LIVE STOCK MANAGEMENT

SWINE

BY

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LOCALITY.

In selecting a locality for raising hogs, there are certain points which the hog raiser should keep in mind. Proximity to the market, or some shipping point, determines in a large measure his ability to get hogs to market on short notice, and enables him to take advantage of fluctuations in the market of which he could not avail himself were he farther from the shipping point. Proximity to the central market is also a point to take into account, for the farther one has to haul from the shipping point to market the greater will be the expense and freight. The character of the roads which lead to the shipping point affects the expense of marketing and the ability of the hog raiser to get his hogs to market at the right time. If the road is passable during only a part of the year, it will readily be seen that if this period does not coincide with the period of high prices the hog raiser is handicapped. The market upon which the hog raiser is dependent should be one which is capable of caring for the maximum number of hogs which are likely to reach this market without the latter being flooded. If it is capable of using only a limited number of hogs and the industry expands beyond its capacity, a period of stagnation naturally follows.

THE FARM.

The particular farm is of some importance in deciding on the advisability of hog raising. Having considered the locality, it is well to consider the size of the farm, whether capable of carrying a considerable number of hogs or a small number; the products of the farm, whether suitable for hog feed; the drainage of the farm, whether it will permit hogs to pasture during a good part of the year, or whether parts of its are not fit for pasture during a great part of the year, and the general surroundings of the farm. If the farm lies in such a manner that overflow from adjoining places may run over the fields, the danger of contagion and infection is greatly increased. On the other hand, if the place is in a locality where many hogs are raised, the character of the other hog raisers is to be taken into account, whether they carry on their business in such a manner as to minimize the danger from diseases, or the contrary. The amount of shade which the place affords is also a vital factor, since hogs require shade. If this is not provided by the nature of the place, it is necessary that the hog raiser provide it artificially, which will involve some little expense.

The products of the farm should be in part such as are suited to hog feed or to hog pasture. In fact, if the farm is to be devoted largely to hogs, a great portion of its area should be capable of producing some of the staple cereals or all of them, and one or more legumes for pasture. The other features of the farm should be taken into account, notably the other money products of the farm. If a greater or smaller number of cows are kept for dairy purposes, it should be considered whether the skim milk or other by-products will be utilized more economically by pigs or by calves, for the pig is not universally the most economical consumer of dairy by-products. The amount of skim milk which is available throughout the year may well be considered. Prac-
tically one pig to a cow may be maintained if half the calves are to be raised, but if all the calves are to be raised, ordinarily a smaller number of pigs must be kept.

**THE MAN.**

The man who is to raise hogs should take stock of himself and determine that he is suited to the hog business before he goes into it on any large scale. He should be a lover of animals and not afraid of work, for when animals require attention they require it immediately or dire consequences may result. He should be patient and persevering, because pigs have those qualities themselves, and sometimes persist in doing what the owner desires that they should not do.

**NECESSARY EQUIPMENT.**

**The Houses.**

Pig houses are of two general classes—those which are designed to shelter a single pig or a single sow and her litter, known as colony houses, and those which are designed to shelter a larger number of pigs or sows, and known as centralized houses. Neither has all the advantages over the other, but both kinds of houses are successfully used on the same farms where more than one or two sows are kept. The colony houses are economical, portable, easily kept clean and sanitary, but the disadvantage is that they entail a greater amount of labor to care for a number of pigs than is the case with the centralized house. Moreover, the labor must be done, in part at least, in the open and exposed to the weather, while the centralized house affords shelter to the attendant while doing his work. The colony houses are designed

![Figure 1. Colony House.](image)
according to a wide variety of plans, but the A-shaped, open-front house is the one which has been found most desirable for Willamette Valley conditions. In Eastern Oregon a warmer house—that is, one with a closed front—is more desirable. Because they require no glass, as do the centralized houses, the colony houses are the more economical shelter for pigs. In considering plans for the centralized house, it is well to remember that the danger of disease spreading through the herd is greater, once it enters, than is the case where colony houses are used, so that it should be planned with sanitation or easy disinfection constantly in mind. The comfort of the pigs and the convenience of the attendant are the next considerations. Sanitation involves light, ventilation, cleanliness, and pure-water supply, so that whatever plan is adopted should include these features. The ventilation may be secured in a more or less elaborate manner, according to the temperature of the surroundings. If the climate is severe, greater precaution will be necessary in admitting fresh air and permitting the exit of the stale air, while if the temperature is habitually higher, very little system is necessary in securing good ventilation. An opening at the top of the building, with a hollow shaft leading to it from the bottom of the building and with a ventilator in the roof near the side of the shaft, will permit the exit of air from the bottom and also the admission of air from the top, which will minimize the draught on the pigs. Light may be secured by open space or by glass, depending upon the temperature of the surroundings. If glass is employed the price of the house will be increased considerably, so that glass, if used, should be so placed that it will do the maximum good; that is, so that it will be admitting light during the greatest portion of the day. To this end, most of the glass should be on the south side of the building, so located that morning, noon, and afternoon rays all reach some part of the pig house where sunshine is needed. Any equipment which is used constantly is less expensive than the same equipment which can be used only a part of the time, so that greater expense would be justified in case the glass is used constantly than if used only part of the time. A plan with this end in view has been worked out by Professor Dietrich at the Illinois Experiment Station. (See Illinois Bulletin 109.) This house has been in operation for eleven years and has been found quite satisfactory. The vital principle of this house is the location of the windows in such a way that the sunlight during that part of the year when the pigs are farrowed, will reach the farrowing pens; and during that part of the year when the sun's rays are to be excluded, they are shut out by the projection of the roof. The expensive feature of this house is the flat roof on the south side of the building, which requires prepared roofing, while the other side of the roof may be covered with shingles or whatever material is available. The centralized house should not be too close to other buildings and it should be located on ground that will produce pastures suitable for hogs during the greatest part of the year. A number of plans for reaching pasture from the different compartments of the centralized pig house have been worked out, but the points to remember in this connection are the expense of fencing, the difficulty of cultivating small fields and the disadvantages of perma-
nent fences so that whether permanent fences or portable fences are used, these points may be dealt with.

The Granary.

As a part of the centralized pig house, or in close proximity to it, should be a granary of sufficient dimensions to contain grain enough to last through the feeding period. Obviously the size of the granary will depend upon the number of pigs kept in the herd, or the number fattened in the building during the year. In the Willamette Valley it is especially desirable to have all of the feed close enough to the pigs that it will not need to be hauled during muddy weather. If a large number of pigs are to be kept in the same building, it is desirable that the grain should be centrally located; that is, so that the grain will need to be carried as short a distance as possible. Where only a small number of pigs are kept, however, it is more convenient to have the grain at one end. The granary should have a sufficient number of compartments to contain as many mixtures as are likely to be used at any one time during the year. In addition, there should be a mixing floor, which will be available at all times for preparing mixtures of feed. Convenient to this, but not close enough for inconvenience, should be a water supply, for it is often desirable to wet the feed, but it is not desirable that the feed should be wet when it is not wanted wet.

The amount of grain which is to be stored in the building is contingent upon a number of conditions. If pastures are to be used during a considerable part of the year and the fattening is to be done in a building separate from the farrowing house, smaller granaries are acceptable. A sufficient amount of space should be allowed, to each sow, to contain 7 pounds of feed for each day during which she is to be fed in the building. If it is desirable to store feed to last five months, or 150 days, this would necessitate the storage of 1050 pounds of feed for each sow which is to be kept in the building. If pigs are also to be fattened from the same supply, about 700 or 800 pounds should be allowed for each pig. The mixing floor should be 5 or 6 feet each way and should preferably open onto the alley so that there will be room for manipulating the shovel handle without needing to leave special space for this. You will doubtless think when you figure up the amount of space for grain, that this is to be a granary with a pig sty attached, but labor will be saved in handling the grain, and much satisfaction will be enjoyed in feeding it out without the necessity of getting out into the rain and mud. The plans for storing this grain will differ according to the taste of the owner, and according to the amount of grain which is to be stored. It may be elevated overhead and stored in a long, narrow column, which will necessitate less floor space, or it may be stored in bins only as high as one could shovel it. Some risk is taken if a large quantity of ground grain is mixed and stored for a considerable period of time. It is perhaps safer to mix only smaller portions of this, and keep the main portions unmixed. Likewise, some chance is taken in storing large quantities of finely ground material, even though it be unmixed, so that in case a large plant is being installed, it is perhaps safer and more satisfactory to have the grinder in the same building with the feed, and to grind it
only a short time before it is to be used; that is, only to grind small portions at a time. In most cases, however, if the feed is stored dry and the building is water-tight, there will be but little difficulty from having grain spoil, and the plant on the average farm will not be large enough to justify the installation of a grinder. As for the water supply, if a general water system is installed on the farm this may be attached to the pig house with little difficulty. If no such system is at hand, less satisfaction will be enjoyed and more labor will be required to accomplish the same results with feeding pigs, for they drink a good deal of water, from 12 to 20 pounds to the pig each day for mature hogs. On a majority of Oregon farms, however, a waterworks system can be installed with so little difficulty that not only for the convenience of the pigs, but for the general improvement of the farm should be installed as soon as the owner feels able. The writer has never seen a water system installed on the farm which the owner would have taken out for the price put into it. Likewise, he has never seen a pig house which had a sufficient quantity of grain storage room in it.

The Troughs.

The points which must be considered in deciding upon troughs are initial expense, durability, sanitation, and convenience, and the materials from which the troughs are made should be selected with these points in view. With reference to the initial cost, the most economical troughs are made of wood, oak being the most durable and fir the least durable. The fir, however, is by far the cheapest. If troughs are made of wood, the shape may be either flat bottomed or V-shaped. The flat bottomed troughs are preferable for sows with small pigs, and for pigs in general which are fed on dry feed. The V-shaped troughs are preferable for feeding slop or wet feed and where small pigs are not to be fed with their dams. V-shaped troughs are too high to permit of small pigs eating from them with ease. Consequently, the pigs will not begin eating so soon if their mother is fed from this style of trough. On the other hand, the flat troughs are harder for pigs to clean and more waste results from their use. Cement as a trough material has not been tried out on any large scale, but is entirely satisfactory if a system of flushing can be used. It is impossible to turn the troughs, hence a drain must be provided and convenience for scrubbing. Iron troughs are highly satisfactory, except for the initial cost, which is practically prohibitive. An iron trough may be of any shape, but they are ordinarily a combination of V-shaped and flat bottomed troughs; that is, the bottom is made oval so that the trough will not be easily broken, nor thrown about by the pigs’ noses. On the other hand, it is preferable that it should be malleable so that it will not be so easily broken.

The Fences.

For inside fences, heavy woven wire with a close mesh has been tried out and found satisfactory. The advantages which it enjoys are that it admits the light more freely, permits the hogs to see each other and the attendant, and it is easily cleaned and kept sanitary. The disadvantages are that if properly put up on iron posts, it is too expensive for the ordinary farmer to install. Once installed, however, it
is more durable and more easily kept clean. Wooden partitions had best be tight, otherwise the pigs will gnaw through them or try to climb over them. They had best be made movable, so that if it is desirable to combine two or more pens this may be done without permanently destroying the identity of the pens. This may be done by means of two cleats nailed to the underside of a 2x4 placed at the height which the partition should be. One of these cleats is nailed in temporarily after the ends of the boards have been set up against the opposite cleat, and when the partition is to be removed, the nails are drawn from the temporary cleat and as many boards as are desirable taken out. Concrete fences have been suggested and used to a slight extent, more, however, as a base for iron fences rather than as a total fence; that is, a wall of concrete a foot or 18 inches in height has been used on which to set the iron fence. This prevents the manure passing from one pen to another and makes quarantine more easily possible. As an entire fence, however, it is too cumbersome; that is, takes up too much space and is too expensive.

