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# Agricultural Experiment Station.

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- I.—COMPARISON OF CORN; BARLEY; CORN AND SHORTS; BARLEY AND SHORTS; CORN, SHORTS AND OATMEAL; AND BARLEY, SHORTS AND OIL MEAL IN THE RATION OF GROWING PIGS.
- II.—CORN VS. BARLEY FOR FATTENING HOGS. III.—CORN MEAL, BARLEY MEAL AND A MIXTURE OF BARLEY MEAL AND OIL MEAL COMPARED.
- IV.—WET VS. DRY FEED.

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## CORN VS. BARLEY.

CLINTON D. SMITH.

While the popular taste demanded a heavy and excessively fat hog to bring the highest price in the general market, profitable pork production on a large scale was confined to those states in which was found the peculiar combination of soil and climate best adapted to corn growing. Corn stands easily at the head of our American cereals for fattening swine, but it has not yet been shown that its superiority extends to the feeding of young or growing pigs. In England and on the continent of Europe barley occupies a relation to swine production similar in some respects to the place occupied by corn in America, and Sir John B. Lawes has gone so far as to say that barley is the natural food of the civilized pig.

The late frosts of spring and the early ones of autumn make corn an exceedingly precarious crop in all the northern parts of this state while barley is at its best in those latitudes. To study the question, therefore, whether barley could be substituted for corn in the ration of pigs, experiments were undertaken during the summer of 1891.

Thirty-four pigs as nearly alike as possible were selected from the farm herd on the 21st of July and divided into six groups, two of five pigs each, called pens 9 and 10, and four of six pigs each, called pens 11, 12, 13 and 14. Due care was taken to have the pigs in each pen mated in all respects with the pigs in every other pen so that the results of the feeding test with all the pens are comparable. The average weight of the pigs was then 42 pounds. After a preliminary feeding period of one week, during which each pen received the food which was to constitute its ration during the entire experiment, each pig was again weighed on two successive days and the average of these two weights was taken as the original



Those in pen 9, fed exclusively on corn meal, had developed a strong tendency to lay on fat rather than make a normal growth of bone and muscle. The pigs were short, inclined to be pot-bellied, were all of them overly fat, deficient in vitality and in every way gave evidence of the lack of bone and muscle producing materials in their diet. The experience of practical feeders and a multitude of trials at experiment stations have demonstrated that corn meal alone does not contain all the elements necessary to make a healthy growth in the young of our domestic animals. If the attempt is made to feed young pigs just weaned, on corn meal either alone or as the chief article of diet the bowels will be found either constipated or too loose, the appetite will be irregular and the growth unsatisfactory, there being too great a tendency to become fat and too small a development of the bones and muscular system. The results of this experiment point to the same conclusion.

The pigs fed on barley alone did not show this unfortunate tendency to so great an extent. They were more active, more muscular, longer bodied and had not the potty appearance of the pigs in pen 9. The other four pens, although showing to some extent the deleterious effects of too close confinement at that hot season of the year, had none of this tendency to the laying on of too much fat but throughout the experiment were lively, vigorous and thrifty.

The average gain per pig in the lot fed barley alone, pen 10, was 23.8 lbs. for the five weeks, while in the case of the corn fed lot it was but 18.4 lbs., a difference of 5.4 lbs. of gain per pig in favor of the barley. The addition of shorts to both corn and barley had the effect of increasing the gain very noticeably. The average gain per pig in each of the lots fed a mixed diet was almost identical, namely 33.7 lbs. and 33.3 lbs. where shorts alone was added, and 34.8 lbs. and 34 lbs. where oil meal formed a fifth part of the ration.

One hundred pounds of corn meal fed to the small pigs in pen 9 produced but 17.9 lbs. of gain but where, as with pen 11, one half of the corn meal is replaced by shorts one hundred pounds of this mixture produced 24.9 lbs. of gain, a difference of 7 lbs. in favor of the mixed diet. Where one-fifth

of the ration otherwise composed of equal parts of corn and shorts consists of oil meal the gain per hundred pounds of the mixture consumed was 27.1 lbs. or 2.2 lbs. of gain in excess of that of corn and shorts and 9.2 lbs. more gain for each hundred pounds of the mixture than was produced from a hundred pounds of corn meal alone.

