MANAGING
YOUR HOG BUSINESS

S.W. TERRILL, D. E. BECKER, AND A. H. JENSEN

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This circular was prepared by the late Professor S. W. TERRILL, Head of the Swine Division and well known authority in the field, whose untimely death occurred during process of publication. The work was completed by D. E. BECKER, Professor of Animal Science, and A. H. JENSEN, Associate Professor of Animal Science.

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MANAGING YOUR HOG BUSINESS

THE HOG BUSINESS IS GOING THROUGH A REVOLUTION at the present time. Competition is forcing hog producers to cut production costs, to increase their volume of operations, and to pay more attention to the production of a high-quality product for the consuming public. The general trend is toward increased specialization, drylot rearing, multiple or successive farrowings, and the use of complete rations.

When you go into the hog business in Illinois, you become part of a 450-million-dollar industry. This 450 million dollars represents one-fourth of the annual farm income in Illinois.

A successful hog business is not a matter of luck. To be a successful producer, you must combine the art and science of production with modern business methods to get the highest returns for a given volume of production. As a producer, you must provide adequately for all the needs of your pigs at all stages of their development and you must get each job done well and on time. As a manager, you must make the best use of capital, labor, and other resources. You must be a keen observer.

As a producer, you must carefully examine your own program and try out modifications of it that appear to best fit your own conditions and managerial ability. After further experience, you may find you need to make still other changes. Each specialized producer must evolve a system of hog production that is uniquely fitted to his conditions. The success of a highly specialized large-volume hog operation depends more on the managerial ability of the producer than on any other single item.

To manage your hog business successfully, you must make decisions and take action on all phases of the operation. These include breeding, feeding, hygiene, housing and equipment, and all areas of management. The important aspects of each of these phases are covered in this circular.

FEEDING

One of the basic principles of economical pork production is the proper fortification of farm grains to correct their nutritional deficiencies.

In the past, separate pasture and drylot supplements were recom-
mended for self-feeding with shelled corn to growing and finishing pigs and sows, because pasture was relied on to furnish a margin of safety for vitamins and minerals. Furthermore, many supplemental ingredients such as synthetic vitamins and other additives formerly cost more than they do now. Separate recommendations for drylot and pasture feeding are no longer necessary. The same formula can give the needed fortification for either with the necessary margin of safety for variable conditions.

Feeding complete rations is recommended over free-choice feeding because recent experimental work on practical swine nutrition shows that complete rations have the following advantages.

1. On pasture, pigs of all weights, but especially light-weight weanlings, gain faster. This advantage does not seem so great in drylot.
2. Consumption of supplement is better controlled.
3. Pigs gain more uniformly. There are fewer "tail-enders."

Many producers, however, will no doubt continue to use free-choice feeding of shelled corn and supplement and get good results, especially if the supplement is neither too palatable nor too unpalatable.

Recommended protein levels and average feed intakes per animal for the Illinois System of Swine Nutrition are given below.

<table>
<thead>
<tr>
<th>Protein content</th>
<th>Average daily feed intake, pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>of ration, percent</td>
<td>Growing and finishing pigs</td>
</tr>
<tr>
<td>Creep feed (suckling), 5 to 30 pounds</td>
<td>20</td>
</tr>
<tr>
<td>Pig starter (weaned), 10 to 30 pounds</td>
<td>20</td>
</tr>
<tr>
<td>Grower, 30 to 100 pounds</td>
<td>16</td>
</tr>
<tr>
<td>Finisher, 100 to 200 pounds</td>
<td>12</td>
</tr>
<tr>
<td>Gestation</td>
<td></td>
</tr>
<tr>
<td>Gilts</td>
<td>16</td>
</tr>
<tr>
<td>Sows, first 2/3</td>
<td>12</td>
</tr>
<tr>
<td>Sows, last 1/3</td>
<td>16</td>
</tr>
<tr>
<td>Lactation, gilts and sows</td>
<td>16</td>
</tr>
<tr>
<td>Breeding boars</td>
<td>16</td>
</tr>
</tbody>
</table>

Except for a creep or pig-starter ration, the Illinois system reduces the number of swine feeding rations to two—a 16-percent and a 12-percent ration (Table 1). This simplicity contributes to efficiency in handling, storing, and feeding.

**Feeding during gestation.** You can either self-feed or hand-feed bred sows and gilts. Hand-feeding is recommended because it usually takes less feed and is therefore cheaper and because you can easily
Table 1.— Rations for the Illinois System of Swine Nutrition

