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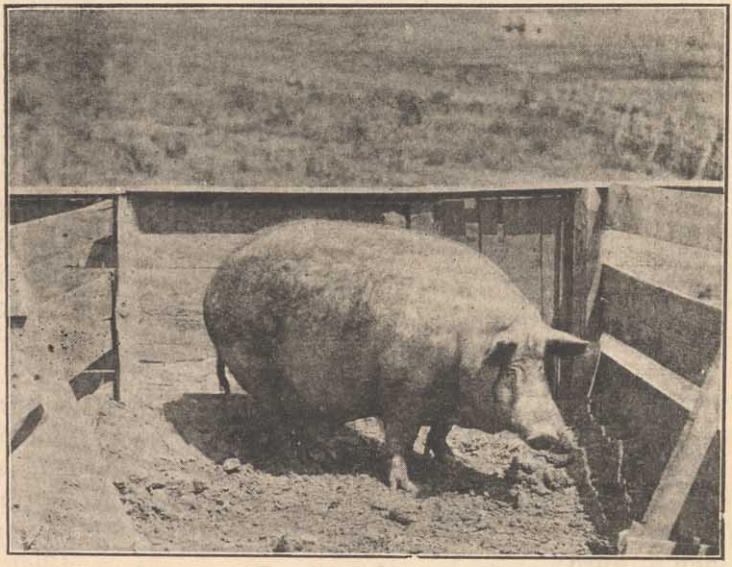

Tamworth Boar, Idaho King No. 872. Weight 935 pounds.

Experiments in Pig Feeding

1. Wet versus dry feed.
2. Slaughter test—Poland-China and Cross-bred Tamworth-Poland-China.
3. Economy in feeding cross-bred pigs.
4. Testing field peas for pasture.

By H. T. French

IDAHO EXPERIMENT STATION

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The regular bulletins of the station are sent free to all citizens of Idaho who request them. Late Bulletins are:

BULLETINS

36. The Codling Moth.
37. Some Conditions of Stock Poisoning in Idaho.
38. Grasses and Forage Plants in Idaho.
39. Some Experiments with Fungus Diseases in 1903.
40. Winter Spraying for the Apple Aphis.
41. Grasshopper and Cricket Outbreaks.

EXPERIMENTS IN PIG FEEDING.

H. T. French.

During the past two years several experiments, in the feeding of pigs with various food materials, and in the testing of several types of pigs, have been conducted at the Experiment Station Farm. The results of the work are set forth in this publication with notes and comments on the points brought out in these feeding tests. The work of feeding, keeping the notes and caring for the animals was performed by Mr. M. F. Wood, Farm Foreman, to whom credit is due for this part of the work.

Experiment No. I.

This experiment was undertaken for the purpose of throwing more light on the subject of feeding wet *versus* dry feed to pigs. While considerable has already been done along this line there still exists a wide difference of opinion in regard to the matter.

The pigs selected for the experiment were eight in number, six of which were Poland-China and two cross-bred Tamworth-Poland-China. They were placed in two lots each containing three of the Poland-China and one of the cross-bred pigs. The cross-bred pigs were spotted in color, some black and white and others sandy in place of white. The pigs were selected so that each lot would be as equal in weight and feeding qualities as possible.

The feeding began May 1st, 1902, and extended to August 27th, 1902, a period of 119 days. The ration consisted of ground wheat from May 1st to June 3rd, when it was changed to a mixture of one-third shorts and two-thirds ground barley. The same amount of grain was fed to each lot through-

out the feeding period. Lot I was fed grain soaked from one feed to the next and Lot II was fed dry grain in a flat-bottomed trough with water in a separate trough nearby. The first lot was given water in trough after grain was eaten.

The pure-bred Poland-China pigs made a better gain than the cross-bred Tamworth-Poland-Chinas.

Below is given a summary of results in tabular form which shows that it required 433 pounds of grain to produce 100 pounds of gain in live weight in the case of the dry fed lot and 485 pounds of grain to produce 100 pounds of gain in Lot I fed on soaked grain. This shows a difference of 11+ per cent in favor of the dry feed. The pigs were weighed every two weeks throughout the feeding period.

SUMMARY OF FEEDING TESTS.

Experiment No. 1.

	No. of Pig	Weight May 1	Weight Aug 27	Gain	Total Gain	Grain Eaten	Grain per 100 lbs. Gain
LOT 1 Soaked Grain	26	64 lbs.	133 lbs.	69 lbs.	303 lbs.	1470 lbs.	485 lbs.
	27	63.5 "	134.5 "	71 "			
	28	90 "	183.5 "	93.5 "			
	29	85.5 "	150 "	69.5 "			
LOT 11 Dry Grain	30	75 lbs.	147.5 lbs.	72.5 lbs.	339.5 lbs.	1470 lbs.	433 lbs.
	31	75 "	156.5 "	81.5 "			
	32	79 5 "	175.5 "	96 "			
	33	88 "	177.5 "	89 5 "			

In a majority of the experiments in this country there is a small margin in favor of soaking grain for pigs and it is especially marked when whole grain is fed. There is only a small per cent in favor of soaked grain when ground. The foregoing experiments seem to indicate a small advantage in

feeding ground grain dry. Experiments by the writer carried on in Oregon in 1894 with a mixture of chopped wheat, shorts, oats and bran showed a slight advantage for the soaked grain. The average results in 12 tests in which 89 pigs were used, reported in a publication from the Bureau of Animal Industry, showed 2 per cent in favor of soaked grain and this was clearly due to the experiments with whole grain, for in several cases the dry ground grain gave the best results. In either case the advantage results are not marked in favor of one method over the other.