Where barley formed the basis of the ration the advantages of adding shorts or shorts and oil meal to the single grain feed are not so apparent. One hundred pounds of barley meal gave in pen 10 a gain of 21.4 lbs., one hundred pounds of barley and shorts in pen 12 a gain of 26.2 lbs. and barley and shorts with a fifth part of oil meal gave in pen 14 a gain of 28 lbs. per hundred pounds of feed consumed.

Comparing now barley either alone or mixed with other feeds with corn in the same situation it is to be noted that while the gain in pen 10 fed exclusively on barley was in the proportion of 21.4 lbs, for each hundred pounds of barley consumed, that of pen 9 fed on corn meal was 17.9 lbs. of gain for each hundred pounds of food consumed, a difference of 3.5 lbs. of gain per hundred of feed in favor of barley. Where shorts was fed with the barley and corn there is a difference of but 1.3 lbs. of gain per hundred weight of feed consumed in favor of barley and where oil meal was added in the proportions indicated this difference is reduced to .9 of a pound.

Two points are thus clearly indicated by the results of this period of the experiment. To make rapid growth with young pigs a mixed diet is essential. This mixture or variety of foods may be obtained either by turning the young pigs out to pasture or if confinement is necessary by feeding more than one kind of grain. The addition of oil meal seemed to slightly increase the total gain during this early period of their growth and gave the pigs a glossiness of coat and general air of thriftiness not possessed by the other pens. These increased gains made by the pigs having a mixed diet were put on with a noticeably less proportion of food consumption. This was undoubtedly due largely to the fact that these pigs had a better appetite and consumed a greater amount of food than the pigs having the corn or barley alone. For,

since a certain amount of food must be consumed in maintaining the life of the animal, supporting the vital functions and replacing the tissues necessarily worn out, the more an animal can be induced to eat and digest the greater will be the surplus available for building up new tissues or laying on fat.

In this experiment barley seems to have been more valuable pound for pound than corn in growing these young pigs. Fed alone one hundred pounds of barley produced 3.5 lbs. more of gain than one hundred pounds of corn, and even when mixed with either shorts alone or shorts and oil meal a slight advantage seems to lie on the side of barley.

#### PERIOD II.

In the following table is given for the second period of five weeks statistics similar to those recorded in table one for the first period.

TABLE II.  
PERIOD II.—FIVE WEEKS.

Pens—	9	10	11	12	13	14
	Corn.....	Barley.....	Corn and shorts.....	Barley and shorts.....	2-5 corn, 2-5 shorts, 1-5 oil meal.....	2-5 barley, 2-5 shorts, 1-5 oil meal.....
Average weight September 2 .....	71.	75.2	84.7	82.	89.3	81.3
October 7.....	85.4	112.4	125.8	122.5	129.3	119.3
Average gain.....	14.4	37.2	41.1	40.5	40.	38.
Total weight September 2.....	355.	376.	508.	492.	536.	488.
October 7.....	437.	562.	755.	735.	776.	716.
Total gain .....	82.	186.	247.	243.	240.	228.
Food consumed.....	538.	872.	1131.	1062.	1158.	1080.
Lbs. gain for each 100 lbs. of feed .....	15.2	21.3	21.8	22.8	20.7	22.

A comparison of the two tables shows that with the single exception of pen 9 each pen shows a greater average gain per pig and a greater aggregate gain in the second period than in the first. In the case of pen 9 the appetite of the pigs owing to the confinement of the diet to the single very imperfect food, Indian corn, was very irregular and the gain was unsatisfactory. With barley on the other hand the appetite was noticeably better and the average gain nearly as great as in the pens which received a mixed diet. The

superiority of barley over corn as a food for young pigs is evidenced by the behavior of these two pens, 9 and 10, in both feeding periods.