For outside fences nothing has been found which is more serviceable or convenient than woven-wire fences. The material of which the fence is made should be as heavy as can be secured, the regulation hog fence being made of No. 9 wire throughout. Very little of this fence is sold on the Coast, but its extra durability will justify securing it even with the additional expense involved. In general, the fence should be stretched tight to posts 16 feet apart, but when fencing small lots the posts should be only 8 feet apart. Around the small lots it is convenient to have a 2x4 laid flatwise on top the posts. This serves to brace the posts, to keep the wire from sagging down between them, and it adds a finished appearance to the fence. For pasture fence, however, this is not necessary, and the wider distance between posts entails no weakness in the fence. The fence should be securely attached at the bottom, and it is desirable that a barb wire be stretched tightly on the ground below the bottom wire of the woven fence. Many of the so-called hog fences are provided with a barb wire woven in as the bottom strand of the fence, but this has no advantage, and the fence is less convenient to handle.

The Floors.

In considering suitable materials for floors, it is well to keep the same points in mind that have been mentioned in connection with troughs and fences. The durability and ease of disinfection are points associated with the more expensive materials, but where only a small number of pigs are kept, or where a house is provided which is later to be replaced by a better one, wooden floors are satisfactory, and will last three or four years, provided they are up from the ground so that they will dry readily. The floors of the inside pens should slope outward from the center or toward a drain, if such a drain is provided. Whether the floor should be provided with a rain will depend upon the system, which is in use on the farm, for handling the manure. Just as with other kinds of stock there are two general systems for handling manure: One method is to absorb the liquid with bedding and removing at frequent enough intervals to keep the house sanitary. The
other method is to lay the floor in such a manner that the liquid will not reach the bedding and will run off from the pen either into a drain or cistern. Obviously both these systems have their advantages, and the general lay of the piggery must determine which of the two methods is more desirable. There is more difficulty in keeping the piggery, bedded down than is experienced with other kinds of stock, because of the habit of rooting which pigs possess. If pigs have the opportunity—that is, if their pen is built in such a manner as to permit it—they will keep themselves and their beds clean, so that it is well in planning the floor to provide some sort of a device in the pen which will shut off the bedding quarters from the dung quarters; and few pigs which have been kept in sanitary quarters will make much difficulty in keeping their bedding quarters clean. The bed may be placed on a platform raised from two to six inches above the rest of the pen, and the remaining portion of the pen built according to either of the previously suggested methods. The "Maryland plan" embodies this principle. On the other hand, the entire pen may slope toward the outside door or towards the drain, and no special precaution taken to keep the bedding out of the manure. Personally we prefer the former method.

The advantages for concrete are durability and sanitation. The disadvantages are the expense involved and the coldness of the material. As sometimes constructed, they are also slippery, but this need not be the case. The coldness may be avoided either by the liberal use of bedding or by an overlay, which consists of a board platform laid over that part of the cement floor on which the pigs are to lie and the bedding placed on top of this. In summer, of course, this platform should be removed and the pigs allowed to lie on the cool floor. In winter, moisture sometimes accumulates under the platform, so that it will need to be moved from time to time, but if the dust is kept from beneath the platform, very little dampness will accumulate. Men who have used concrete floors differ in their judgment on them. Some maintain that the pigs warm the concrete floor through their bedding and that the floors remain warm, provided they are dry. On the other hand, others maintain that the floors are always cold and clammy, and must make the pigs uncomfortable. Undoubtedly the drainage and ventilation of the building have much to do with the condition of the cement floor. If the ventilation is not good, more moisture would accumulate on the floors; and if drainage is poor, they would likewise be damp. If ventilation and drainage are good, however, keeping the floors dry is a much easier problem.

Watering Devices.

Since hogs need water at frequent intervals, it is desirable that a watering system be established which will reduce the labor of watering to the minimum. It seems justifiable to go to greater expense in putting in an efficient water system than in almost any other item of the pig equipment. So far as possible, fields which are to be used as pig pastures should, if not provided with springs or natural streams, be supplied with pipes running from a central water system. If this expense cannot be entailed, a suitable device may be made of a large barrel with the open side down over a large, flat trough, whose edges
are 6 or 8 inches high. Two augur holes bored in the edge of the barrel, the upper one being about half an inch below the upper edge of the trough, and the lower one near the open end of the barrel, will supply the water very conveniently when filled. The barrel may be filled either through an augur hole bored through the head, which may be tightly closed with a plug when the barrel is filled, or may be filled by force from below, provided the water is hauled to it in a large tank. The end of the barrel will need to fit tight to the bottom of the trough and the lower holes must be plugged when filling the barrel. The barrel device will supply water for 1,000 pounds of pigs for four days, provided none is wasted. The labor of refilling the barrel if the water has to be hauled usually adds a considerable expense to the cost of producing the pigs. A suitable device if water is piped to the pastures or pens may be made similar to the trap in a water closet, the trap being boxed in at one end of the trough so that the pigs cannot break it to pieces.

**The Dipping Vat.**

In order to keep pigs free from external vermin and occasional attacks of mange, it is desirable that a system by which the pigs can be easily dipped at intervals as needed should be provided. On farms where sheep as well as pigs are kept, the dipping vat is ordinarily already installed, but where sheep are not kept and only a small number of pigs are raised, it may be considered too expensive to install a dripping vat. In the latter case a hole may be dug in the ground and water poured into it and the sheep dip or crude oil added to it. The pigs are then allowed to wallow in it at their pleasure, and in hot weather they will keep themselves free from vermin. The difficulty about this method is that the wallow will soon become foul, and if sows which are suckling pigs are allowed to run into it they daub themselves with mud so that the little pigs are likely to get the mud in their stomachs, and losses from this cause sometimes occur. Rubbing posts, consisting of bagging or some other absorbent material tightly bound around posts, located conveniently for the pigs to rub on them and saturated with crude oil, have been recommended as a means for keeping pigs free from vermin, but the results secured here have not been entirely satisfactory. There are too many other posts which are convenient for the pigs to rub on, and the pigs do not use the oiled

![Figure 2. Wallowing Vat.](image-url)
posts enough. Various devices are on the market which are recommended as efficient lice killers, but the expense which they entail is ordinarily too great in comparison with that of a dipping vat. If a dipping vat is to be provided, it should be so located that pigs can easily be driven to it and allowed to escape from the farther side or end of the vat. A dripping place should be provided at the far end of the vat, where the pigs are retained for a few minutes after coming from the vat. This allows the excess dip to run from them, and considerable expense is thus saved. If the dripping place has a slight slope back into the vat the great part of it may be recovered. A satisfactory vat may be made of galvanized sheet iron or wood or concrete, the concrete being the most expensive as well as the most durable, and the wood being the cheapest as well as the least durable. The vat should be wider at the top than at the bottom, and the farther end of it, that is, the end from which the pigs escape, should have a sloping corrugated bottom so that the pigs can climb out of it with ease. It should be deep enough at the point where the pigs enter it so that they cannot keep their heads above water, and at the same time there should be enough room at the top of the vat so that the additional bulk of the pig will not make it overflow.

Miscellaneous Equipment.

Under this heading will be considered such instruments and implements as are useful and necessary in connection with the pig business, but which cannot properly be spoken of as fixtures on the place. If pastures are to be utilized it is almost necessary the pigs be prevented in some way from rooting, and the most efficient method which has yet been worked out is to ring them in the nose, one or more rings being placed through the cartilage at the top of the snout. A small pair of pinchers, provided with a holder for the rings, may be had for 15c, and will last a long time. The rings cost about 10c a box, so that the expense of ringing is not great. The rings may be removed if pigs are to dig artichokes or potatoes or roots, but ordinarily the pigs remove them themselves at too frequent intervals to suit the pig raiser. Sometimes, however, they will stay in for several months, or even for the life of the pig.

An ear punch similar to that used for cattle or sheep is useful, if pigs are to be ear marked; that is, notches placed in their ears. Concerning marking, more will be said presently.

A castration knife, which consists of a blade with a straight edge and made of the best steel, is very essential. Such a blade is sometimes found on the ordinary ocket knife, but in such cases the blade usually requires extra attention before any operation is to be performed.

If the pig house is to be kept free from vermin or disinfected, a spray pump is suitable for this purpose, and may be provided with small expense. Such a device is worth having if the house has been built in such a manner as to make disinfection practicable.

The hog holder, for ringing pigs or for holding them for any other purpose, may be made similar to a twich for horses. A simpler device consists simply of a small hard rope with a ring spliced into one end of it. The other end of the rope may be run through this ring,
forming a loop which may be placed about the pig's upped jaw just back of his incisor teeth, and the loop drawn tight. The pig pulls back on the rope in an attempt to get away, and may be easily held. Another hog holder is made of iron about the size of a wagon rod and is provided with a loop bent onto either end, and another bend made in the rod about an inch from the loop. This bend makes it possible to place the loop over the pig's nose and hold the other loop in the hand very nearly straight out from the pig's nose, but slightly above. This would involve an angle of about 60 degrees in the rod. This may be provided at either end, one of the loops being for large hogs, and the other one for small ones, and whichever one is not in use being used as a handle with which to hold the pigs. A man single handed can hold and ring a bunch of pigs with this implement, while

without it two would be necessary. Even large hogs may be snubbed up with the rope suggested previously and the rope tied about a post, which will make it possible for one man to handle even very large hogs.

Effect of Supply Upon Tendency to Vary Size of Herds.

Pigs are subject to wider and more rapid fluctuation in prices than any other class of live stock. This is because they increase so rapidly that a shortage of numbers may be replaced by a surplus in two or three years' time. When for any reason pigs are high in price a great many people are attracted to the business; accordingly they rush into it, buying large numbers, and thus increasing the price, through absorbing stock that would otherwise go to the market. In about a year's time they have stock to put on the market, usually in large numbers, thus causing a decline in the price. They soon become discouraged with the business because of the low price, and sell out not only their surplus but also in many cases their original breed-

![Figure 3. Loading Chute.](image-url)
ing stock. Much of this stock not being suited to the market requirements, tends further to demoralize the market until those who have been in the business in a legitimate, conservative way, suffer also with those who have plunged into the business.

A better way for getting into pig raising is to buy only on a small scale at the start, and gradually build up a herd. This avoids the necessity of tying up a large amount of capital in the business at the start, besides decreasing the danger of an oversupply and the consequent lower price. If the man going into the pig business will buy only two or three good sows at the start, preferably bred sows, he will learn just as much about raising pigs as if he had a much larger number, and is not likely to lose nearly so many. A good time to buy, provided that judgment is exercise in buying, is usually when the price is poor and the market oversupplied. Choice stock can be bought at a low price because so many want to get out, and if young stock is purchased which will not bring on a crop of pigs too quickly, the surplus on the market has time to be absorbed before any product is ready for the market.

Number of Pigs for the Farm.