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Illinois Creep Ration 20 for suckling pigs weighing 5 to 30 pounds</th>
<th>Illinois Starter Ration 20 for weaned pigs weighing 10 to 30 pounds</th>
<th>Illinois Ration 16 for pigs weighing 30 to 100 pounds and for breeding stock</th>
<th>Illinois Ration 12 for pigs weighing 100 to 200 pounds and for breeding stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein content, percent</td>
<td>20</td>
<td>20</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td>Ground yellow corn, pounds</td>
<td>580</td>
<td>250</td>
<td>1590</td>
<td>1805</td>
</tr>
<tr>
<td>Soybean meal, 50 percent, pounds</td>
<td>520</td>
<td>360</td>
<td>360</td>
<td>160</td>
</tr>
<tr>
<td>Dried whey, sweet 70 percent lactose, pounds</td>
<td>300</td>
<td>500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dried skim milk, pounds</td>
<td>100</td>
<td>300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sugar, cane or corn, pounds</td>
<td>200</td>
<td>200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rolled oats or oat groats, pounds</td>
<td>200</td>
<td>300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Animal fat, pounds</td>
<td>40</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trace mineralized salt, pounds</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Ground lim stone, pounds</td>
<td>20</td>
<td>10</td>
<td>20</td>
<td>14</td>
</tr>
<tr>
<td>Dicalcium phosphate or steamed bone meal</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>14</td>
</tr>
<tr>
<td>Vitamin additions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin A, I. U</td>
<td>6,000,000</td>
<td>6,000,000</td>
<td>3,000,000</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Vitamin D, I. U</td>
<td>600,000</td>
<td>600,000</td>
<td>300,000</td>
<td>150,000</td>
</tr>
<tr>
<td>Riboflavin, grams</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>.5</td>
</tr>
<tr>
<td>Niacin, grams</td>
<td>30</td>
<td>30</td>
<td>15</td>
<td>7.5</td>
</tr>
<tr>
<td>Pantothenic acid, grams</td>
<td>10</td>
<td>10</td>
<td>5</td>
<td>2.5</td>
</tr>
<tr>
<td>Choline, grams</td>
<td>200</td>
<td>200</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Vitamin B&lt;sub&gt;12&lt;/sub&gt;, milligrams</td>
<td>32</td>
<td>32</td>
<td>16</td>
<td>.8</td>
</tr>
<tr>
<td>Antibiotics, grams</td>
<td>40</td>
<td>40</td>
<td>10 to 20</td>
<td>10 to 20</td>
</tr>
</tbody>
</table>

* If 44 percent soybean meal is used, use 400 and 200 pounds in Illinois ration 16 and 12 respectively.
* May be added as ordinary salt and trace mineral mixture. If the trace-mineralized salt contains less than 0.5 percent zinc, add 0.1 pound of zinc carbonate per ton of complete feed.
* When Illinois Rations 12 and 16 are used as breeder rations, omit antibiotics.

Observe the bred females at feeding time. You can hand-feed the entire daily allowance at one time and get just as satisfactory results as by feeding twice a day.

If you self-feed, you may save some labor. However, when sows can eat all they want, you must feed a bulky, fibrous ration (containing, for example, ground corn cobs or alfalfa meal) to keep the energy intake of the sows or gilts low enough to keep them from getting too
fat. When you self-feed a bulky ration, hogs usually waste more feed. Moreover, if the gilts and sows are not gaining as they should, you have to change the proportion of bulky feeds in the ration.

Bred sows or gilts need to gain an average of about \( \frac{3}{4} \) pound per day. This much gain will provide adequately for the growth of a gilt and the development of the fetuses and provide a body reserve for a lactation period of 1 to 6 weeks. But if sows or gilts are thin when bred and must nurse litters more than 6 weeks, or be on a limited feeding program during the nursing period, they should gain an average of 1 pound every day during gestation.

You can usually get a gain of \( \frac{3}{4} \) pound per head per day by hand-feeding Illinois Ration 16 (Table 1) to gilts and Illinois Ration 12 to sows at the rate of 4 pounds per head per day during the first two-thirds of pregnancy. Hand-feed both gilts and sows Illinois Ration 16 at the rate of 6 pounds per head per day during the last third of pregnancy.

**Feeding during lactation.** After the sows or gilts have farrowed, self-feed a 16-percent protein ration during lactation. Feed suckling pigs a creep ration (Table 1) until they weigh 30 pounds. Feed weaned pigs under 30 pounds a pig-starter ration (Table 1) and switch them to a grower ration at 30 pounds.

**Feeding growing pigs and finishing hogs.** Self-feed growing pigs a 16-percent protein ration (Table 1) from the time they weigh 30 pounds until they reach 100 pounds. From the time they weigh 100 to 200 pounds, self-feed a 12-percent protein finisher ration (Table 1).

**Feeding gilts for herd replacements.** When gilts weigh 175 to 200 pounds, separate them from the finishing herd. Hand-feed enough of a 16-percent protein ration, usually 5 to 5½ pounds of feed per head per day, to produce an average daily gain of about 1½ pounds.

For more complete details on feeding, see Illinois Circular 811, "Balancing Swine Rations."

**HYGIENE**

Effective hygiene means not only carrying out the sanitation steps of regular, thorough cleaning and disinfecting of housing and equipment, but also minimizing the chances of introduction of disease by the proper testing and isolating of newly purchased stock, using effective immunization, recognizing disease in early stages, and taking prompt action to control it.

As the trend toward specialized high-volume hog production con-
It is increasingly clear that hog producers must practice better hygiene. As the number of animals is increased, the difficulty with both the common specific diseases and the nonspecific respiratory and scouring diseases may increase, because in this larger swine population the number of animals that are disease carriers may also increase and the possibility of pig-to-pig contact and spread of infection may be greater. The virulence of disease organisms may increase as they are passed from pig to pig, and a mixed infection of two or more diseases, in contrast to a single disease, may develop with explosive speed.

The use of antibiotics and other new drugs has helped control some bacterial diseases such as swine dysentery and bacterial enteritis, but they have been of little help in the control of virus diseases except as they have helped control secondary infections. Satisfactory immunization for such diseases as transmissible gastroenteritis may not become a reality until much more disease research has been conducted.

In large-volume operations, the services of a veterinarian as a consultant to assess the health of the herd regularly and advise on sanitation and administer preventive and remedial treatment may sometimes be advisable.

Hog producers lose more money through failure to promote or improve the health of their herds than through any other form of mismanagement.