As in the former period, when mixed with shorts, barley seems to be more effective with these pigs than corn in a similar mixture. As was to be expected, since older animals are never able to show as great gain in proportion to food consumed as younger ones, the gain for each hundred pounds of feed is less with each pen in this period than in the former one, but here also the advantage lies with the barley. Pen 10 showed in the second period a gain of 21.3 lbs. for each hundred pounds of food consumed, in period one a gain of 21.4 lbs. for each hundred pounds of barley, the decrease for this pen being less than for any other.

When fed as the exclusive feed, one hundred pounds of barley produced 6.1 lbs. more gain than one hundred pounds of corn; when mixed with shorts one hundred pounds of the mixture gave a gain greater by one pound than corn and shorts and when oil meal was added to each mixture the difference in gain in favor of barley was 1.3 lbs. The pens 11 and 13, however, in both periods made a slightly larger gain than did pens 12 and 14 but consumed also more feed. The addition of oil meal to the ration, seemed in this period to lessen rather than increase its effectiveness. The total gains were slightly less with the pigs to which the oil meal was given and the amount consumed was slightly greater. As the average weight of the pigs was at this time not far from 100 pounds the indications of this one experiment are that oil meal is more valuable with pigs under this weight than with larger ones. Oil meal is a food for which pigs have not the craving which is essential to make its use in fattening swine profitable.

The appetite of the pigs in pen 9 was very irregular and they could be induced to eat but little more than enough to sustain life, notwithstanding the fact that they had condimental food, ashes, charcoal and salt, in abundance. Where however, the corn is mixed with shorts or with shorts and oil meal the pigs ate considerably more of it than they did of similar mixtures of barley. They made correspondingly

larger gains and at no greater proportional expense of food consumption.

PERIOD III.

At the close of the second period the pigs had attained an average weight of 120 pounds and the fattening period proper began. One pig was taken from each pen and the same system of feeding was carried on with the remaining ones during a period of four weeks ending November 4th. The results for this period are given in table.iii.

TABLE III.  
PERIOD III.—FOUR WEEKS.

Pens—	9	10	11	12	13	14
	Corn.....	Barley.....	Corn and shorts.....	Barley and shorts.....	2.5 corn, 2.5 shorts, 1.5 oil meal.....	2.5 barley, 2.5 shorts, 1.5 oil meal.....
Average weight October 7 .....	88.5	117.5	129.	125.	139.2	123.8
November 4 .....	98.7	138.	160.	149.	169.	158.
Average gain 4 weeks .....	10.2	20.5	31.	24.	29.8	20.2
Total weight October 7 .....	354.	470.	645.	625.	696.	639.
November 4 .....	395.	552.	800.	745.	845.	740.
Total gain .....	41.	82.	155.	120.	149.	101.
Feed consumed .....	328.5	525.5	893.	821.5	924.5	853.
Lbs. gain for each 100 lbs. of feed .....	12.4	15.6	17.4	14.6	16.1	11.9

It is to be noted in the first place that the pens to which oil meal was fed gave a less return for each hundred pounds of feed consumed than did the corresponding pens fed corn and shorts or barley and shorts. That is: pen 13 returned but 16.1 pounds of gain for each 100 pounds of feed consumed, while pen 11 produced 17.4, showing a positive disadvantage in this case in the use of oil meal. A comparison of pen 14 with pen 12 leads more emphatically to the same conclusion. Pen 13, however, consumed 31.5 pounds more feed than pen 11 and pen 14 consumed 31.5 pounds more feed than pen 12, yet the total gain is six pounds less in pen 13 than pen 11 and 19 pounds less in pen 14 than in pen 12. The behavior of the pigs in this period goes to confirm the results of the previous period and clearly indicates that for this lot of swine oil meal, however valuable for young and

growing pigs, is not adapted to fattening swine.

Comparing now the results obtained by feeding corn with those where barley was used we find that with the exception of pens 9 and 10 the gain is greater with the pens fed on corn than with the pens fed on barley. The total gain of the five pigs in pen 11 was 155; in pen 12, 120. In the lots fed with oil meal the corn fed pigs gained 149 while those consuming barley gained but 101. Moreover, this gain was accomplished with a much less proportional food consumption on the part of corn than of the barley. One hundred pounds of corn and shorts made with pen 11, 16.4 lbs. of gain, while the pigs in pen 12 gained but 14.6 pounds for each one hundred pounds of barley and shorts consumed. A similar difference of 4.2 lbs. of gain per hundred weight of feed consumed in favor of corn is noticed when pens 13 and 14 are compared. These results are diametrically opposed to those obtained in the first two feeding periods, where the advantage in every case lay on the side of the barley. This leads us to the conclusion that barley is inferior to corn for fattening swine while it will compare favorably with corn in the ration of young pigs.

