4-H CLUB SWINE PROJECT MANUAL

AGRICULTURAL EXTENSION UNIVERSITY OF CALIFORNIA

4H—Ag 70
Rev. 10/71

This publication was prepared by the State 4-H Meat Animal Committee:

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PRECAUTIONS

Many insecticides are poisonous to man and other animals—particularly the concentrated forms before they are diluted for application. Do not use them without consulting your farm advisors or veterinarians about how and when to use them.

Do not allow waste and spillage from dipping and spraying to drain into lakes or streams, since most insecticides are toxic to fish and other aquatic life. Fence livestock off from pools or vats of insecticides so they can't drink the material. Before dipping livestock, experts recommend letting them drink water. Protect feed and water from insecticide contamination.

Current recommendations are contained in the publication, *Control of External Parasites of Livestock*, AXT–172 Rev., issued each year by Agricultural Extension, University of California. This is available from your county farm and home advisors office.

Co-operative Extension work in Agriculture and Home Economics, College of Agriculture, University of California, and United States Department of Agriculture co-operating.
Distributed in furtherance of the Acts of Congress of May 8, and June 30, 1914.
George B. Alcorn, Director, California Agricultural Extension Service.

BEFORE YOU BEGIN

- No manual can teach you all you need to know about raising swine. This manual gives you a starting place and enough information to help you learn about swine in other ways. Talk to farm advisors, veterinarians, and experienced swine raisers. Visit hog ranches and watch what others do. Visit your library and read materials on the subject. Watch for good ideas wherever you find them.

- SPECIAL NOTE: Some counties prohibit swine raising within their borders. This is because of the possibility of flies and odors and of manure disposal problems. Check with your county or local planning commission to learn if there are any zoning restrictions that will prevent you from raising pigs.

Feeding Market Hogs

SELECTING YOUR FEEDER PIG

Begin feeding your pig about 120 days before showing him. It takes that long to feed a 35- or 40-pound weaner pig to market finish.

Choose a meat-type pig sired (fathered) by a purebred boar (male hog). You can find one in any popular breed. Figure 1 shows the right proportions for a meat-type hog. Figure 2 shows a lard-type hog. He is what is called "chuffy" and not good for marketing because he is too short, too thick, too low set, and carries too much waste fat. When you choose your pig choose one grading either **Choice** or **Fancy**, one of the two top feeder grades.

Choose a barrow or a sow pig for fattening. A barrow is a castrated boar pig; a sow is an adult female. A young pig recently weaned from the sow should weigh 35 to 40 pounds at about 2 months of age.

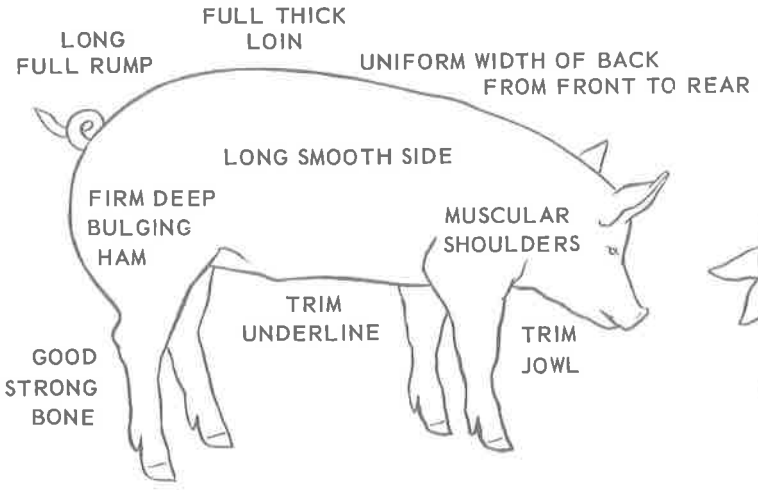

FIGURE 1. Buy this kind—heavy muscling in the ham, loin, and shoulder, with no excess fat.

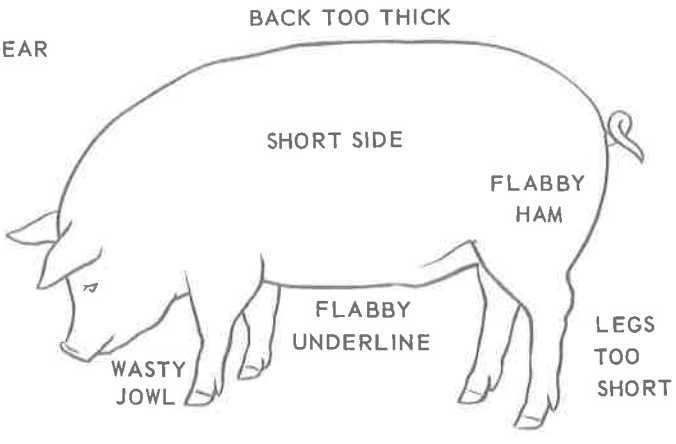

FIGURE 2. Don't buy this type.

Choose a "growthy" animal—that is, a pig of good size for his age group, but don't pick overly large, coarse animals. They won't grade Choice or Fancy as feeders, nor fatten out to market finish at the desirable weight of 190 to 230 pounds.

Don't pick sick or injured animals. There are lots of good, healthy, vigorous pigs to choose from. When choosing three or more animals for possible group showing, look for uniformity—the same size, type, color, and as much alike as possible.

NEEDED EQUIPMENT

Before you buy your pig, build a good hog-tight pen. Build it on a high spot where there is good drainage.

One to three pigs require at least 200 square feet. This size provides room for shade, shelter, feeding, and an area for toilet. A pig is very clean when he has a chance.

If you live where the summers are hot, put the pen under a good shade tree or where there is some other shade. Build the pen with panels or hog wire. If you use hog wire, stretch it tightly starting about ½ inch from the ground. Stretch a strand of barbed wire just below the hog wire to keep the pig from rooting under the fence. Make the fence about 3½ feet high so your pig can't jump it. Once a pig starts getting out, it is hard to keep him in any pen.

Build a shelter in the highest corner of the pen. Make it simple but large enough for summer shade and dry space during winter rains. An 8- by 8-foot roof is large enough for one to three pigs.

You can easily build a shelter by putting 4- by 4-inch posts in the ground 8 feet apart and building your framework on these. Put your roofing material on over this. Slant the roof so rain runs off and out of the pen. Build the shelter high enough for you to work under it easily. In the winter you should probably enclose three sides to protect the pigs. Keep dry bedding in the shelter during the winter months.

Your pig needs a feed trough which you can make from scrap lumber. Make it simple but strong—pigs are rough on feed and watering equipment. If you have two or more pigs, a self-feeder is a help. This is a feed trough with a V-shaped feed storage compartment over it that releases feed into the trough as the pig eats. You can build one or purchase a metal one from a livestock supply store. With one of these you can always keep feed ready for your pigs. If you do use a self-feeder look at it at least once a day. Self-feeders waste a lot of feed if they aren't working right.

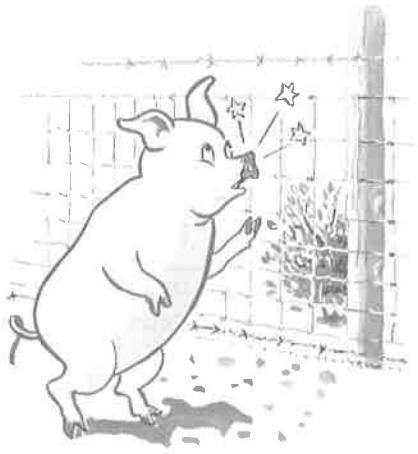

FIGURE 3. Use barbed wire at ground level.

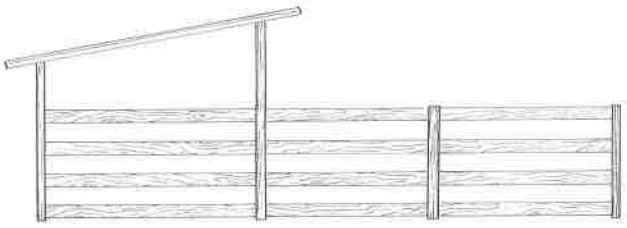

FIGURE 4. A simple pen and shelter.

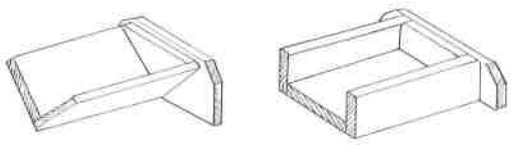

FIGURE 5. Ends of two types of troughs you can make.

You can use a trough for water similar to the simple feed trough. Make sure the pig cannot turn the trough over. Fasten it solidly to the fence or to the ground with stakes at each end, or make it heavy enough so the pig can't root it over.

You'll need a bucket and set of inexpensive spring scales to weigh and measure feed.

FEEDING YOUR PIG

In feeding any livestock the words "ration" and "balanced rations" are common so you should know what they mean. A "ration" is simply how much feed you give your pig each day. A "balanced ration" is the daily amount of feed containing all nutrients, including vitamins and minerals, your pig must have for normal rapid growth and development.

If you have several pigs to feed you will learn more about feeds if you mix the ration yourself. You may save some money. If you have only one or two pigs to feed, it's not a good idea or any great saving to try compounding and mixing your own feed. Instead try one of these methods.

- ☐ Most feed stores have a ready mixed concentrate for adding to barley, milo, corn, or wheat to provide a balanced ration for your pigs.
- ☐ Feed stores probably also have ready mixed complete feeds that cost a little more per pound.
- ☐ It may be you can buy ready mixed feed from a commercial hog grower near you.
- ☐ If you still want to go all out and mix your own feed, consult your leader or your farm advisor about a good feed formula.

Have all grains ground. The pig can get more food value from them and they are easier to mix.

FIGURE 6. Give him plenty of fresh, clean water.

FIGURE 7. Give him plenty to eat.

When your pig weighs 125 pounds, you may substitute 25 pounds of dried cull* fruits or 25 pounds of dried ground cull potatoes for 25 pounds of barley, corn, or milo in the mix. If you add dried cull fruits, increase the daily feed ration a little since cull fruits have less food value than grains or potato meal. For the dried fruit, use prunes, peaches, apricots, raisins, or figs.

Remember this important feeding rule: feed the most inexpensive balanced ration you can. It is one way to make a swine project pay. Your local 4-H leader or farm advisor can help you with this.

Healthy pigs fed under sanitary conditions do not need antibiotics in their ration.

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* Cull fruit is fruit removed because it is not in marketable condition.

How much to feed your pig depends upon his size and appetite. A general rule is as follows:

When he weighs (pounds)	He will eat a day (pounds)
40	2¼
50	2½
60	3
70	3½
80	4
90	4½
100	5
120	5½
140	6¼
160	7¼
180	7¾
200	8
220	8¾
230	9¼

This rule varies from one pig to another and maybe you don't have a way to check your pig's weight. So feed him all he can eat but don't waste any feed. If he leaves feed in his trough from one feeding to the next—cut down a little.

Near the end of the feeding out period feed your pig three times a day. Feed and do the chores regularly. Animals are like people—when it's time to eat they are hungry. They expect certain things at a regular time and do much better if you are regular too. Another thing, don't change your pig's feed suddenly—mix some of the old in with the new for 3 or 4 days.

MANAGEMENT PRACTICES

All livestock must have fresh water around all the time. Without lots of water, your animals won't eat. If they don't eat, they can't gain weight. If they don't gain weight, you lose money.

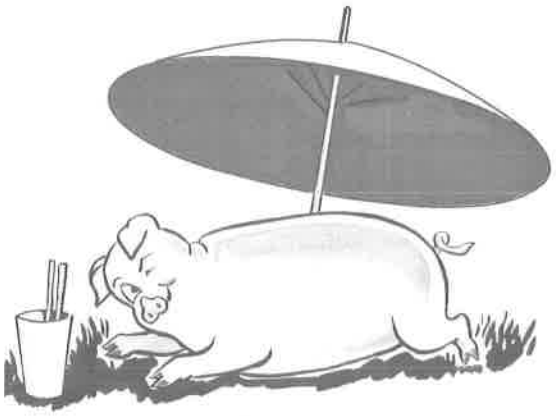

FIGURE 8. Pigs need shade and water in hot weather.

During the hot summer months, water and shade are extremely important to a pig. Hogs easily overheat and may die if they get too hot.

Sanitation is very important to a successful pig project. Keep your pig's pen clean. Clean out his feed trough each day. Clean the watering trough regularly. A clean pen is the best way to control flies, too.

Pests and Diseases

Buy your feeder pig from a good clean herd. Most of the state's swine herds are either within a validated brucellosis-free area or the herds are tested and declared brucellosis free by state veterinarians. Talk to your local leader or farm advisor before you buy your pig.

Hog lice are almost always a problem in a swine herd. Consult your local farm advisor about using chemicals to control them. Anyone using insecticides must always read and understand the labels before using the material. He must follow directions and precautions on the label and handle the materials he is permitted to use with extreme care. After treating the pig don't market him for 2 to 4 weeks, depending on the material you use.

Again, for the control of internal parasites, especially some worms, get the help of your farm advisor or your veterinarian.

MARKETING YOUR PIG

When your pig reaches the right weight and finish, you'll need to know where you can sell him. If you bought him weighing 40 pounds and fed him 120 days, he should then weigh about 225 pounds.

There are many market outlets. You can show him at a fair and perhaps sell him at one of the junior livestock auctions there. If not, there are local auction sales or central markets available. Or you can sell to a private buyer like a neighbor or relative.

The livestock shows available to any 4-H member are:

- your county or district fair
- the State Fair about the first of September each year
- the Grand National Junior Livestock Show at the Cow Palace, San Francisco, held during Easter week each year
- Great Western Livestock Show at Los Angeles, held the middle of November each year.

Swine Breeding

CHOOSE A GOOD ANIMAL

For a good start a good pig is necessary. For a successful project, and no matter what breed you choose, a careful choice pays.

If you start your breeding project with a gilt (young female pig that hasn't yet farrowed a litter of pigs), look for these points:

Age

Buy a vigorously growing gilt of about breeding age—6 to 8 months.

Background

Choose a gilt from a large litter. If she weighs about 40 pounds at weaning (56 days), and comes from a litter of eight or more pigs, you know that her dam (female parent) was fertile and produced many pigs and that she is a good milker. The chances are good your gilt has inherited these characteristics from her dam.

Size and Conformation

Healthy and valuable pigs usually come from large sows of proper breeding. At 6 to 8 months, a gilt should weigh between 225 and 275 pounds and should show meat-type qualities. She should have a strong arched back and a refined head. Her hams should be large, full, and deep. Her body, from front to rear, should be reasonably wide but she should show more width and muscling in the hams and shoulders than over her back. Sides should be smooth, deep, and long. She should be firm and meaty, not flabby and fat. A smooth and refined hair coat is desirable.

Soundness

A good brood sow has 12 to 14 well-developed teats. She has strong straight legs and feet, with rugged bone structure and strong short pasterns.

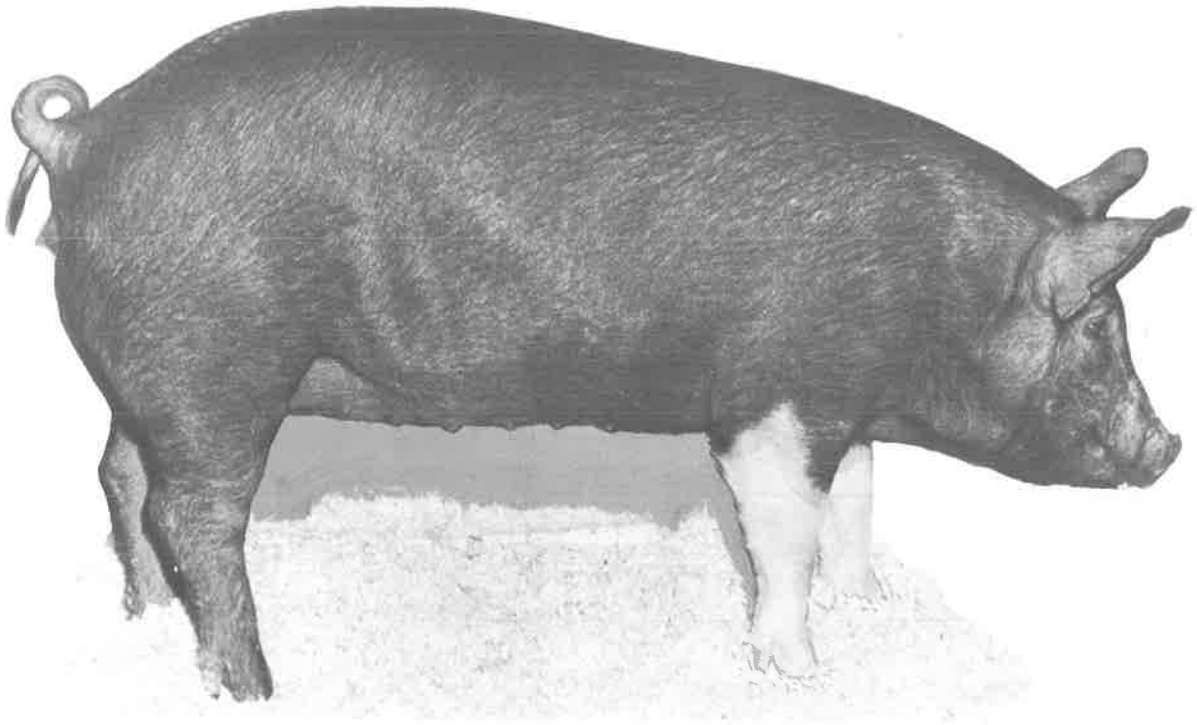

FIGURE 9. Choose a gilt that will grow into a good brood sow, like this one. Note the clean trim lines, without too much fat, the full plump hams, sound straight legs and well developed underline. This is a meat-type gilt. She should grow into a very desirable animal.

General Health

Young pigs in good health and vigor are lively and energetic. They have bright, clean skin of deep pink color, except in some of the dark breeds. Their eyes are bright and there is plenty of red blood showing in the veins inside the eyelids.

Poor health is indicated by coughing, pale skin, chronic scouring, and thinness. Don't buy a gilt or sow that is not thriving; such unthrifty sows may be infested with internal parasites and are not recommended for breeding stock.

General Disposition

Your animal will be easier to raise and breed and will be a better mother if she has a good disposition.

Go to a reliable breeder to select your animal. Get your parents, your 4-H leader, or your farm advisor to help you.

GENERAL NECESSITIES, EQUIPMENT, AND HOUSING

Pasture

Have a large lot with plentiful pasture, preferably alfalfa or clover. You will need at least 2,000 square feet of pasture per pig. On this pasture your pigs can get their needed exercise and direct sunlight, and many of the proteins, vitamins, and minerals that encourage fast growth.

Water

Have plenty of clean fresh water available at all times.

Fences

Your swine area must be tightly fenced. For a small lot you can build a good fence from 1-by 6-inch rough boards, four boards high with about 3 inches between the boards, or use woven wire (diamond mesh), 32 inches high. The main thing is to have a fence that your pigs cannot get through or under.

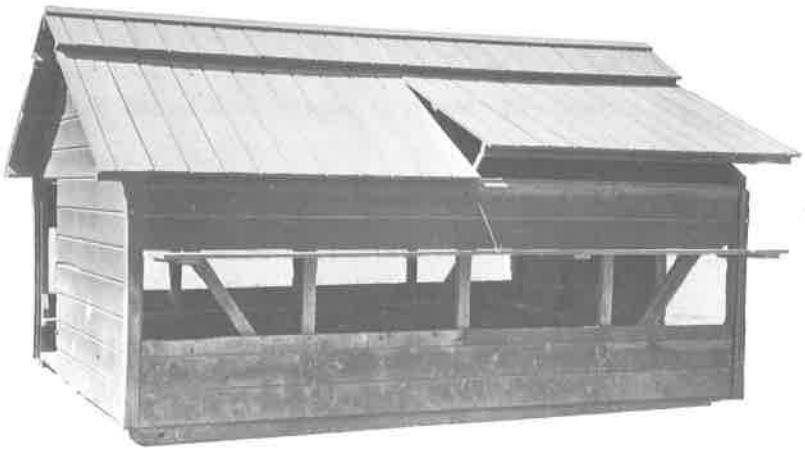

FIGURE 10. This small hog house will take care of two sows and their litters. It is portable and provides good protection from sun and rain.

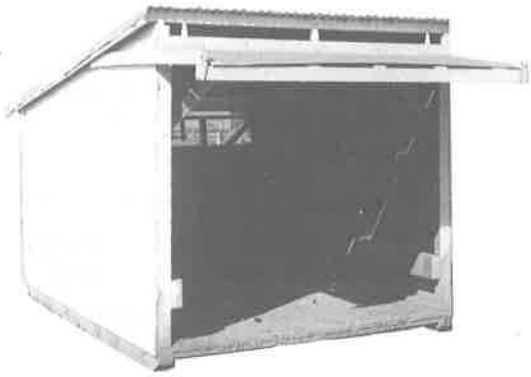

FIGURE 11. This portable, three-sided shelter with a corrugated metal roof gives good protection from the sun.

Farrowing House

A farrowing house is the shelter where the pigs are born. It can be a part of the barn, or it can be a simple pen covered by a roof. A pen 6 feet wide by 8 feet long will take care of one sow and litter at a time, or will provide shelter for 5 to 7 pigs weighing 100 pounds.

The floor of the farrowing pen should be of wood or concrete for easy, thorough cleaning and well bedded with clean straw. A door should lead to an outside pen where the sow and her pigs can exercise and get direct sunlight.

The farrowing pen should have a guard rail around the walls to keep the small pigs from being crushed against the wall when the sow lies down. It keeps her away from the wall and provides protection for the pigs to get under. Make the guard rail from 2-inch lumber or from gas pipe and fasten it securely to the wall 8 inches above the floor and 8 inches out from the wall. If possible, place an electric brooder in one corner of the pen. If you have two or more sows, farrowing crates are highly recommended. They more than pay for themselves in the number of pigs raised per sow.

Electric Brooder

This brooder can save the lives of many little pigs. It is a triangular shelter fastened securely in one corner of the farrowing pen. The two closed sides are about 3 feet long. Place a 100-watt bulb with a reflector over a hole in the top of the brooder about 12 inches above the floor. This gives enough heat to draw the pigs away from the sow, so she is less apt to step or lie on them. Remember to comply with all building codes. Fires sometimes start in poorly built or inadequately wired brooders.

Shelter

You may want a small hog house that can be ventilated, yet kept dry and clean. Such a house protects from rain in the winter and gives shade in the summer. A good size is 8 feet wide by 14 feet long, with sides at least 3 feet high. The one shown in figure 10 will care for two sows and their litters if it has a partition in the middle. If you live where the weather is mild, you can build the shelter with one side open. With good planning, the building can be used interchangeably for both farrowing house and shelter.

Feed Trough

You should have a small trough for feeding concentrates. A small pig needs about 6 inches of trough space; a full-grown hog needs about a 16-inch space. But, of course, several pigs can eat in turn from the same space.

Miscellaneous Equipment

You will need other equipment—brushes, side cutters for removing needle teeth, ear notcher, hoof trimmer, and hog ringer. You can own this equipment yourself, or perhaps several members of your club can buy it together. You must provide the rings yourself.

BREEDING YOUR GILT

Space does not permit us to discuss all of the aspects of breeding that you will need to know. You should talk with your leader, your farm advisor, or with a swine producer so that you have enough information to make adequate plans.

In general, it is all right to breed a gilt between the ages of 8 and 9 months. She will then farrow when she is about 12 months old.

At breeding time, your gilt should be medium fat and gaining ½ to 1 pound daily. For best results, put her on good pasture, preferably alfalfa or clover, at least 2 to 3 weeks before breeding.

Her heat period lasts about 3 or 4 days. Breed your animal the second day of the heat period, or twice, if possible, at 12- to 24-hour intervals. Breed your gilt to a high-grading registered boar typical of the breed. He should come from a large litter, so his offspring will in turn produce large healthy litters.

Time from breeding to farrowing averages 114 days, but may vary from 112 to 116 days. Keep accurate breeding records and give special care at farrowing time. A brood sow normally produces two litters a year if she is properly managed—one in spring and another in fall. March is a good time to have spring litters and September to have fall litters. A sow bred on November 10 should farrow between the 2nd and 6th of March. A sow bred on May 12 should farrow about the 1st through 4th of September.

FIGURE 12. Pigs on pasture are healthier, gain faster, and eat less feed per 100 pounds of gain. In addition, they exercise naturally and get direct sunlight. Legume pasture cuts the amount of high-priced supplements you must buy.

FEEDING YOUR PREGNANT GILT

All pigs need more concentrate feed (barley, corn, or milo) and less roughage than cattle and sheep because their digestive tracts are different. Rations for raising and fattening pigs are given in the section on swine feeding, pages 3 and 4. A pregnant gilt or sow must have a special feeding ration. For the first 12 weeks after breeding, a gilt eats from 1 to 1½ pounds of concentrate mixture for every 100 pounds live weight, if she is on pasture. Legume pasture, either alfalfa or clover, is highly recommended. So a 300-pound sow needs about 4 pounds of concentrate per day in addition to pasture.

Here is a good concentrate mixture to feed pregnant animals on pasture:

	Pounds
ground barley	90
tankage (an animal protein supplement feed made from dried meat and bone scraps)	8
salt	1
bonemeal	1

If no pasture is available, reduce the barley and add 10 to 20 pounds of high-quality alfalfa meal.

Give your gilt a heavier ration during her last month of pregnancy, since 75 percent of the growth of her unborn litter takes place during this period.

A good ration to give your gilt for a month before farrowing is:

	Pounds
ground barley	90
soybean meal	4
meat scraps	5
oystershell flour	½
salt	½

You can substitute leafy alfalfa hay for pasture, and feed it directly, or chopped and mixed with grain. Although alfalfa hay is bulky, it should make up 10 to 25 percent of the ration when there is no pasture.

The week before farrowing, reduce the ground barley to 65 pounds and add 25 pounds of wheat bran to the ration. Reduce your gilt's ration by 30 to 50 percent. These precautions will prevent constipation and help encourage normal birth of pigs.

One light feeding of bran as a thin slop, plus fresh clean water is enough for your gilt during the 24 hours before her pigs are born.

AT FARROWING TIME

One week before farrowing, scrub the floor and walls of the farrowing pen with a scalding lye solution (1 pound of lye to 30 gallons of water) and thoroughly disinfect the pen. More pigs will survive if the pen is dry, airy, well lighted, and draft-free.

Put the sow in her farrowing pen about 4 days before her pigs are due. Wash her well with soap and warm water before bringing her into the farrowing pen, and disinfect her with a mild germicide, like Lysol®* or other coal-tar preparations. You can do this with an ordinary sprinkling can. A Lysol® solution can be made by mixing 5 ounces (10 tablespoons) of Lysol® in 1 gallon of water.

Use clean bedding, free of dust. Straw, hay cut in 6-inch lengths, or wood shavings make good bedding. Use enough bedding to keep the sow clean and warm, but don't use too much. Remove all bedding at least once a week and replace with clean material. Remove manure every day.

*® = Registered trade name.

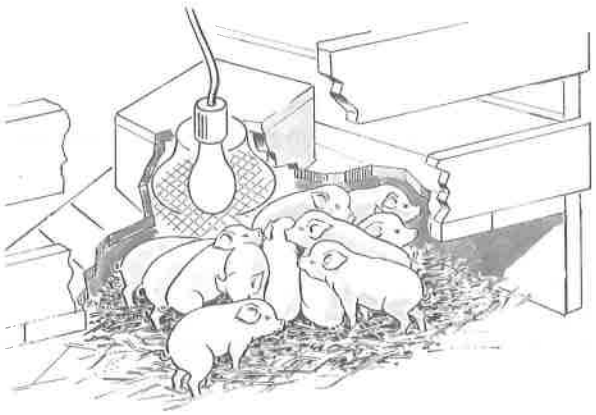

FIGURE 13. Build a pig brooder in the corner of the farrowing pen. The 100-watt bulbs and reflectors provide warmth for baby pigs and draw them away from the sow so that there is less danger that she will injure them.

Sows do not ordinarily have much farrowing difficulty with their second and later litters, if they have been well taken care of during pregnancy. Sometimes, however, a gilt does have trouble bearing her first litter. Give her careful attention but don't disturb her. Once she starts delivering pigs she should complete the farrowing without interruption. Any prolonged delay between the birth of the pigs accompanied by constant straining is cause for alarm. If she is having a hard time delivering her pigs, get an experienced person to help. If the sow is having extreme trouble, get a veterinarian quickly.

