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Swine Feeding
Michigan State University Extension Service
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SWINE FEEDING

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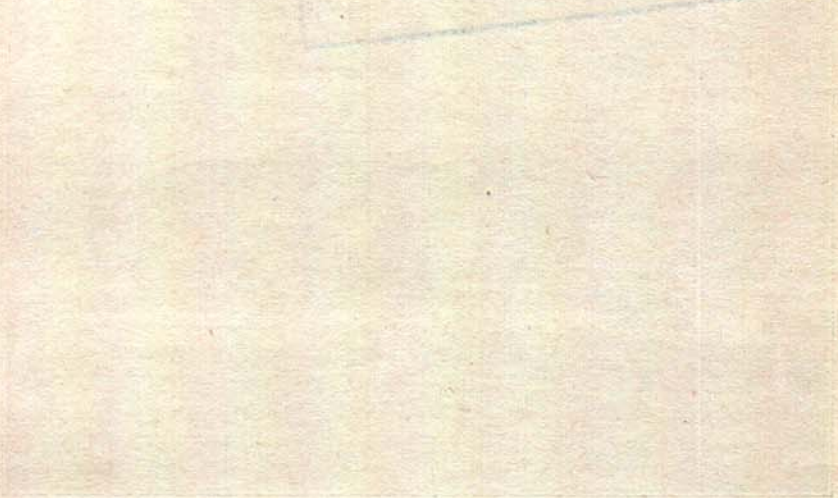
MICHIGAN AGRICULTURAL COLLEGE
EXTENSION DIVISION

R. J. Baldwin, Director

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SWINE FEEDING

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Swine Feeding

By VERNE A. FREEMAN

The greater part of the cost of producing pork lies in the feed consumed. The quantity of feed required for a unit of gain in weight varies greatly under the different conditions met, and is materially lessened where one has healthy, thrifty pigs, uses good pasture, gives access to minerals, and has sufficient protein feed to balance the ration properly. Several factors directly related to feeding which will reduce the cost of pork production on many farms of the state are considered in the following pages.

The principle of a balanced ration is generally recognized. Farm grown grains and farm and factory by-products make up the main part of the rations for most profitable swine production. One of the most difficult problems is to grow or purchase, on an ever-changing market, the amount and kind of protein rich feed that will most economically supplement and increase the efficiency of such grains as corn, rye, and barley for swine feeding. In order to get this subject well in mind, a brief review of the qualities of our most common swine feeds is given. Balanced rations for swine of different ages are given, showing the amount of protein feed required for best results with corn, rye, and barley.

Recent experimental work at several stations has shown the economy of supplying minerals to swine. Several good mixtures are given in this bulletin, along with other suggestions that go with good swine feeding practices.

FEEDS FOR SWINE

Corn is the richest in fattening food nutrients of our farm grown grains, and, when properly balanced, a smaller quantity of corn than of any of the others, except wheat, will produce 100 lbs. gain. Experimental data prove that under ordinary circumstances it does not pay to shell, grind, soak, cook, or otherwise treat corn for swine feeding, except in the case of old, dry corn or flint corn. Corn is very deficient in protein and minerals and requires supplementary feeds for the best results. Factory by-products of corn, rich in protein, do not satisfactorily supplement corn.

Rye and barley should be ground. They are both fattening feeds, but require much less protein supplement than corn: Neither rye nor barley gives as rapid or economical gains from the standpoint of pounds of feed consumed per pounds of gain as does corn. On account of the irritating nature of the barley hulls, a large proportion of barley in a ration may cause digestive troubles in young pigs. Rye is not so acceptable to the pig as corn or barley,

and, though concentrated in food nutrients, it produces very slow gains unless combined with other feeds that tempt the pig's appetite. Rye containing ergot should not be fed to bred sows, as it may cause abortion. Large amounts of ergot may harm hogs of any age.

Oats contain more protein than the other grains, and, except for young pigs, are nearly a balanced ration. They may be fed either whole or ground, and are an excellent addition to the ration for starting young pigs. Unless the oats are finely ground or fed whole, the hulls may cause pigs to have digestive trouble when rations are made up largely of ground oats. Oats are one of the best grains for growing breeding stock, but for fattening and heavy feeding they are too bulky and carry too much fibre to produce rapid gains.