Experiment No. 2.

The same lot of pigs, eight in number, used in Experiment No. 1, were used in the following test. This experiment was made with headed wheat as a ration and at the end of the feeding period a slaughter test was made of the cross-bred Tamworth-Poland-China as compared with the pure-bred Poland-China. The pigs were confined in a pen with tight plank floor and were fed all the headed wheat they would eat; but no account was made of the amount consumed. The pigs were supplied with fresh water in trough placed in feeding pen.

The feeding period began August 27th an ended November 13th, making 77 days. The pigs were weighed every 14 days throughout the entire period. Below is given a summary of weights and gains:

SUMMARY OF FEEDING TESTS.

Experiment No. 2.

	No. of Pig	Weight Aug. 27	Weight Nov. 13	Gain	Average Gain
Poland China	27	134.5 lbs.	184 lbs.	49.5 lbs.	53 lbs.
	28	183.5 "	242 "	58.5 "	
	29	150 "	199 "	49 "	
	31	156.5 "	214 "	57.5 "	
	32	175.5 "	226 "	50.5 "	
	33	177.5 "	231 "	53.5 "	
Tomworth-Poland-China	26	133 lbs.	174 lbs.	41 lbs.	42.25 lbs
	30	147.5 "	191 "	43.5 "	

The average gain per day is not large in either lot, the Poland-China making .70 of a pound per day and the cross-bred pigs .55 of a pound.

For the slaughter test two Poland-China sow pigs were selected from the lot to compare with the two cross-bred sow pigs. They were slaughtered on November 13th and careful note made of the weight before slaughtering and of the dressed weight after hanging twelve hours

SLAUGHTER RECORD.

	Live Weight	Dressed Weight	Shrinkage	Blood	Intestines	Gut Fat	Spleen	Heart	Tongue	Liver	Lungs	Leaf Fat	Head
	lbs	lbs	per cent	lbs	lbs	lbs	oz	oz	oz	lbs	lbs	lbs	lbs
Cross-bred.....	174	133.5	23	5	25	2.3	4	8	7	3.2	2.4	4.75	13
Cross-bred..... ..	191	147.5	23	5.5	20	3.1	4	9	8	3.1	2.5	5.25	14.6
Poland-China.....	184	146.5	20-/-	5	21.2	1.75	3	8	7	3.6	2.8	8	12.75
Poland-China..... ..	214	167.5	22	5	23.1	2 8	5	10	8	4	2.5	4.5	15.5

There are no striking features brought out in the slaughter record. There is slightly less shrinkage in the Poland-China than in the cross-bred pigs; but not enough to become of great importance.

One each of the pure-bred pigs and of the cross-bred Tamworth-Poland-China was cut up by the local butcher and the meat was cured in the usual way by him, after which it was sampled and photographed, cuts of which appear in connection with this report.

The cross-bred pork was superior in quality for curing in the following particulars, to-wit: Thinner rind, less fat and larger per cent of lean, even distribution of fat and a finer texture of fiber in meat. The meat was submitted to a cooking test and pronounced of superior quality as compared with that from the Poland-China pure-bred pigs. The fat was uniformly distributed in the cross-bred pigs. There was no appreciable difference in the thickness throughout the entire length of the back. In the Poland-China pigs the fat was considerably thicker over the rump and on the shoulder than along the middle of the back. This detracts from the value of the bacon and hinders in curing the meat uniformly.

It will be seen in the cut showing cured meat that there is considerable larger per cent of lean in the pork from the cross-bred pigs. This could not be attributed to feed in any way, for the pigs were all fed in the same pen, and the same kind of food.

Experiment No. 3.

This experiment was undertaken to determine the economy of feeding cross-bred Tamworth-Poland-China pigs. The pigs were sired by Idaho King, No. 872, American Tamworth Swine Record Association, purchased of the Minnesota Agricultural College in 1900; dam a pure-bred Poland-China sow.

but not recorded. The pigs were all of one litter, farrowed April 19th, 1902. There were three barrows and three sows in the lot. The pigs are shown in the half-tone cut made from a photograph taken just before the pigs were sold to butcher at close of experiment.

KIND OF FOOD.