\*In an experiment conducted by Prof. W. A. Henry, at the Wisconsin station, for the purpose of determining the value of barley in comparison with corn for fattening hogs, ten hogs, fourteen months old and weighing on the average 208 pounds each, were used. They were divided into two even lots of five hogs each to one of which barley meal was fed and to the other corn meal. He found after continuing the experiment eight weeks that it required 8 per cent more barley meal than corn meal to produce 100 pounds of gain. These results are substantially in accord with those obtained in the third period of this experiment. In both cases the hogs were being fed for fattening and not for growth, and for this purpose there is no question but that corn is better.

In the Journal of the Royal Agricultural Society, Vol. 14, O. S., page 459, is recorded an experiment performed by Sir J. B. Lawes at Rothamstead in February, 1850. He fed a

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\*Seventh Annual Report Wisconsin Station, page 64.

pen of three pigs on corn meal alone for eight weeks. The pigs consumed 1086 pounds of corn meal and made a gain of 221 lbs., or a return of 20.3 lbs. of gain for each hundred pounds of meal consumed. The average weight of these pigs at the beginning of the experiment was 143 lbs.

In May of the same year he fed a pen of three pigs averaging 147 lbs. in weight on barley meal. The conditions of this feeding period were the same as those of the corn fed lot in the February previous, except that the weather was exceedingly hot for several days during its progress. These pigs made a total gain of 291 lbs. consuming 1644 lbs. of barley, a gain of 17.7 lbs. per hundred lbs. of barley. These pigs were also nearly as mature as the pigs in our experiment at the beginning of the third period, hence our results are not contradictory.

#### CONCLUSIONS.

In order to exclude the uncertain factor, the amount of pasture which pigs would consume, it was impossible in this experiment to allow the pigs to run either to clover, peas or even good blue grass pasture. The gains made by the pigs even in the pens which showed the best results are therefore small. To make pig growing profitable the brood sows and the young pigs, all their lives up to the time when they are shut up for fattening, should have the run of a good pasture, preferably clover or peas; but to reach conclusions anything like definite in this experiment we were obliged to keep the pigs closely confined.

(1) When fed as the entire ration of pigs weighing on the average 52 lbs. at the beginning of the test, one hundred pounds of barley meal was found to produce as great a gain as 119.5 lbs. of corn meal.

(2) When mixed with shorts in equal parts and fed to pigs of the average weight of 50 lbs., one hundred pounds of barley meal and shorts produced as great a gain as 105.2 lbs. of corn meal and shorts.

(3) When to the mixtures with shorts one-fifth part of oil meal is added then one hundred pounds of barley meal, shorts and oil meal produced as great a gain as 103.3 lbs. of corn meal, shorts and oil meal.

(4) The older the pig grows the more food it takes to produce a pound of gain.

(5) In this experiment the addition of oil meal to the ration of either barley meal and shorts, or corn meal and shorts after the pig had attained an average weight of slightly over a hundred pounds, was deleterious.

(6) The continued use of corn meal as the sole food of growing pigs was found to be productive of too great a tendency to become excessively fat without a normal growth of bone and muscle and to produce unhealthy pigs, while the use of barley alone was not attended with this result.

(7) The pigs throughout the experiment consumed more corn meal and shorts than barley meal and shorts, produced a greater gain with the former than the latter but, except in the third period, at a greater expense of food consumption.

(8) The same relation holds good where oil meal forms a fifth part of the ration.

(9) When fed to pigs weighing 125 pounds or more one hundred pounds of corn meal and shorts produced as great a gain as 119.1 of barley meal and shorts.