The ideal number of pigs for each farm is something which must be determined by the individual farmer. This depends upon the system of farming which is followed. Pigs have been found most profitable, in times past, in connection with diversified farming, notably where grain growing and dairying are prominent industries. A sufficient number of pigs should be kept to consume the by-products which are suitable for pig feed, and only enough of the expensive concentrated feeds of the farm should be fed to finish the pigs for market. The buildings which are available for raising pigs should be taken into consideration, or if no buildings are available, the amount of money which can be put into buildings should be taken into account. Some of these points will be considered more in detail in connection with "The Farm."

By the term by-products we mean such products of the farm as cannot be marketed in their present form, but which must be put into some other form before being salable. Grain, shattered in the stubble fields, melons and pumpkins which have been found unsalable and left in the field, the aftermath of clover-, rape-, and grain-fields, skim milk, the droppings from corn-fed steers, and cracklings from the production of grease, all have a place in the pig's diet, and can be marketed through the pigs more profitably than through any other kind of stock. As to the advisability of buying grain for fattening pigs, it may be said that on a farm where the grain can be produced, a much better practice is to raise the grain on the farm and feed it to the pigs. In this way both the producer's and the feeder's profits are secured by the farmers, whereas if the grain be bought, the producer's profit goes to the man from whom the grain was purchased, and only the feeder's profit, which is usually a small one, goes to the feeder. At ordinary prices of grain and hogs there is not sufficient feeder's profit to justify one embarking in the business. One who is situated to produce on a large scale may engage in the strictly feeding business to
advantage, but the average farmer cannot do so. Some concentrated feed may need to be purchased, but such should be as supplemental to grain feed rather than as the basis of the ration.

Adaptability of Pigs to Different Types of Farming.

Swine are particularly adapted to dairy farms where the skim milk can be made to fill in the gap between the weaning and fattening period. With the exception of high-grade dairy heifer calves pigs will pay a better price for skim milk than any other class of stock, and pigs do not come very largely into competition with dairy cows for the products of the farm. Pigs can use but very little of the rougher forages on the farm which form the basis of the ration of the dairy cow, and the fattening pig is a large consumer of concentrates. In fact, under most intelligent systems of farming, pigs and dairy cows on the same farm will pay better than will either the one or the other of these kinds of stock raised exclusively on the same farm. The exception to this rule is found in localities where milk condenseries have been developed so that there are few by-products of the dairy business which can be utilized in pig feeding.

Swine Feeding Compared With Cattle Feeding.

The practice of swine feeding differs from the practice of cattle feeding in that the former is conducted largely in connection with the raising of the hogs, while in the case of cattle feeding the fattening process is often carried on at a long distance from the farms and ranges on which the cattle were raised. On the Pacific Coast the practice of fattening hogs after beef cattle is not so general as in the corn belt because of the difference in the character of the feed of the cattle. Hay-fed cattle contribute but little feed to pigs through their droppings, and heavy grain feeding has not been so general here as in the corn belt. Hence, hogs and beef cattle have not thrived on the same farm as have hogs and dairy cattle. A possible exception to this rule is found on farms where two distinct kinds of soil or land are found. That is, where there is, on the same farm, some rough land suited to grazing, and some tilled land suited to the production of grain, there is really no competition between the hog and beef cattle. On such farms, however, the two lines of business are, in practice, conducted separately.

Many farms in the Willamette Valley also carry a certain number of both hogs and sheep, but here again there is little relation between the two lines of industry, neither of them contributing anything material to the other. Hogs are found on more of the strictly grain farms in Western Oregon than in Eastern Oregon. This is probably due to the fact that in Eastern Oregon the grain farming is carried on so much more extensively that the farmer has very little time or concern for pigs, while in Western Oregon, the farms being smaller, the farmer has a certain amount of time which he can profitably devote to pigs. Hogs are rapidly making a place for themselves, however, on the large grain farms of Eastern Oregon; for they fit in well with parts of the systems of farming which are in most common vogue. The localities in which they have not made a place for themselves, as a rule lie remote from transportation. It is doubtful, therefore, if much place will be found for pigs in
these localities until transportation facilities are improved. Of course, even here, a sufficient quantity of pigs should be produced to supply the farm needs for pork, but as a money-crop pigs cannot be depended upon where the product must be hauled so many miles to market.

**Market Considerations.**

As has already been suggested, the time to have pigs is when other people have not very many of them; i. e., to have pigs to sell when the price is good and not many are offered for sale. A look at our Portland market reports for the few years during which the market has been established reveals the fact that there are certain high spots and certain low spots on the market with reference to the months of the year. In other words when a price curve and a supply curve are drawn it is found that as the supply curve goes down the price curve goes up and vice versa. This rule is not without its exception, but it holds in a great majority of cases. This is somewhat different, however, from conditions which prevail in the corn belt. In the larger eastern markets there is a well-defined packing season, during which large numbers of pigs come to market, and at the same time the price, not declining, even advances somewhat. Our packing, curing, and storage facilities are inadequate to take care of a run of pigs much in excess of 3,000 a day for a week at a time, and by far the greater quantity of our pork is sold in a fresh condition over the block. This makes it practically imperative that if one is to realize highest prices for his product he must have his product well distributed through the year, or at least must have his product on the market when the others have but little there. The system of farming followed in many localities practically prescribes the time at which pigs shall be marketed, while in other localities there is no particular reason why any large number of pigs should be marketed at one time more than at another. Where the main portion of by-products which are available for feeding come at a particular time in the year, and then are gone, it is imperative that the pigs should be at the suitable size to consume these by-products to best advantage at the time when they are available, and in localities where the by-products are pretty evenly distributed throughout the year it is necessary that some pigs of suitable size to make the most use of these by-products be available throughout the year. In the great grain-growing sections of Eastern Oregon the chief by-product, as has been suggested before, is the shattered grain on the stubble fields, and since this must be used up pretty quickly after grain cutting, and since the pigs which make the most profitable use of this by-product are individuals weighing from 75 to 125 pounds, it follows that within a few months after this period Eastern Oregon will have a considerable number of market pigs.

Fat pigs are a perishable product; that is, they must be marketed very soon after they are ready, regardless of price or any other condition. They depreciate rapidly with holding; hence it is necessary to begin to plan for their disposal, a long time before the pigs are ready for market.

**Gestation Period.**

The gestation period of pigs is 112 to 115 days, and it will re-
quire 6 or 7 months to grow the pigs from birth until they are fat. Hence it is 10 or 11 months from the time the sow is bred until the pigs should be ready for market. As has already been intimated, we are likely to have a comparatively weak market for a good many years to come during the fall months. It is evident that where it is possible the pigs should be ready for market at some other time than at the season when he greatest supply is coming to the market. A sow bred January 1 should farrow April 22, and the pigs should be ready for market in November. These dates are given as being fairly typical of the practice throughout the greater portion of the State, regardless of other conditions which are often more important. The custom of having pigs farrow in April or the first of May is pretty widespread, a custom no doubt brought out from the corn belt before the custom of having two litters farrowed, each year, came into vogue.

POINTS FOR SELECTING FARM SWINE.

In the past, the development of the improved breeds of swine has been directed almost entirely toward meeting the market requirements. But little attention has been paid to points which have no bearing on the market value of the product. That there are some points which are of vital importance to the farmer, but for which the market cares little, no one who has given much thought to the subject will doubt.

A great deal is yet to be accomplished in reducing the birth cost of pigs. Immunizing to hog-cholera has passed from the realm of the breeder to that of the veterinarian, though a good bit of effort has been expended in attempting to produce an immune strain. Vaccine, however, not inheritance, was destined to achieve the best that has yet been accomplished in enabling swine to withstand the disease. Fecundity has long been recognized as a highly important factor in the swine business. Early market maturity is a point for which most of those who shaped our improved breeds selected rigorously; but something remains still to be desired in this direction. The ability to make the most economical use of feed has received little attention, because of the large numbers in which pigs are usually kept together, making any quantitative account of this characteristic very difficult to ascertain. The number of a litter which is raised and the percentage lost during the first day or two after birth have not received the attention which their importance to the farmer would justify.

Good feet in breeding stock are of vast importance to the farmer and have always been given some attention. Good constitution is also important in breeding stock and deserves at least as much attention as is generally given to it.

Let us take a look at some of these profit-affecting influences and try to discover whether or not it is possible to make any improvement and to bring about a set of conditions which will be gratifying to the farmer without in any way lessening the desirability of the product to the butcher. The butcher's requirements must be met and satisfied, else other improvements are likely to net little profit.

The birth cost of pigs is in part contingent upon the fecundity of the sow and in part upon her maintenance requirement. The latter depends in part upon the size of the sow and in part upon the efficiency
of her digestion. Where the sows are kept in separate pens and the feed measured to each of them, it is noticed that some will grow fat and others of the same weight grow thin on the same amount of feed. After determining that worms are not the cause of the difference and that all the sows are in good health, the hard keepers should be placed on probation pending still further investigation. When farrowing time comes around again, notice whether the litters of the different sows grow thinner during the days in which their mother’s milk is their only feed. If a sow is a good milker, her pigs will grow plump and will appear well satisfied after taking their meal. If the sow is a poor milker the pigs do not get plump and the runts grow runtier and more numerous. When the sow gets up to eat or move about the pen the little ones will follow the poor milker and pull at her teats, thereby increasing the infant mortality. The sow may or may not fatten when feed is supplied to her in abundance. But if she fails properly to nourish her pigs, she should be provisionally booked for the discard, for it is fairly certain that a litter which is handicapped by a bad start in life and at six weeks’ old is several pounds behind the average will hardly make up in the race for the two-hundred weight.

Another consideration in connection with brood sows is their dispositions. If they are to be given any attention at farrowing time, as they most certainly must if best results are to be secured, they must be gentle, intelligent, and amenable to the advances of the attendant, as well as motherly to their young. The manifestations of a disposition to fight whenever a man is around usually results in the trampling and killing or crippling some of her pigs. Hence pig intelligence or intuition is a necessary part of the makeup of a good brood sow.

Fecundity is the characteristic which more than all others is urged for or against the different breeds of swine. But there are strains of the highly fertile breeds which are less fertile than the average of breeds of low fertility, and there are strains of the latter which are counted high in fertility. Do not retain as breeders, sows which you know are likely to prove low in fecundity, for after producing pigs a sow is worth about a cent less a pound and you have maintained her a much longer period of time than is the case with the seven-months pig sold for pork. Select both sows and boars from strains of high fecundity.

Good feet are given a place on practically all swine breed score cards, and it is safe to say that they are of almost as much importance in swine as in horses. If a boar has poor feet, service is difficult or impossible according to the degree of the defect. In a brood sow, poor feet seriously impair her usefulness, by preventing her from taking needed exercise, causing her muscles to degenerate and go to fat. Poor feet also make her awkward and clumsy, so that her pigs are in great danger of being crushed. If the young inherit this defect, it detracts very much from their value as breeders and also to a lesser extent from their value as market pigs. The latter are expected to carry a great deal of weight in proportion to the size of their bones, and as weakness in their feet makes weight carrying very difficult and
makes the pigs lazy, their carcasses will be less desirable from the butcher's standpoint.

As to good constitution, the usual marks by which it is determined are depth and breadth of chest and breadth of muzzle, snout, and poll. The thickness of the chest or the width of the floor of the chest, just back of the elbows is a good index to the heart and lung capacity, and the width of the poll is a fairly good index to the amount of nerve force the animal possesses with which to carry on the life-processes. Together these points give a fair idea of the length of life and vitality of the animal under ordinary conditions.