The pigs were fed, August 28th to September 25th, on shorts soaked from one feed to the next. September 25th the ration was changed to chopped wheat fed in the same way. This ration was fed until November 25th, when it was changed to a mixture of 1-3 chopped wheat and 2-3 pea meal, which ration was continued to the end of the experiment, December 17th. The pigs made the largest gains during the period when the mixture of pea meal and chopped wheat was fed. The mixture was not fed through a long enough period, however, to warrant conclusions regarding its value.

SUMMARY OF RESULTS.

	No. of Pigs	Weight August 28th.	Weight December 17th.	Gain in 112 days	Grain Consumed	Feed per 100 lbs. Gain	Average Daily Gain per pig
		lbs.	lbs.	lbs.	lbs	lbs.	lbs
Cross-bred Tamworth Poland-China	6	458	1254	796	3134	395.7	1.185

The results as shown in table compare very favorably with those obtained by the writer in feeding pigs of other breeds. The ratio of gain to feed consumed is greater than in similar experiments recorded in this bulletin, and in comparing with results in other states where corn was used for a portion of the ration the ratio is still larger. At Wisconsin Experiment

Station it required 404 pounds of grain, corn meal and shorts equal parts, to make 100 pounds of gain.* The following table is taken from a report, "The Hog Industry," by George M. Rommell, published from the Bureau of Animal Industry, Department of Agriculture, Washington, D. C. This table is compiled from results obtained in eight of the Experiment Stations in the United States and Canada.

BREED TEST.

Breed	No. of Tests	No. of Pigs	Feed per 100 lbs. Gain
Tamworth	16	92	344
Chester-White	13	71	347
Poland-China	22	96	357
Berkshire	23	121	369
Large Yorkshire	11	67	407
Duroc-Jersey	11	66	418
IDAHO STATION.			
Cross bred Tamworth-Poland-China	1	6	393.7

The cross-bred Tamworth-Poland-China pig for a bacon hog in our opinion is certainly a very desirable one. The pigs are thrifty from the time they are farrowed until matured.

PROFITS.

As to economy in feeding, the results were quite satisfactory. The pigs sold for six dollars per hundred live weight, which makes a gross profit on increase in weight of $47.76. Estimating grain at $18.00 per ton makes the cost of feed $28.18, which leaves a net profit of $19.58 or $2.46 per hundred live weight. The cost of labor is not taken into the account.

*Report 1888.

Experiment No. 4.

An experiment was conducted in 1903 to determine the value of green peas as a pasture for pigs when supplemented with a part ration of shorts and skim milk. Nine pure-bred Poland-China pigs were used for the test. Six of these were farrowed March 8th and three of them April 28th, 1903.

The variety of peas used was the black-eyed marrow-fat. They were sown May 22nd in a field near the pig pens (¼ of an acre) at the rate of two bushel of seed per acre. The peas came up quickly and made rapid growth. On June 29th the pigs were turned into the field and allowed to return to pen for milk and shorts.

The milk was from the separator and was fed before it had time to sour. The shorts were fed with the milk twice each day, each ration being carefully weighed when fed. At first only one pound of shorts and three pounds of milk per day was fed to each pig. This was increased as the period advanced until the pigs received two pounds of shorts each day and four pounds of milk, which was the maximum feed.

The feeding period extended from June 29th to August 30th, at which time the peas were exhausted, and the experiments discontinued. The pigs were weighed every seven days throughout the experiment.

SUMMARY OF RESULTS IN FEEDING PIGS ON GREEN PEAS, SKIM MILK AND SHORTS.

Breed	No. of Pigs in Lot	Weight June 29	Weight Aug 30	Total Gain 63 days	Grain for 100 lbs. gain	Milk for 100 lbs. gain	Area of Peas
			lbs.	lbs.	lbs.	bs.	¼ acre
Poland-China	9	358.5	827	468.5	215	443	

RESULTS.

As shown in the summary given above the pigs made a very good gain, 468.5 pounds in 63 days, or an average daily gain for each pig of .83 of a pound. It required 215 pounds of shorts and 443 pounds of separated milk for 100 pounds of gain in live weight.

Valuing the increase in weight at six cents per pound, the market price for pork at the time, the financial result would be as follows: Cost of grain eaten, 1008 pounds at $18.00 per ton, $9.07: 2079 pounds of skim milk at 20 cents per hundred, $4.15, making a total cost of $13.22. Taking this from the value of the increase in live weight would leave a balance of $14.89, or $3.18 per hundred pounds gain in live weight. This could be credited to the ¼ acre of peas, which would make an increase from one acre of $59.56. This, of course, is very large and could not be expected from any considerable area.