Sanitation

For effective sanitation, follow all the steps outlined below.

**Clean and disinfect the farrowing unit.** Use a steam cleaner or a power sprayer. If you use a power sprayer, adding an alkaline detergent will help with the cleaning. You can also wash the facilities with boiling water and 1 pound of lye to 30 gallons of water. If you use lye, wear goggles and rubber gloves to avoid getting caustic burns. Clean until all dirt and foreign material have been removed. Rinse the cleaned surfaces with clean water to remove soaps or detergents and apply a disinfectant.

Disinfectants can destroy disease germs only after thorough cleaning. Disinfectants applied to unclean surfaces kill only surface organisms. The disinfectant has to make contact with the organisms to kill them. If the organisms are imbedded in dirt or manure, contact is limited and the results may be unsatisfactory. Good disinfectants include certain quarternary ammonium compounds, phenol solutions, or hypochlorites. In general, disinfectants work best when used on warm surfaces.
Clean the equipment thoroughly to remove all dirt and foreign material. When it is dry, spray it with a good disinfectant.

Your veterinarian can help by recommending specific disinfectants. Follow the manufacturer's recommendations carefully because such factors as concentration and alkalinity are important to the effectiveness of a disinfectant. If you plan to fumigate hog buildings, get help from your veterinarian. Plan your program so that the cleaned farrowing equipment can be idle at least a week before each farrowing season. These “sanitation breaks” help to prevent the build up of disease.

Wash the sows before you put them in the farrowing quarters. Use warm water and soap. It is a good practice to spray the sows with a lindane solution at this time to kill any lice or mange that might be transmitted to the pigs later.

Give the sows and pigs a clean ride to clean drylot or pasture if the pigs are to be raised in an area other than the farrowing unit. Driving sows or pigs through infected lots to a clean pasture defeats many of the other sanitary measures you have practiced up to this time.
Wash the sow with warm water and soap to remove dirt, particularly from the udder and lower part of the body. Then spray her with a mild disinfectant.

Thoroughly clean and disinfect the feeding facilities between pig crops.

Worm the sows. Worming sows before the breeding season or in early pregnancy helps to break the roundworm cycle and reduces the chances of roundworm infestations in the nursing pigs.

Disease Control

Prevent disease. Most hog diseases are more easily prevented than cured. To prevent disease, do the following things.

1. Follow a good sanitation program as previously outlined.
2. Feed rations fortified according to recommendations on page 5.
3. Prevent hog cholera by routine immunization.
4. Prevent swine erysipelas with routine immunization if you and your veterinarian feel that the incidence of trouble with this disease warrants immunization.
5. Provide enough space and equipment (see page 20 for recommendations).
6. Blood test all breeding stock for brucellosis and leptospirosis at least once a year and discard reactors.
7. Maintain a closed herd if possible. Do not introduce onto your farm any more purchased hogs than absolutely necessary. Most diseases are introduced by the animals themselves. Purchasing diseased feeder pigs or breeding stock is asking for trouble. Bringing animals that have been exposed to various swine diseases onto your farm increases your chances of introducing disease to your herd.
Blood test all breeding stock at least once a year for brucellosis and leptospirosis and discard reactors. Blood testing is a "must" in any good disease control program.

8. Isolate newly purchased animals for three weeks. Blood test all purchased stock for brucellosis and leptospirosis. Observe purchased stock carefully for signs of disease. It is a good idea to buy stock from breeders who have a history of a healthy herd. When you buy feeder pigs insisting that the producer have a healthy herd is particularly important.

9. Isolate your hog operations from the public. Do not allow outside persons or vehicles to enter your hog pens, lots, or buildings.

Follow these tips. They may help you keep disease from breaking out in your herd.

1. When you move pigs to different quarters, make sure the environment is clean, comfortable, and sanitary.
2. Do not mix pigs from different pens or put pigs of different ages and sizes together.
4. Do not vaccinate, castrate, and wean at the same time.
5. Provide fresh feed and water at all times.
6. Provide enough feeder and waterer space.
7. Control internal and external parasites.
8. Avoid having caretakers move from one area of the hog operation to another if more than one person cares for the hogs. Break up the hog operation into logical units and insofar as possible isolate each unit from the others. When you build new buildings or remodel your present ones, make them easy to clean, easy in which to isolate separate operations, and easy in which to maintain a comfortable environment for the pigs.

9. Become familiar with the symptoms, causes, and treatment of parasitic infections such as lice and mange, and such diseases as cholera, erysipelas, brucellosis, leptospirosis, transmissible gastroenteritis, atrophic rhinitis, and bloody dysentery. Write to the College of Veterinary Medicine at Urbana for leaflets on swine diseases.

Act immediately if disease appears in your herd.

1. Call a veterinarian to get an early and accurate diagnosis. The services of your state diagnostic laboratories are available to you and your veterinarian where laboratory procedures are indicated.

2. Isolate all sick animals and move healthy animals to clean premises.

3. Carry out the measures recommended by your veterinarian.

4. Correct any errors in management or hygiene.

5. Destroy dead or stunted animals and clean and disinfect the premises. Formalin as a fumigant may be helpful in destroying some remaining disease organisms.

BREEDING

The art of breeding is old, but the science of breeding is relatively new. In the past 20 years, swine breeders have learned a great deal about this science.

The breeding practices outlined here will help you produce market hogs of high quality.