(10) When fed to pigs weighing 125 pounds or more one hundred pounds of corn meal, shorts and oil meal, mixed as indicated, produced as great a gain as 135.2 pounds of barley meal, shorts and oil meal.

## CORN VS. BARLEY FOR FATTENING HOGS.

W. M. HAYS.

On the 6th of October, 1891, two groups of hogs, taken from a woods pasture where they had been kept in fair growing condition by some grain food, were placed in pens with ample yard room for exercise, and were fed, one corn meal and the other barley meal, to compare these grains for fattening hogs. In each group was a young Essex sow weighing at the beginning about 160 pounds, one Berkshire sow, one Berkshire barrow, and two cross bred Jersey Red Poland China sows, all four of which weighed in the neighborhood of three hundred pounds each. The two groups were well matched as to breeding, appearance, size, etc. They were all in good condition to make rapid gains and the individuals in each pen on the same ration made comparatively uniform gains. Pen A was fed corn meal of good quality and made on an average for the entire period of 51 days one pound of pork for each five pounds of grain eaten or 11.2 pounds of pork for each bushel of corn. Barley meal was fed to pen B, the meal simply being moistened as with the corn. The barley used was from four small lots purchased for feeding our general stock of hogs. As the hogs in pen B showed a decided dislike for one or two lots of this barley the notes were so kept that the results of feeding each lot or quality of barley could be shown in comparison. The barley fed pen B during several days of preliminary feeding and during the first period of sixteen days, October 6th to 21st inclusive, was not relished by the hogs. It was "off color" and had a slightly musty odor. During the second period of seven days, Oct. 22nd to 28th inclusive, good barley was given and was eaten with greater relish by the hogs. During the third period of fourteen days, Oct. 29th to Nov. 11th inclusive, another lot of barley almost as poor as that fed during the

first period was given and with a similar lack of relish shown by the hogs. During the fourth period of fifteen days, Nov. 12th to 26th inclusive, barley of good quality was fed again. The accompanying tabular statements gives the summarized results. Not forgetting the comparison of corn with good barley special attention is directed to the lesser amount of barley eaten per hundred weight of hog when barley lacking flavor was fed as compared with bright barley of good flavor; also to gains resulting.

CORN, GOOD BARLEY AND POOR BARLEY COMPARED.

			No. hogs in lot	Barley meal fed, lbs.....	Corn meal fed, lbs.....	Total gain lbs	Average gain per day per head, lbs.....	Pounds fed to lb. gain..	Am't eaten pr 100 lbs. live wt per day.
1st period 16 days.	Corn vs. poor barley.	Pen A.	5		933.	207.	2 3-5	4.5	4.
		Pen B.	5	628.5		77.	1	8.2	2.8
2d period 7 days.	Corn vs. good barley.	Pen A.	5		451.5	116.	{ nearly 3 1/8 }	3.9	4.
		Pen B.	5	374.		94.	2 4-5	4.	3.6
3d period 14 days.	Corn vs. poor barley.	Pen A.	5		829.5	170.	2 3-7	4.9	3.2
		Pen B.	5	507.5		33.	1/2	15.4	2.3
4th period 14 days.	Corn vs. good barley.	Pen A.	5		935.	135	1 4-5	6.9	3.4
		Pen B.	5	784.		101	{ nearly 1 2-5 }	7.8	3.4

SUMMARIZED AVERAGE RESULTS.

	Wt. at beginning of 1st period.....	Wt. at end of 4th period..	Corn to 1 lb. gain for the whole time.	Barley to 1 lb. gain for the whole time.	Good barley to 1 lb. gain	Poor barley to 1 lb. gain
Pen A .....	1362	1990	5.			
Pen B .....	1364	1669		7.5	5.9	10.3

The comparison of corn and good barley was hardly fair at any time. The fact that good bright malting barley is of more feeding value than that considerably "off" color and flavor is certainly here illustrated.