As each pig is born, with a clean flannel cloth remove the membrane from the nose and mouth, and wipe the body dry. Then disinfect the navel with a 7-percent solution of tincture of iodine. Get a fresh solution each year, since it gets stronger with age. If a pig looks dead when born, you may be able to start its breathing by gently slapping its sides. If the pigs get chilled, you can usually revive them in a warm box, in direct sunlight, or by rubbing them vigorously between your hands. As soon as newborn pigs have gained a little strength, let them nurse. If a pig is weak or cannot nurse, you can probably get him started by stripping a little milk into his mouth. If you

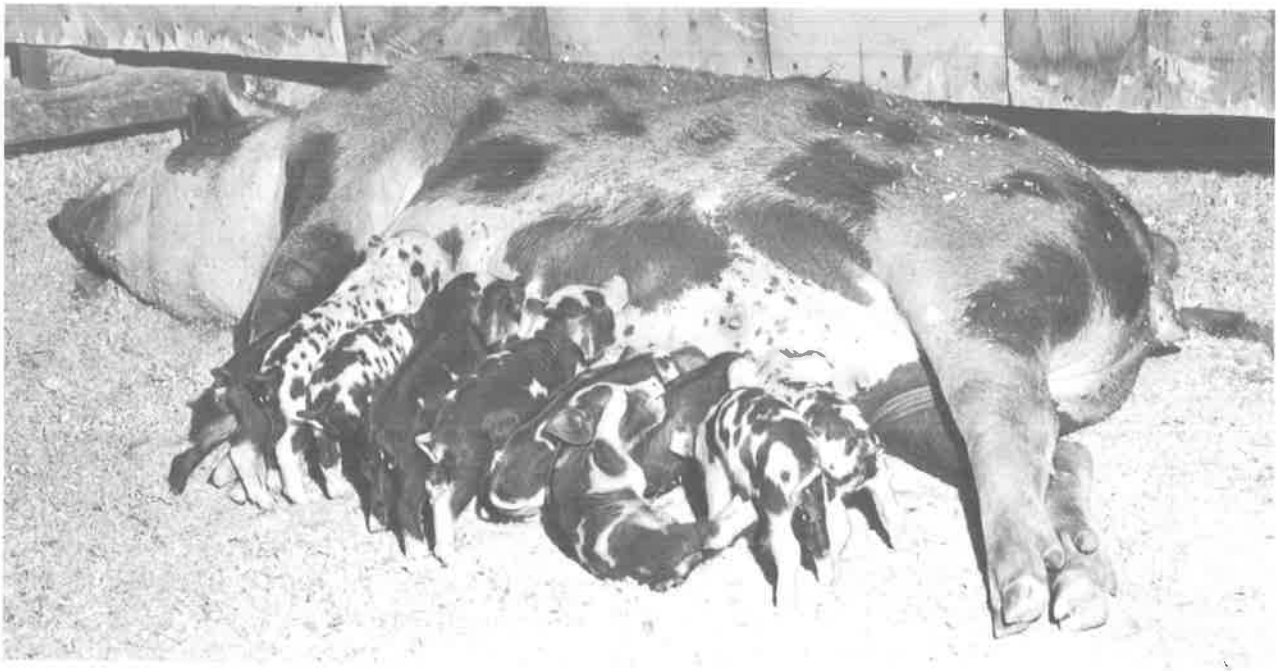

FIGURE 14. Your sow needs body building nutrients to maintain her body and produce plenty of milk for her litter. Her ration should be especially high in proteins, vitamins, and mineral matter, especially calcium and phosphorus, while her pigs are nursing.

can make him swallow, he'll soon gain enough strength to manage by himself. Let the pigs nurse and then put them in a warm brooder lined with straw. When farrowing takes a long time, take the pigs back to the sow every hour or two and let them nurse. If some small weak pigs are born in a litter of strong pigs, take the stronger ones away occasionally so the weaker ones have a chance to nurse.

Watch your gilt closely. You may save pigs by inspecting the litter every 2 or 3 hours, because some newborn pigs may wander away, get cold, or be unable to suckle. Leave the pigs in the farrowing shed until they are 7 to 10 days old.

FROM BIRTH TO WEANING

The time from birth to weaning is the time when a pig's life is most in danger. Let the pigs use the brooder as long as they will. It will pay you to leave it on as long as they keep crawling under it for warmth.

About a day after farrowing, remove the eight needlelike teeth in the upper and lower jaws of each young pig. Do this carefully by cutting them with special pliers called "side cutters." If these teeth are not removed they may injure the sow's udder or other little pigs. Get an experienced person to help you with the operation.

When the pigs are a few days old, mark them in the ear with either an individual number or a litter number (the same number for every pig in one litter). A special tool called an ear-notcher which cuts a V-shaped notch in the ear can be secured through livestock supply stores. Most growers use the ear-notch system because it is the easiest and best. You can mark young pigs a few days old without hurting them. The numbers are easy to read if you make the notches large enough. Again, you should have help from an experienced person.

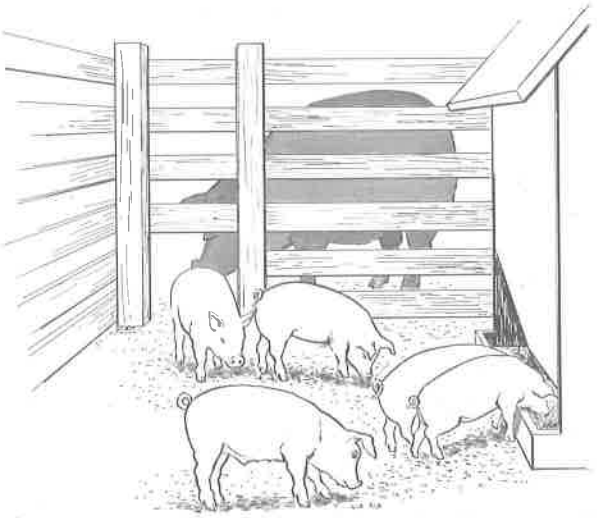

FIGURE 15. A creep for the little pigs.

When pigs are 1 week old, they will eat a little grain. A good ration is ground wheat and barley, half and half, plus about 10 percent tankage. Feed in a creep, away from the older hogs. A creep is a small pen with a narrow opening which the pigs can get through but the sow can't. As the pigs grow older and eat more grain, give them some protein supplement, such as skim milk, wheat middlings, or tankage (an animal protein supplement feed).

Put your sow and pigs on good pasture from 10 to 14 days after farrowing, weather permitting. Your pasture should be large enough for your sow and her litter, approximately ½ an acre, and it should be tightly fenced. A clean, warm, well-bedded house is essential. A good type of house, big enough for two sows and litters, is shown on page 7.

Castrate young male pigs if they are not going to be used for breeding. You can do this easily and without much danger if you take proper precautions. The best time to castrate is when the pigs are 2 to 3 weeks old and still nursing. A good plan is to feed nothing but mother's milk the day before and the day after castration. Be sure the instruments and surroundings are clean and disinfected before the operation. Get an experienced person to help you the first time.

SOW FEEDING AFTER FARROWING

Increase your sow's ration slowly after farrowing. You may or may not feed her during the first 24 hours after her pigs are born. You must feed sows lightly the first 3 or 4 days after their pigs are born.

A good rule for the first feeding is 1 to 2 pounds of a suitable concentrate mixture, like rolled barley and wheat bran, equal parts by weight. On the second feeding day, give 2 or 3 pounds, and increase the amount daily until you are feeding 8 or 9 pounds by the end of the first week. Normally, the sow can be on full feed in 7 to 10 days after farrowing.

Watch for digestive upsets in nursing pigs, and regulate your sow's feed accordingly. If your sow is overfed, constipated, or needs exercise, your pigs may scour (have diarrhea). It is often helpful to reduce the sow's feed. If she is constipated, give her 5 ounces of Epsom salts in her feed.

Your sow needs body building nutrients to maintain her body and to produce plenty of milk for her litter. Feed her a ration high in energy, proteins, vitamins, and minerals, especially calcium and phosphorus. You can supply these with home-grown grains and added high-protein feeds, like wheat middlings and tankage. Underfeeding often makes the sow lose too much weight but changes in rations after farrowing should be gradual. Feed the first ration carefully—not more than 2 pounds for the first 3 days—and gradually increase it up to 8 or 9 pounds on the seventh day.

Here is a suggested ration for the first 7 days:

	Pounds feed per 100 pounds mix
ground barley or other grains	62½
alfalfa meal	15
soybean or cottonseed meal	6
wheat bran	10
meat and bone scraps (50% protein)	6
common salt	½

By 7 to 10 days after farrowing, your sow will be on full feed. This is as much feed as she cleans up readily in 20 to 30 minutes twice a day. Change the ration gradually so that by 7 to 10 days after farrowing your sow is on the ration she will get for the rest of her lactation (milking) period.

Here is a typical ration for a lactating sow on pasture:

	Pounds feed per 100 pounds mix
ground barley or other grains	87
soybean or cottonseed meal	7
meat and bone scraps (50% protein)	5
oystershell flour	½
common salt	½

WEANING YOUR PIGS

Pigs can be weaned from 4 to 8 weeks of age. About 1 week before weaning, gradually begin to slightly reduce the sow's ration to decrease her flow of milk. For weaning, leave the pigs on the same pasture or pen they have been using while nursing, and put the sow on a separate pasture.

Early weaning baby pigs (4 to 6 weeks) must be eating a well formulated starter ration before they are weaned. You can see that they do this by providing, from 3 days of age on, a creep feed area that only the baby pigs can get into.

Keep feeding the same grain ration to pigs. If you must change the feed, stretch the change over 3 to 5 days. Any sudden change almost always upsets pigs. Sometimes it may kill them.

After the pigs are weaned, put the sow in a separate pasture and feed her lightly until her milk flow stops. Then increase her feed, according to her condition. You should be feeding her heavily enough at breeding time so that she gains from ½ to 1 pound daily. Don't overfeed your sow during the dry period. She will get too fat.

BUILDING A BREEDING HERD

At weaning, choose the gilts and boars you want to save for breeding stock. Separate them from those you'll fatten for market. As a rule, keep for feeding only the finest gilts and boars and those whose dams produced many pigs and much milk. For fattening pigs for market, see the section on feeding market hogs (page 1).

Accurate breeding records are important, whether your herd is grade or purebred. Keep them up to date. Your records for each sow should show breeding date, boar used, farrowing date, number of boars and gilts farrowed, and number of each raised. Birth and weaning weights are desirable. You can make up 3- by 5-inch cards showing this information.

PROTECTING AGAINST DISEASE

- ☐ Keep the shelter and lot clean
- ☐ Keep equipment clean
- ☐ Keep the barn or shelter well ventilated.

For controlling lice, commercial preparations are available. Check with your farm advisor about their use.

Control roundworms with one of the drugs recommended by your farm advisor or veterinarian. Follow the directions on the package. Other worms will not be serious if you prevent the pigs from rooting by putting rings in their noses.

MARKETING

More information about marketing can be found in the section on showing swine (page 14).

See that your hogs are in good thrifty condition, well groomed, and of high market grade. In fitting a hog for sale or show, first wash him well so he is clean and free of dirt. A brush, plenty of soap and water, and elbow grease will do the job. Trim the hair around the outside of the ears. Lightly oil the hair and skin of the hog the evening before it is to be shown or sold so he will look sleek and attractive. Train your animal so you can drive and show it to the best advantage—quietly and attractively.

Swine Showing

TRAINING YOUR PIG

If you want to show your pig, you must train him to be driven and shown. Start this training soon after you begin feeding him as a weaned pig.

First, gentle your pig by scratching or brushing him at each feeding period, but don't play with him. A pet pig becomes contrary and is sometimes difficult to show.

Use a very light cane for training. The pig will run at first, and you may get pretty annoyed, but keep your temper and he will soon learn what you want him to do.

You won't be using a show halter, so you must direct him with a cane. He will soon learn to stop or turn as you apply the cane to various parts of his body.

Tap the pig on the side of the head to turn him right or left, and on the nose to stop. Don't hit your pig on the head when you want him to go forward. Slap his side or back with hand or cane. Tapping his hind legs works quite well, too.

Drive the pig often. If you have a large lot, try directing the pig to various places within the lot. Ask your parents to act as judges while you practice moving the animal as you would in a show ring. Notice what positions make your pig look best.

FITTING YOUR PIG

A part of the training program is fitting the pig for the show ring. No amount of fitting and showing makes a scrub win a blue ribbon so good feeding is part of fitting, too.

Train the pig's hair to lie down properly by brushing it frequently. Apply a light coat of edible vegetable oil before brushing, to help train rough hair coats and soften hard scaly hides.

Wash your pig at least once a month. Use a stiff scrub brush and a bar of laundry soap. Only a clean skin and hair coat will look good in the show ring.

If possible, weigh your pig often to be sure he is gaining properly.

If hoofs become long, trim them evenly. Don't wait to do this trimming until show time. The time for trimming hoofs is about 3 to 4 weeks before the show. Market pigs seldom need their hoofs trimmed.

About 2 months in advance of the show, fill out your entry forms. Have your leader check and sign them. Get them in on time.

FIGURE 16. Soap and water treatment.

PREPARING FOR THE SHOW

Before the Show

Several days before the show date, get the necessary feed, supplies, and equipment together.

Property box. A good thing for carrying supplies to the show and having them available when you need them. Equip your box with a lock.

At the Show

You'll need these supplies:

Feed. Same ration you use at home; do not change ration now. Allow about 6 pounds of feed per day for a 200-pound pig.

Bedding. Bright, clean straw. Use one-third bale per pen daily.

Feed trough. A short, deep, wide-based trough is difficult to overturn; feed stays in better, and the pen stays cleaner.

Water bucket. For carrying water and mixing feed.

Show cane.

Soap, brushes, light oil, wool cloth, powder and bluing for white pigs.

Clippers are often useful.

Old clothes, boots to wear when washing pig.

Equipment box. Don't build it too large; 15" x 12" x 36" is a good size.

Make advance arrangements for transporting pigs to show. If you need a health certificate for your pig, get one early. Check your premium book for information.

FIGURE 17. Show equipment—brush, hose, spray gun, rubber boots, soap, mineral oil, show cane, show stick, water bucket, equipment box.

GROOMING FOR THE SHOW

Just before leaving home, or soon after arriving at the show, clip pig's ears and tail.

Ears. Clip off all long hair from under ear and around the edge. Closely clip the hair from top of ear.

Tail. Closely clip hair from tail setting back to switch. Leave a 4- to 5-inch switch on end.

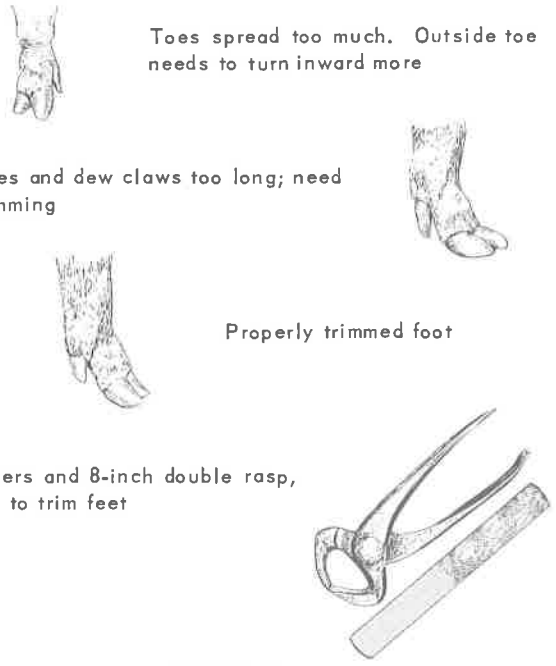

FIGURE 18.

TAKING PIG TO SHOW

Check loading chute for loose nails and wide-spaced boards that could hurt the pigs.

Have the truck or trailer well bedded. Use sand in summer, and sand and straw in winter.

Skip the feeding before leaving for the show. Hungry pigs ride easier and are less apt to get sick.

Take care loading your pig—its easy to break a leg or cripple him.

Protect pigs from the weather on the way to show. Use a covered truck or trailer to keep him out of draft and cold winter rains. Haul during cool of day if weather is hot, and be sure he has ventilation and protection from the sun.

AT THE SHOW

Find your assigned pen. Pen assignment charts are usually posted. Put straw bedding in the pen, don't use too much straw, and don't wet it down.

Unload your pig carefully and drive him to the pen slowly. Hurry and excitement now or at loading time can completely ruin the pig's disposition. Don't spoil hours of training by careless handling. In hot weather you can easily overheat him, too. Let the pig rest.

FIGURE 19. He needs a rest.

FIGURE 20. Keep your assigned pen and aisle areas clean.

Before feeding or watering, check with your club leader. If your pig is near a weight division mark, perhaps you should weigh him before feeding or watering.

Exercise the pig after he has rested so he won't get stiff and sore from the ride.

An exhibitor has a definite obligation to his organization and to the sponsors of the show. Read catalogs carefully and abide by all rules and regulations.

Keep your pig's pen and surrounding area clean. Clean the pen early each morning. Stay close to the pen assigned to your pig. Prevent accidents; don't let your pig get out of his pen. Be available in case the show management needs information.

Keep your pig cool and well watered during hot spells. Wash him when the wash rack is not crowded. The pig usually needs at least

one washing at the show. Panel your pig in a small corner for easier washing and less pig fighting. Return the pig to his clean pen and brush him dry.

FEEDING AT THE SHOW

Don't feed your pig right after you arrive. At the show, feed about one-half to three-quarters his normal ration. Hungry pigs rarely become sick. Pigs need less feed when confined to small pens. Do not leave feed in front of your pig at the show.

Exercise the pig before feeding time. Let pigs out of their pens for exercise at least once a day. Panel off the alleyway and let him run while you clean the pen.

Before show day, watch your pig eat. Decide when he looks best. Too much feed before show time can give him a heavy, wasty middle. Too little feed may make him look gaunt.

SHOW DAY

Check the show catalog for the time your animal is to be shown. If the show is moving slowly, do not feed or put final touches on fitting too early.

Your pig will probably need washing on show day. Ask your leader's advice.

White pigs may be covered evenly with powder before entering the ring. White areas in other breeds may also be powdered.

For black and red pigs, use a light oil (equal amounts of mineral oil and alcohol, or some prepared dressing oil). Oil lightly and evenly. Use a wool cloth soaked in oil, or a fine mist sprayer for this application. If weather is very hot, use cool clean water instead of oil. Sprinkle on lightly, then brush off.

Brush pig in a back and down fashion. Do not brush straight back. Do not part the hair in the middle. A pig's hair looks natural when you brush back and then down over the sides. Brush all straw off the animal just before entering ring.

When your class is called, slowly drive your pig to the show ring. Don't rush him.

Don't forget that you are part of the show. Dress in your full 4-H uniform. Stay as neat and clean as possible.

IN THE RING

Keep your eyes on the judge and on your pig. Pay no attention to anyone on the sidelines. Keep your pig between you and the judge.

Drive your pig slowly about the show ring. Don't ever hurry your pig.

Don't keep your pig under the judge's nose. Seek the open areas of the ring at a distance from the judge. Your pig looks best at about 15 to 20 feet from the judge. Be sure the judge gets a good look at your pig. You will know when he has, if you watch closely.

Don't keep your animal on the run; let him stand and rest when the judge is looking at other pigs in the ring. If you keep forcing him around the ring, he may become very stubborn.

Don't lean on your pig's back. Keep brush and hands off the pig. If you hit your pig on the rump with a brush or cane, he will straighten out his tail. No pig looks good with a straight tail! It also makes him look steep-rumped.

Be sure to close and latch the gate if the judge tells you to put your pig in one of the ring pens. Be ready to answer any questions about your animal—his age, feed, how long you fed him, etc.

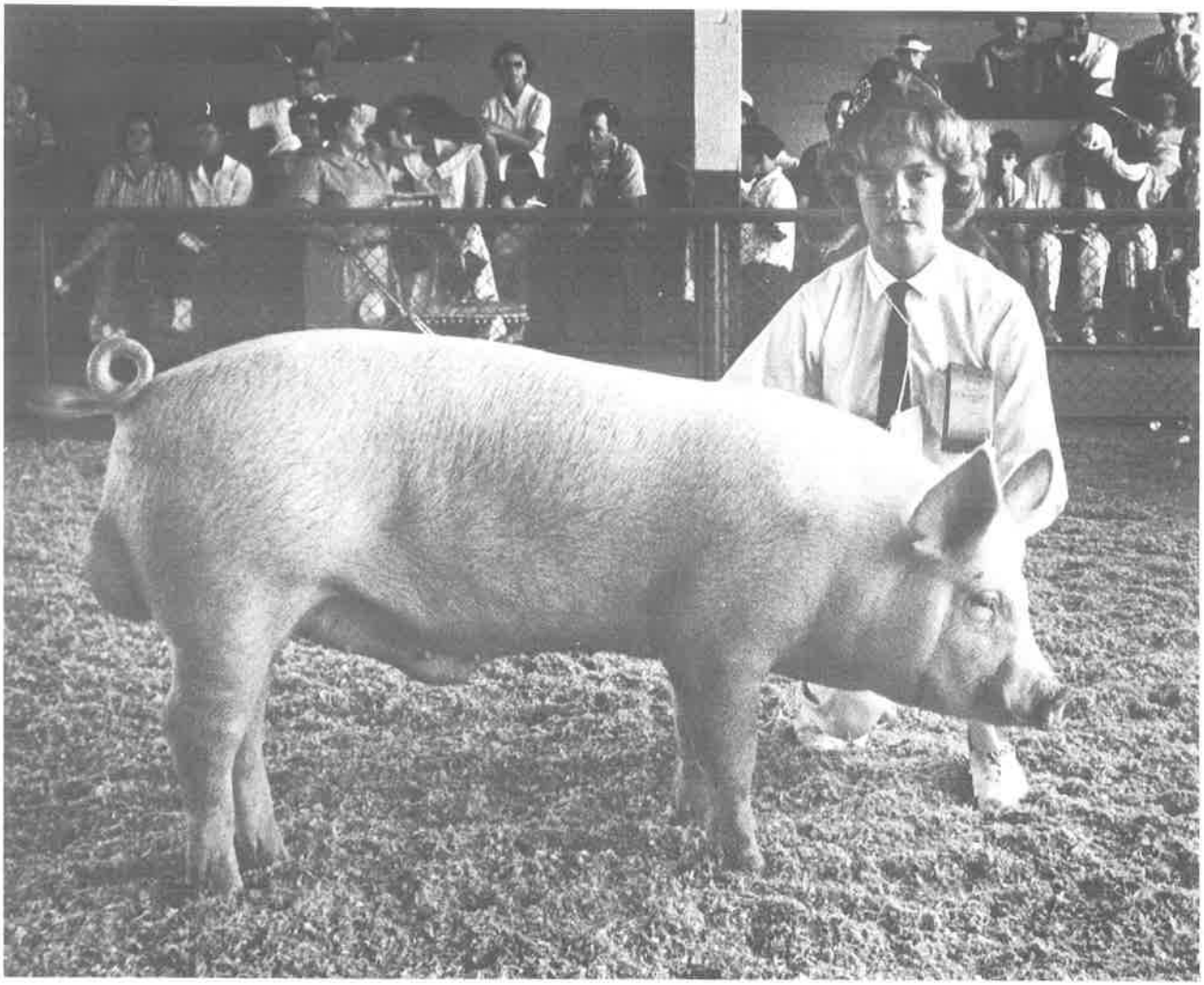

FIGURE 21. A well fitted and trained animal shows off to its best advantage and may bring you extra profit from your Swine Breeding Project.

Sportsmanship in the ring includes respect for the judge and fellow exhibitors. One wild, fighting pig can upset the entire ring. Win or lose fairly and gracefully. Everyone admires and likes a good sport. No matter what happens—grin and take it!

A poor job of showing won't help your chance of winning. Study these suggestions carefully. The time you spend fitting and showing properly is well spent. Win or lose, you have become a better person in the trying; you've learned a lot and there is always another show. The best of luck!

BUILDING PLANS

If you want to get more detailed plans for building the housing and equipment you need in your swine project, consult your local Farm Advisor's office.

4-H JUDGING

SWINE

PREPARED BY

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NOTES

NOTES

PROCEDURE FOR JUDGING FAT LIVESTOCK

1. HAVE FIXED IN YOUR MIND, A DESCRIPTION OF THE IDEAL FAT ANIMAL.

2. KNOW THE CORRECT NAMES FOR THE PARTS OF THE ANIMAL.

3. KNOW THE DESCRIPTIVE TERMS TO BE USED IN DISCUSSING THE ANIMALS.

4. BE SURE YOU KNOW HOW THE CLASS IS NUMBERED -- LEFT TO RIGHT FROM REAR. IF IN DOUBT, ASK.

5. OBSERVE THE ANIMALS FROM A DISTANCE, ABOUT 20-25 FEET, FIRST FROM THE SIDE, THEN THE REAR AND THEN THE HEAD.

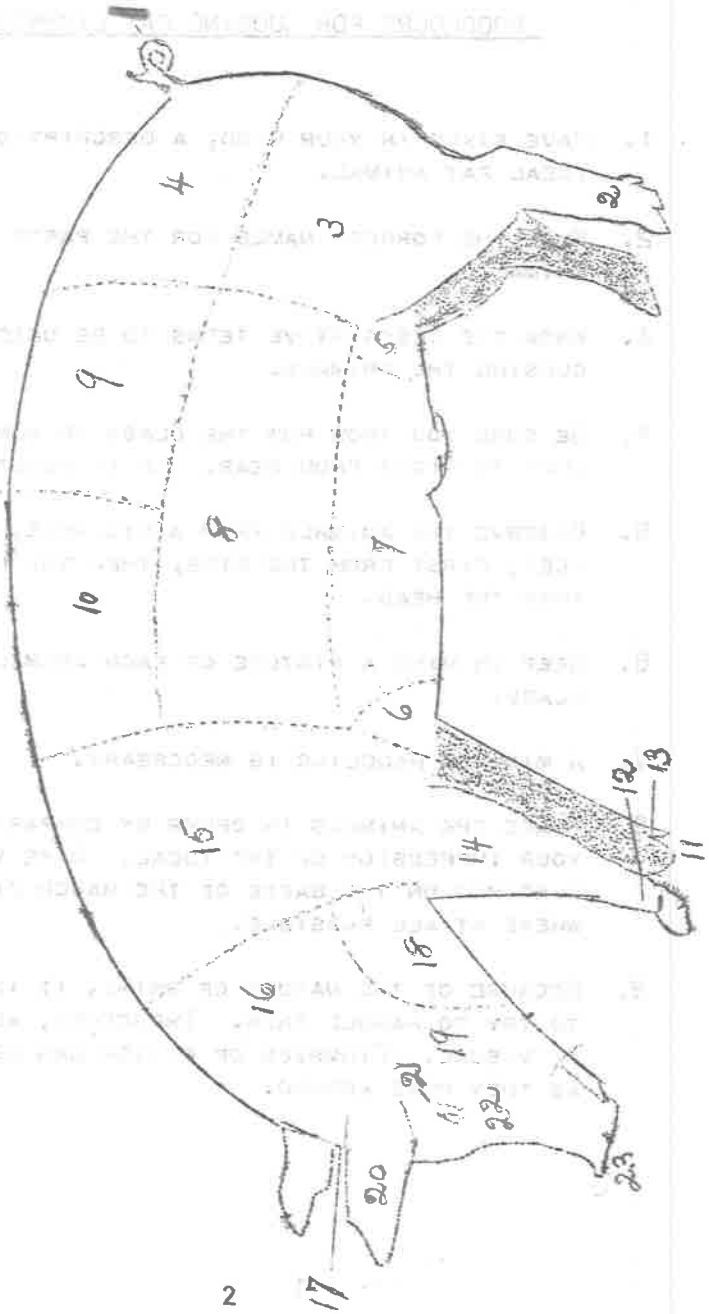
6. KEEP IN MIND A PICTURE OF EACH ANIMAL IN THE CLASS.

7. A MINIMUM HANDLING IS NECESSARY.

8. PLACE THE ANIMALS IN ORDER BY COMPARING WITH YOUR IMPRESSION OF THE IDEAL. MAKE YOUR PLACINGS ON THE BASIS OF THE MAJOR DIFFERENCES WHERE AT ALL POSSIBLE.