Crossbreeding for More and Heavier Pigs per Litter

You can increase the number and weight of pigs your herd is producing by rotation crossbreeding. Crossbred litters usually weigh more than noncrossbred litters at both weaning and marketing time. On the average, crossbred sows farrow and raise larger litters than non-crossbred sows.

One of the most practical methods of crossbreeding to produce market hogs is to use boars of three different breeds. You can use a
boar of one breed, for instance a Yorkshire, until the gilts from his litters go into the breeding herd. You can then breed these gilts to a boar of the next breed in the rotation, for example, a Duroc. You can breed the gilts from the Duroc's litters to the boar of the third breed, say a Hampshire. You can keep the older boars for breeding the dams of the gilts as long as the dams are kept in the herd. There is a slight theoretical advantage in using a rotation of four breeds instead of three if the boars of all breeds are of comparable quality, but in practice you may have to accept poorer boars by going to a fourth breed. Buy breeding stock only from individuals or firms that have healthy herds.

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**FIRST ROTATION**

- Sow
- Gilt from 1st Cross (Duroc)
- Gilt from 2nd Cross (Hampshire)

**SECOND ROTATION**

- Gilt from 3rd Cross (Yorkshire)

Continue as in First Rotation

This is one example of how you can start and continue a rotational cross-breeding program on the farm.
Each of the following examples demonstrates the principle of rotational crossbreeding. You may find other combinations equally good.

Example 1: Yorkshire, Hampshire, Poland China
Example 2: Landrace, Poland China, Duroc
Example 3: Yorkshire, Duroc, Hampshire
Example 4: Montana #1, Minnesota #2, Maryland #1
Example 5: Berkshire, Landrace, Spotted Poland China

In a rotation of hybrid boars, the procedure is the same except that each boar is a cross between two or more inbred lines or breeds.

The choice of breeds to include in rotational breeding should be based on availability of tested boars and knowledge of how the various crosses perform. If you have no experience involving various crosses, remember that those breeds that perform best as purebreds will generally produce the highest-performing crossbreds. Select boars of similar excellent meat-type to produce uniform market hogs.

Selecting gilts and sows to keep in your breeding herd is important too. When you select females or boars, look for these traits: (1) high-quality meat-type as indicated by visual appraisal, backfat thickness probe, and high cut-out of the four trimmed lean cuts (ham, loin, boston butt, and picnic shoulder), based on slaughter data of close relatives such as litter-mate barrows or gilts; (2) the ability to produce efficient and rapid gains; and (3) brood-sow productivity (large numbers of pigs farrowed, weaned, and marketed). Buy only from firms or breeders who are making effective selection for these traits and select from herds free from unsoundness and heritable defects. Consult your farm adviser for the names of breeders who are following meat-hog certification, doing on-the-farm weighing and probing, or participating in the test station programs.

More Pigs Through Better Breeding Season Management

To get a high conception rate and large litters of healthy pigs, you must manage properly during the breeding season. Your gilts should be well grown and at least 8 months old before they are bred. Size alone is not in itself a good indication that gilts or boars have reached sexual maturity and are ready for an active breeding season.

Hog producers often make the mistake of economizing on the number of boars they buy to sire their pig crops. If you do not have enough boars for the size of your herd, you may overwork those you have and reduce sperm quality and concentration. The result may be a lower conception rate and fewer pigs to the litter.
You can use the recommended number of boars per sow given below as a guide. But a good herdsman with active boars will be able to breed more sows per boar than the numbers given here.

<table>
<thead>
<tr>
<th>Length of season</th>
<th>Pen mating</th>
<th>Hand mating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boar pig</td>
<td>Mature boar</td>
</tr>
<tr>
<td>3 weeks</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>6 weeks</td>
<td>20</td>
<td>30</td>
</tr>
</tbody>
</table>

Do the following things before the season starts. Doing them will increase your chances of getting good results.

1. Blood-test boars, gilts, and sows for brucellosis and leptospirosis, sell reactors, and retest until you get clean tests.
2. Remove the tusks from old boars.
3. Increase the daily feed of boars so that they are gaining weight when the breeding season starts. Feeding $1\frac{1}{2}$ to 2 pounds of feed per 100 pounds of liveweight should provide sufficient gain.
4. Mate the boars to a few extra sows or gilts just before the breeding season starts. The first service after a period of inactivity is often infertile. Hand-mate each young boar pig to a sow before you turn him out with the sow herd for pen or pasture mating.
5. Hand-feed sows and gilts Illinois Ration 12 at the rate of 6 pounds a day per head for 3 weeks before they are bred.

Do the following things during the season if you hand-mate.

1. Provide the boars with adequate shelter and if possible a pasture exercise lot. It is ordinarily better not to pen boars next to the sow lot. The excitement of being near sows in heat may cause boars to “rant” and go out of condition. It may, however, help to pen a sluggish boar near the sow herd.
2. Vary feeding to fit conditions. The 16-percent protein ration you feed bred gilts will be satisfactory for the boars. Hand-feeding boars is recommended. Between breeding seasons, keeping boars on good pasture when it is available and feeding at the rate of 1 to 1 1/4 pounds of feed daily per 100 pounds of liveweight are advisable.
3. Feed boars after service rather than before.
4. Be patient and avoid any action that will cause a boar to become wary.
5. Breed sows and gilts during the first or second day of heat. If enough boars are available, breed each sow or gilt both days.

6. Keep a record of each mating so that a farrowing date can be scheduled for each sow or gilt.

7. If you plan to use a breeding crate, train boars to use it during their first breeding season.

HANDLING BABY PIGS

The quickest way to increase your profits in the hog business is to raise more pigs per litter to market age. (For the importance of gestation feeding and sanitizing of farrowing quarters, see pages 4-6 and pages 7-9.) The following tips on managing baby pigs should help you get more pigs to market.

