104	119	'87	455	4	36				
15	Pease, barley and rye.	Ground and soaked.	4	76	210	134	119	1'12	464	3	46				
	Skim-milk								645	4	81				

Conclusions.—From these tests to gain information as to the feeding value of skim-milk it appears that :—

1. When swine were fed with meal, barley, rye and wheat, alone 4·27 lbs. were required to give 1 lb. gain, but when swine were fed upon similar meal, half the quantity being given, and all the milk they could consume only 1·26 lbs. of meal were required for 1 lb. gain and 25·39 lbs. skim-milk. One pound meal would thus be worth 8·43 lbs. milk.

2. A mixture of pease, wheat and rye gave 1 lb. pork for each 3·43 lbs. fed. (Exp. 4.) For comparison a similar number of swine (Exp. 5) were given three-quarters the quantity of the same meal and all the skim-milk they would drink. It was then found that 2·17 lbs. meal and 11·10

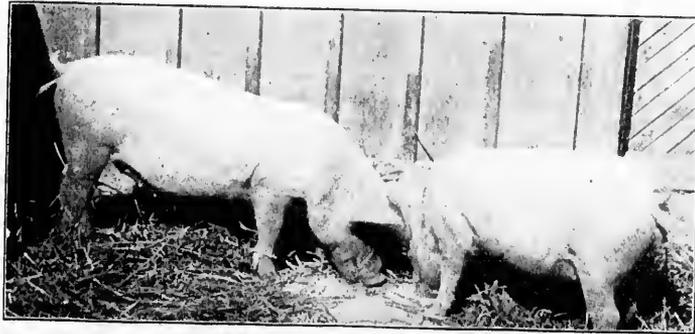
lbs. skim-milk gave 1 lb. increase in weight. According to these data skim-milk may be said to bear the relation of 8.82 lbs. to one of meal.

3. In Exps. 7 and 8 the use of skim milk with corn is exemplified. It will be observed that in the one case the corn was whole while it was ground in the other. The longer period for which the whole corn was soaked in the one case may be expected, however, to exert as great an influence as the grinding in the other, upon the proportion of nutrients available. The data obtained from these experiments would indicate that 1.83 lbs. skim milk were equivalent to 1 lb. corn. While this is not exactly in accordance with the results of other experiments here, it serves to emphasize the great value of skim-milk as a supplementary food, and as a supplement to no other grain does its effect seem so marked as when used with corn.

4. In Experiments 10 and 11 with barley and milk the same conditions obtain as are discussed in the preceding paragraph. It will be observed that while of barley fed alone 4.35 lbs. were required to produce 1 lb. of pork, only 3.64 lbs. were required for the same effect when fed with 2.52 lbs. of milk. Here also the feeding value of skim-milk seems very much greater than most work along this line would indicate.

5. In Experiments 12 and 13 the use of milk with a mixture of pease, barley and rye fed whole as compared with the same mixture fed alone, is illustrated. The mixture seems to bear the relation of 1 to 6.99 of milk.

6. In experiments 14 and 15 a meal composed of equal parts of ground pease, barley and rye was fed in the one case without milk when 4.36 lbs. were required to produce 1 lb. of pork and in the other case with all the skim-milk the pigs would consume in addition to the grain ration when 3.46 lbs. meal and 4.81 lbs. skim-milk produced 1 lb. pork. Skim-milk according to this experiment would be worth about one-fifth ($\frac{1.00}{5.34}$) as much as an equal weight of the meal.



YORKSHIRE YOUNGSTERS.

7. In addition to the work a summary of some other work is submitted below.

From tests made in 1892, 1893 and 1894 with 48 swine it appears that when a small quantity (about 3 pounds per head per day) of skim-milk was fed, a less quantity of it was equal to 1 pound of the grain in the feed consumed per pound of increase in live weight, than when a large quantity (about 15 pounds per head per day) was fed.

Average amount
feed for 1 lb.
gain.

	lbs.
7	4.27
8	1.26
10	25.30
11	3.80
12	4.10
13	3.43
14	2.17
15	11.10
16	1.45
17	15.49
18	4.16
19	2.90
20	2.31
21	3.33
22	2.35
23	4.35
24	3.64
25	2.52
26	4.45
27	2.46
28	13.92
29	4.36
30	3.46
31	4.81

feeding

4.27
similar
consume
m-milk.

43 lbs.
Exp. 5)
the skim-
d 11.10

The results are shown in the following table :—

TABLE VIII.