9. BECAUSE OF THE NATURE OF SWINE, IT IS IMPOSSIBLE TO TRY TO HANDLE THEM. THEREFORE, ALL JUDGING IS VISUAL. FIRMNESS OF FINISH CAN BE NOTICED AS THEY MOVE AROUND.

IMPORTANT PARTS OF FAT SWINE



JUDGING MARKET HOGS
(Cont'd)

Score Card

		1	2	3	4
4. Quality . . . . . Smoothness in form and fleshing. Free from wrinkles or flabbiness; hair fine; bone and head of medium size, neat trim jowl.	15				
5. Carcass Yield or Dressing Per Cent . . . Indicated by amount of condition and trimness of middle	10				
TOTAL	100				
FINAL PLACING					

JUDGING MARKET HOGS

SCORE CARD

	1	2	3	4
1. WEIGHT ACCORDING TO AGE . . . . . 15 6 MO. -- 200-225 LB. 9 MO. -- 325-350 LB.				
2. FORM . . . . . 40 MODERATELY LONG, WITH EVEN WIDTH AND DEPTH; SLIGHTLY ARCHED TOP LINE; UNDERLINE AND SIDES STRAIGHT; TRIM MIDDLE; SHOULDERS NOT PROMINENT; WIDE BACK, LOIN AND RUMP; WIDE, DEEP, PLUMP HAM; SIDE, MODERATELY LONG, DEEP AND SMOOTH; DEEP FLANK; LEGS MEDIUM LENGTH, STRAIGHT, WELL PLACED				
3. CONDITION . . . . . 20 DEGREE OF FATNESS, INDICATED BY THICKNESS AND FIRMNESS OF COVERING OF BACK, LOIN, SIDE AND HAM. NOT EXCESSIVELY FAT.				

1. TAIL
2. HIND LEG
3. HAM
4. RUMP
5. REAR FLANK
6. FORE FLANK
7. BELLY
8. SIDE
9. LOIN
10. BACK
11. TOES
12. PASTERN
13. DEW CLAW
14. FORE LEG
15. SHOULDER
16. NECK
17. POLL
18. JOWL
19. CHEEK
20. EAR
21. EYE
22. FACE
23. SNOUT

REASONS

1. Have in your mind a picture of each animal in the class.

2. Stand before the judge, looking him in the eye, and tell him why you place the class as you did.

3. The opening statement should include the name of the class and your final placing. A good beginning might be, "I place this class of (BREED) fat hogs: 1-2-3-4."

4. Describe the good points of your top animal first, and if there are any major faults be sure to mention them, also.

5. In talking about the animals of the class, compare them to the one placed next in order. Stay away from generalized descriptions.

6. The text of the reasons should be to the point in as few words as possible.

7. When the reasons are completed, a closing statement should be made, for instance, "For these reasons, I place this class of (BREED) fat hogs 1-2-3-4."

Rump and Ham

1. Longer rump
2. Wider rump
3. Nicer turned over the rump
4. Higher tail setting
5. Larger ham
6. Deeper ham
7. Thicker ham
8. Firmer ham
9. Freer from wrinkles at base of ham
10. Fuller ham
11. More shapely ham
12. Longer ham
13. Meatier ham
14. Wider, more bulging ham
15. Shorter rump
16. Steeper rump
17. Drooping rump
18. Low tail setting
19. Soft ham
20. Wrinkled at base of ham
21. Long shanked ham
22. Wasty ham
23. Pinched rump
24. Narrow rump
25. Lacks fullness of ham
26. Flabby ham
27. Shallow ham

Finish

1. Fatter
2. More finish
3. More desirably finished
4. Firmer finished
5. More condition
6. Higher finished
7. Too fat
8. Too chuffy
9. Underfinished
10. Lacks finish
11. Uneven in finish
12. Wasty

Quality

1. Smoother throughout
2. Smoother hair coat
3. Freer from creases and wrinkles
4. Firmer
5. Wrinkles
6. Coarse
7. Wasty
8. Flabby

Body (back, loin, side, belly)

1. Stronger backed
2. Neater arched back
3. More uniformly arched top
4. Longer, leaner loin
5. Wider top
6. More width and thickness
7. Greater arch of rib
8. Wider back and loin
9. More uniform in width
10. Longer side
11. Stretchier side
12. Smoother side
13. Deeper side
14. More uniform depth of side
15. Firmer side
16. Trimmer middle
17. Neater middle
18. Straighter underline
19. Firmer underline
20. Less wasty about middle
21. Flat backed
22. Fish backed
23. Cuts in at the loin
24. Narrow or pinched
25. Shallow
26. Uneven in width
27. Tapers
28. Tucked up in flank
29. Heavy middle
30. Wasty middle
31. Flabby middle
32. Wrinkled side
33. Lacks spring of rib
34. Lacks arch of rib
35. Soft, flabby underline
36. Short sided
37. Pinched over the loin
38. Falls away behind the shoulders
39. Lacks balance in turn of top
40. Lacks uniform depth

SCORE CARDS

For those who are just beginning in judging, it might be to their advantage to use a score card. This will give them a general idea of the importance of the various points in appearance.

In judging contests, score cards are not available so it might be wise to spend some time studying the one on pages 14 and 15.

SAMPLE SET OF REASONS

Duroc (Fat) Barrows

I place this class of Duroc (Fat) Barrows, 1-2-3-4.

I placed 1 at the top of the class and over 2 because he is a stretchier, trimmer, meat type barrow. 1 has a longer side and a thicker ham. 1 has a more uniformly arched top with a longer, leaner loin, a longer rump and is more desirably finished than 2. 1 is trimmer in the jowl and middle. Also, 1 shows more quality than 2, being smoother in the shoulders, smoother in the sides, and having a firmer ham. 1 will hang up a higher quality meat type carcass that has a higher lean to fat ratio and with less back-fat thickness. However, I'll grant that 2 is a thicker barrow, having more width over his top and has a deeper side.

For my middle pair, I place 2 over 3 because 2 is a nicer balanced barrow, having more stretch and follows more closely the type of my top individual. 2 has a longer, deeper side and is more uniform in depth, letting down to a deeper rear flank. 2 has more thickness than 3, having a wider loin and carries down to a deeper, plumper ham. I give 2 added advantage for being trimmer in the middle. 2 will hang up a thicker, meatier carcass that will yield more high priced cuts. On the other hand, I'll admit that 3 shows more quality, being firmer in his finish, neater in the jowl, smoother in the hair coat, and standing on more refined bone.

Head and Neck

1. Cleaner
2. Trimmer Jowl
3. Firmer Jowl
4. Smoother Jowl
5. Lighter Jowl
6. More refined head
7. Cleaner cut head
8. Coarse head
9. Coarse jowl
10. Flabby jowl
11. Wasty Jowl
12. Staggy Jowl

Shoulders

1. Smoother shoulders
2. Neater at top of shoulders
3. Neater shoulders
4. Fuller shoulders
5. Fuller behind the shoulders
6. Coarse shoulders
7. Wrinkled shoulders
8. Pinched behind the shoulders
9. Rough shoulders
10. Open shoulders

MARKET BARROWS

General Appearance

1. Meat type barrow
2. Typier individual
3. Stretchier
4. More stretch
5. Longer sided
6. Deeper sided
7. Stronger back
8. Higher arched back
9. More balance
10. Style
11. Stylish
12. Flashy
13. More refined bone
14. Neater barrow
15. Neater arched top
16. Smoother
17. More uniformity of width
18. More uniformity of depth
19. Straighter, neater underline
20. More quality
21. More desirable amount of finish
22. Fatter
23. More finish
24. Higher finished
25. Chuffy
26. Short
27. Thicker
28. Wider
29. Lacks type
30. Tapers from front to rear

SAMPLE SET OF REASONS
(continued)

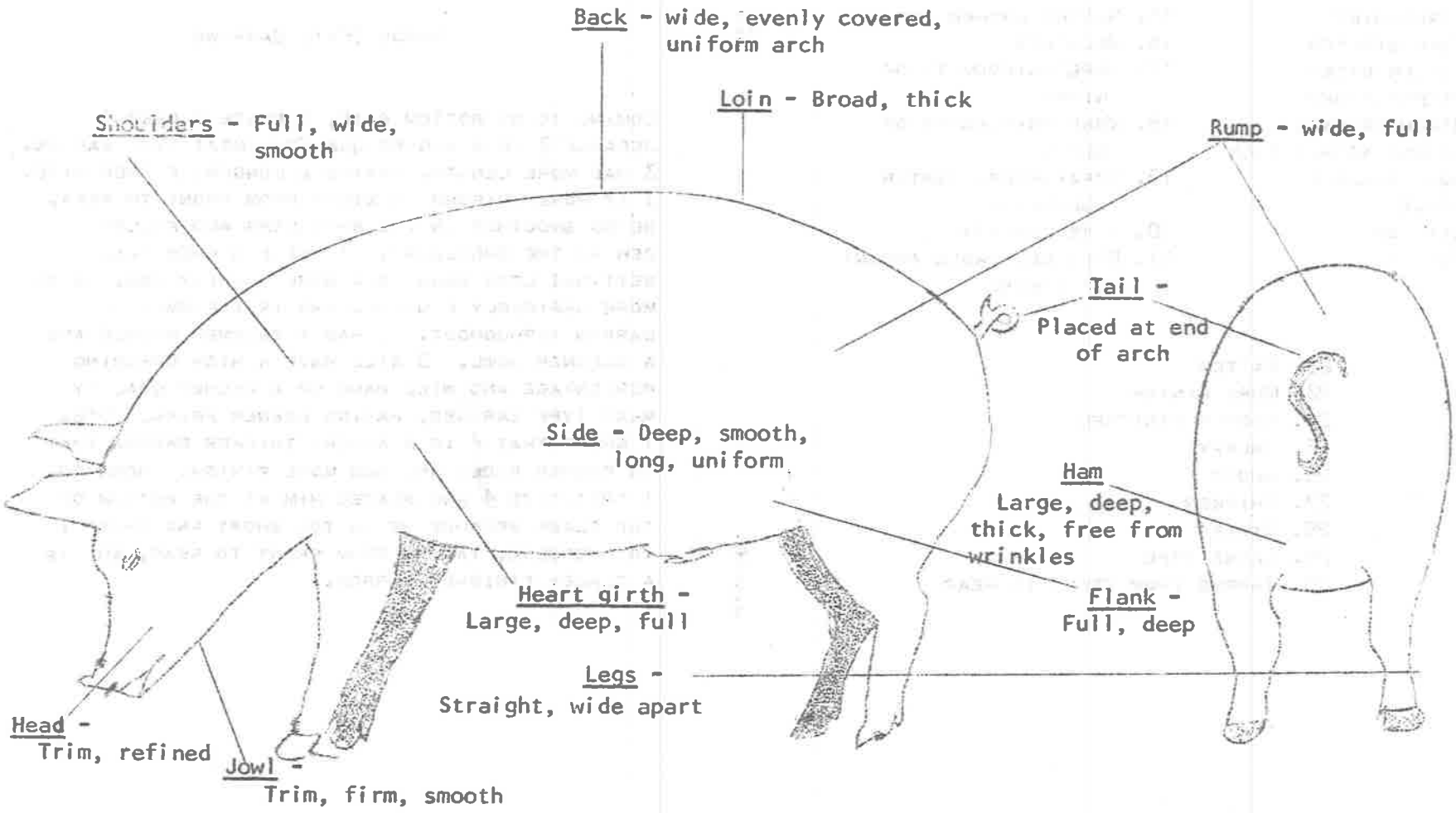
Duroc (Fat) Barrows

Coming to my bottom pair, I place 3 over 4 because 3 is a higher quality, meat type barrow. 3 has more length, having a longer, firmer side. 3 is more uniform in width from front to rear, being smoother in the shoulders and fuller behind the shoulders. 3 has a higher tail setting; lets down to a more shapely ham. 3 is more desirably finished and is a firmer barrow throughout. 3 has a trimmer middle and a cleaner jowl. 3 will have a high dressing percentage and will hang up a higher quality meat type carcass, having leaner primal cuts. I grant that 4 is a wider, thicker barrow that is deeper sided and has more finish. However, I criticize 4 and placed him at the bottom of the class because he is too short and chuffy, is overdone, tapers from front to rear, and is a flabby finished barrow.

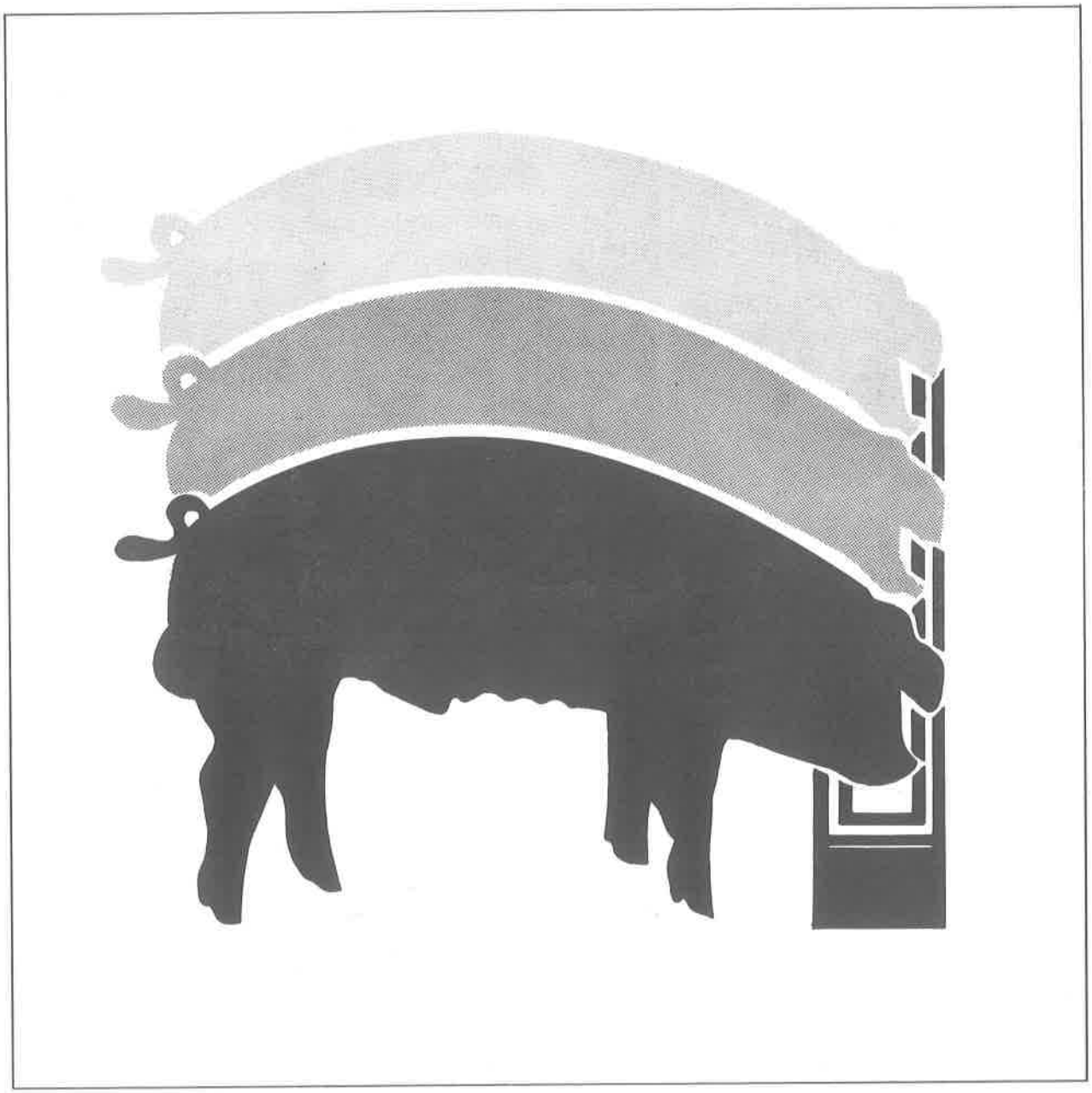
CONFORMATION OF IDEAL FAT HOG

Form - Long, wide, deep, uniform width and depth, uniform arch, straight underline, trim

Fleshing (condition) - Firm, smooth, uniform covering of back and ribs



A PRACTICAL GUIDE TO SWINE NUTRITION



Division of Agricultural Sciences
UNIVERSITY OF CALIFORNIA

REVISED DECEMBER 1977

LEAFLET
2342

COOPERATIVE EXTENSION UNIVERSITY OF CALIFORNIA

This publication provides practical and economical solutions to most swine feeding needs in California. Because availability of feed and feed prices change, use it only as a guide.

Examples of protein supplements and vitamin and mineral premixes are given. Ration formulas meet the various feeding schedules faced by the producer, including those for growing and finishing market hogs and for the breeding herd.

NOTE: The rerun in March 1978 of the December 1977 issue of this publication included a change to the cover artwork only.

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2m–3/78–HS/LAM

A PRACTICAL GUIDE TO SWINE NUTRITION

The authors are Robert F. Miller, Farm Advisor, Tulare County; John R. Dunbar, Extension Livestock Specialist, Davis; and Steve Berry, Staff Research Associate, Davis.

Feed costs represent 75 to 80 percent of the total cost of California's pork production. A producer must develop economical rations for swine that are nutritionally adequate and efficient. For this reason, the nutritional needs of swine must be thoroughly understood.

Optimum swine nutrition requires overcoming deficiencies of grains that are the basic energy sources. Grains are low in some amino acids. Amino acids are the "building blocks" of protein and are particularly needed by the pig. Grain also lacks some vitamins and minerals swine need for good nutrition.

Grains and protein supplements fed in the correct ratios can form an adequate feeding program when supplemented with needed vitamins and minerals.

Energy Feeds

Feeds that supply energy (calories) form the basis of swine rations. In California, these energy-supplying feeds can be *barley, milo, yellow corn,* or *wheat,* depending on availability and price. Barley is higher in fiber content and has more bulk. It is slightly lower in digestible energy than the other feed grains.

In any of the example rations, the feed grains can be used alone or in combination, and may be substituted for another.

Grinding is the usual way to prepare grain for hogs, although rolling or crushing are equally effective processing methods. Other energy feeds can be used in swine rations but, for best results, they should be limited to 5 percent or less of the ration. Examples of these are *molasses* and *tallow.*

Oats or dried beet pulp can replace a limited portion of the grain shown for sow and gilt rations. In the bred sow and gilt ration, 10 to 20 percent of the grain can be replaced with laxative feeds like beet pulp or bran, during the last few days of gestation and several days after farrowing, to reduce problems from constipation.

Protein

Protein (or its component amino acids) is the most critical nutrient in swine rations. Because swine are simple-stomached animals, the quality of this protein—adequate amounts of essential amino acids—is critical for efficient production and fast gains. This is true for all physiological processes—maintenance, growth, reproduction, and lactation. In some rations, dietary protein of grains is of low quality and meets as little as half the requirements. Adding supplementary protein or amino acids is essential. Protein feeds for balancing swine rations in California are *soybean oil meal, meat scraps, fish meal,* and *alfalfa meal.*

Cottonseed meal can also be used, but it needs fortification with *lysine,* an animo acid in short supply in the cereal grains. Several suitable protein supplements that will bring grain rations to the needed protein level have been formulated.

Minerals

Most swine rations usually require some mineral fortification, mainly *calcium, phosphorus, salt,* and *zinc.*

Trace mineralized salt or vitamin-mineral premixes can supply trace minerals—*copper, iron, iodine,* and *manganese.* Baby pigs on concrete need supplemental iron. This can be supplied with injectible iron or with a high-iron preparation to be swabbed or sprayed on the sows' udders.

Vitamins

Efficient swine performance requires a number of vitamins. In cereal grains some vitamins may be largely unavailable to swine. Others are available in insufficient amounts. These facts make vitamin fortification of swine rations essential. Vitamins *A* and *D, pantothenic acid, riboflavin,* and B_{12} are those usually provided.

Antibiotics, Arsenicals, Other Additives

Antibiotics fed to swine may be beneficial, depending on disease levels and other conditions in the herd.

These are some of the observed effects of antibiotics on growing pigs: some increased rate of gain; some reduction in subclinical disease level resulting in gain improvement; increased feed efficiency; faster early growth; reduction in the number of runts; control of certain scours.

In California, antibiotics are not usually fed to brood sows, because experimental results have been inconclusive regarding their value. Breeding herds having a high disease level may show a favorable response. These benefits are usually achieved by using them shortly before and after farrowing, and during the breeding season. Growers should carefully consider the economics of using antibiotics in swine rations.

Some antimicrobial compounds behave somewhat like antibiotics. Use them only to achieve the specific purposes for which they are intended—inhibiting specific organisms in swine and improving the rate of gain and feed utilization efficiency. *Arsenicals, nitrifurans, sulfonamides,* and *copper compounds* are most often used.

Water

Pigs consume 2 to 2.5 pounds of water per pound of dry feed. High temperatures increase consumption to 4 to 5 pounds. A weanling pig will consume up to one-fifth of its body weight daily, while a 200-pound finishing pig will consume up to 10 percent of its body weight.

To milk adequately, lactating females need unlimited access to water. Young pigs do not consume adequate amounts of creep diets unless water is available.

—— PROBLEMS IN SWINE NUTRITION ——

Breeding Gilts and Sows

Overfeeding is the most frequent error in breeding gilts and sows. For best results, follow recommended feeding levels closely. Do not self-feed pregnant sows and gilts unless ration contains enough fiber to limit energy intake.

Growing and Fattening Pigs

Feed wastage can be expensive. Ten pounds of feed wasted each day equals $250 or more a year; this amount of waste can increase the cost of raising 200 hogs by about 50 cents per hundredweight.

It takes good management, constant attention, and proper adjustment of the right kind of feeders—feeders that are not worn out—to keep wastage minimal. Overcrowding feeders adds to feed loss. Four to five hogs per feeder hole is adequate when a complete ration is fed.

FORMULATING THE RATION

Protein Supplements

Here are two examples of successful protein supplements used in California swine rations.

	UC* 1	UC 2
% Protein	41	46
Soybean meal—44%	45	40
Meat and bone meal—50%	35	30
Alfalfa meal—17%	20	15
Fish meal—60%	—	10
Blood meal—80%	—	5

*** Formulas from the University of California.**

Vitamins

The minimum amounts of the following vitamins should be added per ton of feed to California swine rations: A, 2,000,000 IU; D, 400,000 IU; riboflavin, 2,400 mg; pantothenic acid, 8,000 mg; B_{12}, 12 mg. All other vitamins are considered adequate in California feeds.

If 10 pounds of vitamin premix is used per ton of feed, minimum vitamin amounts per pound of premix should be as follows:

Vitamin	Amount of Vitamins Per Pound of Premix
A	200,000 IU
D	40,000 IU
Riboflavin	240 mg
Pantothenic acid	800 mg
B_{12}	1.2 mg

Mineral Mix

This mineral mix, added to swine rations at the rate of 20 pounds per ton, is more than adequate to take care of major mineral deficiencies:

Salt	50 lbs.*
Dicalcium phosphate	48 lbs.
Zinc sulfate or oxide	2 lbs.

* If trace minerals are needed or desired, a trace mineralized salt can be used; or use a trace mineralized premix or pack.

RATIONS RECOMMENDED FOR MARKET/BREEDING

Table 1 shows examples of rations that meet recommended nutritional standards for all classes of market or breeding hogs.

TABLE 1. RECOMMENDED RATIONS FOR MARKET & BREEDING HOGS

	Ration		
	16% Protein lb./ton	14% Protein lb./ton	13% Protein lb./ton
UC 1 Supplement	400	280	220
Barley (Pacific Coast)	1,570	1,690	1,750
Vitamin premix	10	10	10
Mineral mix	20	20	20
UC 2 Supplement	360	260	200
Barley (Pacific Coast)	1,610	1,710	1,770
Vitamin premix	10	10	10
Mineral mix	20	20	20

The percentage protein levels required in the diets of swine of various weights and state of production are shown in Table 2. The amount of feed rquired daily by the various classes of hogs is also shown in Table 2.

TABLE 2. RECOMMENDED PROTEIN LEVELS AND DAILY FEED INTAKE NEEDED TO FURNISH NUTRIENT REQUIREMENTS

	Required protein in ration	Quantity of feed needed per head per day
	%	lbs.
Breeding Swine		
Bred sows and gilts	14	4.4
Adult boars	14	4.4
Young boars	14	5.5
Lactating gilts	15	11.0
Lactating sows	15	12.0
Growing and Finishing Swine		
40—75 lb. starter	16	3.7
75—125 lb. grower	14	5.5
125—220 lb. finisher	13	7.5

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NO. 26 LS

Automatic Hog Waterer

by M. O'Brien *

Here is an automatic hog waterer that can easily be cleaned. You can construct one by following the plans on the back of this sheet. The float is protected under the end of the tank by bending a piece of the tank down. A suitable float valve may be obtained through local hardware stores.

You can use a discarded water heater of 20-, 30-, or 40-gallon size for the tank. Any tank of the proper size and shape will do the job.

Construct the grate from welded 1/2-inch pipe. The round edges of the pipe shield the rough tank edges. The spacing of the cleats is regulated by the size of animal. The grate either may be welded on permanently or hinged on one side and latched on the other.

Clean drinking water is important. This waterer should be washed out periodically. The union connecting the pipe to the water supply may be taken apart after the supply valve is closed and the waterer tipped over and washed out. A flexible or hose coupling is best in some places where the waterer will be moved frequently.

You can mount the tank on metal legs at least two feet wide; this cradles the waterer. It may also be mounted on narrower legs welded to the tank and fastened to a platform. Remember, the waterer must be cleaned occasionally.

Cutting the tank is accomplished with either a cutting torch or a slitting chisel. Remember, hot galvanized metal gives off poisonous zinc fumes which are dangerous in unventilated areas! Be sure to leave the tab which bends down and guards the float.

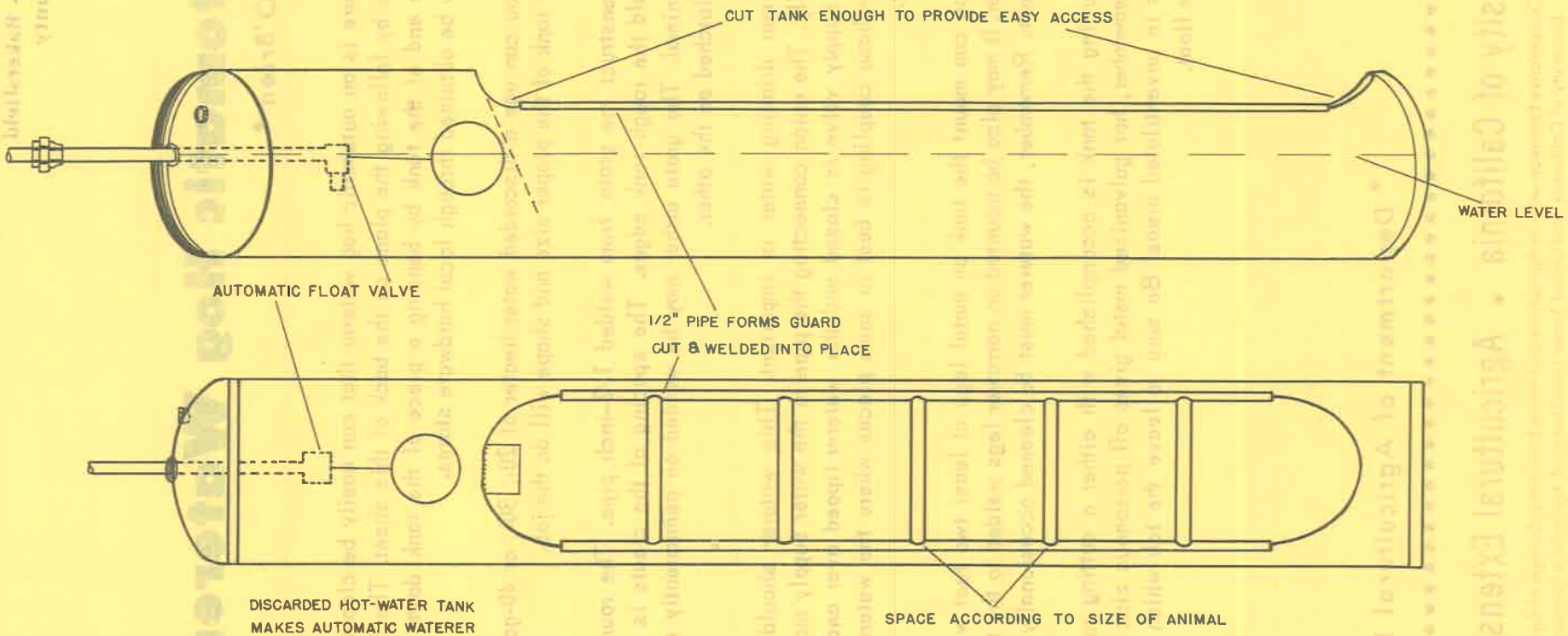
9/56—5000

* Department of Agricultural Engineering

....LABOR SAVERS.....