Move the sow to her farrowing quarters 3 to 5 days before she is due to farrow. Before you put her in the farrowing stall or pen, wash her thoroughly with soap and water to remove filth, mud, and roundworm eggs.

Farrowing stalls save space and help prevent the sow from crushing the pigs. They are recommended over farrowing pens with guard rails. You can provide feeding and watering equipment in the front of each stall, or you can turn the sow out twice a day to a pen or feeding platform provided with a self-feeder and automatic waterer. Turning her out reduces the amount of labor needed for cleaning manure out of the farrowing stall area, gives the sow exercise, and is preferred over feeding in the stall unless equipment is well adapted to stall feeding.

Farrowing stalls reduce somewhat the need for attending sows at farrowing. A good herdsman can save more pigs by being present at farrowing, but many hog producers who formerly acted as “midwives” at farrowing time now place sows in farrowing stalls to farrow unattended except for routine checks or assistance when it is needed. A concentrated nonbulky ration can be self-fed successfully during the farrowing season when the sows are turned out of the farrowing stalls for a period of 1 to 1½ hours twice a day for feeding.

If you use a farrowing pen, it should be at least 6 x 8 feet for gilts and 8 x 8 feet for sows. Equip the pen with guard rails. Make them about 8 inches from the floor and let them project about 8 inches from the wall at the sides and back. If you can, supply the baby pigs with heat by a heat pad, heat lamp protected from the sow, or heated floor area. If you cannot supply heat, use a pig hover. It will conserve the body heat of the pigs, help to protect them against drafts, and protect them somewhat from the sow.
Save more baby pigs by using farrowing stalls.

Stalls built according to the above plans save baby pigs by keeping the sow from laying on them.
Soon after the pigs are born, dip the navel stub in a strong tincture of iodine solution (15-percent) or use straight Lugol’s solution.

Clip the needle teeth if they cause a problem. Clip only the tips. Be careful not to clip so close as to injure the gums and create a wound into which disease germs can enter. Use special pig-teeth clippers or side-cutter pliers.

Warm weak or chilled pigs and help them to nurse. Weak or chilled pigs sometimes develop a condition called hypoglycemia, because their blood sugar supply has been depleted. Some of these pigs will respond to an under-the-skin injection of 5 to 10 cc. of a sterile 10- to 40-percent glucose solution, or to 1 or 2 teaspoons of corn syrup diluted with enough water to enable them to be fed with a spoon. If the pigs respond, treat them every hour until they can nurse successfully.

Even-up litters by transferring the strongest pigs from large litters to small litters. The sow will usually accept foster pigs if you put all the pigs to be left with one sow together in a tub or box for about an hour. You can transfer pigs from one sow to another more easily in farrowing stalls than in conventional farrowing pens.

Prevent nutritional anemia in pigs kept on concrete or wooden floors. They are subject to it until they are eating significant amounts of a creep ration. After that they will meet their own iron needs. You can prevent nutritional anemia in one of several ways. The choice depends largely on cost and convenience. You can use an injectable iron solution; follow the manufacturer’s recommendation. You may have to give a second injection to fully protect the pigs until they get to a weaning age of 6 to 8 weeks.

You can put some fresh sod where the pigs can get to it. Or you can swab or spray the sow’s udder every day with ferrous sulfate solution (1 pound of ferrous sulphate to 3 quarts of water). Either of these ways will protect the pigs until they are eating a creep ration. Or you can give each pig an iron pill (about 45 milligrams of iron) or a squirt of iron sulfate once or twice a week for 3 weeks or a little longer. These treatments also provide satisfactory protection.

Castrate boar pigs by the time they are two weeks old. You can handle them easily and they suffer very little set-back when they are castrated at two weeks old or even younger.

Vaccinate pigs for cholera for best immunity after they have been weaned about a week. You can use modified live virus vaccines before the pigs are weaned, but you may not get as good immunity.
(Right) swab the navel soon after birth. This practice helps prevent disease. (Left) injecting iron in baby pigs kept on concrete or wooden floors is a satisfactory way of protecting them from nutritional anemia.

(Left) castrate boar pigs when they are two weeks old or less. Castrating is easy then and produces very little setback. (Right) to get the best weaning weights, creep feed baby pigs a palatable creep ration when they are a week old.
Spray pigs with a lindane or malathion solution to control lice and mange. Use \( \frac{1}{2} \) pint of a 20-percent lindane solution in 10 gallons of water or 1 quart of a 57-percent malathion concentrate in 25 gallons of water. A solution of 0.1 percent lindane is also effective. Spray sows at the time you wash them and put them in the stall for farrowing.

Wean pigs by the time they weigh 30 pounds and feed them a grower ration. With careful management and a good starter ration, three-week-old pigs weighing at least 10 pounds can be weaned. You may not, however, find weaning pigs less than 5 weeks old practical unless you have special equipment.

HANDLING EARLY-WEANED PIGS

Early weaning has possible advantages.

1. Cuts labor. You do not have to handle as much feed, bedding, or manure for early-weaned pigs as for nursing sows.

2. Saves space. With the sows removed, more pigs can be cared for in the same space.

3. Saves the sow's feed. Heavy-milking sows eat lots of feed—12 to 18 pounds a day. If the starter ration is quite expensive, however, the extra cost of it may offset part or all of this advantage.