## CORN MEAL, BARLEY MEAL AND A MIXTURE OF 9-10 BARLEY MEAL AND 1-10 OIL MEAL COMPARED.

W. M. HAYS.

June 22nd to July 21st inclusive, 1891, five groups of hogs were fed to compare corn, barley and a ration of 9-10 barley and 1-10 old process linseed oil meal. Groups A and B were made up of a lot of shoats of mixed breeding farrowed the fall previous. Each of these two groups contained two sows and one barrow  $\frac{3}{4}$  Jersey Red and  $\frac{1}{4}$  Poland China; one sow and one barrow  $\frac{1}{2}$  Berkshire,  $\frac{1}{4}$  Jersey Red and  $\frac{1}{4}$  Poland China; and three  $\frac{1}{2}$  Jersey Red and  $\frac{1}{2}$  Essex, in all eight, and so divided that each pen was of the same weight and otherwise well mated. Groups C, D and E each had one yearling full blood Berkshire sow of the family known on the station farm as Bell, one of the Nora family and one of the Hipplewaith family, making three hogs in each pen, the groups being well proportioned. To pen C corn was given the same as to pen A; pen D was fed barley the same as B and pen E was fed a ration of 9-10 barley and 1-10 oil meal. The meal for all groups was mixed with only enough water to moisten it without making the mixture sloppy. The feed for morning was mixed in the evening and noon and evening feeds were mixed in the morning, thus always insuring that the meal was not sour. The hogs were all given access to salt, sulphur and charcoal mixed together in boxes. They were all similarly situated as to shade, small yard to exercise in, water ad libitum, etc. The desire for green feed at this time of year so strongly manifested itself that, on July 2nd the feeding of mixed oats and peas, nearing the flowering stage was begun and continued to the end. For six days pens A and B were given eight pounds daily of this green stuff and pens C, D and E were given five pounds each. On July 7th

the allowance of green peas and oats to pens A and B was increased to 13 pounds daily and without farther change the feeding was thus continued to the end. Each group was fed all the meal it was found safe to give and avoid overfeeding. The following tabular statement shows the general result:

CORN MEAL, BARLEY MEAL AND 9-10 BARLEY 1-10 OIL MEAL  
COMPARED.

Pen.		Pounds grain fed.....	Pounds green peas & oats fed.....	Average gain per day and head.....	Pounds grain to 1 lb. gain..	Total gain.....	Pounds grain eaten per day per 100 lbs. live weight...
A	Corn meal.....	1277.5	259	1.14	4.7	273.3	4
B	Barley meal.....	1274.	159	1.04	5.08	250.8	4.
C	Corn meal.....	675.	100	1.15	5.3	106.6	3.4
D	Barley meal.....	868.	100	1.06	5.58	149.2	4.
E	9-10 barley.....	811.8	100	1.07	5.6	106.	4.2
	1-10 oil meal.....	90.2					

With pens A and B considerable less corn than barley was consumed to make a pound of pork while in pens C and D the result is reversed. The addition of 1-10 of oil meal to the barley given in pen E made only a slight decrease in the pounds of grain needed to make a pound of gain.

## WET VS. DRY FEED.

CLINTON D. SMITH.

The object of this experiment was to aid in determining whether a ration composed of two parts corn meal, two parts shorts and one part old process oil meal would produce when fed dry, greater or less gain than when mixed with sufficient water to form a thick slop. Incidentally a study was made of the value of charcoal.

Twelve pigs were selected for this experiment, six from a litter whose dam was a half Duroc and half Yorkshire sow, the sire an Essex boar. These pigs were either black or white and were farrowed June 11, 1891. The litter from which the other six pigs were selected was farrowed June 7th by a Duroc Jersey sow, the sire being a recorded Berkshire. These pigs were all red.

On the first day of August these twelve pigs were divided into four groups of three each and a preliminary feeding period of one week began. The average weight of the pigs at that time was  $28\frac{1}{2}$  pounds. At the close of the week, August 8, it was found that the gains of the pigs had not been uniform but it was decided to carry forward the experiment with the pigs arranged as they were, due care having been taken at the outset to have the pens as evenly matched as to thriftiness, weight and breeding as possible. The pigs were accordingly re-weighed August 8th and the experiment proper began. Pens I and IV received their feed mixed into a thick slop with cold water, pens II and III were fed the same kind of food but dry. The feed for all pens was a mixture by weight of two parts corn meal, two parts shorts and one part old process oil meal. Each lot was fed in a small pen with a large yard adjacent giving the pigs the necessary exercise. Pens I and II were fed all the charcoal they would eat while pens III and IV had none. The results of the trial which extended over a period of sixteen weeks ending November 28th are recorded in the following table:

TABLE IV.