Middlings are relished by swine and are a good addition to most rations when not too high priced. They are a source of both fattening and growing nutrients in such proportions that they are just about a balanced ration for weanling pigs. They are required in large quantities for balancing corn, rye, and barley. Their relative cost to fattening grain, as well as to other sources of protein, must be considered before purchasing them as a source of protein. They are particularly desirable for part of the ration for young pigs.

Skimmed milk and buttermilk furnish protein and are unexcelled for supplementing fattening feeds. They are of about the same value and are particularly efficient for young pigs and shotes. Although when available larger amounts of milk may profitably be fed pigs, the greatest return is obtained when a proportion not to exceed three pounds of milk to one pound of grain is used. About twenty times as much skimmed milk as tankage is required to balance a ration.

Tankage is an animal product that furnishes an ideal source of animal protein and mineral and usually gives good results in experimental hog feeding work from the standpoint of gains per weight of food consumed. High grade tankage, which carries from 55 per cent to 60 per cent or more of protein, even at a high price per cwt., usually furnishes protein at a lower cost per pound than other rich protein feeds that can be purchased at a much lower price. It furnishes but little nutrients other than protein and minerals and serves best when it is desirable to use as much as possible of a large supply of cheap, fattening food.

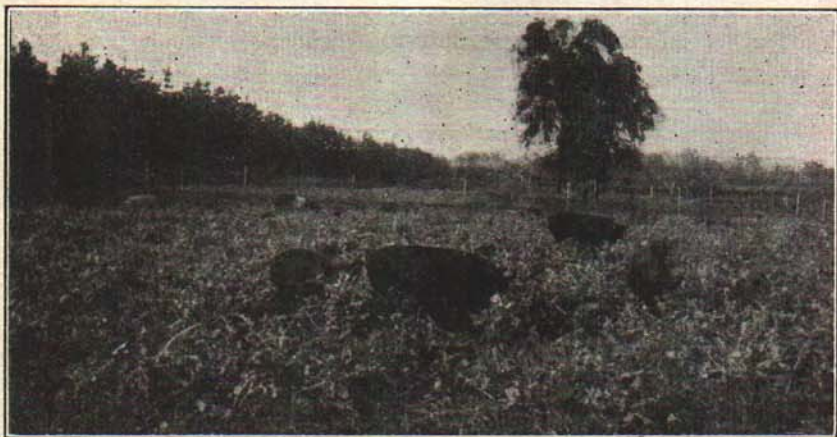
Linseed oil meal, soy bean oil meal and ground soy beans are all vegetable sources of protein which are decidedly lacking in minerals. Until mineral feeding in conjunction with these foods was tried, they usually gave results much inferior to the animal sources of protein. On account of their lower percentage of protein and higher test of fattening nutrients, it requires about two and one-quarter times as much linseed oil meal as tankage to balance a given ration; about one and two-thirds times as much soy bean oil meal; and nearly two and one-half times as much ground soy beans. As a rule, these feeds have given better results on pasture than in the dry lot, and they have proved better as only a part of the protein supplement along with a protein-rich feed of animal origin. However, recent experimental work indicates that home grown soy beans, when properly combined with minerals, may have a much larger place in our hog feeding rations.

Field peas are excellent feed and are relished by swine of all ages. They are rich in protein and are about the best home grown supplement for northern Michigan conditions. They are usually so high in price that other feeds can be purchased that will furnish protein more cheaply, except in communities where they grow well.

Cull beans are often a cheap food for fattening hogs. They are rich in protein but are not very acceptable to swine and have to be cooked to give good results. For these reasons they are not usually considered for supplementing fattening rations, but are used for as large a part of the ration as will give good results. They should not make up more than one-third of the grain ration (on basis of their dry weight) for growing shotes up to 100 pounds, but may profitably be increased later to one-half the ration, and, when very cheap, to two-thirds of the grain fed. Too many beans reduce the feed consumed daily, and gains are slower.

Alfalfa or clover hay should be used to supplement most winter rations. They furnish minerals and vitamins as well as protein. The third cutting of alfalfa is usually preferred because of its fineness and leafiness. When hay is fed in racks where the pigs can help themselves, they will profitably consume it for three to ten per cent of their ration, and brood sows a much larger proportion. Legume hay of some kind or pasture should always be included in a ration with white corn:

Good pasture should be a part of every summer ration. Alfalfa, clover, rape, sweet-clover, blue grass, and many other crops are recommended for hog pastures. Any of these are excellent during the period that they produce an abundant supply of fresh, succulent forage. A good swine pasture will



Better pastures, in combination with all rations, produce pork more economically.

be any combination so handled that it supplies fresh, growing feed from early spring until late fall, and one that does not fail in hot dry weather. It furnishes only a maintenance ration for young pigs and should be supplemented with grain to provide for gains.