4. May permit sows to be rebred or sold sooner after farrowing, although most sows cannot be successfully rebred for 30 days or more after farrowing.

5. May help reduce loss of weight of sows.

Skill and careful management are essential to the success of an early-weaning program. The younger and smaller the pig at weaning, the greater the care that must be given to details of hygiene and environment. You must also have the proper equipment for handling very young pigs—this is a very important point.

Use the following tips to help you manage an early-weaning program.

1. In most cases do not wean pigs before they weigh 10 pounds. Weight and condition form a better basis for weaning than age.

2. Allow 4 square feet of space per pig until the pig is 4 weeks old and 6 square feet for the next 3 or 4 weeks.

3. Provide a temperature of 75° to 80° F. for 1- and 2-week old pigs. Solid walls in pens will help prevent drafts.

4. Group pigs according to size and weight and put no more than 20 of the same size in the same pen.
5. Provide a well-fortified starter ration and keep it before the pigs at all times. In a group of pigs there is considerable variation in the time at which they will begin to eat dry-starter diets. Some pigs learn to eat immediately; others may take several days. Most starters for early weaning contain the necessary amounts of milk products. Moistening some of the starter ration to form a gruel and offering it to the pigs in a shallow pan will often speed the time at which the pigs will consume the starter ration readily from pig-sized self-feeders.

6. Follow all the steps in a good hygiene program. Combining the use of farrowing stalls with early weaning will allow you to keep death losses low and save space and labor if you pay attention to details of management.

HANDLING PIGS FROM WEANING TO MARKET AGE

Many of the hygiene and management recommendations for pigs up to weaning age apply equally well to pigs beyond weaning age.

If there have been any slips in your sanitation program, you may have to worm pigs about two weeks after they are weaned. Piperazine and sodium fluoride are recommended for worming, but the former is less toxic. Water-soluble compounds that may be used in drinking water are convenient and easy to use. For amounts, follow directions on the container. Hygromycin is available from licensed feed manufacturers. Research results have shown that this additive is effective against roundworms and roundworm eggs. Do not feed hygromycin to pigs after they weigh 75 pounds.

If you are going to produce hogs economically, you must neither crowd them nor waste space. Growing and finishing hogs on concrete need the following amounts of space.

<table>
<thead>
<tr>
<th>Sleeping space or shelter per pig</th>
<th>Total</th>
<th>Weaning to 75 pounds, sq. ft.</th>
<th>75 to 125 pounds, sq. ft.</th>
<th>125 pounds to market weight, sq. ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>8</td>
<td>3</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>5</td>
<td>6</td>
<td>8</td>
</tr>
</tbody>
</table>

Growing pigs on summer pasture need the same amount of sleeping space that they need in drylot and need the same amount of total space as shade and shelter combined.

Provide one automatic watering cup for every 20 to 25 pigs. Winter-type waterers that keep the water from freezing encourage water and feed consumption.

The recommended number of pigs per linear foot of self-feeder space or per hole is 4 to 6.
MANAGING HOUSING AND EQUIPMENT

As a producer, you must carefully consider your choice of buildings and equipment from both the economic and production standpoints. Ask yourself whether a large investment in buildings and equipment will enable you to increase the efficiency of your production enough to make the investment worth while.

When you plan your buildings and equipment, think in terms of combinations of 5 units if your operation is large and includes several farrowings a year. If you schedule only two farrowings a year, you will have to combine some units.

The combination of 5 units for a large operation includes: (1) a bred-sow unit where bred sows stay from the breeding season until farrowing time; (2) a farrowing unit where farrowing takes place; (3) a pig nursery unit where pigs are raised until they are 6 to 8 weeks old or until they weigh about 30 pounds; (4) a growing unit where the pigs are raised from the time they leave the nursery until they weigh about 100 pounds; and (5) a finishing unit where pigs are finished from 100 pounds to market weight.

The bred-sow unit is usually separate from the others and is often a pasture unit. The growing and finishing units are often combined and made large enough to accommodate all pigs as they reach market weight.

Except for the bred-sow unit, most building systems are one of three kinds: (1) a one-building system; (2) a two-building system; and (3) a three-building system. In the one-building system the sows farrow in the building and stay there until they wean their litters and the pigs stay until they are finished for market. In a two-building system the sows farrow in a combined farrowing and nursery unit and the pigs at weaning time go to a combined growing and finishing unit. In a three-building system, the sows farrow in a separate unit, and the pigs are raised in a separate nursery until they are 6 to 8 weeks old and then go to a combined growing-finishing unit.

Each system has several advantages and disadvantages. The one-building system has a possible advantage in disease control because the pigs stay in place and are not subjected to the stress of moving to new quarters where they may meet a new set of disease organisms for which they have not developed an immunity. This system eliminates a separate farrowing unit. It permits a two-litter-a-year program and makes economical use of farrowing space. It is a simplified production program in that at any time pigs are all about the same age and have about the same requirements — rations, vaccinations, castration, worm-
ing, weaning, and so on. There are fewer buildings to maintain than in either of the other systems. It is adapted to a producer who likes a two-litter-a-year program.

The two- or three-building systems provide logical grouping of operations and permit a higher degree of specialization for each building, and better isolation of each set of hogs in case of disease outbreak. But more buildings must be maintained and scheduling has to be careful to get the greatest use of them.

For details concerning housing and equipment plans, see Illinois Circulars 780, "Hog Farrowing Houses and Equipment," and 799, "Housing and Equipment for Growing and Finishing Hogs." See also Midwest Plan Service, Book 2, Swine Equipment Plans.