When correct market form is taken as a prime requisite, and good feeding, milking, and temperamental qualities are added, it may seem that the combination can rarely be found or affected. This is in a large measure true. But there is nothing antagonistic in any of these requirements. They are all found, but seldom in one animal, and when they are, they should be made the most of by giving the sow possessing them a long period of usefulness in the herd.

The deficiencies which should lead to the elimination of a sow from the herd will differ slightly according to circumstances. Poor keeping qualities, together with poor milking qualities, are usually fatal to profits even though fertility is high and the motherly instinct well developed. Sows with this unfortunate combination had best be made into pork, even though there be some loss in getting them fat. Poor feeding quality alone need not be convicting if she does not transmit it to her young. A boar strongly bred in good feeding lines may overcome this handicap for her offspring is she has the other good qualities. But it is not advisable to select a gilt that his proved to be a poor feeder.

A poor feeder, though she be a good milker, should be discarded if she is low in fertility or of an unduly nervous temperament. Poor milking ability should not condemn an otherwise good sow until every effort has been made to increase her milk production. Intelligent experimenting with her ration may remove the difficulty. But failing to secure this desirable quality will be sufficient cause for disposing of her, unless she possesses all the other good qualities and there happen to be other sows in the herd which are unusually heavy milkers, in which case some of the pigs may be given to the latter.

Lack of motherly instinct or the presence of the pig-eating propensity is fatal. Even though the depraved appetite arose in the first place from a faulty ration, the habit is next to impossible to eradicate, once it is formed. Fertility in such a sow avails little unless if so chances that a good mother and a good milker has accidentally lost a large part of her farrow and can be given the pigs of the pig-eater as soon as they are born. The chance of having this combination will not justify a farmer in retaining a pig-eater long in the herd.

Concerning early market maturity, by which is meant the ability to attain market weight and condition at an early age, it must be looked to especially in the boar. It is not known that the sire is more potent in transmitting this characteristic than is the dam, provided the latter be equally well bred, but it frequently happens that the farmer finds
himself in possession of a herd of brood sows about whose early market qualities he knows little or nothing. He may have selected them without thought of this, or he may have purchased them after they were fairly mature. But no farmer should use a boar, whether from his own herd or from somebody's else, which after being fed in the manner to produce market pigs, at six and a half months does not weigh close to two hundred pounds. By no means make weight the prime consideration in selecting a boar; but do not select as a sire an animal which does not himself have the ability to achieve what is expected of his offspring.

A gilt of poor constitution should not be retained as a breeder for reasons already stated; though a mature sow already in the herd may be retained if she has not transmitted this defect in too marked a degree to her young, and provided she has the other desired characteristics in a high degree. Replace the old sows of poor constitutions as soon as better ones can be secured having the other desirable characteristics suggested. But do not replace a tried and satisfactory sow, though of poor constitution, with an untried one no better in this respect.

In all points seek uniformity in the sows, so that a boar unusually good in the points in which the sows are weak may have some opportunity of producing uniform pigs superior to their dams.

When gilts are selected to replenish the breeding herd, look well to their early maturing qualities, as well as to the desirable qualities enumerated for their dams. Select the very best gilts from the sows having the desirable qualities in the highest degree.

A suggestion as to a system of marks which will enable the farmer

Figure 4. System of ear markings. One hole through left ear means 100; one hole through the right ear means 200; one hole through each ear means 300; two holes through the right ear and one through the left means 400; a notch in the inner margin near the point of the right ear (not shown in cut) means 500; a notch similarly placed on the left ear means 1000. For details of ear marking see text.
to identify his pigs may be of interest. If so many pigs are kept that it does not seem advisable to keep track of individuals, all the members of a litter may be marked alike. Buttons for the ears of swine do not give as much satisfaction as with sheep, for the reason that swine more frequently bite one another's ears and pull out the buttons. Ear notches are a little more difficult to read, but are the most satisfactory means of identification yet devised. A system which has proved fairly satisfactory is as follows: one notch near the middle of the outer margin of the left ear means one unit. The same mark in the same place on the right ear means one ten. Two notches about three quarters of an inch apart on the left or right ear means two or twenty respectively. A pig with two notches in the middle of the outer margin of both ears would be number twenty-two. One notch at the outer base of the left ear with no other notches means three and the same mark on the right ear means thirty. A notch in the tip of the left ear means five, and in the tip of the right ear means fifty. Four and forty are made by putting a notch at the base and one in the middle of the outer margin on the left or right ear respectively, while nine and ninety are made by adding the five or fifty notch respectively. One hundred is made by punching a hole through the middle of the left ear only. Three hundred is made by a hole punched through both ears and four hundred by punching two holes through the right and one through the left. Five hundred is made by cutting a notch in the inner margin near the point of the right ear and one thousand by a similar notch on the left. In marking the ears be careful not to cut the stiff cartilaginous supports of the ears.

The hardest numbers to make out are the three and thirty notches. If market pigs only are to be produced, the tip may be removed for about three quarters of an inch from the left or right ear for three or thirty, and if a five notch is to be used in either ear it may be cut in the middle of the cut edge. It is next to impossible to see the number at the base of the ear if the animal has long hair about this part, so that it is frequently necessary to feel for this notch, which is a good deal of trouble in some cases.

If some method more accurate than mere inspection is desired for determining the actual gain of pigs, if a platform scale is provided with a rack into which pigs can be driven and weighed one at a time, weights taken at the finish of fattening will tell pretty accurately when taken in connection with the age of the animals. But for the general farmer not so equipped with a small scale, the appearance of the animal, considered in connection with its age, will afford a pretty good guide to determining the rate of market maturity. More effort than is ordinarily expended may well be given to this characteristic, which next to form is the most important factor about a market pig from the standpoint of the farmer.

The points, then, to which farmers should pay most attention in producing market swine are: first, the butchers' preference as to form and quality, because these determine in a large measure the desirability of the pig's carcass for pork. Second, a brood sow should possess certain characteristics which affect vitally the profit which she pro-
duces for her owner. Among these it is proper to consider, (a) the maintenance cost of sows, and (b) their fecundity as these bear upon the birth cost of her pigs; (c) the gentleness, (d) milking qualities, and (e) the maternal instinct, for these have a direct bearing upon the number of pigs of a litter which she is likely to save. Third, a good brood sow, that is, one possessing in a higher degree all the desirable characteristics named, should be retained as a breeding animal as long as she retains those characteristics.

THE BOAR.

The number of sows which it is the intention to keep on the farm must be considered in deciding whether to own a boar or not. If it is the intention to keep more than six sows it is generally the better practice to own a boar also. On the other hand, if less than five are kept on the farm and it is possible to secure the services of a good boar from a neighbor, it is more economical not to own a boar. It is often necessary that a pig raiser buy a boar even when he has less than five sows, because of his inability to secure the services of a suitable boar in the neighborhood. In such an event the possibility of outside service will usually bring up the number of sows bred, so that there is no marked loss in economy by owning the boar. If it has been determined to buy a boar, it is best, when possible, to secure a tried breeder; that is, one which has been used until the owner can no longer make profitable use of him because of having gilts sired by the boar, or for some other reason must let him go. The opportunity to secure such animals, however, is not very frequent, and it is usually necessary to resort to a young, untried pig. After locating breeders who have stock for sale it is best, if possible, to visit the farm from which it is proposed to secure the animal before making any definite contract for him. This will give you an opportunity to see the way the animals have been kept, and to find out the particulars concerning the animal which could not be found out by mail. First, see that the animal is of good market type; second, see that he has masculinity well defined; third, see that he is in good condition as compared with the other pigs kept in the same lot with him, or kept in like manner as himself; fourth, see that he is out of a large litter from a sow that is a good mother (a good index to this is the number of pigs raised in the litter from which the boar is secured); fifth, see that the boar is pure bred, and get his pedigree and transfer certificate with him, or if the owner has not these papers hold back a part of the purchase price until he turns them over to you.

Don't buy a grade boar, or one which the owner says is of pure blood, on which the registration papers have not been kept up. If you find that such a boar is an exceptionally good breeder and want to pass him on to somebody else, the next person will be sure to insist on the papers, and you will not have them. Don't buy a runt from a good herd simply because he is cheap. Don't buy a boar of one breed when your sows are pure bred and of some other breed. Don't buy a pig under five months of age which has to be used for service the next month.
When you have secured the boar don't turn him out in a lot with strange hogs where there may be a lot of brood sows in heat.

The feed of the boar should not be materially changed when he is taken to his new home. So far as possible the same feed should be given, and if any changes are to be made these should be made gradually. If he is in good growing condition keep him so, but do not endeavor to make him excessively fat. On the other hand, if he has been kept up in show condition and it is not necessary to use him for breeding purposes right away, it is not a bad plan to reduce his flesh somewhat, and then a month before he is to be used begin to make him pick up again. As a rule, however, it is not necessary to reduce the flesh of the boar unless he is very large, or an old one. A boar six months old can get pigs, but a boar should not be used until he is eight months old, and but sparingly at that age. The way the young boar is used has a great deal to do with his lifetime and his utility. If it is desirable to try him out and find out what kind of pigs he produces, this may be done with only a small number of sows and then his usefulness will not be impaired if he proves good. A good many men waste a lot of money by getting a new boar every year. Allowing a boar to do service takes a great deal from his value as a market animal, and most boars are sent to the butcher before the owner finds out whether they have proved profitable breeders or not. A much better way of handling the boar is to keep him for several years. If no new sows are added from the young ones the same sows may be mated to the same boar year after year, provided the breeding has proved successful, and it may be more profitable to buy sows from outside rather than to save gilts of one known breeding in order to retain the services of the boar. If the boar has proved good it is well and profitable to sell him to somebody else for breeding purposes as long as he is a good breeder. He is worth but little for meat and another year of service will take but little value from his carcass when he is killed. When you get a good one use him as long as you can, and when you can no longer use him give somebody else a chance to use him as long as he is of any value. An old boar will get larger and stronger pigs, and more of them from the same sows than will a younger one.

CARE AND MANAGEMENT OF BROOD SOWS.

The pen in which the sow is to have her little pigs should be about ten feet square. After she has been placed in this pen it should be noted which part of the pen she makes her bed on. Then a fender rail eight inches high and eight inches from the wall should be attached around the corner where she makes her bed. She should be turned into this house at least a week before farrowing time in order that she become accustomed to her new surroundings. The troughs out of which she is fed and watered should be fastened down to the floor, so that she cannot root them around.

She should be accustomed to a small amount of bedding, and this preferably of finely chaffed material, because this is the kind of bedding she will have to be provided with when she farrows. For about twelve hours before the sow farrows she will not show a disposition to eat much. She is more likely to be up on her feet,
gathering together straw out of which to make a bed, or roving about restlessly as if trying to get out of the pen. From this time until about twelve hours after she has the pigs she had best not be fed anything, but given plenty of fresh water to drink. Before the sow begins to farrow she will usually lie down in her bed for a few hours. Very soon, if all goes well, the pigs will begin to arrive. It is a good policy to be near the pen so that help can be offered in case it is needed, but if the presence of anybody with the sow seems to annoy her, the helper should keep out of sight, but yet where he can see what is going on. In case help of any kind is needed, if it is offered gently and assuringly, the sow will usually take kindly to the help. If any of the little pigs fail to show any signs of life when they are born, examine them to see

![Figure 5. Fender Rail for Farrowing Pen](image)

that their noses are not covered with mucus. If so, remove the mucus, either with a rag or with the finger, and give the pig a few gentle spanks on the side with the hand. This will usually start his breath going, if he has any life in his body. If he comes alive all right, let him have a pull at one of the sow's teats, and then remove him, placing him in a basket lined with burlap. This latter will not be necessary if the sow is quiet and all is going well, but if you are not sure what the sow will do, this had best be done.