Number of Swine in Test.	Skim-milk consumed per head per day.	
	lbs.	
4	2	1 pound corn equal to 1.83 pounds skim-milk.
31	3	1 pound mixed grain equal to 3.23 pounds skim-milk.
4	5.4	1 " " " " 5.38 " "
4	13.6	1 " frosted wheat " 7.91 " "
5	15.7	1 " mixed grain " 7.34 " "
2	17.1	1 " " " 8.82 " "
2	23.7	1 " " " 7.76 " "

General Conclusions. From these tests and from our experience in feeding young pigs, it appears that :—

(1.) Skim-milk may form the largest part of the feed of *young and growing pigs* with advantage and economy ;

(2.) For the fattening of swine weighing on the average over 100 pounds each, live weight, it is economical to give an *allowance* of skim-milk *not exceeding* 5 pounds per head per day ;

(3.) In every case the swine fed with part of their ration of skim-milk were *lustier, more vigorous* and of a more healthy appearance than swine fed wholly on a ration of grain.

(4.) Skim-milk gives the best returns for the amount fed when it constitutes a comparatively small part of the total food fed.

(5.) Skim-milk may generally speaking, be considered to be worth from one-sixth to one-fifth as much as mixed grain.

Experiments contrasting the value of whole grain with similar grain when ground, as a pork producer.

It is generally conceded that there is more or less waste when grain is fed whole to swine. Many feeders maintain, however, that the gains are practically equal from equal weights of grain whether fed whole or ground. To get some data on this point a number of experiments have been carried on here.

The following table gives a summary of the results with ten lots fed at different times and with different feeds.

TABLE IX.

Experiment.	Feed.	How Prepared.	No. of Swine.	Average weight		Average net gain.	No. of days fed.	Average daily gain.	Average amount feed eaten.	Average amount feed for 1 lb. gain.
				to start.	at finish.					
1	Pease, barley and rye	Whole, soaked 48 hours	48	115	156	87	119	73	386	4.45
2	Pease, barley and rye	Ground, soaked 12 hours	121	69	173	104	119	87	455	4.36
3	Pease, barley and rye	Whole, soaked 48 hrs.	5	69	201	135	119	113	330	2.46
	Skim-milk								1869	13.92
4	Pease, barley and rye	Ground soaked 12 hrs	4	76	210	131	119	112	461	3.46
	Skim-milk								615	4.81
5	Oats, barley, pease and part bran	Whole, dry	4	67	175	108	119	90	411	4.08
6	Oats, barley, pease and part bran	Ground, dry	1	69	195	126	119	66	430	3.76
7	Oats, barley, pease and part bran	Whole, soaked 30 hours	4	66	171	105	119	88	409	3.88
8	Oats, barley, pease and part bran	Ground, soaked 30 hours	4	66	190	124	119	104	467	3.76
9	Oats, pease and barley	Whole, dry	1	163	185	82	76	108	307	3.60
10	Oats, pease and barley	Ground, dry	1	161	190	89	76	117	367	3.43

A study of the above table would seem to show that:—

1. When pease, barley and rye were fed whole, 0.9 lbs. more of the mixture was required to produce a pound of pork than when fed ground. This is a gain of 2 per cent.

2. Lots 3 and 4 were given in each case all the skim-milk they would drink. While no exact feeding value can be attached to the skim-milk, yet a considerably greater gain is indicated from grinding the feed than in lots 1 and 2.

3. In lots 5 and 6, where a ration of oats, barley and straw was fed, first with the grain part unground and second with the grain part ground, a large gain is indicated, viz., 20 per cent.

4. In lots 7 and 8, where a similar ration to that in lots 5 and 6 was fed with the difference that in lots 5 and 6 it was fed dry, and in lots 7 and 8 it was fed soaked, a smaller gain of about 3 per cent is shown in favour of the ground feed.

5. In lots 9 and 10 a mixture of oats, pease and barley is fed whole and contrasted with a similar mixture when fed ground. A gain of almost 4 per cent is shown in favour of the ground feed.

6. While the results vary considerably it will be observed that in every case a gain is noticeable where ground feed is used rather than whole feed. It is quite safe to say that a gain of from 5 to 10 per cent may be looked for when ground grain rather than unground is fed.

In some experiments conducted here with whole grain an effort was made to ascertain the per cent of grain that escaped digestion when it was fed whole. The excrement was collected for 24 hours after the animals had been

on a fixed ration of one variety of grain for some weeks, and the following results obtained:

a. In case of whole oats where 14 lbs. feed was fed, 2 lbs. 6 oz. of undigested grain, or 21.6 per cent of the whole amount, was found in the excrement. One tenth of this germinated.

b. In the case of whole barley where 17 lbs. was fed, 2 lbs. 2 oz. or 12½ per cent of the whole amount was found in the excrement. None of this would germinate.

c. In the case of whole pease where 17 lbs. was fed, 2 oz. only, or about 3/4 of 1 per cent of the whole amount, was found in the excrement. None of this would germinate.

d. In the case of whole corn where 11 lbs. was fed, 8 oz. or nearly 5 per cent of the whole amount was found in the excrement. About one-twelfth of this germinated.

e. In the case of unground mixed grain (oats, pease and barley) where 11 lbs. of grain was fed 10 oz. or 5.7 per cent of the whole amount was found in the excrement. About one fiftieth (oats) of this germinated.