University of California . Agricultural Extension Service

Co-operative Extension work in Agriculture and Home Economics, College of Agriculture,
University of California, and United States Department of Agriculture co-operating.
Distributed in furtherance of the Acts of Congress of May 8, and June 30, 1914.
George B. Alcorn, Director, California Agricultural Extension Service.



UNIVERSITY OF CALIFORNIA
DIVISION OF AGRICULTURAL ENGINEERING
COLLEGE OF AGRICULTURE
DAVIS, CALIF.

PLAN No. C 26 LS

AUTOMATIC HOG WATERER

APPROVED FOR DIVISION OF:

DRAWN BY WBH TRACED BY WBH CHECKED BY LO DATE 3-18-55

California 4-H Swine Project

Animal science projects are favorites in California 4-H. The swine project offers you fun while you learn about pork production and improve your knowledge and skills.

Your 4-H animal science leader can help you in 14 units.

1. Project Overview
2. Selection
3. Purchasing and Financing
4. Facilities and Equipment
5. Feeding
6. Health
7. Fitting and Showing
8. Marketing
9. Management
10. Extra Activities
11. Group Activities
12. Public Relations
13. Science
14. The California Swine Industry

Discuss with your leader how many units you will cover each year. As you gain experience, you'll want to advance to other units in the project.

You can use the information in this guide for more than 1 year. BE A CONSERVATIONIST. PLEASE SAVE THIS GUIDE.

In the swine project, you can: own an animal; manage but not own animals; or participate by working in related activities, such as swine and the consumer, marketing, public relations, or science.

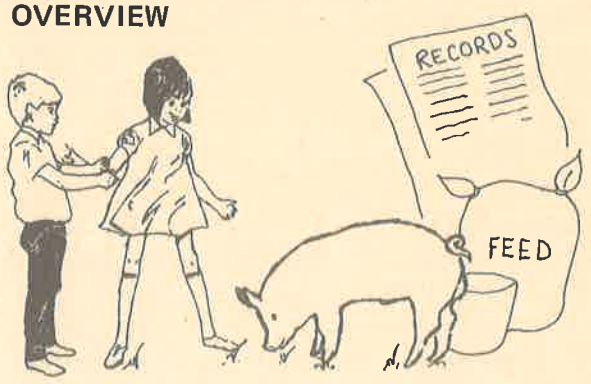
Before beginning any animal science project, both you and your parents need to find out what's expected. If you wish to have a live animal project, you must know what a desirable animal is, what facilities and feed you need for the animal, and the potential costs. The three types of live animal projects are as follows.

Market animal. You select, own, and feed one or more animals to market weight and then sell or use the meat at home.

Breeding animal. You own and raise one or more animals for breeding purposes. If you wish to show any animal, it must be registered in your name.

Jointly owned or nonowned animal. You can take this project no matter where you live—on a farm or in the city. You can jointly own an animal or manage, feed, and keep records on one or more animals—either on your own or with a group, such as on a 4-H farm. You can't show jointly owned or nonowned animals at fairs.

OVERVIEW



The swine project is a part of a **total animal science program.** You don't need to live on a farm to participate in a 4-H swine project. There are lots of things you can do without owning an animal.

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4-H—406
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If you wish to take the market animal or breeding animal project, then you and your parents will want to visit a successful 4-H swine project to learn about the costs, facilities, and time needed for the project.

Each of the units in this guide provides you with information about the project. Your leader will assist you. His interest in and knowledge of swine, combined with teaching aids from the county Cooperative Extension 4-H office, will help you have a pleasant experience—and FUN, too.

SELECTION

☐ OLD TYPE

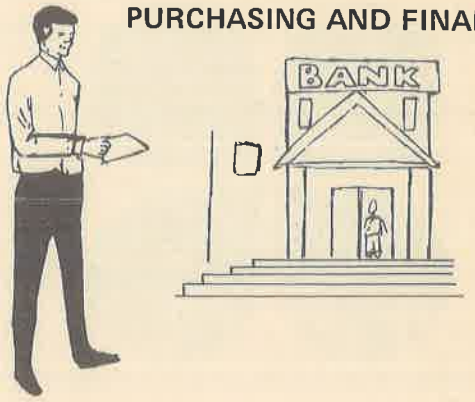
☐ MODERN HOG

Choose the meat-type hog. It is more upstanding; has greater length; is moderately heavy-boned; stands squarely; is trim in the jowl and belly; shows obvious muscling throughout; and is free of wastiness. Select only healthy, thrifty animals of good size for their age.

Market animal. Select a Choice or Fancy animal that's about 8 weeks old and weighs 45 to 50 pounds.

Breeding animal. Buy a high-quality grade gilt (for commercial purposes) or a registered gilt (required for showing). If you buy a bred gilt, buy one that has been bred to a registered boar of the same breed. Ask your leader about show base dates and be sure to register the gilt in your name.

PURCHASING AND FINANCING

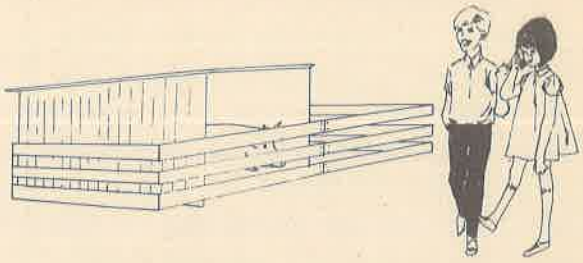


Be sure to figure on enough money to feed and care for the animal you purchase. The feed for a market animal will cost 60% to 70% of your total project cost. There are three basic sources of money—your own, your parents, or that borrowed from a lender.

If you plan to borrow money from a lender, arrange the loan before buying an animal. A lender will want to know the kind of project you have, how long you'll have it, the amount of money you need, and any assets you have (bank account, other livestock, etc.). Be businesslike. Call the lender for an appointment. Arrive neatly dressed and on time. Know your facts and figures. Ask questions if you don't understand any of the terms used in the discussion.

Sources of feeder animals are your parent's herd, purebred or commercial swine ranches, feeder pig sales, or auctions. Purchase registered breeding gilts from purebred breeders.

FACILITIES AND EQUIPMENT



Animals need living space. Provide about 200 square feet of pen area for the first animal on dry lot; 10 to 20 square feet more for each

additional animal. It's very important to use a well-constructed pen. A board fence is fine if the bottom board is right down on the ground. A hog wire fence is cooler for the animals, but be sure there is a strand of good, tight, barbed wire at ground level.

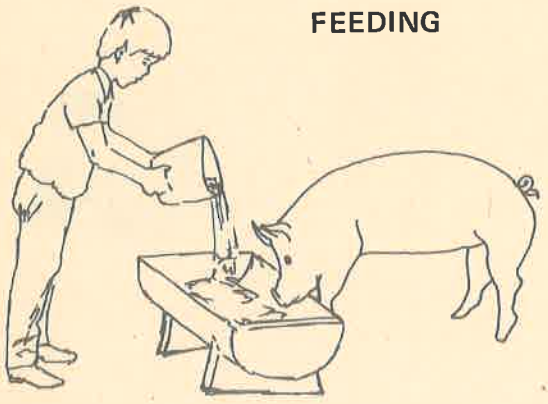
Shelter. A simple 8- by 8-foot, three-sided lean-to is adequate for one to five animals. Allow more space if you have more than five animals.

Water. Pigs need fresh water in front of them at all times, especially during the summer months. Pigs drink often and water helps them keep cool. You can use an automatic watering device or a large, heavy trough that the pigs can't tip over to provide water.

Feeding. Use a heavy trough that can't be tipped over. A V-shaped trough constructed of 2- by 8-inch lumber makes a satisfactory feed trough. Plan for drainage and be prepared to deal with odors, flies, noise, and other environmental factors.

Fitting and showing. You need a show cane, a scrub brush, a bar of soap, and a mineral oil-alcohol mix for dark-colored pigs or talcum powder for white hogs. You also need clippers, either owned or borrowed.

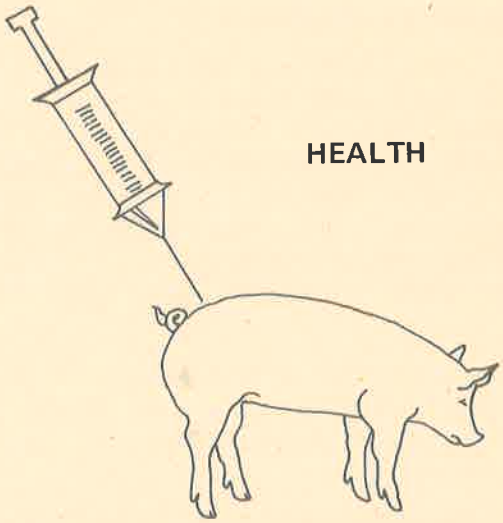
FEEDING



Before you buy an animal, discuss with your leader the kind of ration the animal needs. Plan to buy an economical yet balanced commercial feed or mix your own. Learn the kinds of feeds. Identify them and know their importance in the ration.

Pigs are easy to feed. They don't go "off" feed like cattle and sheep. When you purchase a newly-weaned pig, it's good to start it on a mix similar to what it was fed before. For example, if the pig was raised on a mix based on ground barley, use ground barley in your mix. If you plan to change feeds, do it gradually over a 2- to 3-day period.

Feed your pig twice a day. Give it all the food it can clean up, but don't waste feed by overfeeding. If you have three to four pigs or more, a self-feeder is an excellent way to feed them. It takes about 4 pounds of feed to put 1 pound of gain on a growing market hog.



HEALTH

Provide your animal with clean pens and equipment, fresh water, and a correctly fed, balanced ration. Also control external and internal parasites and protect against disease. Always be alert.

If an animal appears sick, work with your leader to check its temperature (normal rectal temperature is 102.5° F.). Observe the stool (solid, liquid, or bloody?). If your animal is sick, check with your veterinarian, leader, or parents for recommended treatment. When using chemical controls, **be sure to carefully read and follow the application instructions on the container label.**

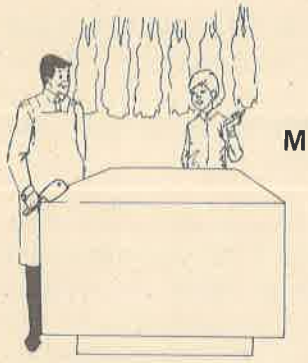
FITTING AND SHOWING

Pigs have a different temperament than dogs, sheep, or cattle do. They are quite intelligent, but can be very stubborn. This stubbornness is the main trait you have to understand to be a successful swine showman.

Make friends with your pig. Let your pig out of the pen to work with it. Do this just before feeding time so you can use the feed bucket to easily get the pig back in the pen. The pig will quickly learn to stay near you when turned loose. Learn to use a show cane when working with your pig. Ask your leader or junior leader to demonstrate how to show a pig.

Wash your pig two or three times about 10 to 14 days before the show date. Thoroughly wash the pig each time. Use soap, water, and a scrub brush.

Ask your junior leader or leader to show you how to clip the hair on the pig's ears and tail.



MARKETING

As a swine project member and as a consumer, you'll want to learn about carcass evaluation, dressing percentage, cutability, and the prices of wholesale and retail cuts of meat.

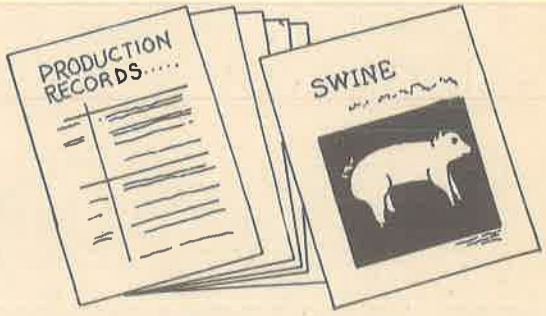
The ideal hog carcass has a high yield of high-quality muscle (lean meat) and a minimum of waste. Carcass evaluation is determined by: **conformation**—high proportion of carcass in the ham, bacon, loin, and shoulder; **finish**—external fat covering; and **quality**—color, texture, and firmness of lean.

There are four grades for market hogs: U.S. No. 1; U.S. No. 2; U.S. No. 3; and U.S. No. 4. U.S. No. 1 is the highest grade. The grade depends on the weight of the carcass in relation to the amount of back fat and the length of the carcass.

If you own, show, and sell a hog at a junior livestock sale, remember that the animal must grade U.S. No. 1 or in the top portion of that grade. Marketing success depends on the grade of the animal at purchase, your feeding program, carcass grade, availability of buyers, and the demand for pork.

Always write a thank you note to the buyer of your show animal; it pays big dividends.

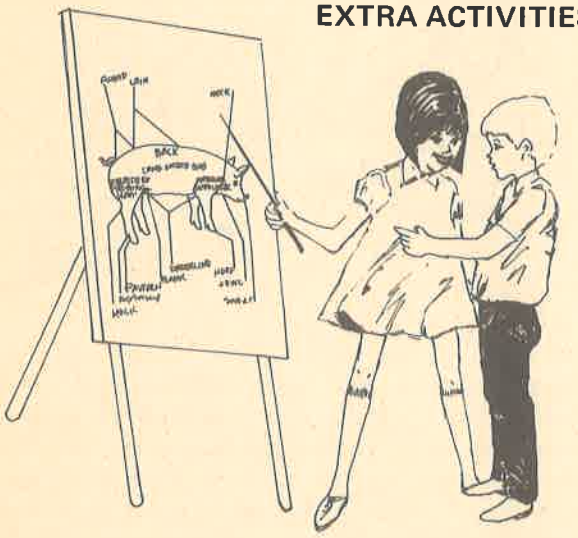
MANAGEMENT



Management includes planning your project, selecting your animal, providing correct facilities and equipment, feeding, maintaining animal health, learning to keep records, and, if applicable, breeding. You'll learn that some management tasks are done at designated times of the year. (For example, make provisions for keeping your pig cool during summer heat.)

Work with your leader to set up a month-by-month swine management calendar. This calendar can help you keep more accurate records and improve your knowledge of the swine industry.

EXTRA ACTIVITIES



You'll want to participate in the swine project's extra activities. These include demonstrations, livestock conservation, and livestock judging.

A **demonstration** is a planned presentation that teaches something by illustration or example. It may include: an introduction (why the topic was chosen and why it is important); the body (how the job is done); and a summary (what was accomplished, its meaning to the demonstrator and the audience). Plan and give at least one demonstration each year—either by yourself or with other members. Your junior leader or leader can help you with ideas for titles, subject matter, and presentation techniques.

Livestock conservation includes learning about animal protection and safety. Give conservation demonstrations; plan and participate in safety tours and checks; do a research paper on a topic of special interest; or design your own conservation activity.

Livestock judging is the process of analyzing animals and measuring them against a standard commonly accepted as the ideal animal. Learn the parts of the market hog shown in figure 1.

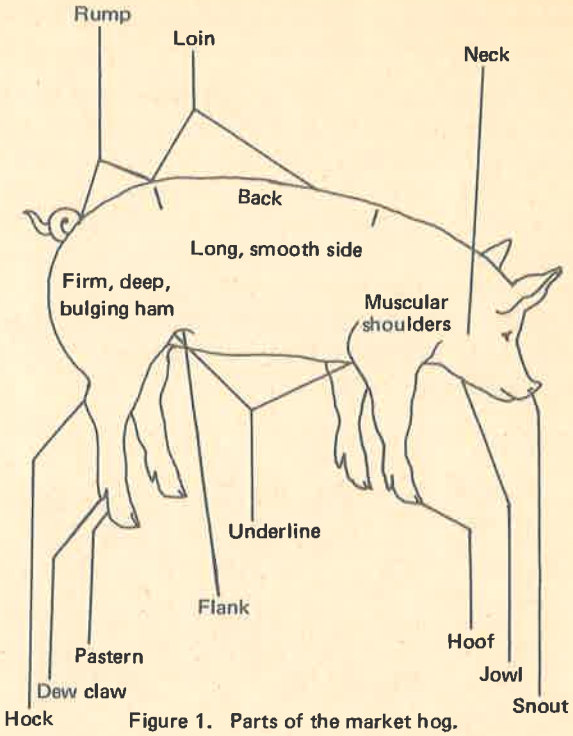


Figure 1. Parts of the market hog.

Learn to compare animals by developing an evaluation system. View each animal from the side, rear, front, top, and while walking; use the same order each time you view an animal. Take notes on why you like each animal and use these notes to practice giving oral reasons.

When giving oral reasons, stand 6 to 8 feet away from the judge, look him in the eye, and speak in a conversational tone without using notes. Keep oral reasons to about 2 minutes in length; use and emphasize comparative terms (more-muscled, deeper-hammed, trimmer, etc.).

GROUP ACTIVITIES

Working together to "Make the Best Better" can easily describe group activities. These activities are suitable for all phases of the

swine project and help you gain a broader knowledge of agriculture.

Discuss and plan with other members what you want to do or learn; study the activity; list and secure resources to enhance the study or event; find possible solutions to the problem (or event); complete the activity; and evaluate it. In a total animal science program, group activities have no boundaries. (For example, those enrolled in foods and nutrition can explore the uses of pork, barbecuing, or whatever else is of interest.)

PUBLIC RELATIONS

Public relations is an everyday job with many opportunities to work, learn, and serve. Three needs are to: 1) foster good relations with livestock producers, industries, and organizations; 2) improve public knowledge and appreciation of the animal sciences; and 3) help others understand the need for raising animals for food, fiber, and recreation—balanced with a concern for the environment.

You can become a junior member in a breed association; prepare exhibits on livestock for showing at schools, fairs, or shopping centers; or host a non-4-H member on a visit to a fair, farm, or your home to promote better understanding of the livestock industry. You can work with many different people, including urban youth, civic leaders, health and safety groups, businessmen, and others. Improving public relations starts with you.

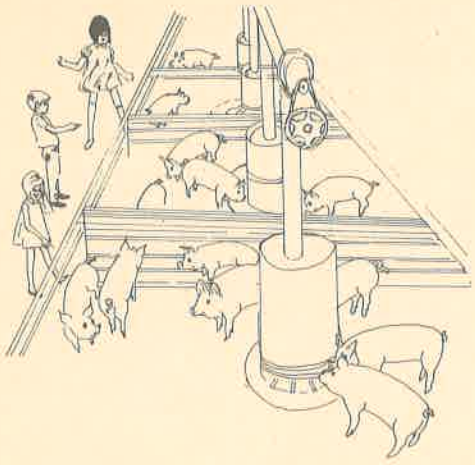
SCIENCE

In the science unit, you need to learn about nutrition and genetics. **Animal nutrition** is the study of the feeding process and how the animal uses feed. Swine have a simple digestive tract similar to that of humans, cats, and dogs. (In contrast, ruminants—cattle, sheep, deer, goats—have a complex digestive tract.) Therefore, you must feed your pig a complete ration that includes specific vitamins and proteins because the pig can't synthesize (build) them in its digestive tract.

Genetics is the study of how animal characteristics are passed from parents to offspring. As you progress in the swine project, you'll learn more about genetics and its use in improving your herd.

To learn more about science in your swine project: learn to identify feeds and know how they are used by the animal; and learn how feeding, breeding, and management of swine relate to the basic sciences of nutrition, genetics, physiology, and animal medicine.

THE CALIFORNIA SWINE INDUSTRY



California produces less than one-half of 1% of the nation's pork. But Californians consume nearly 10% of the pork produced in the United States. Most of the pork used in California is shipped in from the Midwest as dressed pork or cured hams and bacon.

As a swine project member, you'll want to learn more about the industry. Visit a commercial swine operation. Tour a hog marketing facility and a packing plant. Learn the different breeds of swine and the major characteristics of each breed.

GLOSSARY OF SWINE TERMS

Barrow – Male animal that has been castrated before sexual maturity.

Boar – Male hog of any age that is uncastrated.

Breed – Animals of like color, type, and other characteristics similar to those of parents or past generations. Some breeds of swine are Hampshire, Duroc, Chester White, Poland China, Yorkshire.

Castrate – To remove the testes of male animals.

Dam – A female parent.

Feeder – A weaned animal that is ready for feeding or that is being fed for market.

Finish – Degree of fatness and readiness for market.

Fitting – The process of fattening, training, and grooming an animal for show or sale.

Gilt – Female animal that has not borne offspring.

Grade animal – An animal that has one or both parents not registered with a breed association.

Parturition – Act of birth.

Pedigree – A table that gives a line of ancestors for an animal; a genealogical tree.

Purebred animal – An animal of a recognized breed kept pure for many generations. A purebred animal may or may not be registered, but all registered animals are purebred.

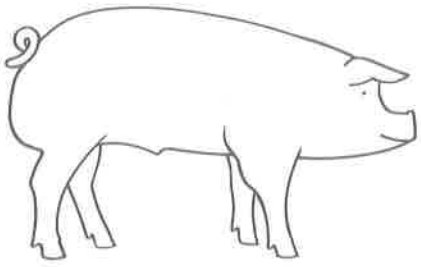
Ration – The total feed given any animal during a 24-hour period.

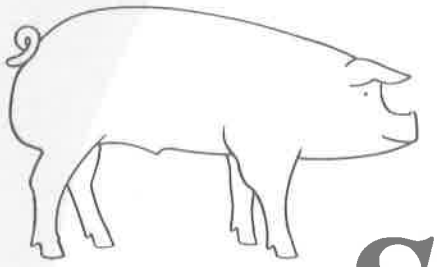
Registered animal – Purebred animal that has a registration certificate and number issued by the breed association. The animal's name is recorded together with the names of the sire (father) and the dam (mother).

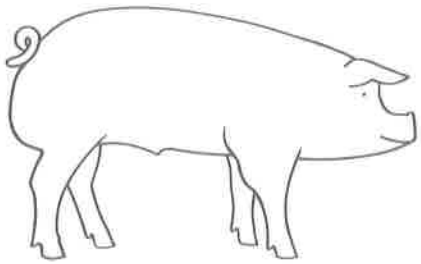
Shoat – A young hog of either sex under 1 year of age.

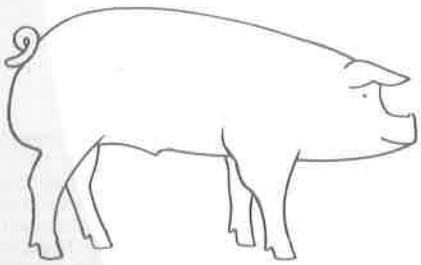
Prepared by W. B. Hight and W. R. Hambleton, Farm Advisors, Madera County,
in conjunction with the 4-H Animal Science Materials Committee.

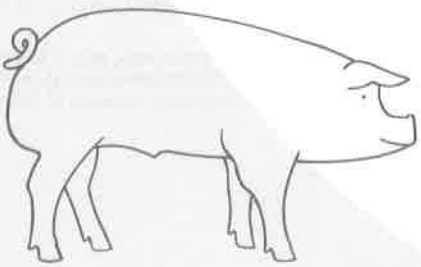
Fitting and Showing Swine











Cooperative Extension **University of California**
Division of Agriculture and Natural Resources
4-H–2064

The authors are: James L. Farley, Farm Advisor, Merced County, and Robert F. Miller, Farm Advisor, Tulare County.

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Kenneth R. Farrell, Director of Cooperative Extension, University of California.

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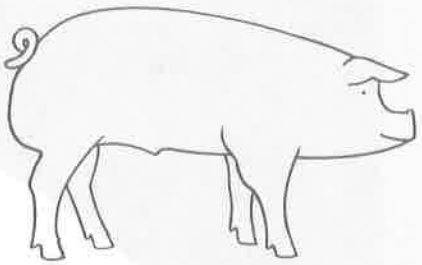
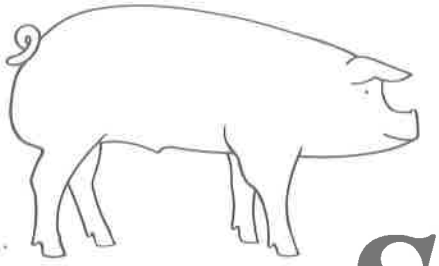
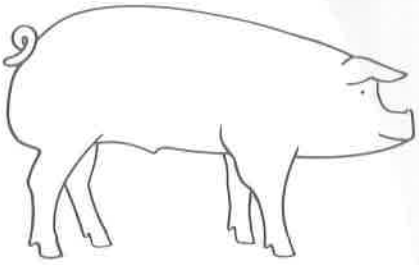
Fitting and Showing Swine







The main point to remember about fitting and training swine for a show is to make the pig look good to the judge. The expert exhibitor must be able to move the animal around the show ring smoothly for the judge to see. This leaflet can help you learn how to become an expert.

Training your pig

In order to show your pig, you must train it to be driven and shown. Start this training when the pig is weaned or when it is put on feed. First, gentle it by scratching or brushing its body at each feeding, but don't play with it. A pet pig becomes contrary and may be difficult to show.

Since you don't use a show halter in the ring, you must learn to direct your pig with a light cane or crop. The animal will run at first, and you may get annoyed, but keep working it until it learns to stop or turn as you apply the cane to various parts of the body.

For example, tap the pig on the side of the head to turn right or left, and on the nose to stop. To go forward, slap the side of its body with your cane or hand. Don't hit your pig on the head nor on the body behind the hip bone.

To have an animal that moves smoothly in the ring and responds to your commands requires work and practice. So drive your pig often, without overworking it. In fact, the exercise will keep its legs and feet healthy. Use a good size pen for training, and ask your family or friends to act as judges so you can learn how to present your animal to them. Watch also to see what positions make your pig look best.

Fitting your pig

Fitting means improving the appearance of your pig for the show ring. Since no amount of fitting and showing will make a poorly fed or cared-for pig win a blue ribbon, start the job from the inside out! This means feed the pig correctly, control internal and external parasites, and keep it healthy.

Train the pig's hair to lie down properly by frequent brushing. Wash your pig at least once a month. Scrub it with a stiff brush and livestock soap.

Try to weigh your pig often to be sure it is gaining properly and will meet show weight requirements.

If hoofs are long, trim them evenly, but don't wait until show time. The time for trimming hoofs is 3 to 4 weeks before the show. This will allow tender feet to heal. Market pigs seldom need their hoofs trimmed.

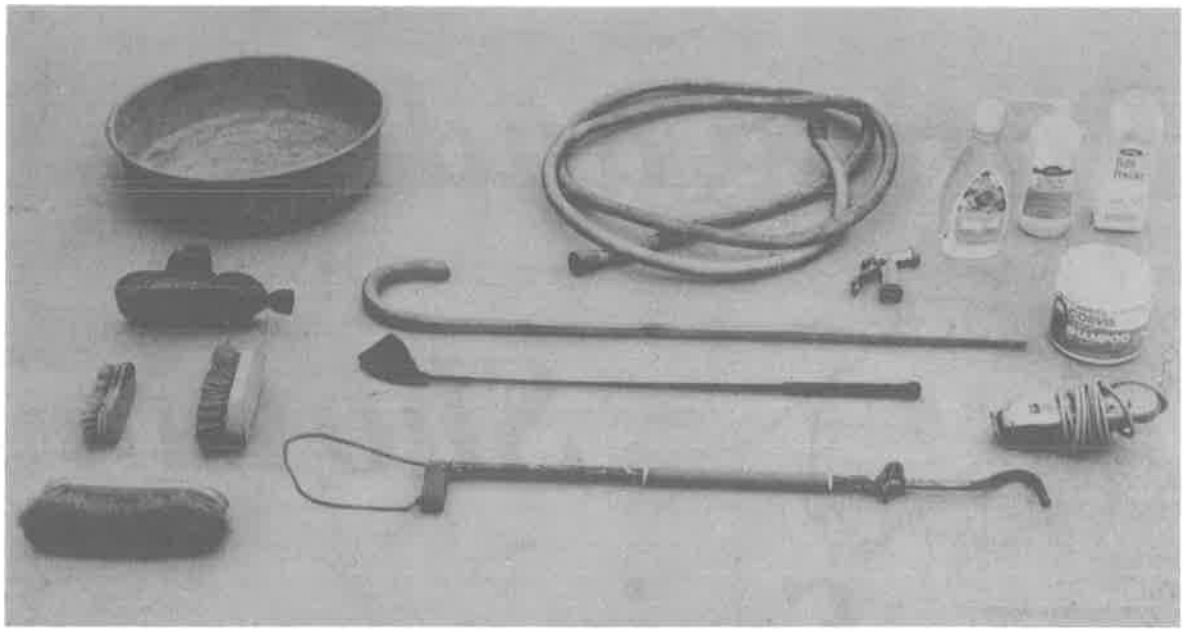


Fig. 1. Show equipment—feed pan, hose, nozzle, oil, alcohol, talcum powder, wash brush.