Usually the little pig will suck until his stomach is filled, and then snuggle up to the sow and lie comfortably and securely until the arrival of the next. It is well to keep watch that the sow does not get up and root the bedding all back under the farrowing rail, so that the pigs may be crushed against the bedding.

When the pigs are all born, the soiled straw and afterbirth should
be removed from the pen in which the sow is kept, and may be burned or buried. If the sow is lying quietly, she should not be disturbed for several hours after the pigs are born. She will usually show signs of thirst and get up and look for water before very long, and this should be provided.

When twelve hours have elapsed, some feed should be given her. This had best be in the form of a thin slop. In case the sow has a large litter, there is little likelihood that she will have too much milk. Each pig will take possession of one teat, and will take most of the milk which is formed by it. In case of only a small litter, however, it is well to take precaution that the sow shall not produce too much milk during the first day or so. During this time the pigs can take but little milk, and if the sow has a lot of it, the pigs will neglect some of the teats, and these will go dry. Hence, after a few days, when they are able to take all of the milk that is given them, they will not be able to get any from the dry teats.

If the little pigs get out of the nest and follow the sow around the pen whenever she gets up, trying to pull at her, it is an indication that she is not giving a sufficient amount of milk for them, and every-feed possible of producing milk flow should be given. If the pigs are getting plenty of milk, they will suck for a few minutes at a time and then lie comfortably by and sleep. If you have any skim milk which small pigs do not eat, the brood sow which is just suckling pigs may well be given some of it. Shorts and barley mixed, together with a little tankage, make a good substitute for the skim milk, and if kale or roots are available, the sow may well be given eight or ten pounds of these each day, or as much as she will eat.

When a three-hundred-pound sow is suckling a large litter of pigs, she will need ten or twelve pounds of grain each day, in addition to eight or ten pounds of kale or roots. She will usually drink about fifteen pounds of water.

The little pigs should be induced to eat as quickly as possible, and to this end a low flat trough should be provided for the sow. Into this her feed may be placed, and the little pigs will soon show curiosity to know what the sow is doing, and will soon get to eating out of her trough.

If breeding stock has just been purchased, before it is taken home, find out what feed and how much of it the animals have been receiving. If those feeds are not available to you or if for any reason other feeds are to be used, after a day or two rather than immediately, begin to change the feeds to those which will be used.

Feeds. Let us now consider the requirements which the feed should meet. The stomach of the pig is small as compared with other farm animals, and this excludes to a very large extent the coarser roughages, except in connection with a greater or less quantity of more concentrated feed. The feeds grown on the farm should be relied upon to furnish the greater part of the ration. The desirability of these varies within comparatively narrow limits. Wheat has about one-tenth greater value than oats for fattening swine, but the difference for growing stock is probably less than this. Barley, wheat, oats, speltz, and rye
are valuable in near the order named, and all are pretty expensive. Breeding stock as a rule is to be maintained at a constant weight, after maturity is reached, except at intervals when it is desirable that they should gain in weights and at other times when a loss in weight can not be avoided. As a rule digestible dry matter equal to a little over one per cent of the live weight of an animal, is required daily to prevent loss in flesh. Since the capacity of the alimentary canal of a pig is equal to about four per cent of the live weight of the animal when in a medium degree of flesh, it is evident that with breeding swine only, the maximum good can be secured from forage.

The desirability of different plants for forage purpose varies in different localities. In the Willamette Valley, rape, sown in rows and cultivated, has been giving good results. The satisfactory winter-pasture crop for this valley is yet to be found. Kale is good for the pigs, but the labor of cutting and handling it adds to the cost. The softness of the ground makes it difficult to secure any pasture during the winter without injuring the crop unduly, and the soil permanently. A plant furnishing a fairly tough sod, a vigorous growth in cool weather, and furnishing a good yield of nutrients to the acre would come near to meeting the requirements.

Clover furnishes one of the most desirable forage crops where conditions are favorable for its growth and endurance. Oats and vetch, wheat and rye furnish good feed, though the ground is likely to suffer the maximum injury. In Eastern Oregon winter wheat sown pretty early in the fall will, if it makes a good growth before cold weather, furnish a lot of forage at a minimum of expense. When sown in the spring, winter wheat affords excellent summer pasturage and will often make a satisfactory crop of grain the year following.

It is difficult to specify a succession of crops for each locality, as experience only will prove what crop is most productive during a certain season and in a particular locality; but suffice it to say that a little attention given to sequences of forage crops will aid materially in cutting down the expense of maintaining breeding stock.

On farms where but few swine are kept, the table scraps and kitchen waste are generally utilized for swine feeding, and satisfactory results are secured. When this practice is extended, however, and hotel and city garbage cans are made to contribute to the maintenance of swine, unsatisfactory results sometimes follow. The most common causes of trouble in this connection are staleness or putridness of some of the garbage, caused by the irregularity with which it is collected. This frequently causes a more or less severe attack of inflammation of the stomach and ptomaine poisoning. Washing powders, toothpicks, broken glass- and crockery-ware, all come in to make occasional trouble where city wastes are used for pig feeding, and some loss must be counted upon from their use. If a means of excluding objectionable material could be assured, a large amount of valuable swine feed would be made available and much of the risk attending its use could be eliminated.

In summer, breeding stock should have access to good pasture of whatever kind grows best in the locality. While sows are suckling
pigs, they will require a full feed of concentrates in addition to what they gather from pastures. For a mature sow eight to ten pounds means a full feed, and the ingredients of this feed depend in some degree upon the character of the pasture. If alfalfa or clover is used, little tankage or other proteid feed need be given. Barley, wheat, speltz, or oats, preferably ground, will be relished and will be well paid for in the gains of the little pigs. Tankage, however, has been found profitable by the Iowa Experiment Station, even with swine on alfalfa and clover pastures. The profit on tankage, however, is less when swine are on alfalfa or clover than when they are on grass—wheat, rye, or rape. With these latter pastures, tankage, middlings, or oil meal will be very profitable adjuncts to the usual grains.

When the litters have been weaned, the feed of the brood sows may be cut down, and if pastures are fairly good it may be entirely eliminated. If, however, the sows are very thin and it is the plan to breed them for fall litters, it will be well to continue heavy feeding until after they are safely bred again and are in good condition for their next farrow. It is reasonably certain that both the number and vigor of the pigs at birth are influenced by the condition in which their dam is kept before and during pregnancy.

As fall approaches, if any corn has been raised, the green corn, stalk and all, will be eaten well by sows and boars, and on this diet they can be maintained pretty cheaply. It will be found more economical in most cases to cut the corn and feed by hand rather than to let the sows and boars pasture on it. If given access to much of it at a time, only the ears will be eaten off, and the stalks and the rest will be wasted. Since the object is to have the swine get as much of their living from roughage as they can, rather than to have them fatten, it is clearly economy to secure the nutrients from the stalks, rather than waste them.

Stubble fields furnish a lot of good feed in the fall after the younger pigs have run on them until time for more rapid fattening. The breeding stock can then be turned into the field and will be able to secure a good part of their living therefrom. Since dry sows, and boars not in service, will do well on a more carbonaceous ration than will younger stock or sows suckling pigs, the protein adjuncts may be eliminated and the maintenance cost cut down.

If it is planned to have sows produce a fall litter they should be bred as soon as possible after the first litter can be weaned. The sows should be in good condition and preferably gaining in flesh when bred; and at farrowing time they should be almost fat enough for market, but not rolling fat. Lots of exercise, such as is secured by roaming about stubble fields, makes the sows active on their feet and capable of producing thrifty litters.

A few days before the sow farrows the feed should be reduced slightly and for a day just before farrowing and a day after she should have no feed. Light feeding on bulky feed is best to start on after the young are born, and when the pigs are able to take all the milk the sow produces, her ration should be increased and enriched until she is on full feed of a milk-producing ration. Kale is desirable if
no pasture crops are available or if the pastures have already been softened by rains. Bran, middlings, barley, wheat, with tankage or skim milk, are good for producing a copious flow of milk.

As long as pigs are suckling, the sow will require abundant feed of a succulent, milk-producing nature, and whatever shortage of feed may occur, do not stint the young stock, which is being fed through the mother.

During the winter the maintenance cost of the sow is greatest and the income she produces is usually the least. Hence she is likely to be neglected. If she has raised a fall litter and is to be bred for a March litter her maintenance cost will be greater, but she is not so likely to be neglected as if she is not to farrow until May. But in either case she should have feed suited, both in kind and amounts, to her needs.

Where alfalfa is a staple feed, brood sows may be maintained on it at little cost, either by giving them access to the stacks or by feeding through a rack. Where hay is worth more than ten dollars a ton, the rack-feeding will be found cheaper, the labor costing rather less than the hay.

The cost of maintaining brood sows varies with the method of feeding and the use that is made of forage. During a year a sow will require daily about four pounds of grain or its equivalent. If she can be maintained during six months of the year with no grain and the other six on only a part grain ration, it is clear that her maintenance cost can be materially diminished. Any means of reducing the cost of feed will be a potent factor in adding to the total profit. One of the large items of expense in producing the feed is labor. Hence the necessity for all the labor-saving devices which can be used, and the necessity for producing as many crops as can be profitably grown to “hog off” or pasture.

Unusual feeds which are used to some extent for forage for breeding swine, are artichokes, pumpkins, squashes, cull potatoes, turnips, beets, watermelons, and buckwheat. The potato crop is the only one of these crops which can stand much labor in harvesting, and return a profit. The others are valuable in some localities where they yield unusually well, and conditions are favorable for the swine to harvest them.

TO CALCULATE A RATION.

(a) Turn to the Table of Standards for Farm Animals found in the backs of most works on feeding. Standards are for 1000 pounds of live weight. (b) Multiply the nutrients in the standard each by the weight of the animals you are to feed, counting their weight as so many thousand and so many thousandths of a thousand. Having determined the requirement for your animals, turn to the table of digestible nutrients, select the feeds you are to use, and approximate the dry-matter requirement of the standard for your weight of animals. (This is your trial ration.) If protein is low, carbohydrates and dry matter sufficient, increase the proportion of the feed having the highest percentage of protein and slightly decrease the feeds carrying most carbohydrates. Continue the process until each nutrient in the ration prac-
tically balances or equals the corresponding nutrient required by the standard for the weight as determined.