Experiments to determine the value of soaked feed as contrasted with similar feeds fed dry.

It will be seen by referring to page 26 that experiments with cooked feed (grains) would indicate that the increased returns from cooked feed were not sufficient to pay for the extra work and expenditure. The nearest approach to cooking at practically no expense is soaking the food and the following experiments were carried on along this line. A number of other experiments include some data on this point, but they are so complex as to render their consideration under this head inadvisable.

TABLE X.

Experiment.	Feed.	How Prepared.	No. of Swine.		Average weight to start.	Average weight to end.	Average net gain.	No. of days fed.	Average daily gain.	Average amount feed eaten.	Average amount feed for 1 lb. gain.
			lbs.	lbs.							
1	Pease, barley and rye.	Whole, and soaked 30 hours.	4	66	171	105	119	1.58	400	3.88	
2	"	Whole, dry.	4	67	175	198	119	.90	441	4.68	
3	"	Ground, soaked 30 hours.	4	66	190	124	119	1.04	467	3.76	
4	"	Ground, dry.	4	69	195	126	119	1.06	450	3.56	

It can be observed that in lots 1 and 2 where whole grain was fed that a considerable saving was apparently wrought in feed by soaking the grain. This amounted to about 5 per cent of the food fed lot 2.

In lots 3 and 4 it will be observed that ground grain was fed dry and compared with ground grain fed soaked. The data here would seem to point to a loss from soaking meal. While this may not be the actual case yet it is probable that the result from soaking meal may not be so marked as from soaking whole grain. A study of some other experimental work not submitted under this head would also indicate this.

Experiments to determine the value of steamed or cooked feed, fed warm, as contrasted with raw feed, fed cold, including an experiment with pea ensilage.

The following report is taken with slight changes from the report for 1891:—

The object of this experiment was twofold—(1) to discover the difference, if any, in the quantity of grain required to produce every pound of increase of the live weight of the swine, when *fed steamed and warmed* in the one case, and when *fed raw and cold* in the other case; (2) to obtain a record of the comparative quantities of grain required to produce every pound of increase in the live weight of the swine, during the different stages of the feeding period. The grains fed were ground pease, barley and rye, equal parts.

The mixture of grain was fed wet in both cases. Cold water was given to drink. A mixture of salt and wood ashes was kept in a box on the floor of each pen, where the pigs had access to it at will. In the following table the feeding period has been arranged into five periods of four weeks each, and one period of three weeks. It shows the gain in weight and the quantities of grain consumed.

TABLE XI.

	9th December.	5th January.	2nd February.	2nd March.	30th March.	27th April.	18th May.	Totals.
<i>Pen 1—Four Swine—</i>								
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Fed on a mixture of ground pease, barley and rye, <i>fed steamed and warmed</i> :								
Live weight.....	302	407	614	808	917	974½	745*	*Three alone only.
Gain in weight.....		105	207	194	109	57½	30	702½ gain in weight.
Feed consumed.....		348	637	736	545	406	256	2,928, grain consumed.
Feed consumed per lb. of gain in live weight.....								4.16 lbs. grain.
<i>Pen 2—Four Swine.</i>								
Fed on a mixture of ground pease, barley and rye, <i>fed raw and cold</i> :								
Live weight.....	308	413½	597	723	781½	830½	872	
Gain in weight.....		105½	183½	126	58½	49	41½	564 gain in weight.
Feed consumed.....		348	563	558	433	278½	237	2,398, grain consumed.
Feed consumed per lb. of gain in live weight.....								4.25 lbs. grain.
<i>Pens 1 and 2.</i>								
Average weight of pigs.....	76	102½	151	191	212	225½	231	
Average feed consumed per lb. of gain in live weight.....		3.31	3.07	4.04	5.73	6.45	6.93	
Percentage of increase in feed consumed per lb. of gain in live weight.....			31%	86%	110%	125%		

In this experiment, the object was to discover the value, if any, of pea ensilage for the feeding and fattening of swine.

Records were also kept to ascertain the comparative quantities of feed required to produce every pound of increase in the live weight of the swine, during the different stages of the feeding period.

The pea ensilage was prepared by harvesting the crop when the earliest pods were filled and before the peas became hard. The vines were green and succulent. The ensilage was well preserved. The pigs in lot 3 were fed an allowance of grain, a mixture of equal parts of ground peas, barley and rye, but not as much as they would have eaten readily. They were fed also a quantity of pea ensilage. The pigs in lot 4 were fed upon pea ensilage only. In both cases the pigs refused to eat more than a small portion of whatever quantity of pea ensilage was offered to them. The remainder was nosed over, pushed about and tramped on. When what was left uneaten was weighed out of the pens, it was very wet.