GOOD PASTURE CROPS FOR MICHIGAN

Kind of pasture	When to Sow	Seed per acre	When at its Best	Other crops best suited to supply pasture the remainder of the season.
Alfalfa (Grimm or northern grown common)	Spring or summer of previous season	10 to 12 lbs.	Throughout growing season	None. Best results obtained if pastured lightly and some hay cut
Red Clover (domestic grown)	Spring of previous season	8 to 10 lbs.	Spring, summer except during dry season and fall	Rape or sweet clover
Rape (Dwarf Essex)	Early spring to mid-summer of same season	3 to 6 lbs.	Summer and fall	Clover and blue grass
Sweet Clover (Biennial White)	Early spring in grain crop	15 lbs.	Late summer and fall of same season and very early spring to late summer of next	None if reseeded every year, more palatable if kept down to 6 or 10 inches high
Blue Grass (June) (Permanent pasture)	Early spring with grass seed mixtures two seasons before	3 to 5 lbs. in a mixture	Spring and fall	Rape, sweet clover or alfalfa

Pasture should be used because it:

1. Helps to balance a ration of home grown grains.
2. Reduces the grain necessary per pound gain.
3. Lessens amount of high priced protein feed needed in the grain ration.
4. Increases health and vigor of the swine.
5. Produces better pigs for hogging down corn.
6. When properly rotated, aids in sanitation and round worm prevention.

For further information concerning grass and pasture mixtures, send to the Michigan Agricultural College for Experiment Station Bulletin No. 130.

PROTEIN REQUIREMENT

The feeds commonly used for swine may be roughly divided into two classes: Fattening feeds, such as corn, barley and rye that do not carry a sufficient proportion of protein to meet swine needs; and growing feeds, rich in protein. Those of the second group are usually higher in price than those of the first. Adding suitable protein feed to the fattening feeds reduces the amount of feed required per unit of gain and adds to the thrift and vigor of the animals. Even if the protein feed is much higher priced than the fattening feed, a small proportion of it usually results in cheaper gains. The problem is to feed the proportion which pays best. Young pigs require more protein than do the older ones. Growing shotes and nursing brood sows will pay for more than will fattening hogs or dry brood sows. The amounts of protein feeds given in the following examples of successful feed mixtures for hogs of different ages are such that increasing the proportion of protein feed would not materially reduce the total feed requirements for 100 pounds gain. As the average weight of the pigs approaches the heavier weight stated for each group, the proportion of protein supplement could profitably be cut down toward the proportion given in the next group.

1. WEANLING PIGS, 30-50 lbs.

- A. { Corn 100 lbs.
Oats 50 lbs.
Middlings 50 lbs.

Supplemented by

Tankage 28 lbs.

or

Field peas 300 lbs.

or

Skim milk 650 lbs.

- B. { Rye 100 lbs.
Oats 50 lbs.
Middlings 50 lbs.

Supplemented by

Tankage 21 lbs.

or

Field peas 230 lbs.

or

Skim milk 490 lbs.

- C. { Barley 100 lbs.
Oats 50 lbs.
Middlings 50 lbs.

Supplemented by

Tankage 22 lbs.

or

Field peas 240 lbs.

or

Skim milk 520 lbs.

2. GROWING PIGS, 50-100 lbs.

- A. { Corn 100 lbs.
Oats 50 lbs.
Middlings 50 lbs.

Supplemented by

Tankage 15 lbs.

or

Field peas or cull beans 105 lbs.

or

Skim milk 350 lbs.

- B. { Rye 100 lbs.
Oats 50 lbs.
Middlings 50 lbs.

Supplemented by

Tankage 8 lbs.

or

Field peas or cull beans 60 lbs.

or

Skim milk 175 lbs.

- C. { Barley 100 lbs.
Oats 50 lbs.
Middlings 50 lbs.

Supplemented by

Tankage 10 lbs.

or

Field peas or cull beans 70 lbs.

or

Skim milk 205 lbs.