**FEEDING THE GROWING PIG.**

**Before Weaning.** Pigs begin to nibble at their mother's feed at about four weeks' old and at five weeks are usually eating an appreciable amount of feed. If they are not weaned until seven weeks old they have three weeks in which to change from their mother's milk to artificial feed. This is not a very long time in which to make the change, hence it is well to crowd all the feed to them that they can use profitably so that their growth will not be checked when weaning comes. This, however, must be done carefully to avoid digestive trouble, waste, and pot-belly. The digestive tract of the small pig is larger in proportion to his body than when he grows larger. Hence it is possible at this time to overfeed a pig; but the more common mistake is underfeeding. Another ill which may result from overeating is impaired efficiency of the entire system, so that the gains in later life are secured at greater cost than should be. Pot-bellies result from the too-long continued use of very bulky or watery feeds. Little trouble of this kind, however, is likely to result from the feeding during the first seven weeks, but where pigs suckle for as much as three months such troubles are not unusual.

When the little pigs first begin to nibble at the feed in the trough, a trough inside a creep should be provided where the young ones can have feed especially suited to them. To start on, there is nothing superior to skim milk into which about one-tenth part, by weight, of middlings or oat meal has been added. If oats are used, the coarser hulls should be sifted out. Gradually the proportion of middlings or ground oats may be increased until at weaning time the pigs are getting about one part of middlings to two of skim milk.

When the little pigs are first being started on artificial feed, care must be taken that no feed be left in their troughs to become sour, for scours almost surely will result if they eat this left-over feed. Therefore give them but little, and remove what is left and give it to their dams. Then thoroughly clean their trough, and if possible scald it and set it up in the sun. At any rate make sure the trough is left clean, and is clean when feed is put into it again. A good start makes success possible; a bad one makes success very uncertain. The advantages of the creep are that cleanliness is more easily secured and a smaller amount of high-priced feed is necessary, as the sow does not require such expensive feed.

If it is considered too much trouble to provide a creep for the little ones, they may be allowed to continue eating with their dam, and her rations may be made suitable to the pigs. Milk production is stimulated by sloppy feed, and the sow requires concentrated feed which is easily digestible. For this method of feeding Dietrich suggests one-fourth to one-fifth pound digestible protein and 1.2 to 1.4 digestible carbohydrates for each one hundred pounds live weight of the sow and litter. The same amount of nutrients is all right for each 100 pounds live weight of the sow if she is fed separate from the pigs, but it may contain more coarse feed in the latter case. In terms of
feeds used on our farms, the ration may be made up as follows: For a 250-pound sow with seven pigs weighing seven pounds each 300 pounds live weight in all, there would be required 6 pounds middlings and 3 pounds skim milk; or 6 pounds barley and 8 pounds skim milk; or 6 pounds barley and .4 pound tankage; or 6 pounds middlings and .15 pound tankage. For a 400-pound bunch, one-third should be added to each ingredient.

After Weaning. Weaning time should bring about little or no hardship for the pigs if they have been properly accustomed to feed. Frequently a decided improvement in a litter of pigs is noted as soon as they are weaned. This is especially true of an uneven bunch whose dam has not milked abundantly; and it is also true of pigs which have not taken kindly to feed other than their mother's milk. Not securing enough from this source and being indisposed to take other feed, a change is frequently observed as soon as they get on other feed.

If green pasture of any kind is in season, the weanling pigs should still have access to it; and if they are to be hurried for market their other feed should be continued in liberal quantities. If skim milk is abundant enough to permit its use in quantity for the pigs, it may be fed to them twice daily in quantities not to exceed 8 pounds daily for each hundred pounds live weight. Their other feed may well be fed through a self-feeder or it may be given by hand, either at noon if they are not to be hurried to the limit, or morning and night if they are. A better return will be made for the skim milk if it is used at the rate of only about 5 pounds for each hundred pounds live weight.

The other feed of the pigs at this time may be ground oats, barley, wheat, speltz, or mill-stuff, according to the price. If the skim milk is available any of these feeds will give satisfaction. If not, tankage, about one part to eight of grain, to make a nutritive ratio of about 1:5, will be found desirable.

Pastures suitable for weanling pigs depend upon what grows well in the given locality. Clover, rape, alfalfa, wheat and grain stubble all afford good pasturage in certain localities. The rape will afford more pasture if sown in rows and cultivated until six inches high. In this way the plants will be tramped very little and will sprout up several times during the summer. Clover in early summer, and the aftermath if rains follow the cuttings, affords pasture second to none. Alfalfa is splendid forage during most of the summer.

Raising pigs up to the feeder size is followed to a considerable extent when lots of alfalfa but little grain is grown. Pigs from 75 to 100 pounds sometimes bring a cent above the market price of porkers. Conditions will determine whether there is any profit in this business. A few pigs can be raised by supplementing what they get in the pasture with the waste from the house, but it is questionable whether there is much profit in it on a larger scale.

As a rule liberal feeding of the growing pig is profitable if any grain feeding at all is done during this time, for the feed simply for maintenance nets no profit on market pigs. Hence good, consistent gains should be secured whatever grain is required, else profits are likely to be small.
FATTENING SWINE FOR MARKET.

Fattening swine for market covers that part of a pig's life from the time he is put on full feed until he is ready for slaughter. Usually a pig weighs from 80 to 125 pounds, when he is known as a feeder and is put on fattening feed to finish him for pork. Practice is divided as regards any set division between the growing and fattening periods of a pig's life, and obviously local conditions must determine which is the better method. Before taking up a consideration of fattening swine, it will be well to note the purposes of fattening, and the accompanying changes which take place in the pig's carcass.

First, fattening, as the term implies, increases not only the absolute weight of fat in the pig's body, which is one of the main purposes, but at the same time it increases the proportion of fat to other constituents in his body. Swine fat is not so heavy as water, and since lean meat contains a greater proportion of water than does fat meat, making a pig fat decreases the amount of water in the carcass. This renders curing easy without hardening the meat by the abstraction of too much water, and without making the meat excessively salty. Making the pig fat, as has been previously suggested, increases the proportion of material in his body which is fit food for man. These two reasons are among the chief ones why the butcher insists that a pig be fat before he will buy it.

The feeder wishes to have his pigs fat when he sells them, for fat is usually put on at less outlay for each pound than it costs to grow the pig's frame.

Now, in addition to increasing the edible meat and decreasing the water content of the pig's carcass, other significant changes are going on in the pig's body. A certain amount of the muscular cells undergo fatty degeneration, making the meat more tender and delicious to the epicure, but making the pig weaker and less efficient as a machine for transforming feed into food for man. This is one reason why more and more feed is required to produce gains as the pig approaches market maturity. This fact should be kept in mind in deciding when to crowd all the feed into the pigs which they will consume. The debilitation process accounts in a measure for the greater susceptibility of fat pigs to disease.

Fattening increases the body weight which has to be maintained by feed; hence an advantage in favor of doing the crowding and putting on the rapid gains at the finish.

As to the length of time required for putting pigs on full feed, the method of feeding previously followed will have its effect. In general, however, if care is exercised, from ten days to two weeks will suffice to make the change.

The correct nutritive ratio for pigs during the different stages of fattening is based on one of two theories. One is that as the finish approaches, the pig is adding less and less protein to his body and consequently requires less and less as market maturity approaches. The other, leading to quite the opposite practice, is that of supplying the factor of waste. It is maintained by some authorities (notably Dietrich in this country), that as fattening goes on, the pig comes to
waste more and more protein and that the waste factor must be supplied before any feed for gain is secured. The pig may still be absolutely maintained on a certain amount of the various nutrients for each hundred pounds of his live weight, but we are interested, not in keeping the pig at a constant weight, but in making him increase his weight. The conclusion of this reasoning is that the pig will require a greater and greater proportion of protein in his ration or a narrower and narrower nutritive ratio. Dietrich found that pigs fed by this principle gained 28% more on 5% less feed, but when the difference in the cost of digestible protein and carbohydrates is taken into account the significance of his discovery is in a large part lost.

At this station no change in the nutritive ratio is made from the beginning to the end of the fattening period, though the nutritive ratio is widened gradually from birth until the pig is weaned and then usually kept constant until the sixty-day fattening period begins. Then it is widened again to about 1:7.7. The difference in nitrogen waste is offset in very large measure by the decrease in the amount added to the body and by the increase in the total feed consumed. At the beginning of fattening, the pigs are given about 4 ½ pounds of feed for each hundred pounds live weight. This is increased as rapidly as is expedient until the pigs are getting all they will clean up in thirty minutes. If they are to be fed on the self-feeder, a little larger increase is safer before giving them access to the feed.

A pig on full feed should gain from 1 to 1.75 pounds daily, and on about 425 pounds of feed should gain one hundred pounds. This on analysis will be found to be just about four times the maintenance requirement of the pig, which is approximately 1% of his live weight. The decreased capacity of the pig for consuming feed is well illustrated here, for a 100-pound pig can consume 6 pounds of feed daily. In all our feeding tests but few lots of 200-pound pigs consumed 8 pounds at the end of the test, when they were beginning to show failing appetite.

As a practice, it is well to put rapid gains on pigs. If the pig is crowded to his capacity, he will waste a larger proportion of the nutrients which he consumes, though he is kept a shorter period of time so that his maintenance cost is less in the aggregate. The high finish is not secured on pigs which make their gains more slowly; for they grow instead of fattening, and mere framework, while making weight, does not make human food and hence does not bring the price which a plump, well-finished pig of smaller frame will bring. Hence, all things considered, the rapid gains are ordinarily the most economical and the most profitable, which means that the extra waste incident to rapid feeding is less than the increased maintenance cost due to slower rate of gain.

The age of pigs affects the economy of gains as well as the quality of the carcass, and the consequent price for each pound. In the Portland market, there is a difference of nearly a cent in the prevailing prices of old hogs and 200-pound pigs well fattened. The general trend of the evolution of market swine has been toward younger, lighter-weight smoother animals, and since this is in line with the de-
sire of the consumer as well as economy to the producer, there is little reason to expect any radical change.

Experiments have shown that, other things being equal, the pig will gain more rapidly and economically on three feeds daily than on two, but usually not enough to pay for the extra labor involved. The overloading of the pig's system with digested feed seems to induce a more rapid waste of nutrients than where feeding is distributed through shorter intervals; but the labor is half as much again as in feeding only twice.

The palatability of a ration determines in a considerable degree its usefulness to the pig. If the feed does not please the pig's palate, he will not eat so much of it as is required for economical gains. He may eat only enough for maintenance. It has been noted that protein in sufficient quantity in a feed increases the digestibility of the other nutrients. It has also been noted that the addition of protein to a ration deficient in it causes an increased consumption of feed.

Since most of our farm grains are deficient in protein, the most satisfactory source from which to secure this nutrient should be considered. Alfalfa hay, suitable for brood sows and boars, for this purpose is too bulky to be added to a grain ration in sufficient quantity to provide the needed protein without decreasing, below the amount required for rapid gains, the quantity of feed which the pig can consume, doubtless can be used to fairly good advantage during the earlier stages of fattening, but its continued use will almost certainly result in slower gains and poorer finish on the pigs. Alfalfa pasture is even more bulky than the hay, but on account of its cheapness in localities where it is grown extensively, a considerable use should be made of it, though the pigs should not be made to depend solely upon it for their supplemental protein. Bran, like alfalfa hay, carries too much bulk to be desirable feed for fattening pigs. Middlings and shorts can be depended upon for a considerable part of the supplemental protein if they may be had for little more than the price of cereals fed, and the distance to haul is not too great. Linseed oil meal is used to a considerable extent in the north central states, but even if flax growing should assume considerable proportion in the Northwest, the price of oil meal will never be very low here on account of the appreciation of English and Scotch cattle feeders for it, and because of the nearness of this locality to sea.