Both lots of pigs were allowed cold water to drink, and a mixture of salt and ashes was accessible to the pigs in both cases. The pea ensilage did not seem to have any feeding value to the pigs which received an allowance of grain; and the pigs in lot 4 steadily decreased in weight for nine weeks, when the feeding of ensilage was ended.

The following table contains the details of the weights of pigs, feed consumed, and rate of gain in live weight:—

TABLE XII.

	29th December.		5th January.		2nd February.		2nd March.		30th March.		27th April.		18th May.		Totals.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.		
<i>Lot 3—Four swine.</i>															
Fed on a mixture of ground pease, barley and rye, fed, steamed and warmed, and pea ensilage—															
Live weight	251	267	414	379	442	494	548	*Three swine only.							
Gain in weight	13	147	74	63	52	54	403, gain in weight.								
Feed consumed (Grain)	63	474	335	287	260	243	1,662, grain consumed.								
Pea ensilage	112½	682	345												
Pea ensilage left uneaten (wet)	100	625	319												
Grain consumed per lb. of gain in live weight															4.12, grain.
<i>Lot 4—Four swine.</i>															
Fed on pea ensilage only until 2nd March—															
Live weight	256	237	223	205											
Loss in weight	19	14	18												
Pea ensilage fed	235	1401	2127												
Pea ensilage left uneaten (wet)	150	938	1409												
After 2nd March, fed on a mixture of ground pease, barley and rye, fed raw and cold—															
Live weight					205	395½	512½	571							
Gain in weight					190½	117	58½								
Feed consumed					443	388	327	366, gain in weight.							
Feed consumed per lb. of gain in live weight					2.32	3.31	5.59	1,158, grain consumed.							
<i>Lots 3 and 4.</i>															
Average feed consumed per lb. of gain in live weight	4.84	3.22	4.52	2.88	3.83	5.06									

Lots 5 and 6 were fed similarly to lots 3 and 4, save that sugar beets were substituted for pea ensilage.

The following table shows the quantities of feed consumed per pound of gain in live weight, during each of the six feeding periods. The duration of each feeding period was four weeks, with the exception of the first period for pens 4 and 5, and the last period for all the pens, which was three weeks. The grain fed in each case was a mixture of equal parts of ground pease, barley and rye. No notice is taken in this table of the pea ensilage fed to lots 4 and 5, as it did not appear to have any appreciable feeding value in these cases :—

TABLE XIV.

Pounds of feed consumed per pound of gain in the live weight of swine.

Feeding Periods.	Lot 1, four swine ; grain, fed steamed and warm.	Lot 2, four swine ; grain, fed raw and cold.	Lot 3, four swine ; grain, fed steamed and warm.	Lot 4, four swine ; grain, fed raw and cold.	Lot 5, four swine ; grain, fed steamed and warm, and sugar beets.		Lot 6, four swine ; grain, fed raw and cold, and sugar beets.	
	lbs.	lbs.	lbs.	lbs.	Grain	Sugar Beets	Grain	Sugar Beets
First.....	3·31	3·30	4·84	.....	4·69	0·61	3·17	0·84
Second.....	3·07	3·07	3·22	.....	2·46	2·00	2·76	2·23
Third.....	3·79	4·43	4·52	.....	3·46	2·00	3·81	2·32
Fourth.....	5·00	7·07	4·55	2·32	5·40	3·63	3·15	2·13
Fifth.....	7·06	5·68	5·00	3·31	4·88	4·08	9·51	8·25
Sixth.....	8·53	5·71	4·50	5·59	4·17	3·31	6·58	6·00
Average.....	4·16	4·25	4·12	3·16	3·86	2·46	3·89	2·73

Conclusions.—The teaching of these three sets of experiments is to the effect that :—

(1.) There is no appreciable difference in the number of pounds of grain required to produce every pound of increase in the live weight of swine, when fed steamed and warm, as against fed raw and cold ;

(2.) On the average there is a gradual increase in the quantity of feed consumed, for every pound of gain in live weight of swine, after the second month of their feeding period and after the average live weight exceeds 100 lbs. ;

(3.) It is most economical to market swine for slaughtering when they weigh from 180 to 200 lbs. alive ;

(4.) The largest consumption of feed per day by swine is at or near the period of their feeding when the number of pounds of feed consumed, per pound of increase in weight, is lowest ;