This does not mean that 10 pounds of tankage is worth as much as 70 pounds of peas, but that the smaller amount of tankage is required because of its concentration of protein. The peas and other protein feeds add to the mixture considerably more fattening nutrients as well as protein. They are required in larger quantities to balance a given amount of corn, rye or barley, but would make a correspondingly larger amount of the mixture and would produce correspondingly more gain. Large amounts of skim milk are required because of its large percentage of water.

The weights of corn, rye or barley stated below are the amounts of each which would be properly supplemented by the amount given for any one of the protein feeds. It is usually advisable to use mixtures including several feeds. This is particularly true when rye or oil meal is used, so that rye will not make up more than half the ration, and so that not more than half the protein supplement will be oil meal.

2. SHOTES, 100-150 lbs.

Corn 100 lbs., or rye 220 lbs., or barley 170 lbs.

Supplemented by any one of the following:

Tankage 12 lbs.

Field peas or cull beans 75 lbs.

Oil meal (old process) 30 lbs.

Middlings 200 lbs.

Skim milk 250 lbs.

The 12 pounds of tankage required to supplement 100 pounds of corn is sufficient for 220 pounds of rye or 170 pounds of barley for shotes of this size, but the 232 pounds of rye and tankage mixture would produce much more growth than the 112 pounds of corn and tankage mixture. Rye is richer in protein than corn and more of it than corn is properly supplemented by a given amount of protein rich feed.

3. HOGS, 150-225 lbs.

Corn 100 lbs., or rye 330 lbs., or barley 220 lbs.

Supplemented by any one of the following:

Tankage 9 lbs.

Field peas or cull beans 50 lbs.

Oil meal 21 lbs.

Middlings 105 lbs.

Skim milk 175 lbs.

4. GROWING BREEDING SWINE, OR SOWS WITH SUCKLING PIGS:

{ Corn 100 lbs. } or { Rye 200 lbs. } or { Barley 200 lbs. }
 { Oats 50 lbs. } { Oats 100 lbs } { Oats 50 lbs. }

Supplemented by any one of the following:

Tankage 11 lbs.
 Field peas or cull beans 60 lbs.
 Oil meal 25 lbs.
 Middlings 130 lbs.
 Skim milk 210 lbs.

5. MATURE SOWS, Between Suckling Periods.

Corn 100 lbs., or rye 400 lbs., or barley 250 lbs.

Supplemented by any one of the following:

Tankage 7 lbs.
 Cull beans 35 lbs.
 Middlings 70 lbs.
 Skim milk 125 lbs.

Ground alfalfa 75 lbs., or alfalfa hay self-fed in racks to balance rye or barley.

With corn some of the other supplements may pay with the alfalfa self-fed.

These rations show how much of each one of a number of different protein rich feeds are required to supplement a stated amount of corn, rye, or barley for swine of different ages. The amounts of each needed for mixtures can easily be estimated from the above. When protein feeds are as cheap as fattening feeds, somewhat more protein may be fed without affecting the efficiency of the ration. When they are extremely high in proportion, it sometimes pays to feed less protein, even though more feed is required per unit of gain.

On good pasture, the protein rich feed for any of the corn rations may be reduced by one-half, and with barley or a combination of rye and oats it may not pay to use a supplement, except with young pigs. For fattening swine and carrying dry brood sows on good pasture, when protein feeds are very high as compared with corn, supplements do not pay even with corn.

MINERAL REQUIREMENTS

Our grains are all lacking in mineral matter for the pig's needs. Pasture helps to correct this deficiency, as do skim milk and tankage, but even with these supplements some additional minerals usually pay. A supply of minerals should be kept before swine at all times. This is especially important where pigs are fed on poor pasture or in a dry lot. Wood ashes, finely ground limestone, air slacked lime, bone meal, and acid phosphate have given good results in experimental work in such combination as:

1. Pulverized limestone.....30 lbs.	2. Wood ashes.....10 lbs.
Bone meal.....30 lbs.	16% acid phosphate.....10 lbs.
Salt.....30 lbs.	Salt.....1 lb.
Sulphur.....10 lbs.	
3. Pulverized limestone.....10 lbs.	4. Air slaked lime.....10 lbs.
16% acid phosphate.....10 lbs.	Steamed bone meal.....10 lbs.
Salt.....1 lb.	Salt.....10 lbs.