Preparing for the show

Be sure to check with show or fair officials in ample time to obtain and complete entry forms and obtain the necessary signatures.

Make advance arrangements for transporting your pigs to the show. If you need an animal health certificate, get it early; check the premium book for information. Registration certificates will be needed if animals are entered in purebred breeding classes. Be sure your registration certificates are in order and are taken to the show.

Several days before the show opens, obtain all the feed, supplies, and equipment you will need during the event. Use a tack or show box to store and carry grooming equipment and supplies. A show box measuring about 12 by 15 by 36 inches is a good size; don't build it too big. Put a lock on your box. A combination lock eliminates problems with lost or misplaced keys.

You will need these supplies:

Feed—the same ration you use at home; do not change feeds. Allow about 6 pounds of feed per day for a 200-pound pig.
Bedding—bright, clean straw or clean shavings.
Feed pan—rubber or plastic feed pans are the best to use at shows. They do not cause injuries and keep the pen neat and clean. Take feed pans out of the pen after your pig has eaten.
Water bucket—for carrying water and mixing feed.
Show cane or crop—to move your pig around the show ring.
Cleaning aids—livestock soap, brushes, light oil, wool cloth; powder and bluing for white pigs.
Small clippers—useful for clipping tails and ears.
Old clothes and boots—to wear while washing your pig.
Hose—for watering pigs and for washing.
Snare—to control pig when clipping ears and tail.

Grooming for the show

Just before leaving home or soon after arriving at the show, if desired, clip the hair on the pig's tail and ears. Wash pigs to be sure they are clean before clipping.

Fig. 2. Hold the ear and carefully clip the hair on top of the ear; trim long hair from under and around the edge of the ear.

Tail—Closely clip hair on the tail. Start from where the curled tail touches the body and clip to where the tail attaches to the body. Do not clip the tail on a pig that has been docked.

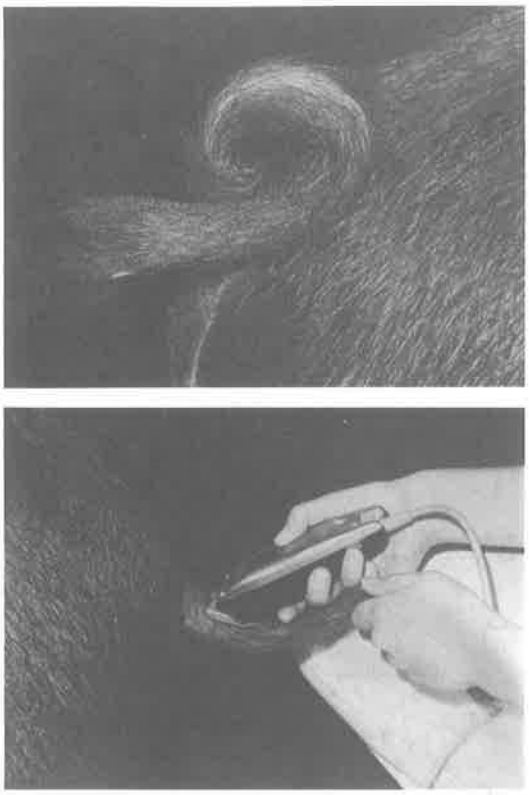


Fig. 3. Use curled tail as a guide for clipping. Start clipping from where the tail touches the body; clip the tail to the point where the tail attaches to the body.

Ears—Clipping the ear itself is not necessary, but ear hair should be trimmed. To do this, clip the long hair from under and around the edge of the ears, then closely clip the hair on the top of the ear.
Rough hair—Trimming the rough or long hair from the body of pigs will improve their appearance.

Taking pig to show

Before loading your pig, organize your loading procedure—PLAN AHEAD!

Check loading chute for loose nails and wide-space foot boards that could cause injuries.

Have the truck or trailer well bedded to keep animals from slipping and a place to lie down.

Take care loading your pig. It's easy to break a leg or cripple it. If a pig will not load, don't fight it.

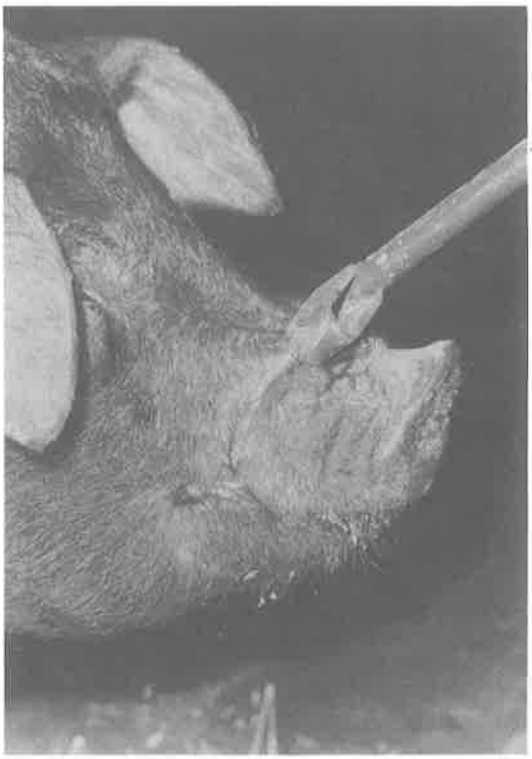


Fig. 4. If necessary, use a snare to control your pig while clipping the tail and ears.

Put a bucket over its head and back it into the truck or trailer.

Protect pigs from the weather on the way to show. Use a covered truck or trailer to keep pigs out of drafts and cold winter rains. If the weather is hot, haul during the cool of the day. Be sure there is protection from the sun, and that your pigs have adequate ventilation.

At the show

Find your assigned pen by using charts that usually are posted at the livestock office or at the barns. Put bedding, straw, or shavings in the pen, but don't use too much.

Unload and drive your pig to its pen carefully. Hurrying can excite and upset your pig. In hot weather you can easily overheat your pig, so don't spoil your hours of training by careless handling. When the pig is in the pen, let it rest. Then, afterwards, provide some exercise so it won't get stiff and sore from the ride.

If your pig is entered in a market class, check the schedule listed in the premium book or posted at the livestock office to find out when it must be weighed.

Keep the pen and surrounding area clean. Clean early each morning. Stay close to the assigned area in case the show management needs information. Exhibitors have clear obligations to their organizations and to show sponsors. Read catalogs carefully and abide by all rules and regulations.

Keep your pig cool and well-watered during hot spells. If it becomes too hot, cool down your pig with a mist sprayer every half-hour or so. Be sure to change the bedding before night so your pig won't have to sleep on wet bedding.

Your pig usually will need several washings at the show. Do this job when the wash rack is not crowded. Panel your pig in a small corner for easier washing and less fighting. Return the pig to its clean pen and brush it dry.

Feeding at the show

Avoid feeding your pig right after you arrive. When you do start, feed about one-half to three-quarters its normal ration. Pigs need less feed when confined to small pens. Do not leave feed and feed pans in the pen. When your pig has finished eating, remove feed pans and clean them.

Let pigs out of their pens for exercise at least once a day. You may find that pigs are easier to control if they are exercised after they have been fed.

Before show day, watch your pig eat. Decide when he looks best. Too much feed before show time can give it a heavy, waisty middle. Too little feed may make it look gaunt.

Show day

Check the show catalog or show schedule for the time your animal is to be shown. If the show is moving slowly, do not feed or put final touches on fitting too early.

Fig. 5. Use a wool cloth to lightly oil black or red pigs.

You will want to wash your pig the day before the show. On show day, use a wool cloth to apply a light, even coat of light oil (equal amounts of mineral oil and alcohol) to black and red pigs. If the weather is very hot, use cool clean water or alcohol, instead of oil. Sprinkle on lightly, then brush off.

White pigs may be lightly powdered with unscented talcum powder before entering the ring. White areas in other breeds may also be powdered.

A pig's hair looks natural when you brush back and then down over the sides. Do not brush straight back or part the hair in the middle. Be sure to brush all straw and shavings from the animal just before entering ring.

Fig. 6. Brush the hair back and downward in the natural way the hair lies.

When your class is called, slowly drive your pig to the show ring. Do not rush it. In addition to a cane or crop for driving, carry a small brush in your pocket to smooth the pig's hair if it is disturbed while showing.

In the ring

The main point is to make the pig look good to the judge. Be alert and courteous. Move naturally and smoothly, not bent over. "Over showing" is discouraged, it detracts from the pig. Keep control over your animal so you can put your pig where you want it. To do this, stay fairly close, 2 or 3 feet from the rear flank, so you can direct the animal easily and quickly.

In using a cane or crop, do whatever will control the animal best. When using a cane, carry and use it with the hook end pointing up. Move the animal by approaching from the side of the head that is away from the judge and tap the pig under the ribs

Fig. 7. Hold the straight end of the cane and use it with the hook end pointing up.

or on the belly. The animal should respond to light taps or even the mere sight of your cane or crop. If this doesn't work, guide the animal by lightly placing the cane next to its cheek. This usually is successful. If the animal absolutely refuses to move, slap it on the back. You are allowed to touch the animal by hand to get control, but do not keep hand contact for long periods, or the pig will set a steep rump and a straight drooping tail.

If the show ring is large and uncrowded, consider using a crop instead of a cane. If your pig is a fighter, carry a small, light panel instead of a cane or crop, but never carry both a panel and a cane or crop. One hand should always be left free.

When moving the animal in a large ring, keep an open area, approximately 20 feet between it and the judge to provide a better place to show it off. In a smaller, more crowded ring, you will have to show your animal within several feet of the judge. In this case, keep it out of the group so it can be seen, and keep it between yourself and the judge. Also, keep the animal out of the corners of the ring, even if you have to step in front of it to do so. When turning your pig, turn it so the head, not the tailend, is towards you. This will help maintain control.

Show your animal at a slow walk; pigs look best while on the move. If it suddenly runs off, do not run after it. Remain calm, continue to follow the animal, and retain control.

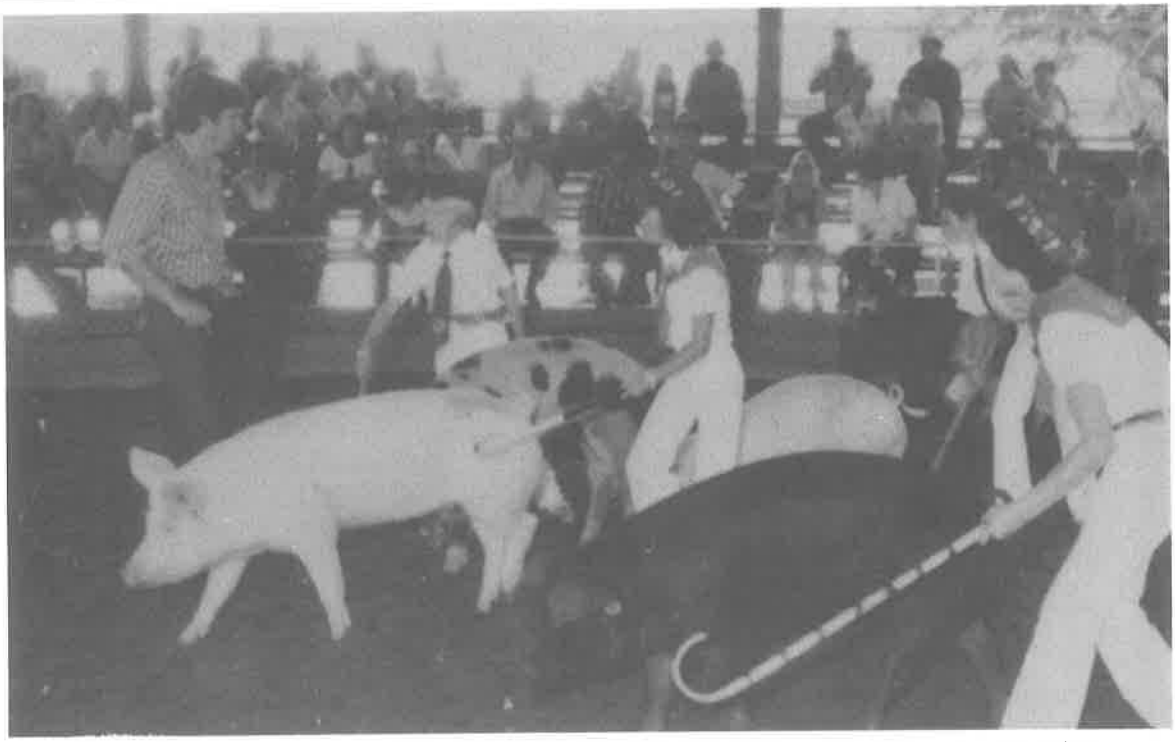


Fig. 8. Show your pig in the open area of the ring; keep it between you and the judge. Stay alert.

If the judge indicates that he would like to inspect your pig at a standing position, bring the animal to an immediate halt by stepping in front of it, rather than hooking it. Placing the cane in front of the animal at the same time will help.

Fig. 9. Place the cane in front of your pig to help stop it when the judge wants to take a close look at it.

Allow the animal to stand briefly, providing it remains alert and does not assume an awkward position. Never attempt to place the animal's feet by handling them. Also, avoid trying to improve the arch of the animal's back by pushing its nose down or its rump forward. Such tactics actually make the animal look worse.

When walking your animal in the ring, do not force it to make abrupt turns, and do not permit it to walk into a spot where it must back out.

If directed to put your pig into a pen, move it close to the pen, open the gate, and then follow the pig into the pen and close the gate. Other pigs may scare your pig away from the open gate. In this case, close the gate, bring your pig back to it, reopen the gate, and try again. You are allowed to nudge your pig or grasp its tail to push, if the animal is being difficult. Close the gate anytime you are entering or leaving the pen. Although not showing, stay alert while you are in the pen to be ready to show the pig again when the judge indicates.

If your pig fights with another, do not hit either animal. If possible, use the hook of the cane to grasp the pig's jaw and pull it away. Panels are best to separate fighting animals. If your animal is constantly fighting, it may be excused from the ring or placed in a small pen.

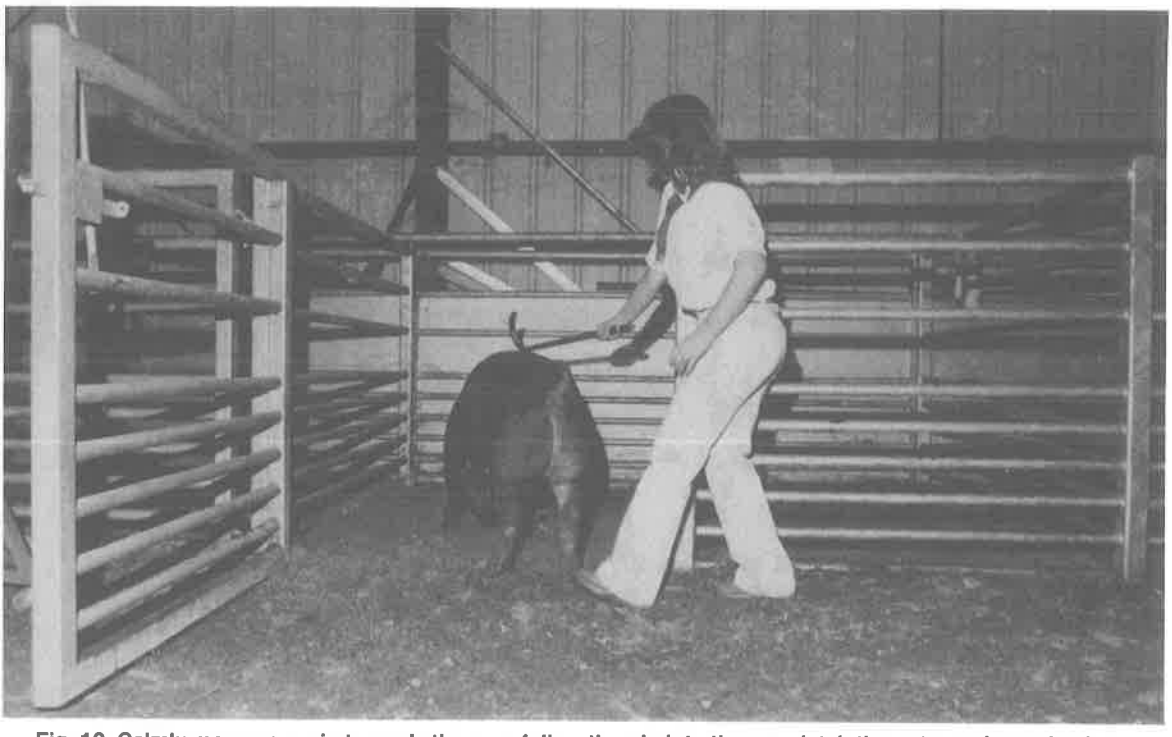
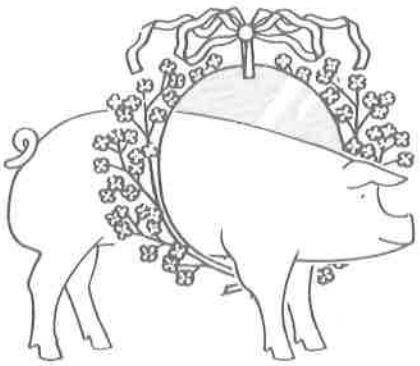


Fig. 10. Calmly move your pig towards the pen, follow the pig into the pen, latch the gate, and remain alert.



Personal appearance and conduct

Your own appearance and behavior in the show ring does not go unnoticed. Here are some guidelines to help you put your best foot forward as well as your pig's:

- Be courteous at all times, particularly to the judge and to competing exhibitors.
- Keep alert and follow exactly any instructions given by the judge, the clerk, or the ringmaster.
- Give your animal and the judge your undivided attention while you are in the ring.
- Be prepared to give prompt answers to any questions about your animal.
- Be proud of your animal, but don't overdo it. The judge knows both good animals and good exhibitors.
- Don't point to any part of your animal to draw attention to a strong feature. Showing your animal properly makes it convenient for the judge to see your animal's strong points.
- Don't ever lose your temper with your animal if it becomes unruly. Stay calm and work with it to move the best it can.
- Never make comments about competitor's animals.
- If you do not place high, don't be discouraged. The more often you show, the better you will become.
- Always be a good sport. If you're a runner-up, offer your congratulations to the winners. Everyone likes a good winner and a good loser. Win without bragging and lose without complaining.
- Dress suitably; be neat and clean.

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IMPORTANT! COUNTY _____

Here are my suggestions for improving this 4-H publication, **4-H-2064, Fitting and Showing Swine**

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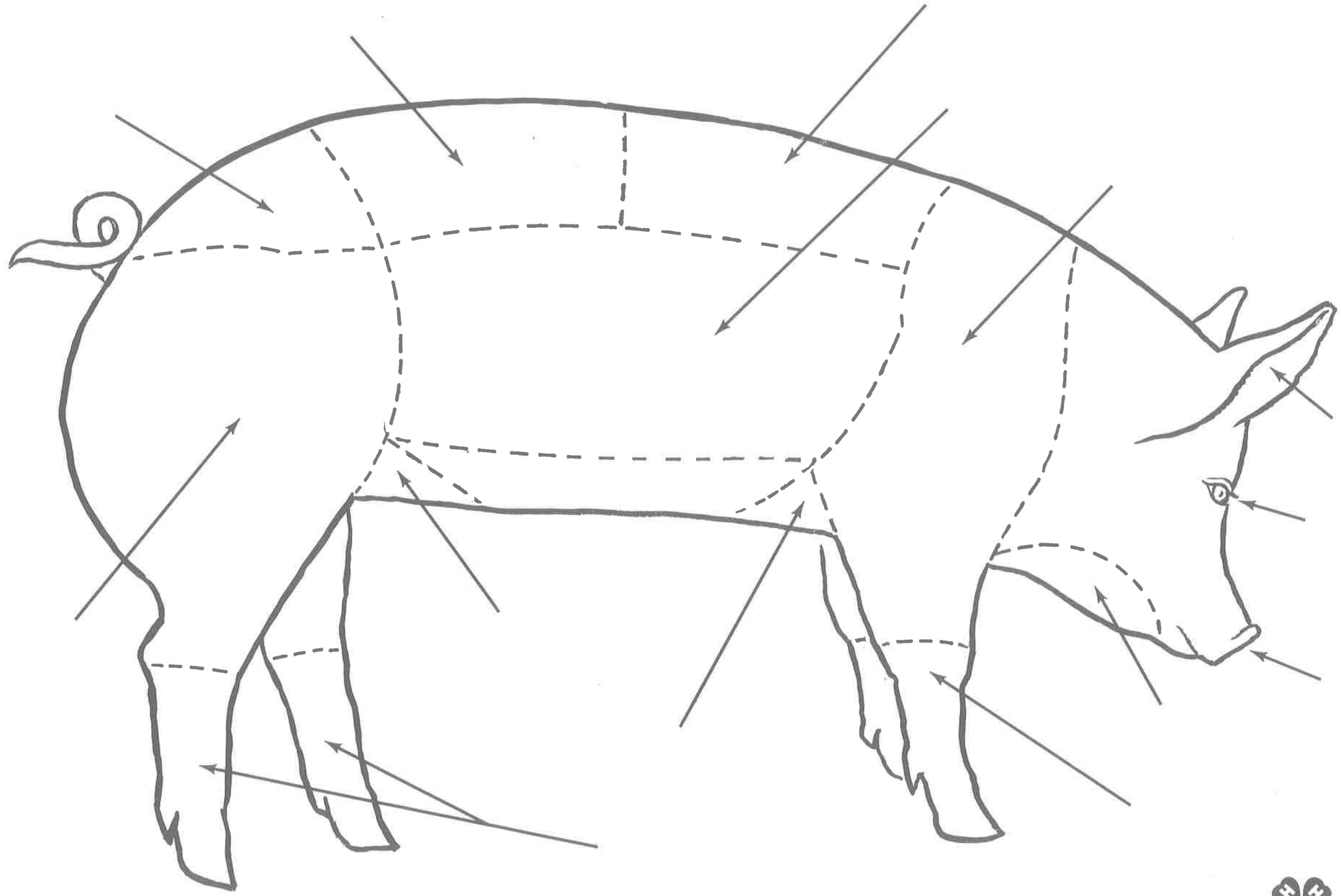

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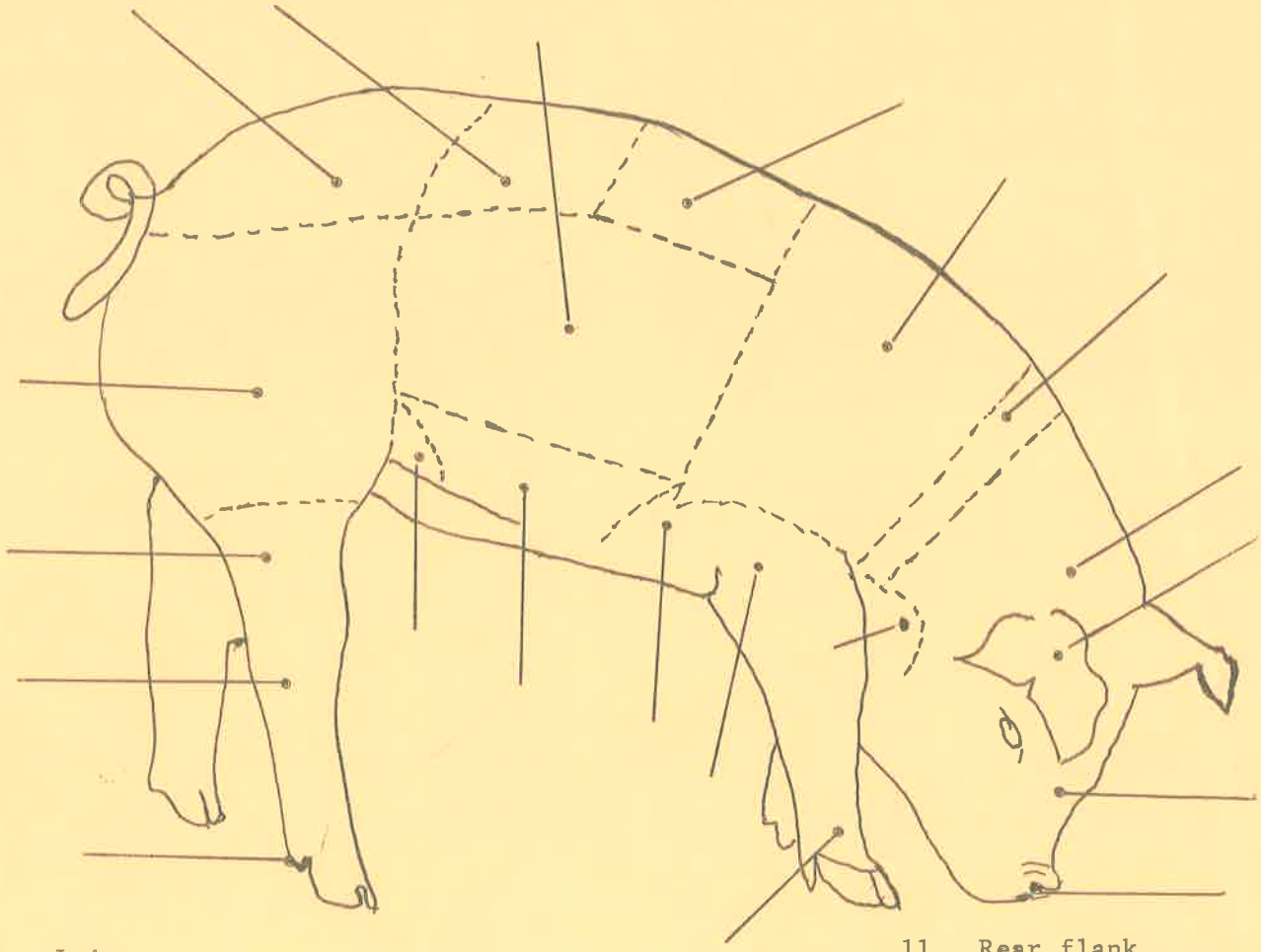
POINTS OF A SWINE



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12. Fore flank
13. Shoulder
14. Dew claw
15. Poll
16. Face
17. Belly
18. Jowl
19. Snout
20. Side

Ronald S. Knight
Farm Advisor
Tulare County

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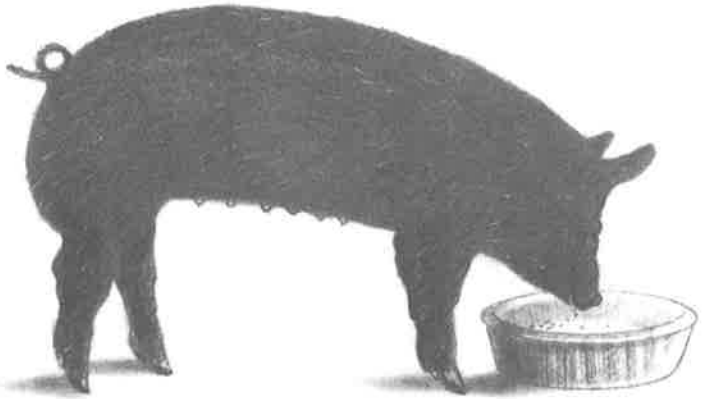
A PRACTICAL GUIDE TO
SWINE NUTRITION



AGRICULTURAL EXTENSION UNIVERSITY OF CALIFORNIA

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The authors are Robert F. Miller, Farm Advisor, Tulare County; and John R. Dunbar, Extension Livestock Specialist, Davis.

This publication provides practical and economical solutions to most swine feeding situations in California. Because of changes in the availability of feed and changes in feed prices, use it only as a guide.

We have given examples of protein supplements and vitamin and mineral premixes. Ration formulas meet the various feeding situations faced by the producer, and include formulas for growing and fattening feeder and market hogs for the breeding herd.

Co-operative Extension work in Agriculture and Home Economics, College of Agriculture, University of California, and United States Department of Agriculture co-operating. Distributed in furtherance of the Acts of Congress of May 8, and June 30, 1914. George B. Alcorn, Director, California Agricultural Extension Service.