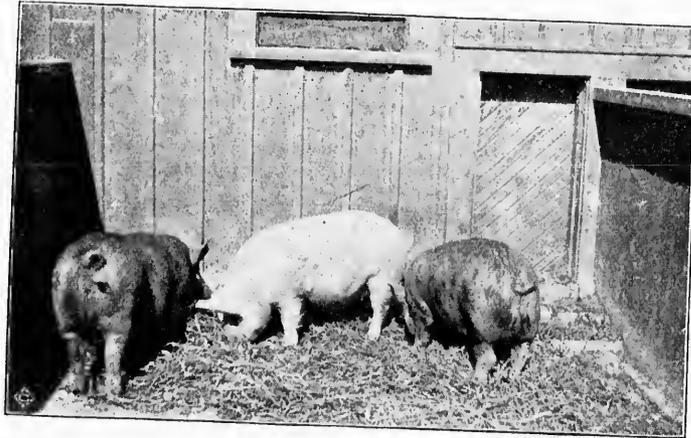
(5.) For the increase of weight by 3,231½ lbs. in 24 swine, 4·14 lbs. of a mixture of ground pease, barley and rye were required for every pound of increase in live weight.

Experiments to determine the advisability of feeding a full or a limited ration.

Many feeders claim that a full ration should be fed all through the fattening period, while others maintain that during the early weeks of the finishing or fattening period a comparatively scant ration should be

allowed. By full ration is meant all the animals will eat up clean, and by a scant ration some considerable amount less than this.

Very few experiments have been tried along the line here, nor yet do many other experiment stations appear to have done anything very important upon the question. The importance of this line of research has in the past not been so great as at present and nowhere on the American continent is it quite so worthy of pursuit as here.



UNLIMITED RATION LOT.

The question of the cost of producing hogs of the weight of 160 to 200 pounds, which shall show not over 1½ inches of fat along the back as contrasted with the cost of producing the thick hog showing from 1½ to 2½ inches of fat is at present of paramount importance, owing to the recent rapid development of our bacon export trade which demands the former class of hog.

No conclusive deductions may be drawn from our work here along this line, but the following report is submitted of an experiment with twelve swine recently completed.

TABLE XV.

Experiment.	Feed.	How Prepared.	No. of Swine.		Average weight		Average net gain.	No. of days fed.	Average daily gain.	Average amount of feed eaten.	Average amount of feed for 1 lb. gain.	
			at start.	at finish.	lbs.	lbs.						
1	Oats, pease and barley	Whole, amount limited	4	103	185	82	76	1	08	307	3	60
	Skim-milk		Limited							254	3	09
2	Oats, pease and barley	Ground, amount limited.	4	101	190	89	76	1	17	307	3	43
	Skim-milk		Limited							254	2	85
3	Oats, pease and barley	Ground, whole unlimited	4	103	188	85	76	1	11	326	3	84
	Skim-milk		Limited							254	2	99

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Lot 6, four
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Grain	Sugar Beets
lbs.	lbs.
3-17	0-84
2-76	2-23
3-81	2-32
3-15	2-13
9-51	8-25
6-58	6-00
3-89	2-73

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To lot 1 was fed a mixture of pease, oats and barley, whole. A daily allowance of 3 pounds per head of skim-milk was given to the three lots.

To lot 2 was fed a mixture of pease, oats and barley, ground.

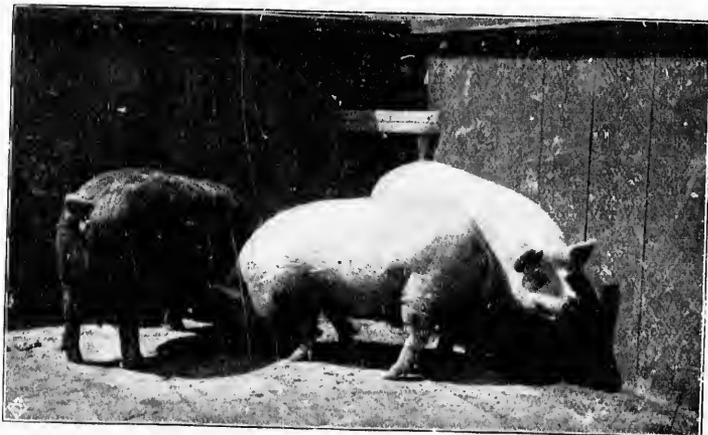
To lot 3 was given a mixture of pease, oats and barley, morning and evening feed ground, but whole grain at noon.

Lots 1 and 2 were given 3 pounds meal each daily at first, and this was gradually increased until at the end of the feeding period they were receiving 4.25 pounds meal each day. Lot 3 started off with 5 pounds of meal each daily, this amount being all they would eat up clean.

Lots 1 and 2 were more easily fed than lot 3, for they exhibited no tendency to get "off their feed" at any time and made good progress.