If trouble with hairless pigs at birth has been experienced in your community, you can insure against it by feeding the brood sows iodine during pregnancy. It is often mixed into commercial minerals, but is expensive and is required in such small quantities that it is difficult to mix under farm conditions.

A good method is to dissolve one ounce of potassium or sodium iodide in one quart of water. Each ounce of solution then contains about 15 grains of the iodide and is sufficient for one sow for one week and should be mixed with her feed in two or three doses. Three sows fed together could be given one ounce of the solution mixed in their feed or water three times a week. It is probably well to treat the sows throughout the gestation period, but it appears that treatment during the last 8 or 10 weeks before farrowing is most essential.

HOW MUCH TO FEED, AND HOW TO FEED IT

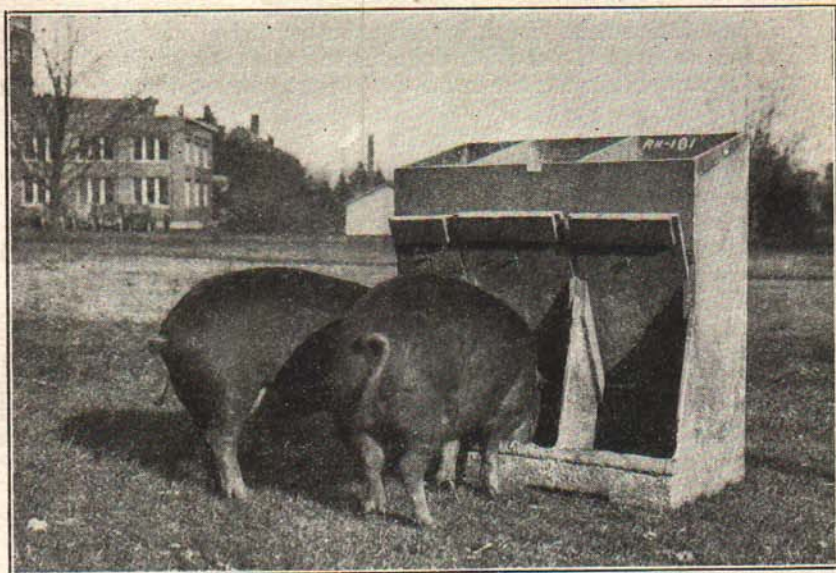
Ten days before breeding time the daily allowance for thin sows should be increased so as to get the sows into a rapidly gaining, thriving condition. This flushing or extra good feeding of the sow ten days or two weeks previous to breeding will increase the size of the litter. Young gilts should carry more flesh than older sows at pigging time. Gilts and older sows that are in thin condition should be fed separately from old sows in good flesh, so that the daily feed allowance can be so regulated in amount as to keep them gaining steadily, usually about .6 to 1 lb. daily during pregnancy, without getting any of the sows too fat. As a rule brood sows should receive from one to one and one-fourth per cent of their weight in grain daily, and gilts from one and one-half or two per cent of their weight. Daily exercise and a sufficient supply of protein and minerals in the ration during pregnancy helps to assure strong pigs at birth.

Just before farrowing and from four days to one week after, use only light laxative feeds such as equal parts of bran and middlings, ground oats, oats and middlings, or either bran, oats or middlings with only a small portion of corn, rye or barley. These are best fed in a thin slop, which should be warm in cold weather. Overfeeding or feeding on heavy fattening foods soon after farrowing often causes udder troubles. Sows in poor condition should have feed increased earlier than the fat ones. The grain allowance should be increased as it is seen that the pigs can take more milk. Guard against such heavy feeding that the pigs become fat, short, and chubby, for this, along with lack of exercise, is the cause of thumps. With large litters, three weeks old and getting plenty of exercise, the sow should usually be fed as much as she can eat.

When the pigs are four weeks old, they should be eating from a separate trough or self-feeder, placed in a creep where only the pigs have access to it. Then they get no set-back at weaning time and grow continuously. It is best to use tempting feeds at first. Where it seems desirable to use such unpalatable foods as cull beans (cooked) or ground rye, they should be started in small amounts and the proportion increased very gradually. It does not pay to use so much unpalatable feed in the ration that the pigs feed lightly and consequently gain slowly.