On the other hand soy-bean meal is being imported to a slight extent from Manchuria since the removal of tariff duties, and it is barely possible it may be unloaded at Willamette- and Columbia-Valley points at a price which will make it available as a supplemental pig feed. Since soy-bean meal has just the same percentage of protein as linseed oil meal, and very nearly the same carbohydrate equivalent, it is evident that it should be had at practically the same or a less price than the latter, else there is no inducement for using it in preference to an American-grown product.

Cottonseed meal has a third more protein, as well as a little more digestible carbohydrate, than the two above-mentioned meals, but because of the poisonous effects it exerts when fed in large quantities to
pigs, it should not be used over forty-two days. It can usually be had at a price little above that of linseed oil meal and is generally the more economical feed because less desirable for feeding dairy cows and because grown in larger quantities in this country.

Tankage, a by-product of the meat industry and admirably suited to hog feeding, is likely to remain the cheapest source of supplemental protein for swine. The reasons for this are many. The supply of it is likely to increase as the handling of slaughter animals becomes more economical and efficient. At present large quantities of material suitable to the production of tankage are being wasted by the smaller slaughtering establishments. A system which will provide for saving waste tankage material and rendering it a valuable commodity instead of a menace to public health, will increase the supply and assure its availability throughout the year. Swine are likely to remain the principal consumer for this feed, because it is not so palatable to ruminants. Foreign competition is not so keen for the tankage as for the meals named, because two-fifths of the world’s swine are in the United States; and in other swine-producing countries a home supply of this product is available and dairy wastes are relatively more abundant. Tankage, being a by-product of the meat industry, has a more direct relation to swine production than any of the other feeds named. It connects the successive generations of pigs so vitally that each generation may become the feed or at least supply the most expensive part of the carcasses of the succeeding generation. Tankage is the highest in protein content of all the feeds named, carrying twice as much as linseed and soy-bean meal and a fourth more than cottonseed meal, and it may be fed for an indefinite period without injurious results. It carries nearly seven times as much protein as barley or corn and costs but two times as much. Hence the question so frequently asked of the Experiment Stations and the Agricultural Press should not be, “Can one afford to buy supplemental protein?” but rather “What is the cheapest source from which to secure it?”

**COMPARING FEED VALUES.**

Farmers can tell much about this for themselves if they count the value of the carbohydrate equivalent as about two-thirds that of the protein to the pound. The carbohydrate equivalent, it will be remembered, is found by multiplying the digestible fat by 2¼ and adding the digestible carbohydrates. Now, if it is considered that digestible protein in the grain which is your principal feed is worth half as much again to the pound as carbohydrate equivalent, a numerical value proportionate to the money value may be ascertained for that feed. Take as an example barley, which is deficient in protein for a pig feed. In one hundred pounds, it contains 65.6 pounds digestible carbohydrates, 1.6 pounds digestible fat, and 8.7 pounds digestible protein. 

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65.6 + (2.25 \times 1.6) = 69.5 = \text{carbohydrate equivalent valued at } \frac{3}{4} \text{ a pound equals 46.12 + protein 8.7% valued at } 1 \text{ a pound makes a numerical value of 54.82 a hundred. Suppose oil meal is quoted at } $37.00 \text{ a ton and a new feed at } $30.00 \text{ a ton. The former has 28.2 pounds protein, 40.1 pounds carbohydrates and 2.8 pounds fat. By the foregoing process a numerical value of 59.14 is found for it. The new feed we}
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will say has 20 pounds protein, 18 pounds carbohydrates and 2 pounds fat for each hundred pounds. By the same process we find a numerical value of 35. Now to find what the new feed is really worth as compared with oil meal, the price of oil meal ($37) is to its numerical value (59.14) as the price of the new feed should be to its numerical value (35) completing the proportion, we find $21.00 is the price at which the new feed should sell and that at the prices quoted oil meal is the more economical feed to buy.

Whatever method is adopted in arriving at the economy of various supplementary feeds for pork production they should be bought on a guarantee as to their protein content, for this is really the nutrient for which the feed is bought. Until a better method of computing the values of feeds for pig feeding is figured out, the one suggested will be found fairly accurate as a guide to determining comparative values. These values must not be construed as taking the place of, or lessening the importance of, a correct nutritive ratio in the ration, but they afford a good basis for comparing feeds whose purpose in nutrition is comparable.

In localities adjacent to creameries and cheese factories, skim milk, butter milk, and whey are often available in larger quantities than are needed for younger pigs and these by-products of the dairy industry all have value for fattening pigs. Used in quantities up to ten pounds for each head, the Oregon Experiment Station has found that skim milk has a value of about 22 cents a hundred pounds as compared with tankage at $45 a ton. As compared with barley feeding alone, it doubtless has a much higher value than this. Some experiments give it nearly double this value (22 cents a cwt.) when compared with corn feeding alone. But it is obviously fair to compare it with the cheapest satisfactory source from which supplemental protein can be secured, since it has been repeatedly demonstrated that some supplemental protein is necessary to the most satisfactory results in fattening swine.

In conclusion, it is well to keep in mind that the purposes in fattening swine are—to increase the edible meat and dressing percentage, to decrease the proportion of water, and to improve the texture of the meat. That the feed eaten by a pig is used for two distinct purposes—maintenance and gain—and part for no purpose, being wasted. That approximately one per cent of the live weight in digestible dry matter is required for the maintenance of the pig. That rather more protein than exists in ordinary farm grains is necessary to economical pork production. That the supplemental protein must necessarily be drawn from material carrying a larger proportion of protein than is required by the pig. That the price paid for such supplemental feed should be in general proportionate to the protein content, but the carbohydrate equivalent should be given a value of about % as much for each pound as the protein. That supplemental feeds should be guaranteed as to the protein they contain.

METHODS OF FEEDING FATTENING SWINE.

The rate of gain, maintenance requirements, purpose in fattening, and changes in the pig's carcass incident to fattening have already been
considered. Comments on some methods of preparing the feed and putting it before the swine are now in order.

Cooking feed has been largely abandoned, because the digestibility of most of the feeds has been found to be diminished by cooking. Potatoes seem to be the one exception to this rule. When they are cheap enough to feed to pigs, potatoes will stand the expense of cooking and pay a profit in doing so, if installing the equipment does not form too large a proportion of the feeding cost. It seems fairly well settled that at the present time no one would be justified in installing an expensive cooker, for ordinarily potatoes are more valuable for human food than for pig feed, and in localities where they are not, other crops will usually furnish more nutrients at less cost to the acre than will potatoes. The potatoes are cooked in order to decrease the water content and burst the starch cells. Hence steaming is more desirable than boiling, and in the latter process if the water is drawn off and the potatoes left over the fire long enough that they have a mealy appearance when they split open, they make better feed than if left in the water in which they are cooked and have the meal mixed with them.

Grinding feeds is a profitable practice at the present prevailing prices. The purpose of grinding should be kept clearly in mind when having it done. The mill does some of the pig's work in preparing the grain for swallowing and digestion, saving to the pig about six per cent of the feed. If the grain is ground coarse, the pig can still swallow it without much chewing, and a considerable part of the grain may pass through the pig without being digested. It is therefore evident that where grinding is done at all, it should be thoroughly done and the meal made fine. If six pounds of feed will just pay for grinding one hundred pounds, it will not pay to grind. At 1 1/4 cents a pound, six pounds is worth 7 1/2 cents. This is a little less than the usual cost of grinding. At $30.00 a ton, six pounds covers the ordinary cost of grinding and leaves a profit on the work.

In addition to the actual saving of feed required to produce 100 pounds of gain, grinding feed will usually secure a better finish; and consequently a higher price a pound will be obtained for the fat pigs. Where grinding costs practically the same as the saving in grain, it may be practiced only at the close of the fattening period. The desirable finish is thus secured without the larger expense involved in grinding the feed for the entire period.

Soaking feed which is so excessively hard that it is not likely to be well chewed unless so treated, may be of some mechanical advantage, though it is not likely to be accompanied by favorable results in any other way. It is more than likely that there will be some sugar dissolved out of the fuel and possibly become fermented if the weather is at all warm. With ground grain, no advantage due to soaking is noted, though merely wetting before feeding may be good practice in that it prevents the finer parts from being blown away or from being inhaled by the pigs, causing bronchial troubles.

Other methods of treatment, such as steaming, roasting, fermenting, malting, and predigesting with various acids and caustics result
unfavorably, so far as the pig is concerned, for they either destroy or render less available some or all of the nutrients contained in the feeds.

Having considered most of the methods suggested for treating feed preparatory to its presentation to swine, it is well to give some attention to the relative merits of the different methods of putting feed before them. Most of our American breeds of swine were nurtured in their incipiency on whole ear corn shoveled over the fence from a wagon box drawn up beside the fence. This wagon load was used until it was gone, enough being thrown over at one time to last twelve hours. At next feeding time, if some corn was still uneaten, a slightly smaller quantity was given them. If it was all gone, a little more than was given at the previous feed was given them. When the first wagon load of corn was gone, father and the boys would go out and snap another load, and continue as before until husking proper began. Before this time came around, the feeding floor, if there was one in the feed lot, was buried fathoms deep in cobs and shucks. But nothing daunted, the process was continued; may be occasionally some one would hop over the fence with a scoop shovel and dig away the rubbish off the floor, piling it in a windrow all around the feeding floor. The trouble came, if not sooner, when the rains fell and thoroughly soaked this mass of decomposable material. Inflammation of the stomach, often confused with hog cholera, and too frequently cholera itself, claimed its victims as a result of the carless method of handling the refuse on this and adjoining farms.

Figure 6. Swinging Panel for Feeding Trough.

This method of feeding implied, besides some lack of thought on the part of the farmer, cheap feed and cheap swine. With an increase in the value of both, changes have more or less gradually come about. When the corn-belt farmer by force of circumstances was transplanted to Oregon, he found wheat instead of corn the staple pig feed,
and the waste of throwing the small grains in the dust or mud as the case might be, was so glaring that it attracted his attention. Other farmers who had left the corn belt after a better regime had been established, settled near this first awakened farmer, and together they discussed means of eliminating some of the waste. Floors with edges on them, and raised a little above the rest of the lot, alleviated the difficulty, but the droppings of the pigs and the mud carried onto the floor by the swine, soon made other equipment necessary.

Troughs similar to those which had always been used for water suggested themselves and were tried. The difficulty of getting the grain into these suggested the swinging gate which had already come into use in Ohio on the farm of Ed Clever. This method gave very good satisfaction. By this time, the problem of equipment which confronted one pig-producing locality, confronted all in one form or another, and many of them have come to us still unsolved. The increased cost of labor has also added problems, until now there are almost as many problems for us to solve as our grandfathers knew of.

The self-feeder is one attempt to decrease the labor cost incident to pork production. By this method, once a lot of fattening pigs were on full feed, a correct ration could be put into the bins to last a week or more and only slight attention need be paid to that feature for several days. An extension of this system to eliminate the labor of mixing feed has been put into practice by the Iowa Experiment Station. Several self-feeders in which various ground grains and tankage each in separate compartments were provided, and the pigs were allowed to balance their own ration. The idea was, I believe, borrowed from the poultrymen, who for several years had been using this system at the Maine and Cornell Stations with laying hens. Wherever the idea originated, it is a good one, for the pigs make as economical use of their feed taken in cafeteria style as the most frugal New England housewife could make of the contents of a limited larder.