Lot 3 took as much as $5\frac{1}{4}$ pounds meal per head when about a month on feed, but they soon fell from this large ration, and during the last month were able to eat only $3\frac{1}{2}$ pounds meal daily.

The pigs in lot 3 after being on feed for some time had a dull look while lots 1 and 2 were much more lively and thrifty in appearance.



LIMITED RATION LOT.

It will be observed that the amount of meal required for the production of 1 pound of pork was considerably less in the cases of the limited rations than in the unlimited one, viz.: .24 pounds in the case of the whole-grain lot and .41 pounds in the case of the ground-grain lot.

TO DISCOVER THE CAUSES OF "SOFT" HOGS.

The following report is taken with slight changes from the reports for 1894-95.

To discover the cause of "Soft" Hogs.

A series of experiments were begun to discover the effect on the quality of the meat and cured bacon from the feeding of wheat and buckwheat to swine. Complaints were common from buyers of swine in Western Ontario that the quality of flesh was soft in a larger percentage of animals than formerly; and an opinion was current to the effect that the "softness" was the result of the feeding of wheat or of buckwheat.

Fourteen swine of three different litters were sorted into three lots as nearly even as possible.

Lot No. 2 contained four swine of the following breeding :—

- 2 crossbreds by *Berkshire* sire and *Improved Large Yorkshire* dam ;
- 1 do *Tamworth* sire and *Berkshire* dam ;
- 1 purebred *Tamworth*.

These were fed on a *mixture* of equal parts by measure of barley, rye, wheat (all ground) and wheat bran, soaked in cold water for an average period of thirty hours.

TABLE XVI.

Lot No. 2.	First weight.	Weight at end of 1st four weeks.	Weight at end of 2nd four weeks.	Final weight.	Totals.
	lbs.	lbs.	lbs.	lbs.	lbs.
Live weight	477	624	718	786	.....
Increase in weight.....		147	94	68	309
Feed consumed.....		614	382	326	1,322
" per pound of increase in live weight.....		4.17	4.06	4.79	4.28

Lot No. 4 contained 5 swine of the following breeding :—

- 3 crossbreds by *Berkshire* sire and *Improved Large Yorkshire* dam.
- 2 do *Tamworth* sire and *Berkshire* dam.

These were fed on *ground wheat* soaked in cold water for an average period of thirty hours.

TABLE XVII.

Lot No. 4.	First weight.	Weight at end of 1st four weeks.	Weight at end of 2d four weeks.	Final weight.	Totals.
	lbs.	lbs.	lbs.	lbs.	lbs.
Live weight.....	483	620	716	793	.....
Increase in weight.....		137	96	77	310
Feed consumed.....		616	369	287	1,272
" per pound of increase in live weight.....		4.49	3.84	3.72	4.10

Lot No. 6 contained 5 swine of the following breeding :—

- 3 crossbreds by *Berkshire* sire and *Improved Large Yorkshire* dam.
- 1 do *Tamworth* sire and *Berkshire* dam.
- 1 purebred *Tamworth*.

These were fed on *ground buckwheat* soaked in cold water for an average period of thirty hours.

TABLE XVIII.

Lot No. 6.	First weight.	Weight at end of 1st four weeks.	Weight at end of 2nd four weeks.	Final weight.	Totals.
	lbs.	lbs.	lbs.	lbs.	lbs.
Live weight.....	515	632	840	989	.....
Increase in weight.....		117	298	139	474
Feed consumed.....		655	794	660	2,109
" per pound of increase in live weight.....		5.59	3.81	4.42	4.45

These 14 swine were shipped alive to the Ingersoll Packing Company, Ingersoll, Ont., to be slaughtered and cured in the manner followed by packers who send bacon and hams to the British market. The swine of each lot were marked differently, and a report was made upon them by the manager of the Ingersoll Packing Company according to the descriptive marks.

The report on the condition of the swine, 10 hours after they were killed, was as follows:—

"Lot 1, fed on mixed grain; leaf lard, fairly firm; best of the three lots.

Lot 2, fed on ground wheat; lard softish; not so firm as hogs of lot 1.

Lot 3, fed on ground buckwheat; lard soft, and hogs also soft.

The report on the sides of bacon after they were cured was as follows:—

Lot 1, fed on mixed grain; four hogs; all the sides turned out good hard meat, they were the best of the three lots.

Lot 2, fed on ground wheat; five hogs; six sides were soft and four quite firm.

Lot 3, fed on ground buckwheat; five hogs; two sides were soft and eight sides were firm.

"Conclusion.—From these tests it is evident that the feeding of wheat alone and of buckwheat alone is *not always a cause* of 'soft' hogs and 'soft' sides, since some of the swine fed on wheat and buckwheat yielded sides classed as firm."

Eight swine of a litter of cross-breds of *Tamworth* sire and *Poland China* dam were put into three lots as nearly even as possible.