**MANAGING FARROWING SCHEDULES**

The seasonal pattern of hog prices for the last three or four years has been a single cycle with peak prices and smallest marketings in June, July, and August. The reason appears to be that there were fewer farrowings in December and January than in other months.

As the hog industry moves toward greater specialization, an increasing number of producers will use multiple farrowing; that is, spaced farrowings throughout the year to make more efficient use of equipment and to spread marketings. A multiple-farrowing program places less emphasis on trying to hit the high market and more emphasis on cutting production costs. An increase in multiple farrowing will even out the present cyclical marketing and price pattern to some extent, but it will require excellent management and hygiene plus a fairly even supply of labor the year around.

A producer who has carefully timed his operations to market at peak prices may gain no price advantage by switching to multiple farrowing. From the over-all standpoint of the hog industry, however, it is probably very desirable to produce hogs in more uniform supply throughout the year than has been done in the past. Consumer demand for pork, however, will be lighter during the summer months than during the rest of the year.

Typical farrowing schedules developed by corn-belt hog producers are: (1) one litter a year; (2) two litters a year; (3) three litters a year; and (4) multiple farrowing — spaced farrowings of four or more litters a year.

The one-litter-a-year system in which producers sell the sows after they have weaned their pigs, save gilts from the crop of market hogs, and breed them to farrow when they are about a year old is used to a
limited extent in the northern and western area of the corn belt. Most hog producers, however, have gone from this system to a two-litter-a-year program that permits greater use of equipment, labor, and capital throughout the year. A few producers combine the one- and two-litter-a-year systems to get three farrowings a year. They handle one herd on the two-litter-a-year system and another on the one-litter-a-year system.

Most four-litter-a-year systems are multiples of two-litter-a-year herds, although some are multiples of one-litter-a-year herds. Multiples of one-litter-a-year herds provide an income tax advantage because a higher percentage of sales each year comes from breeding animals than comes from any of the other farrowing systems. Returns from breeding animals, held for a year or more, may be reported as long-term capital gains, one-half the gain being taxable. Market stock is taxable as ordinary income.

In a four-litter-a-year system two herds can be maintained, each on a two-litter-a-year basis. For example, in one herd the sows and gilts can be bred to farrow in January and rebred to farrow in July. In the second herd, the sows and gilts can be bred to farrow in April and rebred to farrow in October. The four farrowing seasons are equally spaced throughout the year. A producer can use one farrowing unit for all farrowings and still have time for a cleanup and “sanitation break” between farrowing seasons. He can use one set of growing-finishing facilities twice each year for each herd if he provides ample margin of safety in the form of extra space to handle slow-growing pigs.

In a six-litter-a-year system, three herds each on a two-litter-a-year system or six herds each on a one-litter-a-year system can be maintained. For example, when three herds are kept, the sows and gilts in one herd could be bred to farrow in February and rebred to farrow in August. The females in the second herd could be bred to farrow in April and October, and in the third herd to farrow in June and December. In this system, farrowings are equally spaced throughout the year to permit maximum use of farrowing facilities. Here again, one set of growing-finishing facilities plus extra space for slow-gaining pigs is needed for each two-litter-a-year herd.

Hog producers with large grain-crop enterprises may find demands for labor between the two enterprises in conflict, especially in April, May, and June. These conflicting demands will influence their choice of farrowing schedules. With a high degree of specialized hog production, having a fairly constant supply of competent labor throughout the year is especially important.
CAUTION: Only the best managers should attempt to carry out a six-litter-a-year program. Others should gain experience on a less specialized program.

**MANAGING FOR HIGHEST RETURNS**

You can get the highest returns in four ways: (1) by increasing the selling price; (2) by lowering production costs; (3) by changing volume of production; and (4) by going into a specialized program that is particularly well fitted to you and your farm.

**Increasing the sale price.** There are four ways by which you can increase the sale price. The first is by scheduling farrowing and planning a feeding program that will let you have hogs ready to hit market peaks. But if you use this method successfully, you must not raise production costs so much that they offset the advantage of hitting market peaks.

Producing hogs of high quality is the second way you can get a higher price. The best way to improve quality is probably by improved breeding; that is, by selecting meat-type breeding stock. You can expect interest in improvement in the quality of the carcass to increase as breeding is improved and maintained and as the differences in prices paid on the basis of quality become greater.

A third way to get a higher price for your hogs is by choosing your market. Study the markets and market reports. On the basis of all available information, choose the market that seems most likely to yield the highest net return. Continually evaluate markets in the light of the type of hogs offered and the season in which hogs are marketed.

Selling at the proper market weight is the fourth way to get a higher average selling price. As the hogs approach a market weight of 190 to 220 pounds, “top out” each drove each week. Gains beyond these weights are more expensive to get and carcass grade goes down as the fat content goes up.