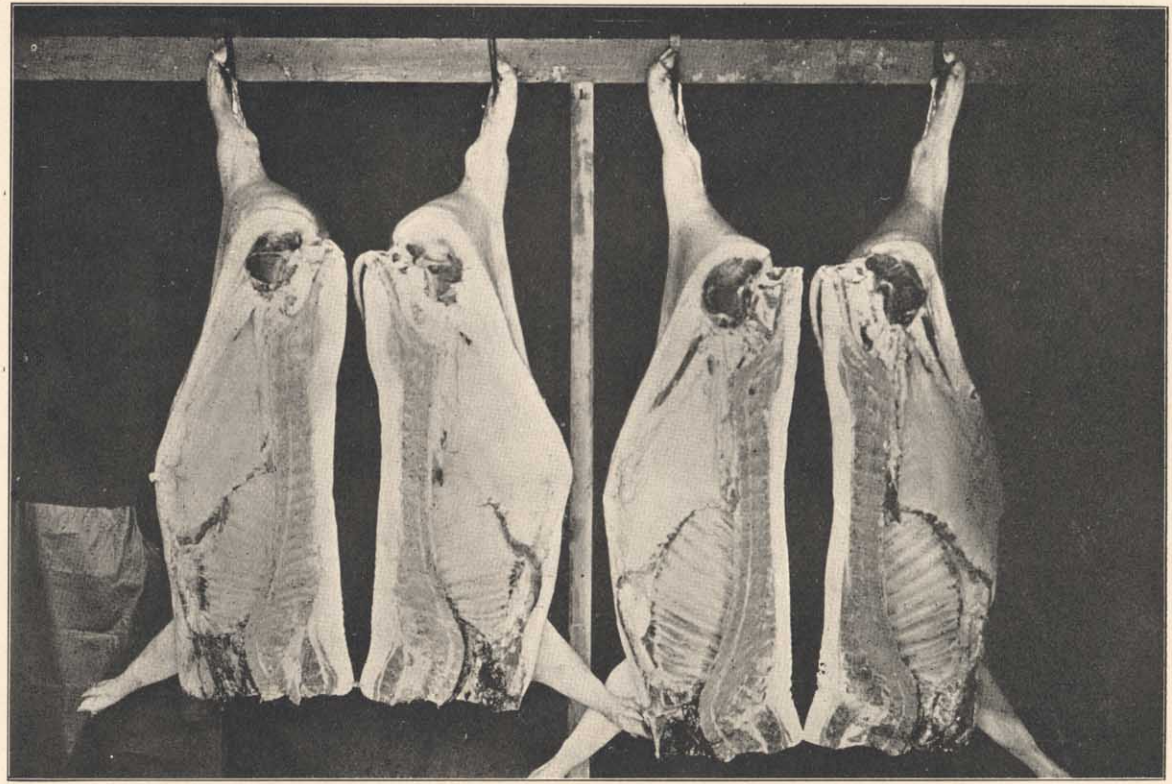
The following table taken from Mr. Rommell's report, Department of Agriculture, Washington, D. C., gives the results obtained at the Utah Station on a pasture of mixed grasses and alfalfa. The pigs were fed milk and whey in this case both taken together under the head of milk.

VALUE OF PASTURE WITH DAIRY BY-PRODUCTS.

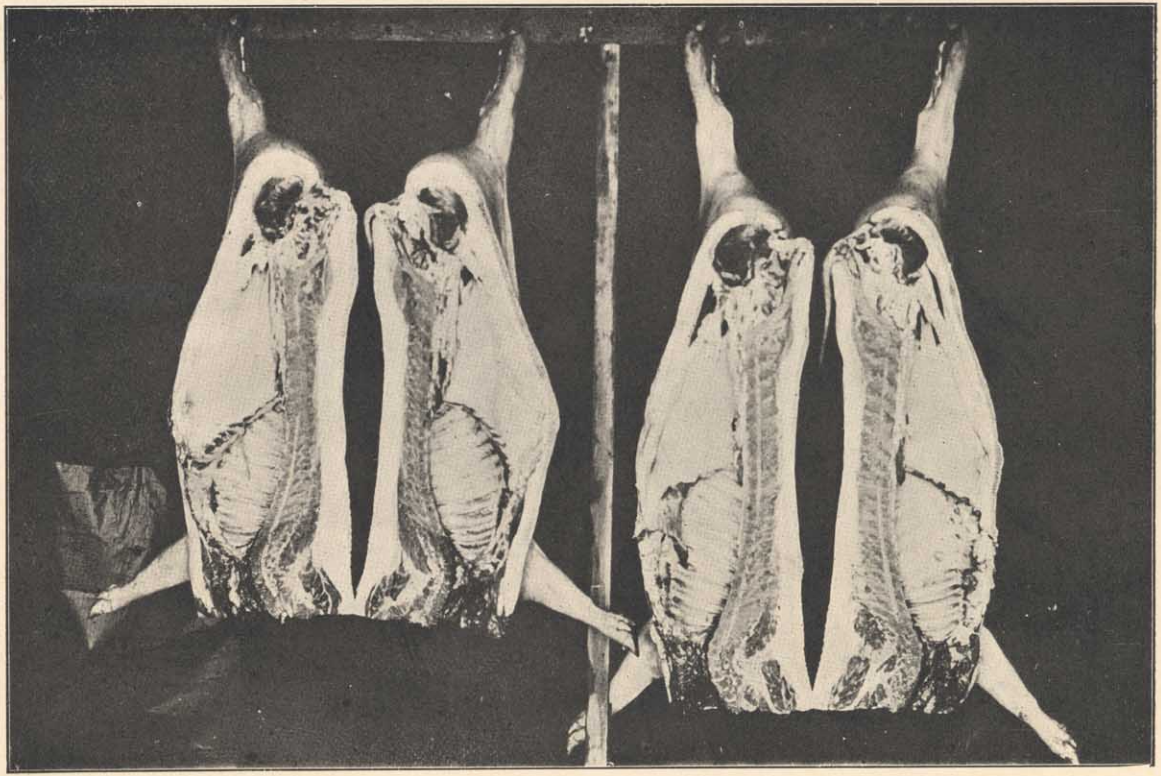
Ration	Total Gain	Average Daily Gain	Feed Eaten Daily		Feed per 100 Pounds Gain	
			Milk	Grain	Milk	Grain
	lbs.	lbs	lbs.	lbs.	lbs.	lbs.
Milk and Pasture	218	0.69	21.00		3034	
Milk	202	0.64	23.54		3672	
Milk, Grain and Pasture	350	1.11	9.56	3.34	859	300
Milk and Grain	366	1.16	10.71	3.13	921	269
Milk, Grain and Pasture	324	1.25	10.11	3.38	805	269
Milk and Grain	351	1.35	11.52	3.24	879	238
Milk, Grain and Pasture	273	1.05	15.65	1.09	1479	139
Milk and Grain	284	1.10	18.12	1.62	1837	147
Average with Pasture	291	1.03	14.08	2.60	1544	236
Average without Pasture	301	1.06	15.97	2.66	1827	218