Pens—	I.			II.			III.			IV.		
	Feed Wet. (With Charcoal.)			Feed Dry (With Charcoal.)			Feed Dry.			Feed Wet.		
	Black Bar- row.....	Red Sow.....	Red Barrow..	Black Sow.....	Blk Barrow..	Red Sow.....	Red Sow.....	Red Barrow..	Blk Barrow..	Red Sow.....	Blk Barrow..	Black Sow.....
Weight August 8 .....	21.5	36.	43.5	30.5	20.5	34.5	41.5	32.5	24.5	36.5	26	28.5
Weight November 28 .....	118.5	147.	178.5	119.	86.	126.	132.5	124.	91.	136.	95	129.
Gain .....	97.	111.	135.	88.5	65.5	91.5	91.	91.5	66.5	99.5	69	100.5
Total gain of pen .....			343.			245.5			249.			269.
Feed consumed .....			1500.5			1085.			1140.5			1233.5
Charcoal eaten .....			64.			80.	none	none	none	none	none	none
Gain per 100 lbs. of feed .....			22.2			22.6			21.8			21.8

The greatest gain made by any pen was 346 lbs., made by pen I, which consumed 1500.5 lbs. of feed. This was a gain of 22.2 lbs. for each hundred pounds of food consumed. Pen II consumed but 1085 lbs. of feed and made a gain of 245.5 lbs. or at the slightly better rate of 22.6 lbs. of gain for each hundred pounds of grain eaten. Pen II consumed 80 pounds of charcoal, 25 per cent. more than the amount eaten by pen I. Whether this was due to the feed being given dry to pen II and wet to pen I there was nothing in the behavior of the pigs to indicate. Looking at the economy of food consumption alone no great advantage seems to lie with either method of food preparation; but, when we consider that the one pen converted 50 per cent. more feed than the other into pork in the same length of time and equally as economically, if there is any profit in feeding the grain at all the aggregate profit of one pen must be 50 per cent. greater than that of the other.

Pen III received no charcoal and was fed dry feed. Of this these three pigs consumed 1140.5 lbs. and made a gain of 249 lbs. Pen IV received no charcoal but the feed was fed in the form of a thick slop. The pigs in this pen made a gain of 269 lbs. from 1233.5 lbs. of feed. The rate of gain in proportion to food consumed is identical with that of pen III, with which it is comparable. As in the case of the other two pens the pigs receiving the feed wet ate more of it and made a correspondingly larger gain. Judging from the behavior of the pigs in these four pens it may be safe to conclude that for the ordinary farmer who desires his pigs to grow as rapidly as possible it is an advantage to feed the food wet rather than dry.

It is to be noted that the pens fed charcoal produced 22.2 and 22.6 pounds of gain for each hundred pounds of food consumed while the pens without charcoal produced but 21.8 pounds a difference of .6 of a pound in favor of the pens receiving the charcoal.

The two pens receiving charcoal taken together made a gain greater by 70.5 pounds than the pens receiving none and consumed but 211.5 pounds more feed, showing a distinct benefit from the use of the charcoal.

A point of importance as to its bearing on the experiment as a whole is the difference in gain made by the individual pigs in each pen. While fed and treated in every way the same, the six red pigs gained 619.5 pounds and the six black ones 487 pounds, a difference of 132.5 pounds or more than one third of the entire gain of the black pigs. Unfortunately the amount eaten by each pig was not separately kept and we can only presume that the red pigs ate proportionately more feed than the black ones. However this may be it is evident that the profit in swine feeding depends largely upon the quality of the hogs selected to feed. Individuality plays too, an important part in all feeding experiments.