**Lowering production costs.** You can cut production costs by improving breeding, feeding, management, and disease control as outlined in this circular. To lower your costs, you must know the amounts and costs of everything you use to produce a pound or a hundred pounds of pork. You must know them and find ways to cut them. The figures in Table 2, taken from detailed cost records, will serve as a guide, but remember this distribution of costs applies to two-litter-a-year field rearing. (Comparable costs for rearing in drylot are badly needed.)
A modern grinder-mixer for farm-mixing rations and an automatic system for feeding growing and finishing pigs in drylot save both time and labor.
Table 2. — Costs per 100 Pounds of Hogs Produced
Central Illinois; 1957 and 1958 Average

<table>
<thead>
<tr>
<th>Item</th>
<th>8 to 19 litters</th>
<th>20 to 77 litters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of farms</td>
<td>44</td>
<td>12</td>
</tr>
<tr>
<td>Feed</td>
<td>$9.58</td>
<td>$10.21</td>
</tr>
<tr>
<td>Labor</td>
<td>3.24</td>
<td>1.62</td>
</tr>
<tr>
<td>Other costs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power and machinery</td>
<td>.84</td>
<td>.44</td>
</tr>
<tr>
<td>Equipment</td>
<td>.88</td>
<td>.48</td>
</tr>
<tr>
<td>Buildings</td>
<td>.53</td>
<td>.52</td>
</tr>
<tr>
<td>Bedding</td>
<td>.18</td>
<td>.20</td>
</tr>
<tr>
<td>Cash expenses&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.42</td>
<td>.40</td>
</tr>
<tr>
<td>Interest on investment</td>
<td>.23</td>
<td>.30</td>
</tr>
<tr>
<td>General farm expense</td>
<td>1.60</td>
<td>1.74</td>
</tr>
<tr>
<td>Total other costs</td>
<td>4.68</td>
<td>3.08</td>
</tr>
<tr>
<td>Total all costs</td>
<td>17.50</td>
<td>14.91</td>
</tr>
</tbody>
</table>

You will have to center your efforts to reduce costs per 100 pounds of pork on: (1) increasing the number of pigs marketed per sow; (2) increasing feed efficiency; and (3) cutting labor, building, and equipment costs per pig marketed.

<sup>a</sup> Primarily two-litters-a-year raised on pasture. Data obtained from detailed cost-account investigation by the Department of Agricultural Economics, University of Illinois.

<sup>b</sup> Includes cost of vaccination, veterinary fees, and other miscellaneous cash expenses.
(Opposite page) this barrow exhibits excellent meat-type characteristics. (Right and bottom) carcass and the four lean cuts from a good meat-type hog. Meat-type hogs yield the highest percentage of the four lean cuts—ham, loin, picnic, and butt—the cuts that are in greatest consumer demand.
Live backfat-probes and information from swine testing stations can serve as valuable guides to selecting breeding stock to produce hogs with meat-type characteristics.

You can cut labor costs by putting the following practices into use.

1. Concentrate farrowings. Farrowing is time consuming. There is little advantage in spreading it over several weeks. Extra sows or gilts and plenty of boar power will enable you to concentrate the farrowing season within a short period.

2. Provide good farrowing facilities. It is easier to care for sows and litters at farrow ing time in multiple or central houses than in individual houses.
3. Set up an automatic feeding system that provides fresh feed with a minimum number of moves and minimum labor.

4. Use an automatic water supply if you can. Water under pressure can also be used to clean buildings and equipment. Provide waterers with automatic heating units to prevent freezing in winter.

5. Fit automation into manure handling if you can. Automation is the most economical way to handle manure whether it is disposed of in the liquid or solid state. See Illinois Circular 820.

6. Do small but important jobs on time. It is easier to castrate a week-old pig than one that weighs 50 pounds. Other important jobs that ought to be done on time include vaccinating, cleaning houses and equipment, spraying for external parasites, treating for internal parasites, moving pigs or sows at weaning time, and providing shade, shelter, and a cooling system as needed.

**Changing volume of production.** For any particular producer and any particular management program, there is theoretically a best combination of capital, labor, and volume that will produce the largest net returns. The success of a highly specialized, large-volume hog operation depends on the ability of the manager to make substitutions of capital for labor and for other things he puts into the business in order to reach the volume of production that will give the best net returns.

**Specializing in a program.** It is sometimes desirable to shift to a specialized program that is especially well fitted to your personal talents or to your local area. If this is true in your case, you might consider one of the following programs.

1. Producing weaned pigs, often called operating a pig hatchery. Pig hatcheries are considered a desirable part of the hog industry because there is often a demand for thrifty weaned pigs. The hatchery business, however, has been held back by difficulties with disease, and by supply, demand, and price problems. This type of operation will probably be most successful on the fringe of the corn belt where small grains and pasture can supply most of the feed and where labor, land, and building costs can be kept low. These advantages give the skilled hog man in this area an opportunity to specialize.

2. Producing breeding stock for sale. The potential market for tested, growthy meat-type boars with a capacity for good feed conversion is practically unlimited. In Illinois, commercial hog men use about 50,000 boars each year to produce over 10,000,000 market hogs. The size of this enterprise furnishes ample opportunity for breeders
who wish to produce tested seedstock for sale. Tested seedstock with above-average genetic value will command substantially higher prices than average breeding stock in the future as specialization continues to increase and as market pricing and grading problems are solved.

3. Other specialized hog programs may include enterprises planned to utilize waste or low-cost products — garbage, bakery foods, grain, poultry offal, and milk by-products.

The quickest way to improve the meat-type characteristics of your herd is by careful selection of boars from good producers of seed stock.
A successful hog producer, like every other good business man, keeps a set of very complete records.
Research on swine production is conducted in several departments of the College of Agriculture and the College of Veterinary Medicine of the University of Illinois at Urbana. For further information on raising hogs, you may wish to write the following:

Department of Animal Science: Feeding, breeding, and management
Department of Agricultural Engineering: Plans for housing, automatic feed-handling equipment, and manure-disposal systems
Department of Agricultural Economics: Marketing
College of Veterinary Medicine: Diseases