The conclusions are that *skim milk* is not of much value with pasture and grain, and that *pasture* is not beneficial with milk and grain. The average results with pasture made a saving of nearly 300 pounds of skim milk in producing 100 pounds of live weight but the gain per day is not quite so large with the pasture.

In an experiment conducted by Linfield, Utah Station, the following results were obtained which we copy from the Department Report:



POLAND-CHINA TAMWORTH



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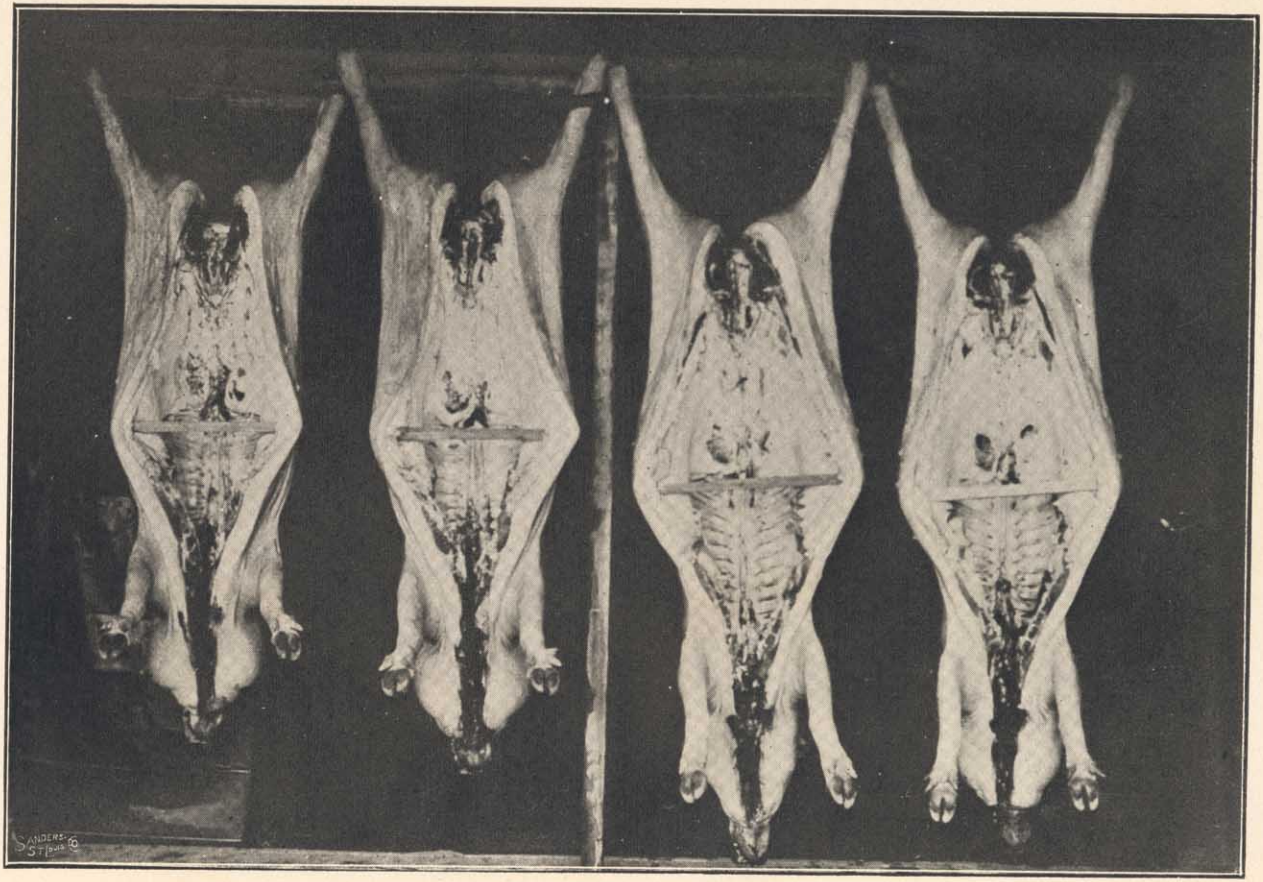