A PRACTICAL GUIDE TO SWINE NUTRITION

THE NUTRIENT NEEDS OF SWINE

Feed costs represent 75 to 80 percent of the total cost of California's pork production. A producer must develop economical rations for swine that are nutritionally adequate and efficient. For this reason, animal's nutritional needs must thoroughly be understood.

Balanced swine nutrition mostly requires overcoming deficiencies of grains that are the basic energy sources. Grains are low in some amino acids that make up protein, particularly needed by the growing pig. Grain also lacks some vitamins and minerals swine need for good nutrition.

Grains and protein supplements fed in the correct ratios can form an adequate feeding program when supplemented with needed vitamins and minerals.

Energy Feeds

Feeds that supply energy (calories) form the basis of swine rations. In California, these energy-supplying feeds can be **barley, milo, yellow corn,** or **wheat,** depending on availability and price.

In any of our example rations, you can use any one of these grains alone or in combination, or any one can be substituted for another.

Grinding is the usual way to prepare grain for hogs, although rolling or crushing are equally effective processing methods.

Other energy feeds can be used in swine rations but, for best results, they should be limited to 5 percent or less of the ration. These are **molasses, dried whey,** and **tallow.**

Oats or **dried beet pulp** can replace a limited portion of the grain shown for sow and gilt rations. In the bred sow and gilt ration, you can replace from 10 to 20 percent of the grain with laxative feeds like beet pulp or bran during the last few days of gestation and several days after farrowing, if constipation is a problem.

Protein

Protein (or its component amino acids) is the most critical nutrient in swine rations. Because swine are simple stomached animals, the quality of this protein—adequate amounts of essential amino acids—is critical for efficient production and fast gains. This is true for all physiological processes—maintenance, growth, reproduction, and lactation. In some rations, dietary protein of grains is of low quality and meets as little as half the requirements only. Adding supplementary protein or amino acids is essential. Protein feeds for balancing swine rations in California are **soybean oil meal, meat scraps, fish meal,** and **alfalfa meal.**

You can also use **cottonseed meal** but it needs fortification with **lysine,** an amino acid also in short supply in the cereal grains. We have shown several suitable protein supplements that can bring grain rations to the needed protein level.

Minerals

Most swine rations usually require some mineral fortification, mainly **calcium, phosphorus, salt,** and **zinc.**

Trace mineralized salt or vitamin-mineral premixes can supply trace minerals—**copper, iron, iodine,** and **manganese.** Baby pigs on concrete need supplemental **iron.** You can best supply this with injectible iron or with a high-iron preparation to be swabbed or sprayed on the sows' udders.

Vitamins

Efficient swine performance requires a number of vitamins. In cereal grains some vitamins are bound and may be largely unavailable to swine. Others are available in insufficient amounts. These facts make vitamin fortification of swine rations essential. Vitamins **A, D, Pantothenic Acid, Riboflavin,** and B_{12} are those usually provided.

Antibiotics, Arsenicals, Other Additives

Antibiotics fed to swine may be beneficial, depending on disease levels and other conditions in the herd.

These are some of the observed effects of antibiotics on growing pigs: some increased rate of gain; some reduction in subclinical disease level resulting in gain improvement; increased feed efficiency; faster early growth; reduction in the number of runts; control of certain scours.

In California, antibiotics are not usually fed to pregnant sows, but using them may increase birth weights, livability, and weaning weights. These benefits are usually achieved

by using them shortly before farrowing, after farrowing, and during the breeding season. Growers should carefully consider the economics of using antibiotics in swine rations.

Some antimicrobial compounds behave somewhat like antibiotics. Use them only to achieve the specific purposes for which they are intended—inhibiting specific organisms in swine and improving the rate of gain and feed utilization efficiency. **Arsenicals, nitrifurans, sulfonamides,** and **copper compounds** are most often used.

Water

Pigs consume 2 to 2.5 pounds of water per pound of dry feed. High temperatures increase consumption to 4 to 5 pounds. Weanling pigs consume the equivalent of up to one fifth of their body weight daily, while finishing pigs consume the equivalent of 10 percent or less of their body weight.

Lactating sows, to milk adequately, need unlimited access to water. Young pigs do not consume adequate amounts of creep diets unless water is available.

PROBLEMS IN SWINE NUTRITION

Breeding Gilts and Sows

Overfeeding is the most frequent error in breeding gilts and sows. For best results, follow recommended feeding levels closely. Do not self-feed pregnant sows and gilts unless ration contains enough fiber to limit energy intake.

Growing and Fattening Pigs

Feed wastage can be expensive. Ten pounds of feed wasted each day equals $100 or more a year; this amount of waste can increase the cost of raising 200 hogs by about 25 cents per hundredweight.

It takes good management, constant attention, and proper adjustment of the right kind of feeders—feeders that are not worn out—to keep wastage minimal. Overcrowding feeders adds to feed loss. Four to five hogs per feeder hole is adequate when a complete ration is fed.

FORMULATING THE RATION

Protein Supplements

Here are two examples of successful protein supplements used in California swine rations.

	UC* 1	UC 2
% Protein	41	45
Soybean Meal—44%	45	40
Meat and Bone Meal—50%	35	30
Alfalfa Meal—17%	20	15
Fish Meal—60%	—	10
Blood Meal—80%	—	5

* Formulas from the University of California.

Vitamins

The minimum amounts of the following vitamins should be added per ton of feed to California swine rations: A, 2,000,000 IU; D, 400,000 IU; Riboflavin, 2,400 mg; Pantothenic acid, 8,000 mg; B_{12}, 12 mg. All other vitamins are considered adequate in California feeds.

If 10 pounds of vitamin premix is used per ton of feed, minimum vitamin amounts per pound of premix should be as follows:

Vitamin	Amount of Vitamins Per Pound of Premix
A	200,000 IU
D	40,000 IU
Riboflavin	240 mg
Pantothenic Acid	800 mg
B_{12}	1.2 mg

Mineral Mix

This mineral mix, added to swine rations at the rate of 20 pounds per ton, is more than adequate to take care of major mineral deficiencies:

Salt	50 lb.*
Dicalcium phosphate	48 lb.
Zinc sulfate or oxide	2 lb.

* If trace minerals are needed or desired, a trace mineralized salt can be used; or use a trace mineralized premix or pack.

Rations for the Different Classes of Swine

Baby pigs, from birth to 40 pounds, should have commercially prepared creep and starter rations. These feed formulations are so complex that it is impractical for most swine growers to prepare them.

See the table on page 8 for examples of rations that meet recommended nutritional standards for all classes of market or breeding hogs.

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National Research Council. "Nutrient Requirements of Swine." Revised 6th Edition. National Academy of Sciences. 1968.

Becker, D. E., A. H. Jensen and B. G. Harmon. Balancing Swine Rations. Circular 866. University of Illinois, College of Agriculture Cooperative Extension Service. 1966.

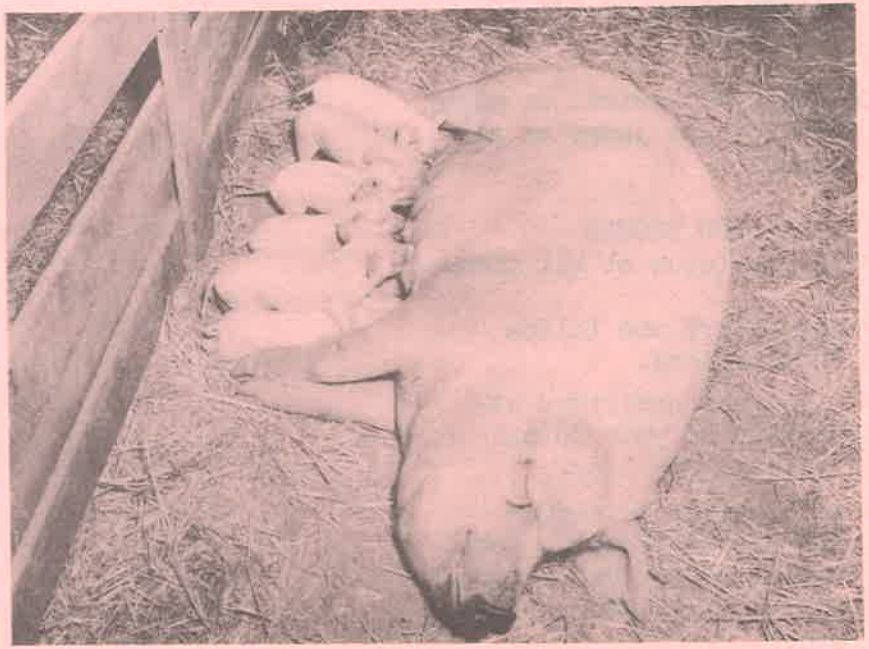
Crampton, E. W. and L. E. Harris. Applied Animal Nutrition, 2nd Edition. W. H. Freeman and Co. 1969.

Hog Class	Quantity Per Head Per Day (pounds)	Bulk Feed Mix						
		UC 1	UC 2	Grain		Vitamin Premix	Mineral	Total
				UC 1	UC 2			
					pounds			
Bred Sows Gilts Adult Boars Young Boars Lactating Gilts Lactating Sows	4.4 4.4 4.4 5.5 11.0 13.0	260	240	1710	1730	10	20	2,000
40–75 lb. (starter) 16% protein	3.75	360	320	1610	1650	10	20	2,000
75–125 lb. (grower) 14% protein	5.5	260	240	1710	1730	10	20	2,000
125–220 lb. (finisher) 12% protein	7.25	160	140	1810	1830	10	20	2,000

Note: A simple protein compromise for the three hog classes listed above, is to use a single 16% protein ration throughout. Such a ration minimizes the changes from stress, increases lean content, and encourages faster growth.

OUR MOTTO

"TO MAKE THE BEST BETTER"



THIS IS THE TYPE OF PROJECT YOU SHOULD BE AIMING FOR AFTER A YEAR OR TWO OF SUCCESSFUL PIG FEEDING

BJ - Swine

RAISING A CHAMPION

AGRICULTURAL EXTENSION SERVICE

2610 "M" Street
BAKERSFIELD, CALIFORNIA

C O N T E N T S

William B. Hight, Farm Advisor

1952

7. Bring your pig to a halt if the judge indicates a desire for you to do so.

8. Make no attempt to place your pigs feet by handling.

9. Don't force him to make abrupt turns or get in places where he has to back out.

10. Keep your animal in clear view of the judge at all times.

YOU SHOULD

* Be courteous at all times
* Keep alert and follow instructions.
* Give your undivided attention to your animal while in the ring.
* Be prepared to answer any questions about your animal as to age, weight, what you fed him, breed, etc.
* NEVER point to any part of your animal while in the ring. The judge will see the good and bad features.
* NEVER comment on a competitors animal.
* Be a modest winner and a gracious loser.

BE A GOOD SPORT!

Using this bulletin, additional information obtained from your Leader and Farm Advisor, plus good luck, you can raise and show a

C H A M P I O N

The
End

Trim the hair from the base of his tail out to the switch being sure you leave the switch.

4. Give him another good scrubbing the day he is to show. After he drys off apply a light application of mineral oil and rubbing alcohol. This may be done simply by shaking up 1 part mineral oil to about 10 parts alcohol then soaking up a rag with this mixture. Rub thoroughly all over the animal following the natural lay of the hair. This operation should be done just prior to ring entry. (The oil treatment is not indicated on the white breeds such as Chester Whites and Yorkshires.) Do an extra good job of scrubbing on them.

SHOWING

Now your pig is ready for the show ring. Are you?

Here are a few important tips regarding showmanship you should know.

1. Use a cane to direct your pig in the ring.

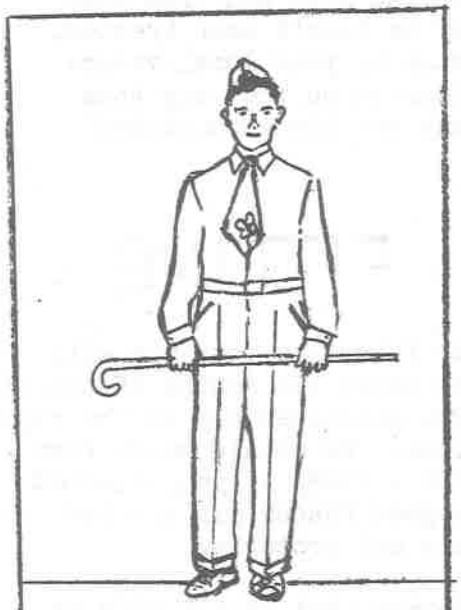
2. Wear your 4-H Club Uniform. Have it spotless.

3. Know when your animal is to be judged and enter the ring promptly.

4. Know that the primary purpose of showing is to assist your animal to make a good impression on the judge.

5. Remember not to crowd the judge with your animal. He can better be seen about 20 feet away from the judge.

6. Show at a slow walk. Allowing him to stand from time to time is permissable providing he does not assume an awkward position.



DRESS FOR THE OCCASION
IN THE SHOW RING

Most of the Kern County Project work is aimed at the County Fair which is held during the last week of September. If you desire to exhibit your project that, however, is not the only show available to you. There is the Jr. Cow Palace Livestock Show held in March or April. The Sacramento State Fair held the 1st week in September and the Great Western Livestock show at Los Angeles in November.

SELECTION

CALENDAR

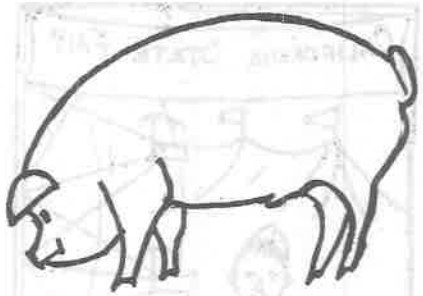
1952			MAY			1952
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

SELECT FOR
KERN COUNTY FAIR

WHEN to select a feeder pig for the above shows and what he should weigh at the time you select him should be about as follows:

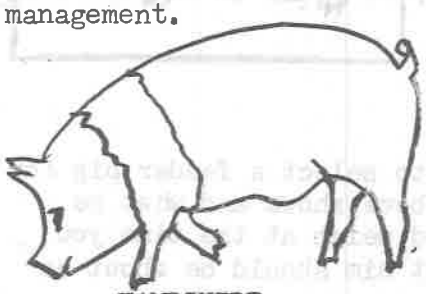
KERN COUNTY FAIR	May 15	30-40#
STATE FAIR	May 1	30-40#
GREAT WESTERN	July 15	30-40#
COW PALACE	Nov. 15	30-40#

For each day that you wait after the given selection date add 1¼ pounds to your selection weight.



DUROC

The Duroc ranges from a light sandy red to a dark cherry red in color. He is still classified as a lard type hog; however, the tendancy of late is to stretch him out and get rid of any excess fat. He is a good feeder and grows fast under proper management.



HAMPSHIRE

The Hampshire is characterized by his black color and white belt over the shoulders. In type he is intermediate between the lard and the bacon hog. He is noted for his ability as a rustler and is, therefore, used quite extensively in the garbage feeding areas of the state.

BREED differences mean little in feeding out a pig. Select a breed you like; one that is available in your county. To be eligible to show, the animal must be from a purebred sire. The four breeds most common to California are:

Poland China
Hampshire
Berkshire
Duroc

Of these breeds the Hampshire and Duroc are available in Kern County. Possibly your leader or Farm Advisor can help you locate any one of these four breeds.

TYPE is very important, particularily if you are selecting a barrow to fatten out for the show. Pick out a pig having plenty of depth; of uniform width from front to rear; a good deep ham; and enough length so he won't feed out to be the short chunky type. Your pig should be growthy, that is of good size compared to other animals in his age group; however, he should not be overly large and coarse. He should be trim, smooth, and free from excess fat around the neck and head.

SANITATION is very important. Keep your pig pen CLEAN! Your pig will grow faster and stand less chance of getting sick. A clean pen is the BEST method of fly control too.

The only disease we will mention here is Hog Cholera. It is the number one pig killer of them all. It's easy to avoid too.

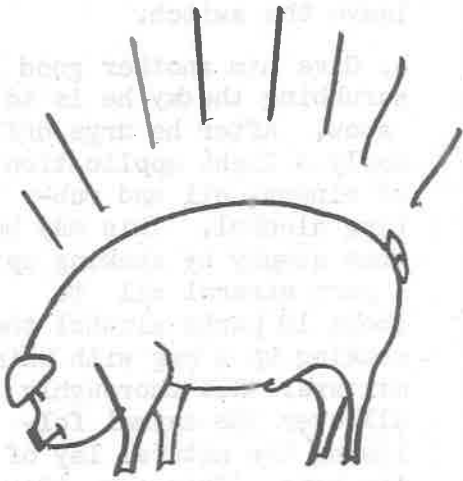
Usually when you purchase your weaner pig from a well managed hog ranch, he will have been treated for hog cholera by the serum-virus method. Ask the man you're buying from and find out. If he hasn't been treated, stop by your local veterinarian on the way home and get him innoculated.

FITTING

By fair time your pig will be about six months of age, if you purchased him at the right time. He should weigh from 200 - 230#, if you selected a good feeder pig and fed him out properly.

Notice that little "if" in that last sentence. Assuming you purchased a good animal, the most important single factor determining

"THE SOAP AND WATER TREATMENT"



how he will show is the way YOU feed him out.

Assuming you've done a good job feeding and caring for him, here are a few tips on how you can dress him up for the show ring.

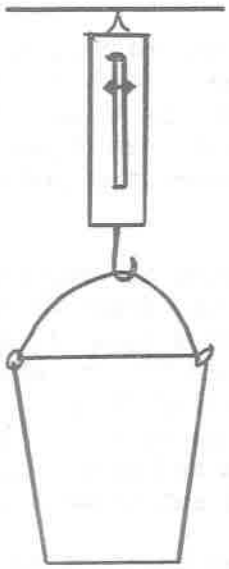
- Scrub him with soap, water, and a good stiff brush 3 or 4 times in the two weeks' period just before the show.
- Trim his hooves, working on the underside, with a file if he needs it. Do this at least 10 days prior to the show.
- Trim the hair from his ears, inside and out, about a week prior to the show.

The Third best and most commonly used method is to feed him all he will eat twice a day.

If you use the first method you will, of course, have to have a self-feeder. Using the last two methods you need only an open trough.

WEIGH OUT your feed. Know how much you're feeding your animal and know how much of the various ingredients you are mixing in your ration.

Purchase a pair of milk of cotton scales and weigh your feed out in a bucket.



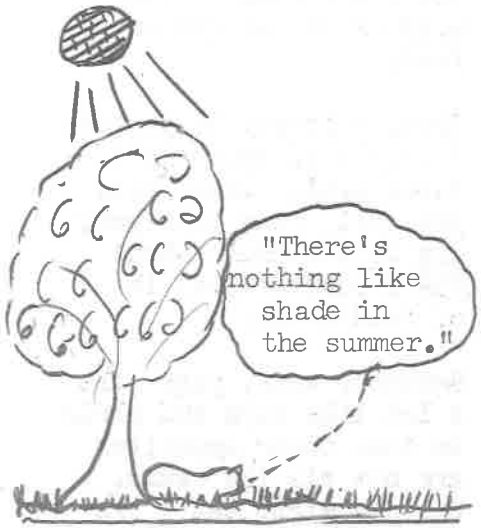
"KNOW YOU ARE RIGHT!!"

MANAGEMENT PRACTICES

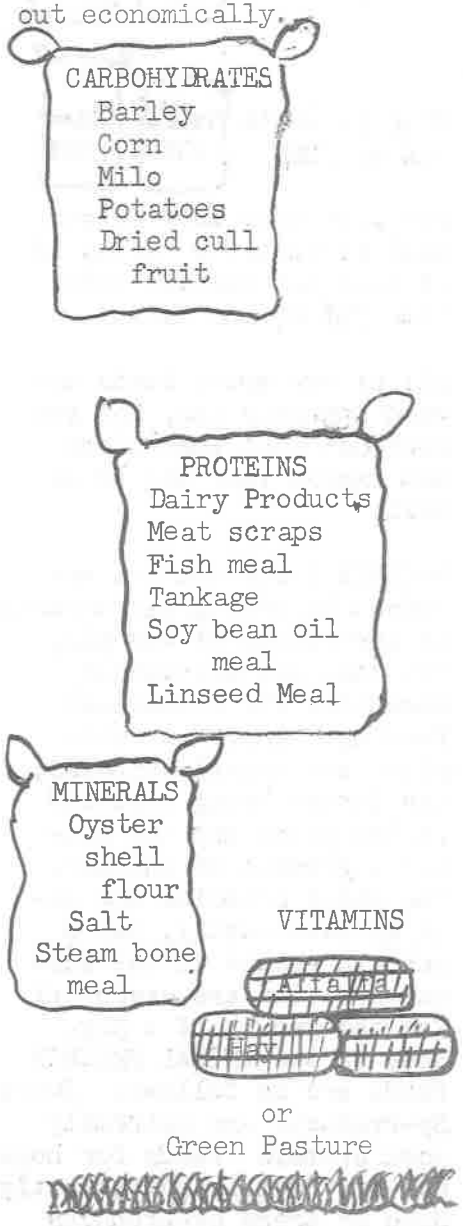
Keep plenty of fresh water in front of your pig at all times. A pig won't eat if he is thirsty and when he doesn't eat he cannot gain.

During the summer months an adequate supply of water is particularly important. A hog heats up easily and will die if it gets too hot. Use a watering device that your pigs cannot root over.

It is not necessary to have anything elaborate for shelter. A dry place in the winter and a cool, shady place in the summer will do the job.



HEALTH and vigor are of the utmost importance in your feeder pig. Never pick out a small unthrifty looking animal. They don't feed out economically.



"DON'TS"

Don't pick out pigs with wart like growths on them or open wounds.

Don't select an animal that is limping severely or doesn't walk normally. Large hair whorls and severe scars detract from the beauty of an animal. There are plenty of healthy normal pigs. Let's stick to them!

FEEDS AND FEEDING

What to feed your pig and how much to feed him are two of the most important items in a pig feeding project.

CARBOHYDRATES make up the basis of the ration and may be supplied by the following feeds:

Barley, which is the most widely grown grain on the West Coast is, therefore, usually more economical to feed than other grains.

It is well to remember that barley should be ground or rolled prior to feeding to any size pig. Soaking or wetting whole barley is no substitute for grinding or rolling.

MILO is also good hog feed but usually a little more expensive than barley. Here again, it is advisable to grind it prior to feeding.

CORN is the most widely used grain for hog feeding in the United States. It has a higher food value than all the grains except wheat. Again, however, it is usually cheaper to feed barley here in California.

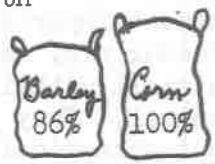
POTATOES make good hog feed when cooked or dried. Raw potatoes are not good hog feed. After drying, potatoes should be ground prior to feeding.

For pigs under 100# you should limit the potato meal to 10% in your ration and for pigs over 100# it is permissible to feed as high as 35% in the ration.

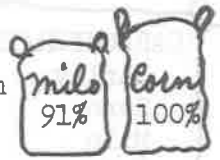
DRIED CULL FRUITS are some times available at reasonable prices. These may safely be fed in amounts up to 25% of the ration for pigs over 100# weight. Excess amounts will cause diarrhea and unthriftyness.

Dried cull fruits do not have as great a value as barley in the diet of pigs.

BARLEY is worth 86% of CORN



MILO is worth 91% of CORN



For pigs over 100# potato meal is equal to barley if it does not compose more than 35% of the ration.

All of the above feeds are good for your pig, but you must not feed them alone and expect your pig to do well.

PROTEIN feeds are not required in very great amounts in the ration of the pig, but they are absolutely essential for economical feeding. There are both plant and animal proteins; the former being produced in the plant and the latter a product of animals. The plant proteins are usually less costly, but a certain amount of the animal proteins are essential for the growth of a pig. Some of the ANIMAL PROTEIN feeds are as follows: Dairy By-Products are extremely good protein feeds for hogs but are usually quite costly. Some of these by-products are: cheese, skim milk,

WHAT to feed your pig has pretty well been discussed in the foregoing paragraphs.

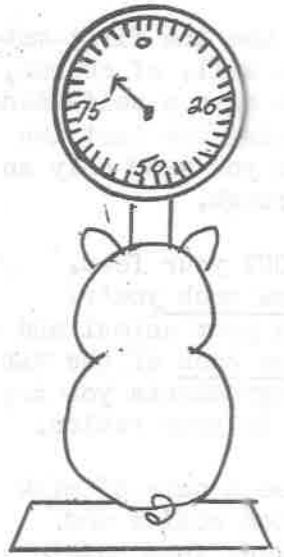
THE AMOUNT of feed you will give him a day will depend upon his size. An easy way to compute the amount he will consume daily would be as follows:

Between the weights of 40 - 125 pounds he will eat about 4.5 percent of his body weight in feed. From 125-225# he will consume about 4.0 percent of his body weight in feed.

For example let us say your pig weighs 85 lbs. He will then fall into the weight grouping of 40 - 125# pounds and therefore consume about 4.5% of his weight in feed.

Thus, multiply 85 pounds (weight of your pig) times 4.5%. Doing this you will find that your pig will consume about (85# x .45) or 3.83 lbs of feed a day.

Remember this, pigs are a lot like boys and girls in that their appetites are not all the same. One pig might eat 3 3/4 pounds of feed a day and another pig, weighing the same, might need over four pounds a day.



"HOW MUCH FEED DO I NEED?"

The best way to feed a pig is to keep feed in front of him all the time. Experimental work has shown this will produce the fastest gains.

In addition to keeping dry feed in front of your pig, it's a good idea to wet feed him for about 6 weeks prior to the show. Mix milk or water with your feed and give him all he'll eat twice a day

The second best method would be to feed him as much as he can eat three times a day.

SALT is the only other mineral that is necessary to add to your pig's diet. This item may be supplied by the addition of 1% of hay salt to the ration.

You DO NOT need to feed high priced complex mineral mixes to your pig.

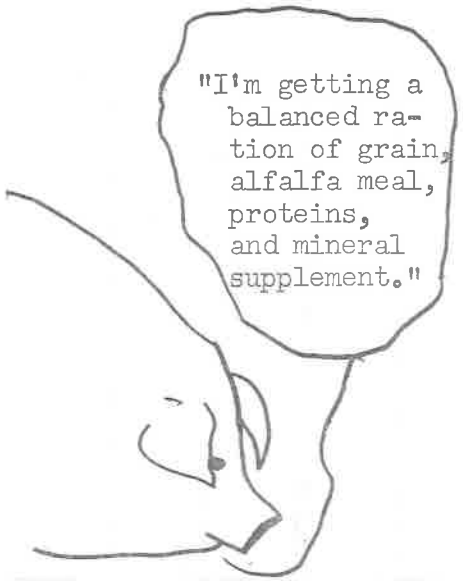
VITAMINS are essential to good growth, but here again a balanced ration of the above mentioned feeds will supply adequate amounts of the required vitamins necessary for the growth and development of your pig, with one exception - we still have to add Vitamin A.

This can be done very simply, in one of 3 or 4 ways. Add 5% alfalfa meal to your pig's ration, or feed him all the good green leafy alfalfa hay he wants, or better still, allow him free access to green pasture. The pasture will also help cut your feed costs.

Another method to supply vitamins, requiring a little more work but very effective, would be to cut some alfalfa and throw it to your pig each time you feed him.

VITAMIN D is not necessarily supplied in adequate amounts in the ration but there is little need to worry about this vitamin because the animal's body readily manufactures its own supply of Vitamin D when exposed to sunlight, and in Kern County we have lots of sunshine.

See pages 6 & 7 for suggested rations.



"THIS PIG WILL MAKE SOME 4-H'r A SUBSTANTIAL PROFIT"

whey, milk solid, dried skim milk, and sour milk. Tankage and meat scraps are the cooked, ground up remains of animals that are taken in to the reducing works or slaughter house. Both of these protein feeds are very high in their amounts of digestable protein.

FISHMEAL is an excellent animal protein and it's composed of the dried waste materials from fish canneries. It is usually hard to find and quite high in cost, therefore, not as widely used as meat scraps or tankage.

The common PLANT PROTEINS used in swine feeding are: Soybean oil meal is widely used as a protein supplement and its use depends on its price in relation to the other plant proteins.

Linseed oil meal is a good protein supplement and it is made from FLAX SEED.

Cotton seed meal is not too widely used in swine feeding; however, it is considered a good protein supplement up to 8% in the ration. Above this amount it quite often proves poisonous to pigs due to a substance contained called "gossypol."