TABLE XIX.

Lot No. 1 contained 3 swine.

They were fed on a *mixture* composed of equal parts, by measure, of barley, rye, wheat (all ground), and wheat bran, soaked in cold water for an average period of 30 hours.

Pen No. 1.	First weight.	Four weeks.	Eight weeks.	Twelve weeks.	Sixteen weeks.	Twenty weeks.	Totals.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Live weight.....	117	177	238	317	384	438	.....
Increase in weight.....		60	61	79	67	54	321
Feed consumed.....		198	210	239.5	233	224	1104.5
" per lb. of increase in live weight.....		3.30	3.44	3.03	3.47	4.14	3.44

TABLE XX.

Lot No. 3 contained 3 swine.
They were fed on a ration composed of *equal parts* by weight of a *mixture* as fed to lot No. 1, and *ground wheat*, soaked in cold water for an average period of 30 hours.

Lot No. 3.	First weight.	Four weeks.	Eight weeks.	Twelve weeks.	Sixteen weeks.	Twenty weeks.	Totals.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Live weight.....	117	181	228	302	370	420	.....
Increase in weight.....		64	47	74	68	50	303
Feed consumed.....		208	178	217	242	212	1057
" per lb. of increase in live weight.....		3.25	3.78	2.93	3.55	4.24	3.48

TABLE XXI.

Lot No. 5 contained 2 swine.
They were fed on a ration composed of *equal parts* by weight of a *mixture* as fed to lot No. 1, and *ground buckwheat*, soaked in cold water for an average period of 30 hours.

Lot No. 5.	First weight.	Four weeks.	Eight weeks.	Twelve weeks.	Sixteen weeks.	Twenty weeks.	Totals.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Live weight.....	96	166	247	337	395	445	.....
Increase in weight.....		70	81	90	58	50	349
Feed consumed.....		203	224	316	284	256	1323
" per lb. of increase in live weight.....		2.90	3.25	3.51	4.89	5.12	3.79

Eight swine of a litter of crossbreds of *Essex* sire and *Yorkshire* dam were put into *two* lots as nearly even as possible.

TABLE XXII.

Lot No. 7 contained 4 swine.
They were fed on a ration composed of *equal parts* by weight of a *mixture*, as fed to lot No. 1 (equal parts by measure of barley, rye, wheat, all ground, and wheat bran), and *ground wheat*, soaked in cold water for an average period of 30 hours.

Lot No. 7.	First weight.	Four weeks.	Eight weeks.	Twelve weeks.	Sixteen weeks.	Twenty weeks.	Totals.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Live weight.....	223	300	383	465	528	569	.....
Increase in weight.....		77	83	82	63	41	346
Feed consumed.....		359	285	288	255	228	1,406
" per lb. of increase in live weight.....		4.54	3.43	3.51	4.04	5.56	4.06

TABLE XXIII.

Lot No. 8 contained 4 swine.

They were fed on a ration composed of *equal parts* by weight of a *mixture*, as fed to lot No. 1 (equal parts by measure of barley, rye, wheat, all ground, and wheat bran), and *ground buckwheat*, soaked in cold water for an average period of 30 hours.

Lot No. 8.	First weight.	Four weeks.	Eight weeks.	Twelve weeks.	Sixteen weeks.	Twenty weeks.	Totals.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Live weight.	220	323	459	551	635	671	.....
Increase in weight.		103	136	92	84	36	451
Feed consumed.		404	442	411	383	275	1,915
" per lb. of increase in live weight.		3.92	3.25	4.46	4.55	7.63	4.24

Conclusions.—1. From the tests in 1894 referred to at page 29, it is evident that the feeding of wheat alone and of buckwheat alone is **not always a cause** of "soft" hogs and "soft" sides, since some of the swine fed on wheat and buckwheat yielded sides classed as firm;

2.—The report of the buyer and curer on the swine reported on in Tables XIX, XX, XXI and XXII, was that he could not detect any differences in the quality of the meat; from which it is evident that the feeding of rations composed to the extent of one-half of ground wheat and to the extent of one-half of ground buckwheat is **not a cause** of "soft" sides.

Table XXIV, below is a summary of the more important data gleaned from an experiment recently completed. It was conducted here in the fall of 1898 on the suggestion of Prof. J. W. Robertson, the Commissioner of Agriculture and Dairying. This experiment included 44 hogs of mixed breeding. They were divided into 11 lots of four each and fed as indicated below. The aggregate weights of the lot are given in each case. The hogs were fed for 84 days. They were given all they would eat up clean, until the 28th day before the completion of the experiment, when it appeared as though most of the animals were likely to be too fat by the time the required weight was reached. To prevent this the ration of each lot was reduced 25 per cent.

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TABLE XXIV.