The daily allowance of feed for pigs from this point on will depend upon circumstances. If plenty of feed is at hand, it usually pays to feed for rapid gains, making a quick turnover of the investment. With early pigs, this also usually means a higher selling price. The price paid for hogs on the Chicago market for the last ten years has averaged \$11.80 for the months of September and October, against an average for the same years of \$10.55 for the months of November and December. Shots that can be finished at a weight of 180

lbs., or more, and marketed in September or October often net a greater profit than they would if held until later.



Use self-feeders for rapid gains. Pigs may be started on a self-feeder and kept on self-feeders until marketed, if proper feeds are used.

Self-feeders are successful when feeding for rapid gains, either on pasture or in the dry lot. They have the following advantages:

1. Require less frequent attention and save time.
2. Save labor.
3. Keep the pigs fed regularly.
4. Save mixing feeds where palatable feeds, such as corn, middlings, and tankage are used in separate compartments. The pigs will balance their own rations.
5. Usually increase the rate of gain and put the hog to market earlier.

Hogging down corn is a practical, profitable practice. It is becoming more popular yearly because it:

1. Saves labor of harvesting and feeding the corn and handling manure.
2. Conserves fertility and distributes it evenly on land.
3. Produces as much gain as other methods.

Important factors for the success of hogging down should be considered:

1. A supplemental feed to furnish protein must be provided for best results. The cheapest method is to plant soy beans with the corn. The pigs sometimes do not relish them at first, and it is a good plan either to cut and throw over a few for the pigs or have some soy bean pasture for them several days before turning them into a field of corn and soy beans. Sowing rape or rye at the last cultivation, or giving access to a field of alfalfa, clover, or rape reduces the need for protein supplement by about one-half in seasons that these

crops make an abundant growth of succulent feed. As soon as these crops frost down or dry up, the supplementary feed should be increased if not self-fed.

2. The most desirable hogs are 90 to 150 pound spring shotes well grown on pasture, although hogs of any age that are ready for fattening may be used to advantage. Pigs and brood sows are often used to clean up the patch after the fattening hogs have been moved on. Larger hogs feeding with light pigs help to break down corn for the pigs.

3. A small acreage of an early strain of corn that can be fed off early lengthens the season for "hogging down," and often finishes one lot at a higher price in September or early October than would be received later.

4. Corn should begin to dent and be past the dough stage before the hogs are turned in. Hogs not accustomed to full feed should have corn thrown in for them, increasing the amount every day for a few days before they are turned into the corn.

5. Clean water, salt and minerals should usually be supplied at the field where the hogs do not have to go far after them. The best gains are not made without fully satisfying these needs.

ESSENTIALS THAT GO WITH GOOD FEEDING

1. SALT.

Salt should be kept before swine of any age where they can help themselves at all times. Mixing it with the feed is satisfactory when done carefully, but too often irregularities occur and the pigs get too much or too little. The mineral mixture may be made up of about one-third salt and kept before them, or a constant supply of salt separate from the minerals may be maintained.

2. WATER.

Hogs will not thrive without sufficient water, and gains are more costly when it is not supplied abundantly. Clean drinking water, that is not contaminated by surface drainage, is important in prevention of spread of disease and parasites. Self-watering devices, that furnish a continuous supply, have proved satisfactory.

2. SHADE.

Good shade in the hog pasture adds to the efficiency of the feeding system.

4. HOUSING CONDITIONS.

Dry, well lighted houses that provide comfortable quarters and that can be disinfected and kept sanitary are necessary.

5. EXERCISE.

Pasture affords exercise for breeding swine, but in winter the trough should be placed as far as possible from the sleeping pen, to force them to exercise.

6. DISEASE PREVENTION.

Constant attention to general sanitation of yards and buildings and watchfulness to suppress disease at its first appearance insure against loss. It is much cheaper to guard the health of your swine and keep them vigorous than to doctor and disinfect after sickness gets under way.

7. BREEDING.

Pigs from carefully selected, pure bred or grade sows, sired by pure bred boars of the same breed and of correct type and conformation give best results. The right type for filling your market demand should be considered



Type of boar pig that answers the present day demand.

In selecting the sows and boars. At present the greatest demand is for length and depth of body with fair length of leg; a strongly arched back of uniform width; smoothness and quality; straight, deep sides carrying even width from front to back and top to bottom; straight bottom line; fullness of heart girth; and strength of bone shown by erect pasterns, straight legs, and weight carried well on toes. The profitable feeding of hogs depends much upon their selection and breeding.