These protein feeds, when mixed with the right amounts of feeds that are high in carbohydrates, make up the greatest part of your pig's ration. He still needs two more types of feeds, however, to do his best.

Minerals are important to your pig and should be added to his diet in the form of a mineral supplement. The three common minerals lacking in a swine ration are calcium, phosphorus and salt.

CALCIUM may be supplied to your pig by adding 1% of oyster shell flour to his ration.

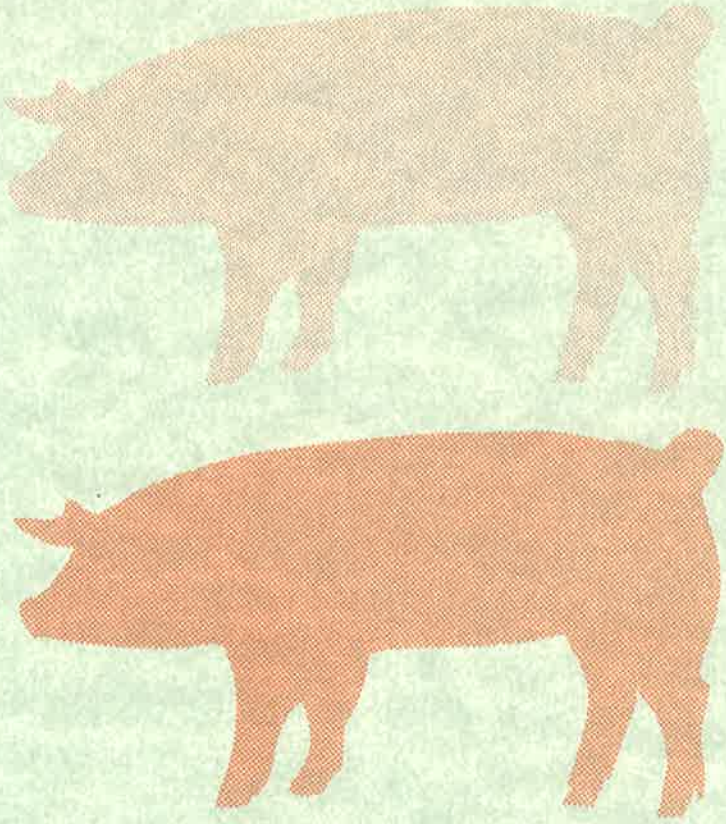
PHOSPHORUS and Calcium may both be added in your ration by including 1% steam bone meal or 1% spent bone black.

	PIGS ON GREEN PASTURE OR ALL THE CUT GREEN ALFALFA THEY WILL EAT				DRY LOT FEEDING OF PIGS (NO GREEN FEED)			
	Weight Range of Pigs (in pounds) and the percentage of Various Feeds to include in their rations at that weight.				Weight Range of Pigs (in pounds) and the percentage of Various Feeds to include in their ration at that weight.			
WEIGHT RANGE OF PIGS	40# - 75#	75# - 124#	125#-174#	175# - 224#	40# - 74#	75#-125#	125#-174#	175#-225#
RATION I:								
Barley or *other grains	74	84	90	94	67	78	83	88
Cotton Seed Meal	6	4	2	1	6	4	2	2
Linseed Meal	8	4	2	1	9	4	4	3
Tankage or fish meal containing (60% Pro.)	8	4	2	2	10	6	3	2
Oyster Shell Flour or steamed Bone meal	1	1	1	1	1	1	1	1
Salt	1	1	1	1	1	1	1	1
Alfalfa Meal	2	2	2	0	6	6	6	3
	100	100	100	100	100	100	100	100
RATION II:								
Barley or other Grain	74	84	90	94	67	78	83	88
Soy Bean Oil meal	12	9	3	2	14	8	5	4
Meat Scraps containing (55% Protein)	10	7	3	2	11	6	4	3
Oyster shell flour or steamed bone meal	1	1	1	1	1	1	1	1
Salt	1	1	1	1	1	1	1	1
Alfalfa Meal	2	2	2	0	6	6	6	3
	100	100	100	100	100	100	100	100

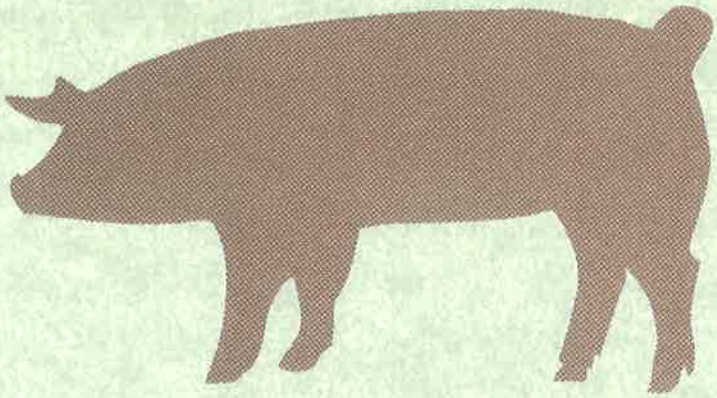
* NOTE: Dried cull fruits can replace up to 20 or 25% of the barley in these rations after the pigs reach 125 pounds.
* NOTE: Never feed more than 8% cottonseed meal in a ration to a hog. It is possible to poison him with more than that amount.
* NOTE: Oats are not a particularily good feed for feeder or fattening hogs because they contain too much fiber.

Animal Care Series:

4-H OFFICE COPY



SWINE CARE PRACTICES



California Pork Industry Group

University of California ♦ Cooperative Extension

FOREWORD

Swine Care Practices has been a joint project of University of California Cooperative Extension, industry representatives, and the California Pork Industry Group.

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The information in this publication is valid as reference material until June 30, 1996 unless revisions are necessary at an earlier date.

TABLE OF CONTENTS

INTRODUCTION

There are at least two good reasons to give pigs proper care. One is an ethical concern for the pig's well-being. Another is production efficiency.

Management practices that incorporate good animal care are usually also the most effective from a production standpoint . When pigs receive good care, production costs per pound of pork produced are less than when pigs are not well cared for.

If certain management practices conflict with the well-being of the animals, it will be to the producer's long-term advantage to adopt practices that put the animals' welfare ahead of short-term cost savings.

Science has not yet provided all the answers we need to fully understand animal needs, and it may never be possible, or practical, to meet the theoretical limits of pig welfare. However, past research and years of practical experiences have provided a wealth of information that can be applied across a wide variety of pork production systems.

This publication is designed to help producers evaluate their husbandry procedures with respect to the well-being of their animals and to offer production practices that are both ethically acceptable and cost efficient.

STRESS

Stress is a significant animal welfare concern.[1] An animal is stressed if it is required to make abnormal or extreme adjustments in its physiology or behavior to cope with adverse aspects of its environment or management.[2] Identifying and minimizing stressful situations in pork production improves the well-being of the animal, reproductive efficiency, and growth as well as economic benefits for the producers and consumers. Stress from the environmental and management aspects of pork production may be classified into four categories.

- Thermal: Thermal stress factors include temperature (heat and cold), humidity, wind, and solar radiation.
- Physical: The physical components of a pig's environment include the space available and the surfaces with which the pig comes in contact.
- Disease: Environments (including care, facilities, nutrition, and management) should be designed and maintained to minimize the onset and spread of disease.
- Behavioral: Most forms of normal behavior should be exhibited in carefully designed environments.

Stress, pain, or suffering may be recognized by the following:

- Increased susceptibility to disease
- Lack of appetite
- Retardation of normal growth
- Abnormal posture
- Restlessness
- Elevated respiration rate
- Lameness or alteration of gait
- Dull or depressed attitude
- Abnormal grunting or squealing
- Self isolation from penmates

Some pork production practices (e.g., vaccination, castration, weaning, tail docking) can be short-term stressors. However, they provide long-term health and management benefits to individual pigs and their herd mates. Swine producers have responsibility for evaluating their husbandry procedures with respect to short-term and long-term well-being of their pigs and the total management plan.

This publication describes and evaluates factors affecting the pig's well-being in a variety of management systems and situations.

[1]The following section on stress has been adapted for pigs from a paper on stress by Stull, C. and D.A. McMartin. 1990.

[2]Frazer, D., J.S.D. Ritchie and A.F. Fraser. 1975. The term stress in a veterinary context. Br. Vet. J. 131:653- 662.

CARE AND MANAGEMENT

Behavior

Pigs have very good frontal vision but poor peripheral vision. This is the reason they often are difficult to move and become upset easily. Producers can facilitate movement and handling of their pigs by taking a few precautions. One method is to have the pig heading in the direction of desired travel before attempting to move it. Also, pigs are gregarious and move better in groups.

Small, square plywood panels are effective portable barriers when moving pigs. Loading chutes should be approximately 20 inches wide (width of one pig). This prevents the pig from turning back and guards against injury. Facilities designed for easy movement of pigs are good investments.

All classes and groups of pigs form an order of social dominance. These orders are formed by competition soon after birth, or when the pigs are first grouped together. Adding new pigs or regrouping pigs will usually lead to struggles until a new social order is established.

Regrouping should be minimized to reduce stress. When regrouping is necessary, it should be done during the cool of the day in a pen or other area new to both groups. Younger pigs adjust to new groupings more easily than older pigs. Avoid regrouping pregnant females to prevent potential harm to unborn pigs. Adult boars that have not been living together should not be regrouped because of possible injury or death from intense competition and struggles.

Practices Related to Production Systems

Since pigs are kept in a variety of production systems, management techniques will vary. Each system requires a degree of management sufficient for the pigs to experience a reasonable level of comfort and well-being. Particular practices to be noted include the following:

- The daily care schedule should be consistent enough to allow the pigs to develop a routine of their own.
- Extremes in climatic changes should be anticipated as much as possible so appropriate provisions can be made to modify wide environmental variations.
- Swine care personnel must take precautions against the transmission of pathogens between pens and between facilities. Disinfectant foot baths used by personnel moving between buildings or premises are important to reduce disease transmission.
- Pigs should be closely observed and their well-being assessed at least once, and preferably twice, each day.
- When feed is delivered to swine housing or individual pens, care should be taken to minimize dust.
- Pens should be kept clean to provide for the comfort and health of the pigs. If pigs are kept on concrete or other solid flooring, daily scraping or washing of manure may be necessary. Slotted floors or flushing gutters will minimize the need for this labor-intensive practice and aid in keeping pens clean.

Breeding

Females can be bred to farrow at any time of the year. Piglets born in the fall and spring require fewer environmentally-controlled facilities because of usually moderate weather.

Most gilts (young females) display their first heat (estrus) at five to eight months of age. It is suggested that gilts be bred on the third observed heat period to allow for additional growth and an increased ovulation rate. Gilts should be mated to boars of small to moderate size to prevent injury during mating.

Four to seven days after piglets are weaned,

sows usually display a fertile heat and can be bred. Breeding should be delayed if unfavorable conditions exist, (e.g., thin body condition or very hot weather).

Sows may be housed individually or in groups during the breeding period. When sows are grouped, individual feed areas may be advisable to eliminate competition during feeding.

Yearling and mature boars should be housed individually because of their intense desire for social dominance which causes aggressive behavior.

Breeding Systems. There are four common breeding systems in pork production: pen mating, individual mating, hand mating, and artificial insemination. Pen (unobserved) mating utilizes one boar with a group of sows. For each group of ten sows, use one mature boar (over one year of age) per 21-day breeding period. Decrease the ratio to 4 to 6 sows for each young boar (less than one year of age). Individual mating involves one sow and one boar in a pen, and the mating is generally unobserved. Hand mating occurs when a boar and a sow or gilt are placed together, and the mating is observed. Artificial insemination uses either frozen semen which is thawed before insemination or fresh semen collected from boars and used immediately or preserved for short periods of time with extenders. Artificial insemination reduces the possibility of injury during breeding to both the sow or gilt and the boar.

The mature boar should not breed more than two females a day. Sows may be bred twice daily for as long as they will accept a boar in hand-mating systems. Each of these breeding systems, when appropriately managed, is acceptable. Attention must be given to preventing fighting and injuries. Breeding difficulties are reduced if males and females are similar in size.

Farrowing

As the sow approaches farrowing time, several management practices should be carried out to improve survival and well-being of the newborn pigs. Farrowing environments should be cleaned and thoroughly disinfected before the pregnant sow is allowed to enter. Sows are normally placed in their farrowing area three to five days before the estimated date of delivery. Before farrowing, sows should be treated for internal and external parasites to keep the newborn pigs free of lice, ticks, and worms. Any vaccinations should be scheduled well in advance of the farrowing date to allow the accumulation of desired antibodies in the colostrum.

Approximately 24 hours before farrowing, the female will appear nervous and may exhibit signs of nest building. Pawing motions with the front feet are a nest-building sign shown by sows or gilts in confined farrowing areas. Small amounts of straw or shavings placed in the area will help satisfy the nest-building desire. Twelve hours before farrowing, milk may appear in the udder; however, gilts may not show signs of milk as soon as sows. Some producers closely attend the sow at farrowing time, while others check periodically to be sure there are no problems. Attention, care, and observation are beneficial to the well-being of both the sow and her pigs.

Several distinct events take place during the farrowing process. Two to six hours before the first pig is born, labor will begin and the sow's respiration rate will increase. Once the first pig is born, the remainder of the litter will usually be born in one to four hours. Factors which usually affect the interval between the first and last pig born include the size of the litter and the number of litters the sow has previously delivered. The end of farrowing is signaled by the delivery of the placental membranes (afterbirth). If more than one hour elapses between pigs or between the last pig born and passing of the placental membranes, assistance may be needed.

During the farrowing process, keeping the sow quiet and maintaining quiet surroundings are important. The sow will remain calmer if attendants stay behind her. Noises, dogs, strangers, and other distractions must be minimized. Every effort should be expended to make the sow comfortable and at ease.

Draft-free environments are very important during farrowing because newborn pigs have a poor ability to regulate their own body temperature. After the pigs are born, they can be dried off by rubbing them with shavings, cloths, or paper towels. Then place them at the sow's udder and, if necessary, help them begin nursing. Nursing stimulates the release of the hormone oxytocin (needed for milk letdown, uterine contractions, and calming) into the sow's system. This hormone reduces the total time in labor and

promotes pig welfare. A restless sow can sometimes be calmed by rubbing her udder to simulate nursing. If the sow is excited and cannot be calmed, it may be necessary to remove the pigs for their protection until farrowing is completed. Gilts, in particular, may sometimes eat or lay on their young.

To maintain the 90°F comfort zone (Table 4, Environment) for newborn pigs, it may be necessary to provide supplemental heat through heat lamps or heat pads specially designed for swine farrowing areas. Do not use ordinary household heating pads. Hovers, designed to capture body heat, may also be used to keep the newborn pigs warm while still maintaining a cooler environment for the sow.

Management of Newborn Pigs

Most producers utilize several management procedures soon after farrowing. Some are essential, while others are optional.

Navel Disinfection. During pregnancy, the unborn pig receives nutrients and voids body waste through the navel (umbilical) cord. At the time of farrowing the cord is severed, but the remaining navel cord can be an entry for pathogens into the piglet's body. To prevent infection, soon after birth the navel should be treated with tincture of iodine.

Needle Teeth. A newborn pig has eight needle teeth. These teeth are very sharp and can cut other pigs when fighting or playing occurs, as well as lacerate the udder of the sow if they are not removed. Soon after birth needle teeth should be clipped to prevent these injuries.

Iron. Newborn pigs have a low reserve of iron. Iron is essential for red blood cell production. Supplemental iron is given by injection, orally, or as an udder spray and must be given within 3 to 4 days after birth to be most effective.

Castration. Castration is needed to facilitate safe handling, good management, and to ensure carcass quality. Intact males become extremely aggressive as they approach puberty. Increased aggressiveness results in disruption and fighting within the herd or group and increases danger to the animal handler. In addition, meat from boars has an objectionable odor caused by an increase of male sex hormone levels in the intact male.

Pigs should be, and usually are, castrated when they are very young. This is much less traumatic for the pig and the operation is easier to perform. Castration and weaning should not be performed at the same time. Castration is best completed before the pig is a week old. Only clean instruments should be used. To allow proper drainage of the body area, the incision should not be sutured. The incision site should be treated with an iodine-based antiseptic. If mature pigs must be castrated a local anesthetic should be used.

Identification. Pigs require permanent identification for management records. Several methods may be used such as ear notching, ear tattoos, electronic transponders, or ear tags. Ear notching should be performed within the first week of age. When done at this age, ear notching may be the least traumatic means of identification. Other forms of identification, such as ear tags, may be torn from the ear during playing and fighting, or be caught on feeders or fences.

Nose Ringing. Nose ringing may be necessary when pigs are maintained in pastures or dirt lots. The nose ring discourages "rooting" behavior in pigs, which can be very destructive. Rooting may also result in pigs escaping from their lot or pasture which could result in the pigs becoming lost, injured, or harmed. Rooting may also increase the incidence of internal parasites when internal parasite larvae or eggs are ingested by the rooting pig.

Tail Docking. As pigs come in close contact with each other they may at times attempt to bite or chew on their penmates-- a natural behavioral action. An undocked tail is a common target. Once blood has been drawn on a tail, further biting may result, sometimes leading to cannibalism of the victim pig. To prevent tail biting, tails are docked (a portion of the tail is removed) shortly after birth. Some producers leave one inch of the tail after docking but removing the last one-third to one-half of the tail is satisfactory. Tail docking should be done within the first 24 hours after birth because the pig is small, easier to hold, and the action less stressful; littermates are less likely to bite at the wound on the docked tail at this age; and the piglet is protected by antibodies from the sow's milk. Sterilized side cutters should be used, and the remaining tail treated with an antiseptic.

Weaning

Historically, pigs have been weaned at approximately eight weeks of age. However, improved management, proper nutrition, and controlled environments may allow commercial producers to wean earlier. When a warm, dry, and draft-free environment is provided along with proper nutrition, early weaning may be very successful and not detrimental to the growth, health, and well-being of the pigs. Earlier weaning may also reduce the stress placed on sows and gilts as older and heavier pigs continue to nurse. Weaning may take place at two to eight weeks of age, with three to five weeks being common.

Weaning is easier when the sow is removed and the pigs remain in a familiar area for several days. Litters that have been grouped together and remain together as they grow will also adapt to weaning easier and faster. An adequate supply of water must be provided at all times. Adequate sanitation measures should be followed.

As pigs grow and mature following weaning, they are often combined in larger groups according to body size. Pigs grouped according to size are less likely to have growth or health problems resulting from social dominance of one pig over another. Pigs should remain in groups sorted for body size through the growing and finishing phases of development. Larger pigs are able to adapt to a wider range of environmental and nutritional levels. The pigs normally reach market weight at approximately six months of age.

FEEDING AND NUTRITION

GENERAL PRINCIPLES AND GUIDELINES

Feeds

Sound feeding practices that provide for adequate nutrient needs are integral to general health and well-being of pigs.

Swine are raised on a variety of feeds, including numerous agricultural by-products. Because of their simple monogastric stomach, pigs require more concentrates and less fibrous roughages than cattle, sheep, and horses. Because single-concentrate feedstuffs are not suitable as the sole ration ingredient for pigs, swine can utilize a variety of feeds. Most concentrate feedstuffs are deficient in one or more nutrients, making it necessary to rely upon fortification or "balancing" with nutrients from other feed sources.

By-product feeds are often used to lower ration costs. They, like any feed, should be introduced into a diet gradually to avoid digestive upsets or the risk of appetite loss. Increased sanitation measures will be necessary when using high moisture feeds or animal by-products because spoilage can be a problem.

Feedstuffs should be free from molds, toxins, or other harmful impurities. Feed with unknown nutritional value and lacking in wholesomeness should not be used.

Nutrients

The diet must meet the nutritional needs of the pigs and fit the purpose for which it is being fed (e.g., growth, reproduction, and lactation). To meet nutritional needs,required nutrients must be supplied in amounts that cause neither deficiency or toxicity from excess consumption. Palatability and digestibility of the feeds are important.

Examples of publications which list and discuss these nutrient requirements are referenced in the bibliography section of this publication. Especially recommended is the National Research Council publication, Nutrient Requirements of Swine. Feeding pigs for optimum growth and production will also provide for their nutritional welfare.

The following nutrients and nutrient groups must be available to swine within balanced ranges:

Energy. Energy requirements are affected by factors such as age, activity of the pig, level of production, and temperature of the environment.

Protein. Critical not only in *quantity* but also in *quality*, where the amounts and ratios of component amino acids must be considered, especially the essential amino acids.

Essential Fatty Acids. Normally adequate in most practical swine diets.

Minerals. Inorganic elements that are not only dietary essentials but may be toxic in excess amounts.

Vitamins. Organic entities that, like minerals, often must be considered in quantitative ratio to other vitamins and minerals as well as in relation to minimum amounts.

Water. Should be clean, cool enough to drink in the summer, protected from freezing during the winter, and readily available.

Providing Balanced Diets

With so many different nutrients being essential in swine diets (e.g. 10 amino acids, 13 minerals and 14 vitamins) and important both in quantity and relative proportion, meeting these needs presents a challenge. This is especially important if the goal is maximum production at minimum cost. Fortunately,

- physical welfare dietary needs are less stringent than those for maximum production.

- a practical mixed-ingredient diet should provide most nutrients in acceptable quantities.

- commercially prepared feeds and supplements are generally available to provide for these needs, and

- professional nutritional advice is readily available, often at no cost, to the swine producer. When in doubt, contact such a consultant. The University of California livestock advisor in your county is a good starting point.

Recognizing Nutritional Imbalances

Even if it is believed that the feed supply is nutritionally adequate, the producer should always be alert for signs to the contrary. Producers should know:

- The normal size and weight for pigs of a given age, sex, and productive stage.

- Expected ages of puberty, length of estrous cycle, gestation length, and litter size.

- Expected rate of gain for growing and finishing pigs.

- Expected feed-consumption rates.

- Symptoms of deficiency and/or toxicity of specific nutrients.

All of the above measures are described in tables that appear in the references listed in the References. All are indicators of the nutritional welfare of pigs.

Feed Additives and Injections

Compounds, such as antibiotics, which are approved to be added to feed or water or injected into the pig must be used only when absolutely necessary and only as recommended by the manufacturer. Such products can help ensure the health and well-being of pigs and, when used strictly according to recommendations and regulations, will ensure a safe and wholesome product. Simple rules should be followed:

1. Label instructions must always be read and followed completely regarding dose, frequency and timing of use, and withdrawal intervals before marketing.

2. Use only under a veterinarian's supervision if this is indicated on the product label.

3. The use of antimicrobial drugs helps to keep harmful microbes under control when pigs are raised in confinement. Subtherapeutic use of antibiotics should be kept to a very minimum. Therapeutic antibiotic use is more efficacious when subtherapeutic levels are not used or used at a very minimal level.

4. When in doubt, seek professional advice.

5. Do not use any product for which clear instructions are not available.

Feeding Practices

A variety of feeding systems and practices can be used and still be consistent with the health and welfare of pigs:

- Feeding one or more times per day, or having feed available *ad libitum* (feed is always available).

- Feed may be placed on a clean floor, in a trough, or in a self-feeder.

- The system should be designed to keep noise levels at a minimum for the comfort of both pigs and producer.

- Pigs, by nature, will consume feces. Feeding the solids separated from manure is an industry practice that provides natural innoculants and builds immunity against endemic pathogens.

GUIDELINES FOR SPECIFIC PRACTICES AND ANIMAL CLASSES

Boars and Gestating Females

Pigs do not have the ability to select feeds in either quantity or quality to meet their nutritional needs. As a result, *ad lib* or unlimited amounts of high energy rations cause excessive weight gain during gestation. Restriction of feed below *ad lib* intake is recommended and required for optimum health and welfare as well as for highest reproductive efficiency. Prescribed nutrition can be accomplished by feeding

measured amounts one or two times a day. If fed once a day, avoid feeding during the hottest part of the day. Feeding time should be the same each day.

If the pigs are fed restricted amounts in groups, allow adequate trough length or floor space (at least 10 square feet per head) to prevent hoarding by dominant animals. Individual feeding stalls will reduce hoarding and competition with fewer square feet or total space required. The amount of feed will vary according to condition, size, and reproductive stage of the pigs. Adequate levels of nutrition for the pregnant sow are needed to insure normal development of the fetuses.

Farrowing

Care of Sows. Laxative feeds (e.g., bran, alfalfa meal) or additives may be needed to minimize constipation as sows advance in pregnancy. This may be needed both before and after the sow gives birth. Feeding sows twice each day, morning and evening, is recommended.

Feeding of the Litter. Creep feeding of pigs, especially large litters, is recommended. Creep feed in an area where the pigs will be protected from crushing when the sow lies down.

Nursery Units

Before weaning and being moved to the nursery unit, pigs should be consuming adequate quantities of a diet similar in nutrient composition to sow's milk.

If litters are to be mixed in the nursery, diets should not be changed until a new social order has been established. Some managers move the sows with their litters, mixing three to four litters in a pen, until the social adjustment is made. The sows are then removed, leaving the pigs in the now-familiar group environment.

Feed can be provided *ad lib* with adequate feeder space and waterers for unrestricted access by all pigs in the group. Tables 2 and 3 in the Environment section suggest feeder and waterer capacities.

Growing and Finishing

For optimum growth rate, pigs should receive a nutritionally-balanced diet as described in the National Research Council's Nutrient Requirements of Swine. In practice, these recommendations exceed the nutrient quantities required for the normal growth and well-being of the pig.

Disease prevention, protection from temperature extremes, and provision for an established, tranquil social order should be maintained at all times.

ENVIRONMENT

Environmental considerations in pork production operations must include the environmental welfare of the pigs as well as facility design to protect air and water quality. Consideration must also be given to the work environment for the owner, manager, and/or employees. Proper design and management of facilities should provide the proper environment for raising pigs and also protect the natural environment.

Space

The space needed for each pig in a group varies with the class of pig and the type of facility in use. The size and design of pens should provide areas for feeding, resting, defecating, and urinating. Housing and space recommendations for various classes of pigs are shown in Table 1.

Pigs require adequate access to feeders and waterers. Feeders and waterers should be checked routinely to be certain they are functioning properly and are be easily accessible to all pigs in the pen. Contamination by feces and urine must be minimized and corrected. Feed delivery systems should minimize dust and noise. If watering nipples are used, they should be spaced far enough apart and have an adequate supply of water to allow simultaneous use of all nipples. If slotted floors are used, locate waterers over the slots to keep resting and feeding areas dry. Some guidelines for feeder and waterer capacities are given in Tables 2 and 3.

Shelter

The comfort and well-being of pigs is enhanced by an environment that is dry, moderate in temperature and draft-free in winter, and cool and comfortable in summer. Housing or shelter may be needed during extremes in weather-- heat, cold, and rain. Providing proper shelter economically is a challenge for every pork producer. Weather conditions in California vary from the extreme heat of the Imperial Valley to the cold wind and rain of the North Coast, and to the snow and freezing conditions of the eastern mountain regions. Swine facilities must moderate these conditions. In addition, pigs in various stages of production require different levels of protection from the environment.

Farrowing Stalls/Pens. A wide variety of choices are available for farrowing facilities. Each has different implications for the well-being of the pigs as well as for management. For example, farrowing can be done in pens or in farrowing stalls. Pens allow the sow to walk and move around freely, but often result in higher newborn pig death loss because the sow may accidentally crush the newborn pigs. Stalls, on the other hand, are small

Table 1. Housing and space guidelines

Stage of production	Pasture	Intensive rearing facilities
	swine per acre	*square feet per head*
Pregnant Sows	10 or less	15
Sows and litters	7 or less	35-75
Boars	4 or less	15-40
Growing and finishing pigs		
under 40 lb	20-25	2.5-4.0
40 to 100 lb	15-20	4.0-6.0
100 to 150 lb	10-15	6.0-8.0
over 150 lb	5-10	8.0-10.0

(Handbook for the Small-Scale Pork Producer and Swine Care Handbook)

Table 2. Feeder and waterer capacities	
Equipment	No. of pigs served
Self feeder (1 space)	4
Supplement feeder (1 space)	15
Waterer	30
(Swine Housing and Equipment Handbook)	

Table 3. Nipple waterer guide

Item	Pig weight, lb.					Sow and Boar
	<12	12-30	30-75	75-100	100-240	
Height, in.	4-6	6-12	12-18	18-24	24-30	30-36
Pigs/nipple	litter	10	10	12-15	12-15	12-15
Min. flow rates, quarts per min.	0.2	0.2	0.4	0.5	0.67	1.0

Install at least two waterers per pen. Locate waterers at least 14" apart for nursery pigs and at least 24" apart for larger pigs. This distance may be reduced some if the nipples are angled away from each other.