A German writer in the *Milch-Zeitung*, page 421, May 30th, 1888, has this to say in regard to feeding meal dry or wet: "Though, it is true that the two methods of feeding meal, dry and mixed directly in the drinking water of swine, obtain, it may be said that the last method though the more common is the least practical. It should be remembered also that the hog has a very simple digestive apparatus and that in his voracity he gulps down without chewing whatever he can thus swallow. Chewing, that is the mixing of the dry food with the saliva, is the first act of digestion. If now the meal is put directly in the drinking water, the hog gulps it down without mixing with it any appreciable quantity of saliva. Digestion which is the abstraction of the valuable ingredients from the food is thereby decidedly lessened and the food materials pass through the alimentary canal unutilized. But if the meal is given dry the hog can not swallow it without mixing saliva with it."

"Dr. Bruemmer, director of the agricultural school in Kappeln, (Schleswig-Holstein) has concluded from his experiments that cracked and whole grain are better digested and more effective on account of a more thorough mixture with saliva taking place before swallowing. Unfortunately the record of his experiments are not at hand."

"I have for several years fed meal dry, using two troughs in the pig pen so that the pigs could get the meal from one trough and drink from the other and I have been very well satisfied with the result."

On page 83 of the fourth annual report of the Wisconsin station Professor Henry urges the farmers to "try giving corn meal, shorts, bran or barley meal dry in troughs supplying plenty of water of course." In the year following he performed some experiments to more thoroughly test this question. He took six hogs and divided them into lots of three each. The three hogs of one lot weighed at the beginning of the experiment 343.5 lbs. and of the other lot 346 lbs. Both lots were supplied with water in a separate trough. The ration consisting of equal parts of corn meal and shorts was fed dry to one lot and wet with cold water to the other. After feeding for 34 days the lots were reversed and after a preliminary feeding of a week the experiment was repeated placing each hog on both sides of the trial. A duplicate trial was being conducted with four other hogs with a ration of two parts corn meal and one part shorts fed dry to two of the hogs and wet to the other two. The tables below show the result of the trials:

FIRST EXPERIMENT—THREE HOGS ON EACH SIDE. EACH PERIOD  
34 DAYS.

Wet Feed.				Dry Feed.			
	Weight at beginning.....	Gain.....	Feed Baten .....		Weight at beginning.....	Gain.....	Feed Baten .....
	lbs.	lbs.	lbs.		lbs.	lbs.	lbs.
First Period, Lot 1.....	346	165	622	Lot II.....	343	127	570
Second Period, Lot 2..	504	172	739	Lot I.....	512	128	658
		337	1,361			255	1,228

SECOND EXPERIMENT—TWO HOGS ON EACH SIDE. EACH PERIOD  
34 DAYS.

First Period, Lot 1.....	343	111	508	Lot II.....	331	63	472
Second Period, Lot 2..	448	109	532	Lot I.....	467	98	511
		220	1,040			161	983

In this experiment by Professor Henry the pigs, where the feed was wet, ate more of it than where dry, made a larger

gain and a less relative consumption of food. One hundred pounds of the corn and shorts produced a gain of 24.8 pounds when fed wet and but 20.7 pounds when fed dry. The results of our experiment are not in accord with the results here given in this one respect. Although our pigs ate more of the wet feed than of the dry, they made no greater gain on the same quantity of feed in one case than in the other. While it is true as a general rule that the more feed an animal can be induced to eat and digest the greater is the profit from feeding and the greater gain made by the animal, the statement above cited from the German writer is entitled to some weight. The difference between the amount which an animal can be induced to eat and the amount required to maintain his existence is at the best but very small and is a very small per cent of the total amount eaten. While the ration of maintenance is an indefinite quantity the results of our experiment seem to indicate that a greater proportion of the feed was actually digested and assimilated when fed dry than when fed wet. To the practical pig feeder, however, who is anxious to make with his hogs the greatest gain in the shortest possible time this advantage is completely overbalanced by the other consideration that the hogs take more kindly to the wet feed and make with it the greatest gains in a given time.

When pigs are shut up in close quarters some food, perhaps condimental in its nature like charcoal or mixtures of charcoal, ashes, salt and other ingredients is highly relished by them and as our figures show is a source of profit to the farmer.