POLAND-CHINA

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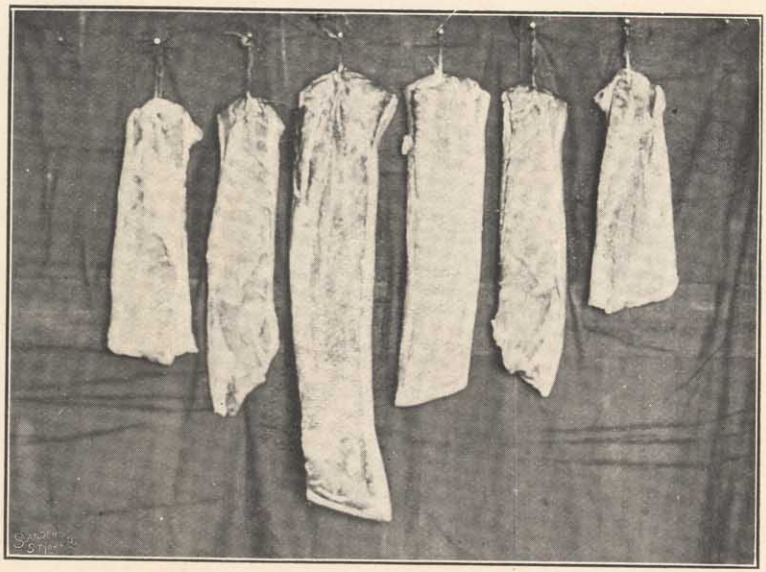

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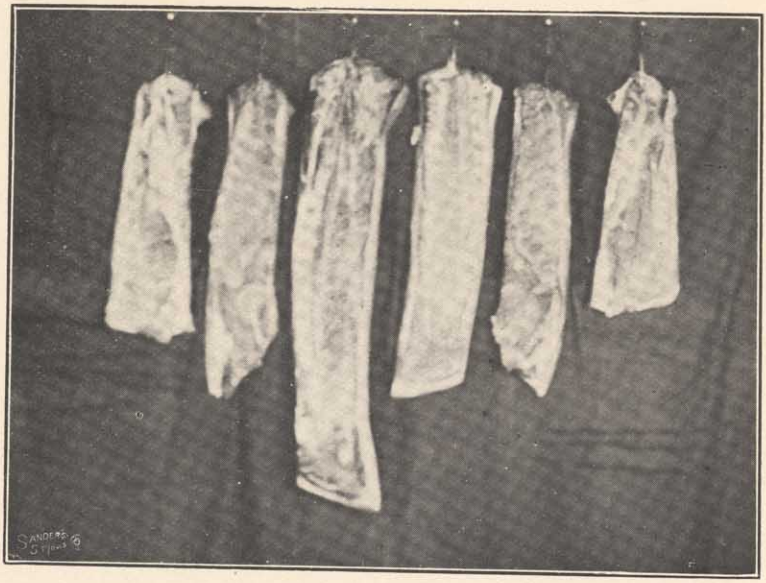

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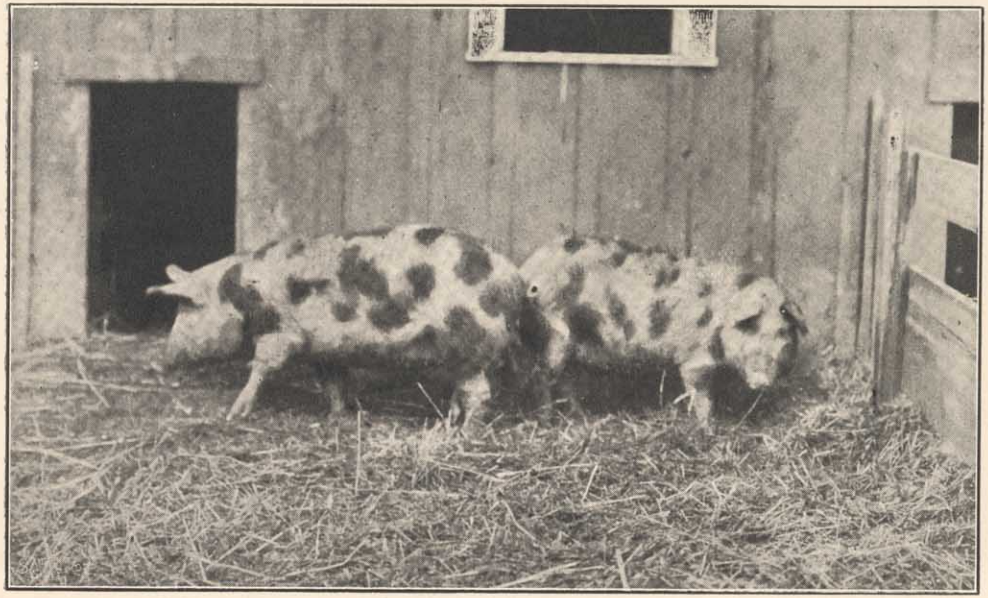