Lot.	Feed.	How Prepared.	Weight		Yard Inspection.	Inside Inspection.	Report on Cured Product.
			to start.	to end.			
1	½ pease, barley and oats; ½ bran....	Ground and soaked 30 hours	180	714			
2	" with ½ clover.....	Soaked 30 hours.	207	636		1 No. 1, 3 No. 2.....	2 small, tender; 2 No. 1 selection, tender.
3	Whole corn.....	Fed dry.....	400	679		4 No. 1.....	3 very soft, 1 tender.
4	Ground corn.....	Soaked 30 hours.	401	746		2 No. 1, 2 No. 2.....	3 tender, 1 soft.
5	Ground corn, skim-milk.....	Soaked 30 hours.	403	965		4 No. 2.....	3 fat, hard; 1 No. 1 selection.
6	½ whole corn, ½ whole pease, oats and barley....	Fed dry and unground	408	785		2 No. 1, 2 No. 2.....	2 good quality, fat; 2 good quality, very fat.
7	½ corn; ½ pease, oats and barley.....	Soaked 30 hours; ground	410	919		1 No. 1, 3 No. 2.....	2 good, No. 1 selection; 2 good, No. 2 selection.
8	½ corn; ½ pease, oats and barley; skim-milk.....	Ground and soaked 30 hours	411	935		2 No. 1, 2 No. 2.....	2 good quality, 1 No. 1 selection and 1 No. 2, sel.; 2 good, but fat.
9	Oats, barley and pease.....	Whole dry.....	413	750		4 No. 1.....	2 good, No. 1 sel.; 2 good, fat.
10	Oats, barley and pease.....	Ground and soaked 30 hours	414	820		1 No. 1 and 3 No. 2.....	2 No. 1 selection, 2 tender sel.
11	Oats, barley and pease; skim-milk.....	Ground and soaked 30 hours	416	835		2 No. 1 and 2 No. 2.....	3 good, selected, fleshy; 1 good, No. 1 selection.
							2 good, No. 1 selection; 2 good, No. 2 selection.

In addition to the reports contained in the table above, the following criticisms of each lot were made by The William Davies Company Limited, Toronto:

Lot 1.—“37 and 40 almost soft, will go into rejected bacon; 36 and 39 doubtful quality.”

Lot 2.—“41, 42, 44, wretched quality with no redeeming feature; 43, doubtful quality.”

Lot 3.—“The fat on these hogs has a somewhat pasty feel, and if any hard substance is rubbed lengthwise on it, it scrapes off somewhat like lard.”

Lot 4.—“The fat in all these hogs feels somewhat greasy under the finger.”

Lot 5.—“Wiltshire sides.”

Lot 6.—“Wiltshire sides.”

Lot 7.—“One must be used for home trade.”

Lot 8.—“Too fat for export.”

Lot 9.—“Distinctly doubtful quality.”

Lot 10.—“Wiltshire sides.”

Lot 11.—“This group is singular among all the rest in that the fat is firm and hard, an entire absence of the greasy feeling noticeable on nearly all the others. It would not surprise us if the flesh and fat in this parcel were too hard and firm.”



A SUMMER HOME.

SUMMARY.

The experiments conducted and reported upon as above seem to indicate that:

1. It will not pay to cook feed for swine where economy of pork production is the sole consideration.

2. There is a gradual increase in the quantity of feed consumed for every pound of gain in live weight after the average live weight exceeds 100 lbs.

3. The most economical time to slaughter swine is when they weigh from 175 to 200 lbs.

4. The greatest and most economical gains are made when the swine are able to eat the most feed in proportion to their weight.
5. Frozen wheat may be used as a profitable feed for swine.
6. Skim milk adds most materially to the value of a grain ration, and 100 lbs. mixed grains equal about 700 lbs. skim-milk. The relative value of skim milk in any ration varies with the amount fed, the poorest returns per pound fed being obtained when the proportion of skim-milk to the total food is the greatest.
7. The average dressed weight of swine is about 76.44 per cent of the fasted weight.
8. Skim-milk is a most valuable adjunct to the grain ration when hard flesh is desired.
9. Type of animals fed influences character of meat more than breed, *i. e.*, the fact of an animal being a Yorkshire or a Tamworth will not insure a good bacon carcass, but they must also be of a rangy type and fed in a certain way.
10. Feeding mixed meal (barley, pease and oats) with milk, usually insure firm meat.
11. The greatest gains from a given amount of grain appear to be made when it is ground and soaked for 24 hours. Part of grain fed whole is frequently voided before being digested.
12. Mixed grains are more economical than grains fed pure.
13. Pigs whose rations are limited make, on the whole, more economical gains than pigs that are rushed.
14. Maturity or ripeness of the animal affects the quality of the flesh.

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