At the Oregon Station, the self-feeder containing a balanced ration has given in several tests, uniformly more economical gains than has hand feeding. The system has been tried with barley, barley and tankage, and wheat, shorts and tankage. The labor item is a considerable saving over and above the grain saved in producing a hundred pounds of pork.

Another fixture which can be made more general use of is an automatic watering device, connected either directly to the general supply tank or with the horse tank. A trap similar to that used in water closets may be used, or where convenient, the level of the troughs can be made to control the supply. This method has an advantage over natural streams, unless the same are entirely on the farm where the pigs are kept, and even where they are so situated there is more danger of the stream becoming polluted than of the supply furnished by the device. The Illinois Station, however, found that pigs made more economical gains where the water was measured to them than when given ad libitum, but here again labor is increased probably to a point where all that is saved on one item is lost on the other.

In general, no labor-saving device which really saves labor without
sacrificing other equally important considerations, can be considered a luxury on farms where any considerable number of pigs are fattened each year, and the more nearly they can be kept in constant use, the less is their real cost to the farmer.

**RAISING PURE-BRED SWINE.**

It is questionable whether any one should engage in producing pure-bred swine who has not served a successful apprenticeship with grades. There are so many practical details with which to familiarize one's self, which can be learned so much more economically with grades, that the foregoing statement seems reasonable and conservative. The purpose of the breeder of pure-bred swine is primarily to produce boars which by legitimate advertising he may hope to sell to pork producers at a price which will permit him to continue his business. Most of the female swine should be culled out, the best saved to continue the herd, and those not quite as good sold to other breeders who can use them.

Up to the present, conditions have been peculiarly favorable to producers of pure-bred swine. There have not been too numerous and there has been a tremendous interest in pork production. Most of these producers and would-be producers of pork have heeded the gospel of good sires. The result has been an active demand for boars. Too often the demand has exceeded the supply of good ones, so that men have been induced to embark in the production of pure breeds without a proper conception of their work. Letters come to this office every day asking where sows of various breeds can be had, and frequently some remark is dropped which indicates that they must be had cheap. Too frequently these letters show an absolute lack of knowledge of the most commonplace details of hog rising.

The time is not yet here, but it very soon will be, when plenty of breeders in Oregon will be raising pure-bred swine. Then those farmers who should have stayed out of swine raising will most likely suffer more or less financial loss. Those who are not producing boars which are good enough to improve good grade herds, and even breeders who are not good advertisers, will find that their wares are a drug on the market.

Swine raising is an ancient occupation, even if not counted honorable by the ancient Jews, and because of the economy with which it can be produced, pork will likely be a staple food product for a long time to come. But the production of pure-bred breeding stock is an exigency of modern conditions, to which those who have already made a success of raising market swine are best fitted. The wealthy man who has never raised grade swine and who takes a fancy to some pure breed may win some prizes, but he is not likely by his industry to leave a permanent imprint on the swine in which he chances to place boars. Such a man often serves his community well by making available for breeding purposes animals which he brings in, but it is rare that he has the judgment or good fortune to mate his stock wisely enough to produce pigs which are good enough to improve the breed.

Swine breeders, like breeders of other kinds of live stock, are usually to the manor born. Acuteness of observation, judgment to de-
termine what will happen before it does happen, this judgment based
on a well-grounded knowledge of inheritance, infinite capacity for de-
tails, but the courage to send to the feed lot good animals which are
not quite good enough to use as breeders, liberality in feeding so as
to develop all the possibilities innate in his young stock;—these are
some of the qualities which help to ward off failure for the breeder
of pure-bred swine.

Success and failure as here used refer to the achievement of the
breeder as a breeder, not as a financier. A man may be successful
either as a breeder or financier and not as the other, or he may
succeed as both. Some examples may illustrate. Mr. A. J. Lovejoy
of Roscoe, Illinois, has been said to have made Masterpiece 77,000 of
the Berkshire Record. He used him on good sows which gave an oppor-
tunity to prove his worth. This boar was then purchased by Mr. W.
S. Corsa, of Whitehall, Illinois, and this boar made the reputation and
assured the financial success of Mr. Corsa's Berkshire breeding. Mr.
J. E. Meharry of Tolono, Illinois, several years ago, purchased an in-
terest in the Poland China boar, Chief Perfection 2nd. He had been
breeding good swine for some time, but had not a wide reputation.
This boar brought Mr. Meharry to the notice of Poland China breeders
and brought out the excellence of his swine. With the skill as a breed-
er which he possessed, his stock have continued to be winners at the
international in both fat and breeding classes.

The illustration also shows that a fortunate selection of a boar,
or the detection of the correct one in his own herd, as has been so
frequently the case with Mr. N. H. Gentry of Sedalia, Missouri, fre-
quently determines a breeder's success either as a breeder or financier.
For there have doubtless been as potentially good breeding swine con-
signed to the slaughter houses or the family pork barrel, which never
exercised their breeding functions.

If none but those who have already familiarized themselves with
some breed through grades of that breed, engaged in raising pure-breds,
most of them would probably breed the kind which they know best.
There is really little choice in the fat breeds, other than that existing
in the minds of the breeders, present and prospective. Good individuals
as well as poor ones are found in all the breeds. It might also be
added that the poor and mediocre are greatly in the majority as com-
pared with the best representatives of the several sorts; but this is no
more than could be said of all kinds of animals, including men.

Judgment must be exercised in selecting a foundation of whatever
breed is decided upon, and good individuals with good ancestry for sev-
eral generations back are to be preferred. Good individuality is of
more importance than the ancestry, or than any one individual in the
ancestry; for pedigreed scrubs occur in all breeds, and while these
often breed better than themselves, they should not be chosen, since
what they contribute directly to their offspring drags downward rather
than upward from the average of the breed. The average of no breed
is good enough for foundation stock. The foundation stock purchased
should be better than the average of the breed, and as much better as
the pocketbook will afford. If it will not afford as good as the average, keep on raising grades until it will afford it.

Before purchasing foundation stock, become familiar with the breed history of the strain you choose. Learn the weak points of the breed to avoid them, and the strong points to preserve them. Having decided on the stock which suits you, become familiar with it. If you can afford it, select your stock from a herd whose ancestry has been bred continuously by one breeder. You get the benefit of his judgment in the ancestry of your selection, and in the absence of better knowledge, it is safe to assume that if the good breeder considered stock good enough to retain in his herd generation after generation, it was better than average stock. Be a little wary of stock which has a succession of ancestry, no two of which were bred by the same man, and whose breeders are unknown in the breed history.

If you know good market and good feeder type select it, not forgetting the approved type of the breed, but insisting above all that the animals you select have, if fat, the forms of highly desirable market swine, and the heads of the best feeder type of the breed. Short, broad faces have a virtue which many Oregon breeders have overlooked, and broad flat backs carrying uniform width are not commonly found even in our show yards.

Concerning particular breeds, it is well to note carefully certain facts. The Berkshire is the oldest of fat breeds of swine, but is still dimorphic, which is to say there still exists a very marked tendency for the breed, even with litters, to split into two distinct types. The one is a larger, slab-sided, big-boned, more slowly maturing variety; the other a neater, broader, more compact and early maturing sort, but undersized. Do not cross these two types in the hope of securing an immediate blend. Breeders as good as any of us can reasonably hope to be have tried for a hundred years and still the two types often crop out. As nearly as possible, breed from those which occupy, with reference to size, the middle ground. If you can get both sexes that have already blended successfully, you will have fewer reversions to the old Berkshire and to the little Neapolitan types. Do not select for the extremely large type. Select, rather, a Yorkshire or a Russian Wild Boar to start with, for you will reach your goal sooner, if size is the goal.

If the small type suits you best you can get at least equally satisfactory results with the Essex.

Concerning Chester Whites, the two types likewise exist in this breed, but there is even greater difficulty met with in this breed in that the breeders themselves are not agreed on the preferable type. The two strains have not so much in their ancestry which accounts for the two sizes and shapes as the Berkshires, but their disparity grew out of a breeder's fancy. The O. I. C. (Ohio Improved Chester) was a large strain developed by a Mr. Silver, of Ohio. In the hands of those who have succeeded to this strain, the swine have become too coarse, rough, and slow maturing. The older, smaller strain is not found in considerable numbers in Oregon, though very common in the northern part of the corn belt, and as found there are beyond criticism.
Figure 7. Berkshire Sow With Eight Pigs, An Average Litter.
as a market pig. The O. I. C. as a breed has been merged with the Chester White, but many still adhere to the type and name.

In this breed look well to quality and head, for the market form of this pig is good and fecundity high. Select the earlier-maturing strain, and carefully preserve the good market qualities of which the better part of the breed is possessed.

The Duroc Jersey breed was transplanted to Oregon when still in a somewhat formative state. Being naturally a bit rough and coarse about the head, but, like the Chester White, possessed of good marketing qualities, the latter have been looked after more carefully than quality, uniformity, and economical feeder form. Oregon breeders need to look well after these last-named points if our swine of this breed are ever to compare favorably with the best representatives bred in the corn belt.

The tremendous increase in this breed during the last twenty years attests its worth. But many of our Western breeders are not observing the best practice, and are failing to discriminate against some of the most palpable faults of the breed.

Poland China swine are the most numerous breed in the corn belt, where they are the smoothest, plumpest, earliest maturing breed. In later years a great deal of misdirected advertising has been turned toward emphasizing large size. At the present time advertisers in swine papers advertise Large Type Poland Chinas, Medium Type, and just Poland Chinas. Extreme size in this as in other breeds is usually attained at the cost of early maturity and the best fattening qualities. The defects of this breed where bred for extreme size are coarseness about the head, a bad kink in the topline just back of the shoulders, and coarseness of the texture of the skin and flesh. A medium-sized, short, broad face, slightly incurved, broad, low chest and even, broad, flat back, should be selected for. The fecundity of this breed must also be looked to, for it ranks the lowest in this point. This breed has determined the type of the American market hog in all essential respects, but this does not insure its maintaining its supremacy unless rigorous selection be exercised.

The Hampshire or belted hog has risen rapidly in popularity, partly because of its striking color. This latter point is one of the limitations of the breed, for many otherwise excellent specimens have to be sent to the feed yard because of a solid black color, while the popularity of the breed is inducing breeders to retain some individuals which have little aside from their striking coloration to commend them, and the market will not pay much for this point alone. Practically all breeds have had to pass through the color-fixing ordeal, and doubtless in time this may cease to be a necessary point for selection. Nothing but rigorous selection for good market type will save this breed from a period of depression after the color is fixed, for up to the present the white belt has been too nearly the “Open Sesame” to the breeding herd, and the absence of it the “Depart ye into outer darkness.”

All breeds are good or bad according to the standard and rigidity
of selection. Insist on individual excellence when purchasing from an outside herd or selecting breeders from your own herd.

Choose the breed that suits you, or that is most popular in your locality, and try to establish a reputation for the excellence of your stock rather than for the high percentage which you sell as breeders.

While insisting on approved market type, by no means disregard the head and other breed characteristics. If only market characteristics appeal to you, breed market swine only.

Common honesty and extreme accuracy in records are absolute essentials to the continuance of the highest success in breeding.

Figure 8. A Good Type of the Duroc Jersey Sow.