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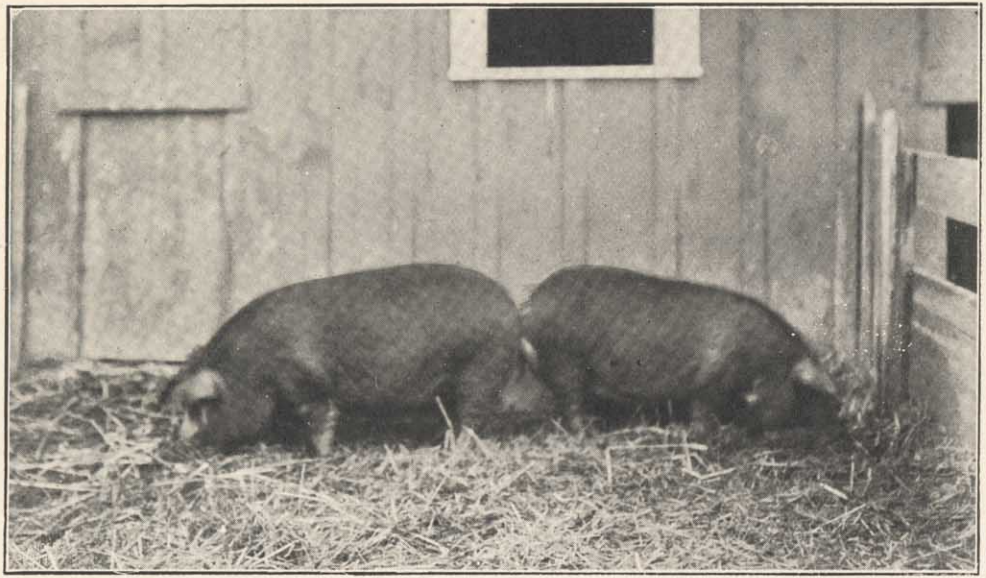

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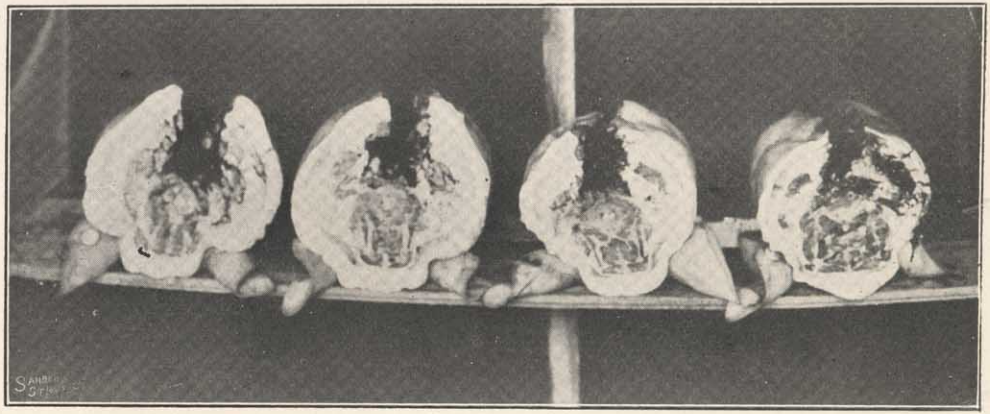

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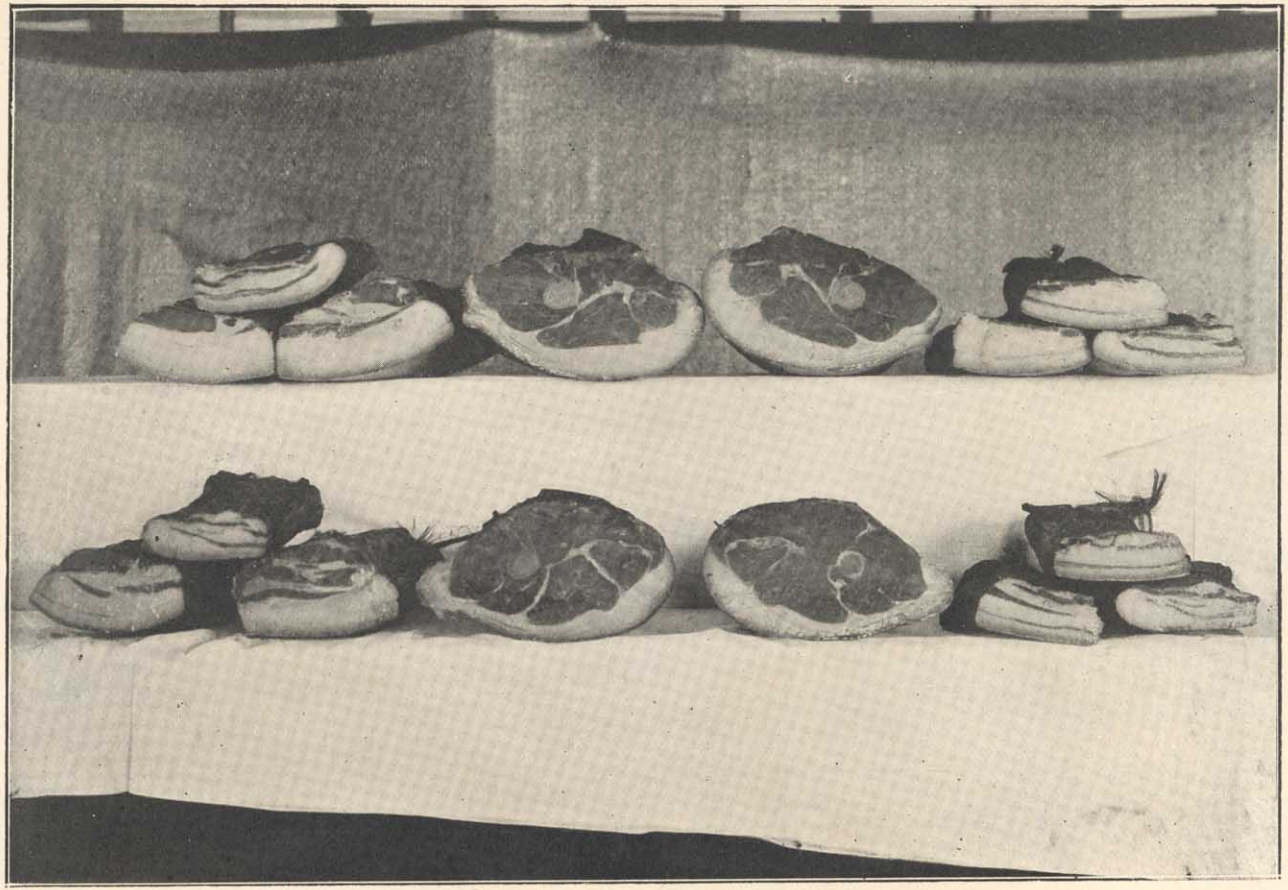
NO. 1
NO. 2

PEN COMPARED WITH PASTURE FEEDING.

Method of Feeding	Average Daily Gain	Dry Matter per 100 pounds Gain	Estimated Digestible Dry Matter per 100 lbs. Gain	Dry Matter Eaten per Day
	lbs.	lbs.	lbs.	lbs.
Fed Milk on Pasture	.70	256	261	1.79
Fed Milk in Pen	.65	310	275	2.00
Milk and Grain on Pasture	1.12	319	261	3 58
Milk and Grain in Pen	1.17	320	232	3.78
Grain on Pasture	.81	355	268	4.35
Grain in Pen	.51	443	334	2.28

According to this table the pigs doing the best are those having milk and grain in pen; but the results are not very marked. The results from grain on pasture are far better than those from grain alone in pen. The pasture in this case was alfalfa. It is safe to conclude that a combination of grain and pasture gives the best results and in this region field peas will supply a cheap, easily obtained source of green feed for pigs. Clover and alfalfa are the best permanent pasture crops for pigs and where these can be grown as easily as in most portions of Idaho, no farmer can afford to be without them.

When we consider the economy of feeding, which after all should be the final test, again a combination of pasture and grain gives the best results. The nature of the pasture will always be an important factor. Dwarf Essex rape and field peas make a good annual crop for pigs in this section and in all high altitudes. We have so far found the black-eyed marrow-fat pea superior to the white Canada field pea. but conditions of soil will modify the results very much. On low, black, rich soil the marrow-fat grows a little too rank, but on dryer, less fertile soil we have found that the marrow-

fat produces more forage and keeps fresh longer in the season.

There is one point worthy of mention in sowing the peas and that is to plant them deep enough to prevent dryng out. If planted near the surface the plants will not withstand drouth so well. We plant them not less than four inches deep and cover them by plowing under. A week or ten days after plowing under, the ground is harrowed thoroughly. This breaks the surface and prevents evaporation, and assists the young plants to come through; and if desired for hay or soiling purposes oats can be sowed at time of harrowing. This will give the peas a start and prevent the oats from choking them out. Further pasture experiments will be carried on at the Station, using alfalfa, clover and annual forage crops in the tests.