(Pork Industry Handbook)

enclosures which allow the sow to stand, lie, eat, and drink, but not turn around. Because there is usually room for pigs to escape crushing when the sow lies down, newborn pig deaths caused by crushing are almost eliminated. Most producers today choose stalls as being both more economical and more humane for newborn pigs.

Gestation Stalls. After sows are bred, they are usually housed in group pens where they remain until they are due to farrow. A few producers house pregnant sows in individual stalls on solid flooring with whatever additional shelter is required to provide a comfortable environment. Generally, the size of gestation stalls prevents sows and gilts from turning around; however, a recent design does allow the sows and gilts this additional movement. The care of sows housed in gestation stalls can be enhanced in that they can receive individual feed portions, allow individual observation, easier health care, better temperature control, and protection from biting in the vulva area by other sows.

Environment

A pig's environment results from a number of interrelated factors, including temperature, air movement, humidity, and insulating effects of the surroundings. Protection from the environment needed also depends on the pig's age, weight, activity level, stage of production, and body condition. Suggested thermal conditions for swine are shown in Table 4.

Because older pigs can tolerate a wider range of environmental conditions than younger pigs, their welfare can be provided for more easily. Pen design and spacing are less critical, although many confinement units have adopted common standards.

Shade should be provided in pastures, fields, and outside pens. Trees and other natural objects can provide adequate shade if available. Facilities to provide shade can be constructed so they can also serve as protection from the wind and cold during the winter. Shades with open sides allow for air movement during the warm and hot months; during the cold months solid sides can be added for additional protection.

Ventilation rates in enclosed facilities will require seasonal adjustment. In cold weather, a sufficient rate of air movement to remove water vapor, contaminants, and odors is necessary. During hot weather, higher ventilation rates are needed to provide cooling.

Fans can keep the air moving during hot weather. High temperatures can also be reduced in buildings by using evaporative coolers or by fogging water into the fan's air stream. Sprinklers have been used successfully to provide cooling in outside pens. Concrete

Table 4. Preferred Thermal Conditions for Swine

Type and weight	Preferred range[a]	Lower extreme[b]	Upper extreme[c]
Lactating sow and litter creep area	60 to 80°F for sow; piglets have 90°F	75°F creep area for piglets	90°F for sow; 90°-100°F
Prenursery, 10 to 30 lb	80 to 90°F	60°F	95°F
Nursery,	65 to 80°F	40°F	95°F 30 to 75 lb
Growing, 75 to 150 lb	60 to 75°F	25°F	95°F
Finishing, 150 to 220 lb	50 to 75°F	5°F	95°F
Sow or boar	60 to 75°F	5°F	90°F

[a]Based on NRC(1981); DeShazer and Overhults(1982); Hahn(1985)

[b]These represent lower extremes in air temperature when pigs are held in groups. Bedding is recommended when air temperature approaches the lower extreme.

[c]Except for brief periods above these air temperatures, cooling should be provided by means such as evaporatively cooled air or spray cooling for growing pigs, or a water drip for lactating sows.

(Swine Care Guidelines for Pork Producers Using Environmentally Controlled Housing)

"wallows" offer a place for pigs to lie in water, yet prevent muddy areas that may result in odors and fly breeding.

Manure Disposal

Wastes must be managed in a manner that will maintain sanitary conditions for the pigs, prevent fly breeding, minimize odors, and protect ground water quality. Fly eggs will not hatch when manure is completely dry, nor when it is in a flowable liquid form. A manure handling, storage, or disposal system must aim at quickly converting manure, urine, and other wastes to a very dry form or a very wet form. The very dry and wet forms also minimize odors.

The density of the hog population will help to determine the degree of waste management necessary. If farrowing and growing are carried out in fields or large open areas, manure disposal on a day-to-day basis is essentially a natural function. Some scraping and manure collection in lots may be necessary to maintain a nuisance-free and healthy environment.

Confinement facilities require waste handling and holding facilities to contain manure, urine, runoff, and wash water. The waste material can be spread on cropland or pastures from the holding facility. Local or county ordinances regarding manure disposal and run off must be followed.

Transportation

Safety and comfort must be a primary concern when transporting pigs. Weak or unhealthy pigs should be loaded and transported separately from healthy pigs. Adequate ventilation is essential when pigs are being

transported. The floors of trucks and trailers should be slip-resistant. Whenever possible, pigs should be separated into groups of uniform weight. Separating by sex may be necessary when older pigs are being transported. Boars require individual separation to prevent fighting.

Adverse weather can add to discomfort during handling and transporting. When transporting pigs in hot weather, they should be shaded from the sun and bedded with wet shavings or wet sand. When the weather is extremely warm, it may be necessary to periodically stop to provide water mist or fog to cool the pigs. A tank of water, a small pump powered by the vehicle's electrical system, and foggers in the truck or trailer can keep pigs cool during long periods of travel in hot weather.

Pigs transported in cold weather require protection from extreme temperatures. Protection from the chilling effects of the wind should be provided when the air temperature drops below 32°F; however, adequate ventilation for the pigs must still be available. Trucks and trailers should be bedded with dry straw or dry shavings for additional protection for the pigs.

The pigs' condition should be checked often during transit. Every attempt should be made to make the pigs as comfortable as possible during transport.

Pest Control

Pest management programs are needed to control the infestation of pests on pork production units. Flies, mosquitoes, rodents, and some species of birds are the common environmental pests. Internal and external parasites are discussed in the health section.

In addition to being a nuisance, pests can be a vector for diseases. Entrance points in feed mixing and storage areas should be covered with screen or sealed to prevent entry by pests. The elimination of breeding, roosting, and shelter sites will aid in pest control.

Only approved pesticides, properly applied, should be used in pest control. Guarding against any contamination of feed is essential to eliminate the possibility of unapproved materials being consumed by the pigs.

Pork producers are encouraged to enroll and participate in the National Pork Producers Council (NPPC) Quality Assurance Program. Producers interested in the program may contact NPPC or their local UC livestock advisor for additional information.

Air Quality[1]

Air quality is important to the health and well-being of pigs and those humans who manage and tend the swine operation. The measure of air quality relates to the content of certain gases, particulate matter, and airborne microbes in the air around or in swine facilities.

Good ventilation and proper waste management will ensure acceptable air quality. Although a number of gases may be present in swine housing, the most important in terms of air quality are ammonia, hydrogen sulfide, carbon monoxide, and methane. Ammonia concentration in buildings should be less than 10 ppm and should not exceed 25 ppm in tightly closed buildings.

Hydrogen sulfide levels in concentrations of less than 10 ppm are recommended. If manure is stored in pits in buildings, care must be taken during times when the waste is agitated. The concentration of hydrogen sulfide above the floor can rise dramatically and must be expelled.

Carbon monoxide can be lethal to humans as well as to pigs. When gas heaters are used in buildings, the concentration of carbon monoxide in the building is a concern. Gas heaters must be vented or fresh air circulation provided. Concentrations of carbon monoxide should not exceed 150 ppm.

Methane is a product of anaerobic digestion of swine waste. If manure is stored in pits in buildings, methane concentration in the building is a concern. Although methane is not toxic, it can be explosive and concentrations should not exceed 50,000 ppm.

Ventilation rates in buildings should be increased when under-floor manure pits are being agitated or emptied. Evacuating the gases being released from the pits is important for the pigs' well being as well as for the health of the workers in the area.

Airborne dust in swine buildings is usually the result of movement of feed. Increased animal activity and excessively high ventilation or air movement rates can cause dust particles to

become airborne for extended periods of time.

Dust is also a concern where electric motors are operating, such as in the feed milling area. Dust can be explosive. Care should be taken to reduce dust wherever motors are operating or where electrical sparks may occur.

Lighting

Lighting is important for workers to be able to carry out their normal activities on a pork production unit. It has also been shown that gilts reach puberty at an earlier age if they are housed at 15- to 20-foot candles of light for 16 hours per day. Recommended lighting levels for various facilities are shown in Table 5.

Preventing Injuries

Pigs can be injured in many ways. Good judgment must be utilized when designing and maintaining a safe environment for the pig.

During the design process, it is necessary to think about potential problem areas, such as sharp corners, slick concrete, or improper spacings. Existing facilities should be routinely evaluated to insure that they are safe for the pigs. The producer should walk through the facilities often, noting the condition of fences, pens, and flooring and making necessary repairs.

The key to preventing injury to both pigs and employees is being observant.

Table 5. Light levels for swine housing.

Based on an 8 foot high ceiling. Add lights for specific tasks such as desk work.

	Illumination		
Application	foot-candles	Fluorescent watts/ft2	Incadescent watts/ft2
Farrowing	15	0.6	2.4
Nursery	10	0.4	1.6
Growing-finishing	5	0.2	0.8
Gilt pool	15	0.6	2.4
Breeding-gestation	15	0.6	2.4
Feed storage and processing	10	0.4	1.6
Record keeping/office	70	2.8	11.2
Animal inspection/handling	20	0.8	3.2

(Swine Housing and Equipment Handbook)

[1]References to specific gas concentrations are from: Christianson, L.L., et al. 1989. *Swine Care Handbook for Pork Producers Using Environmentally Controlled Housing*. Des Moines: National Pork Producers Council.

HEALTH

For a specific disease to occur, certain combinations of factors involving the pig, the environment, and the disease agent must be present. Proper manipulation of nutrition, husbandry practices, and the environment will help to prevent disease. However, in spite of the best management efforts, certain additional practices are necessary if pigs are to remain healthy. These steps can be divided into offensive and defensive measures.

Offensive Measures (disease prevention)

Acquisition. Purchase healthy stock from reputable sources. The best way to prevent having to deal with a specific disease is to never introduce it into the herd. The State of California has certification programs for several of the major swine diseases (Brucellosis and Pseudorabies). If pigs are purchased from a non-certified herd, they should be blood tested for these diseases. Also, it is illegal to transport pigs into California without the appropriate permits.

Quarantine. Facilities should be available to keep new and returning pigs separate from the rest of the herd for 30 days. This allows time for observation, for development of clinical disease signs, and for recommended health procedures (vaccination and treatment for internal and external parasites).

Sanitation. Sanitation is the most basic and most important of all the disease control measures. Prompt and proper removal of wastes, and cleaning and disinfection of both equipment and the environment is central to disease control. Normally, the cleaner the environment, the healthier the pigs will be. Although a wide variety of cleaning and disinfecting agents are commercially available, none are effective without first removing organic material.

Vaccination. Vaccinations are available for a number of diseases that affect swine. In some cases, vaccination constitutes the major part of the control of the disease. In many other cases, it is only a small part of the control program. Vaccination programs need to be tailored to each swine operation and should be developed in consultation with local veterinarians, Extension personnel, and other swine producers. Remember that vaccination only raises a pig's level of resistance. If other important management procedures are neglected, even this elevated level of resistance may be inadequate to prevent disease.

Vaccines must be stored and administered according to label directions if they are to be effective. Withdrawal time to slaughter must be observed at all times to avoid illegal residues. The most common times for administering many vaccines are before breeding and before farrowing. This protects the sow and passes antibodies to the piglets for their protection.

External and Internal Parasite Control. A variety of effective compounds are available that can be administered in several ways. Again, the specific ones used and the timing of their administration should be developed in consultation with local veterinarians, Extension personnel, and other swine producers. As with vaccines, parasite control compounds must be administered according label directions, and withdrawal times to slaughter must be strictly observed. The most common times of administration are prior to breeding and before farrowing.

Records. Records of vaccinations and parasite treatments should be available to help detect health problems. These records do not need to be elaborate, yet are a valuable management tool. The more detail provided, the more likely that problems will be detected early.

Observation. Animals should be observed daily for any sign of illness, injury, or unusual behavior.

Environmental Measures. Insulation and

proper ventilation of buildings will help prevent disease.

Defensive Measures (disease treatment)

Hospital/Isolation. Pigs that become ill should be isolated. Isolation slows the spread of disease to well pigs and allows increased care for the sick pigs. Hospital/isolation pens need to be protected from extreme weather to aid in recovery of the pig's health.

Diagnosis (including necropsy of dead pigs). Whenever possible, precise diagnosis of deaths should be attempted. This allows for a more rational choice of treatment as well as to identify steps that need to be taken to protect pigs that have not been infected. These services are available through local veterinarians and the California Veterinary Diagnostic Laboratory System. Contact names and telephone numbers should be kept in a handy location and also posted.

Treatment. Sick pigs should be treated promptly. Drugs must be administered according to label directions. A record of the product used, dose, duration of treatment, and period of withdrawal should be kept. Treated pigs should be identified to ensure that withdrawal times are observed.

Carcass disposal. Prompt disposal, according to local ordinances, of any dead pig is important for animal and human health.

Summary

Consultation with a veterinarian for help with disease prevention, control, diagnosis, and treatment. A herd health plan, including vaccinations and parasite control, should be developed, reviewed, and updated often. Basic disease prevention and control methods should be used to the greatest degree possible.

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GLOSSARY

Abortion. The delivery of fetuses or fetal membranes between the date of service and up to and including the 109th day of pregnancy.

Ad-libitum feeding. Pigs have access to diet at all times.

Antibiotic. A substance produced by micro-organisms which has the capability to kill or retard growth of other micro-organisms.

Antibody. A protein molecule capable of combining specifically with an antigen.

Antigen. A molecule capable of stimulating an immune response.

Antimicrobial. Any substance, including antibiotics and chemotherapeutic agents, which can retard or kill micro-organisms.

Bacterin. A killed bacterial vaccine, consisting of a suspension of whole bacteria.

Boar. Any intact (uncastrated) male pig.

Crossbreeding. Mating animals from gentically diverse groups within a species.

Diet. The feed fed.

Disease. Any morbid condition that impairs the full productive potential of an individual or group.

Draft. A current of air in an enclosed space.

Dust. Small, relatively dry particles in air or on surfaces, i.e. particulate matter.

Estrus. A period of female sexual receptivity to boars.

Farrowing. Production of a litter of one or more live or dead pigs on or after the 110th day of pregnancy, i.e. parturition.

Farrowing pen. An area in which a sow is confined during farrowing and lactation periods, but in which the sow can turn around.

Farrowing stall. A device in which a sow is confined during farrowing and lactation periods and which prevents sow from turning around (synonym: farrowing crate).

Gestation. The period of time between conception and farrowing.

Gestation stall. An individual stall in which a pregnant sow is held during gestation.

Hover. A cover suspended over an area in a pen or stall aimed at conserving heat for pigs; it may include a heat source.

Immunity. Resistance involving the sum of the host defenses that react either specifically or

non-specifically to an antigen.

Infection. Invasion of the body by microbial agents or parasites other than insects.

Litter. Pigs born to a sow during one farrowing.

Mating. The act of insemination.

Mummified pigs. The pigs that are born degenerate (discolored and shriveled or decomposed) that died sometime during gestation.

Parity. The number of times a female has farrowed.

Purebred. An animal eligible for registry with a recognized breed association.

Ration. The feed fed to an animal during a 24 hour period.

Sow. Any breeding female that has farrowed at least one litter or has reached 12 months of age.

Stillborn pigs. Fully developed pigs found dead behind the sow, or in the afterbirth, after farrowing.

Stress. Any force causing or tending to cause a change in a pig's function, structure, or behavior.

Vaccination. The act of administering a vaccine or antigens.

Vaccine. A suspension of attenuated or killed microbes or toxins administered to induce active immunity.

Weaning. The act of separating the pigs and the sow.

SWINE FEEDING
PREPARING A BUDGET
JOB BREAKDOWN

Important Steps	Key Points
1. Know the thumb rules	1. An average gain on market swine from 50 pounds to 220 will be 1.25 to 1.5 pounds per day.
	2. Swine will eat an average of 5-6 pounds of feed per day through the fattening period.
	3. Swine will convert 3.5 pounds of balanced ration to 1 pound of pork.
	4. Ration will contain 85% grains and 15% protein supplement.
	5. Average daily ration would have 5 pounds grain and 1 pound protein supplement.
2. Figure cost of feeder pig	1. Multiply weight at time purchased by price per pound.
	2. If from your own herd figure fair market value.
3. Figure cost of grain	1. Multiply 5 (pounds of grain eaten per day) by days on feed to find total pounds of grain eaten.
	2. Multiply total pounds of grain by cost per pound to find total cost of grain.
4. Figure cost of protein supplement	1. Multiply 1 (pound of protein supplement eaten per day) by days on feed to find total pounds of protein supplement eaten.
	2. Multiply total pounds of protein supplement by cost per pound to find total cost of protein supplement.
5. Estimate miscellaneous costs	1. This might include: a. entry fees b. equipment c. veterinary fees d. any other costs
6. Find total cost	1. Add together: a. cost of feeder pig b. cost of grain c. cost of protein supplement d. miscellaneous costs
7. Figure break-even price	1. Divide total cost by final weight.

Co-operative Extension Work in Agriculture and Home Economics, U. S. Department of Agriculture, University of California, Tulare County Co-operating

SWINE FEEDING BUDGET

A. COST OF FEEDER PIG

_____lbs. weight x_____¢ per pound A._____

B. COST OF GRAIN

__5__lbs. of grain eaten per day x_____days on feed = (1)_____lbs. total grain.

(1) _____lbs. total grain eaten x_____¢ per lb. = B._____

C. COST OF PROTEIN SUPPLEMENT

__1__ lb. of protein supplement eaten per day x_____days on feed =

(2)_____total protein supplement

(2)_____lbs. total protein supplement x_____¢ per pound = C._____

D. MISCELLANEOUS COSTS

_____entry fees

_____equipment

_____veterinary fees

_____other costs

D._____

Total Cost A + B + C + D = _____

Break-Even Price

(1.25) or (1.5) lbs. daily gain x_____days on feed = (3)_____gain.

(3)_____gain +_____lbs. beginning weight = _____ lbs. final weight.

Total cost $_____ ÷ final weight _____ lbs. = $_____ per lb. break-even price

4-H Youth Advisor
Tulare County

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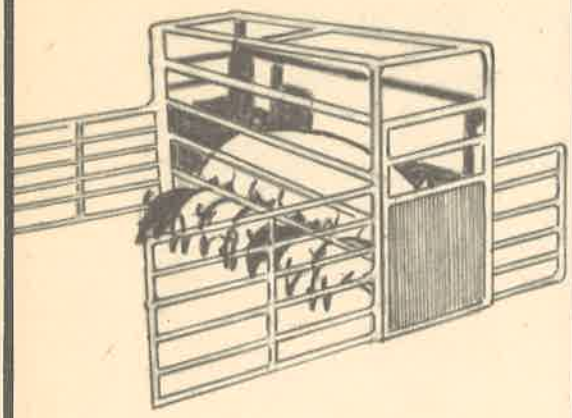
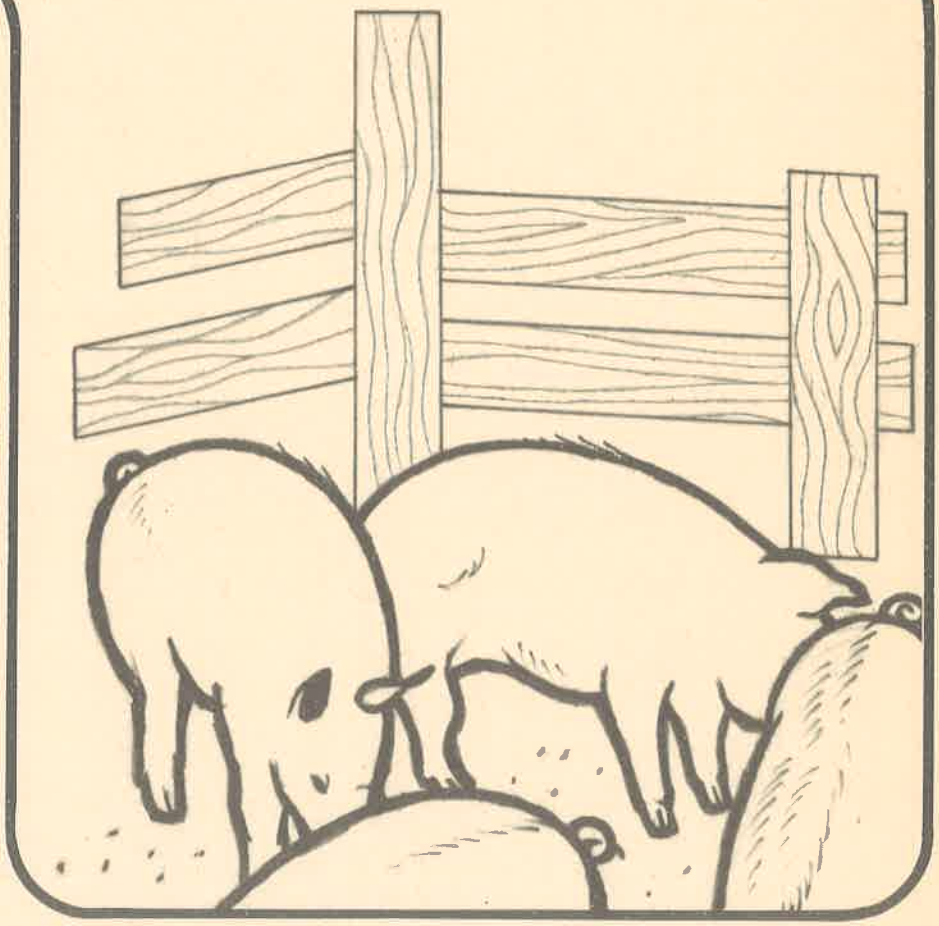


SWINE PRODUCTION AND HOUSING IN CALIFORNIA



Division of Agricultural Sciences
UNIVERSITY OF CALIFORNIA

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COOPERATIVE EXTENSION UNIVERSITY OF CALIFORNIA

This information is provided by Cooperative Extension, an educational agency of the University of California and the United States Department of Agriculture.

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The authors are Robert F. Miller, Tulare County Farm Advisor and William J. van Riet, Stanislaus County Farm Advisor.

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SWINE PRODUCTION AND HOUSING IN CALIFORNIA

Less than .5 percent of the hogs in the United States are produced in California, and the 11 western states produce less than 2 percent of the nation's pork.

The major competitive disadvantage faced by the California swine producer is the price of grain. Higher land values, limited packer-buyer competition, and difficulty in obtaining adequate financing also are problems. Compensating factors are a favorable climate in many areas of the state, which permits lower housing and energy costs; proximity to large numbers of consumers; and availability of some by-product feeds which may reduce ration costs.

PLANNING A SWINE PRODUCTION UNIT

Swine can be raised in any number, and a variety of housing and feeding regimes are available. The system of production chosen must be within the financial resources of the producer, satisfy his personal desires, meet the production requirements of the swine herd, and be coordinated and integrated. Plan carefully before building.

Since swine production facilities are not readily converted to other uses; they should be located away from populated areas and in strict adherence to zoning ordinances and planning commission regulations to protect the investment.

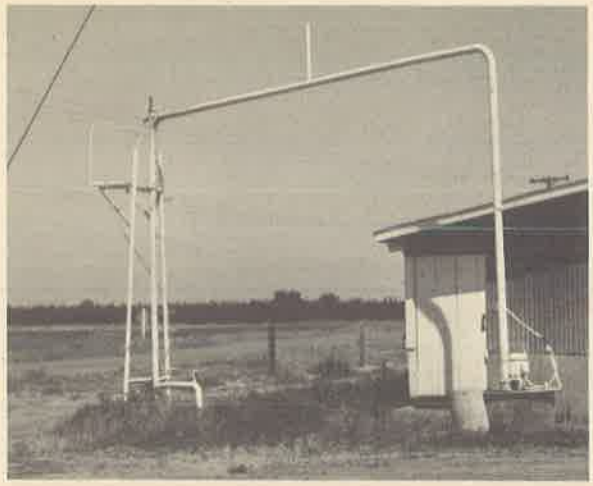
The Manure Disposal System

The best approach to planning a swine production unit is to design the manure disposal system first and then organize production facilities around it. Dirt pens require little if any attention and seem to be used indefinitely without cleaning. Solid floor pens require frequent hosing down, utilizing both labor and water. Self-cleaning slatted floors must have a pit underneath large enough to store the wastes between flushings. With the exception of the dirt pens, a disposal system must be engineered to meet county and state pollution control standards and not be offensive to those living or working nearby.

There are three basic manure disposal systems. The least complicated is the field flush system, where swine wastes are flushed out in the irrigation water and used as fertilizer on growing crops. This system requires a certain amount of crop land in conjuction with the swine enterprise, as well as a storage area that can be used when crops do not need supplemental water. This is probably the most efficient system in that more of the nutrients in the waste are utilized productively, and the least storage area is required. Labor and investment are lowest with this system.

Storage ponds are used on some ranches where crop land for disposal is limited. With this system there may be a series of ponds, one draining into the next with the water being reused as wash water; or one pond may be used to receive the wastes while the second is being cleaned by whatever means is practical and economical. This system requires more storage area; more labor to clean the ponds; and much nitrogen loss occurs, reducing the manure value.

The third disposal method utilizes a lagoon. This technique is not often used because of the relatively large lagoon area necessary for proper operation. About one acre of lagoon, 5 to 8 feet deep, is necessary for every 500 head of mature hogs, if an aerobic state is to



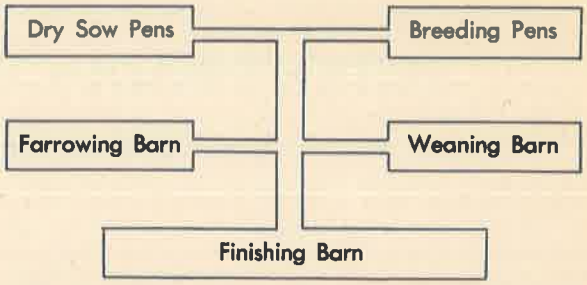
Wastes are collected in a sump and then pumped into irrigation pipeline for distribution.

be maintained. The investment necessary to build and maintain this type of facility has discouraged installation. The lagoon is difficult to make odor-free and causes the loss of most of the plant nutrients found in swine wastes.

Have an Overall Plan

Movement of swine to various production areas is a never-ending job. Labor will be minimized and frustrations reduced if production areas are laid out in a functional manner connected by fenced alleys as, for example, in the schematic drawing, *above right.*

This is the first of three storage ponds used to process liquid waste.



The physical resources of the ranch as well as the possibilities for future expansion should be considered when planning the layout. Housing plans also depend on the following management decisions.

1. Size of breeding herd (A sow will wean 1.8 to 2.2 litters of eight pigs each, twice a year.)
2. Seasonal or year-round farrowing
3. Age of weaning
4. Age of marketing
5. Confinement or pasture and drylot
6. Climate

PRODUCTION METHODS

There are two basic systems of swine production, the pasture system and the confinement system.

Pasture system. In this system, sows and gilts are bred to farrow in spring and fall, when weather is mild. After a sow and her litter remain housed for 2 to 3 weeks, they can be run on pasture in a group of as many as eight sows with litters of similar ages, until the pigs are weaned at about 8 weeks of age. After weaning, two to eight sows can be stocked per acre, with supplemental feed.

Pigs are stressed the least at weaning if sows are removed and the pigs allowed to remain in the field. Weaned pigs may be kept on pasture or placed in a drylot for finishing. Prior to weaning they should receive creep feed and, if they are left on pasture, they should continue to receive supplemental feed.

Confinement system. Breeding is staggered, so that some sows are farrowing every month of the year. Under this system, the primary building is an environmentally controlled

central farrowing house, designed to provide a warm, dry, draft-free environment for the baby pig. Other buildings, each designed for a highly specialized use, may include a nursery for sows and litters, an early weaning barn, finishing pens, and facilities for sows and gilts during gestation.

When the litter is 2 weeks old, pigs may be removed to a semienvironmentally controlled nursery; pigs are then weaned and put in a finishing pen at about 8 weeks of age. An alternate method would be to allow the sow and litter to remain in the farrowing facility until pigs are weaned at 3 to 4 weeks of age. The young pigs would be placed in an environmentally controlled early weaning barn for 4 to 6 weeks, and then removed to finishing pens.

Swine can be raised successfully under both systems. However, if swine production is to be more than a sideline enterprise, serious consideration should be given to the advantages offered by the confinement system.

- Although confinement buildings, unlike pasture land, cannot be converted to other uses, the system requires less investment in land, and allows a more efficient use of labor and facilities.

- Investment in specialized, nonconvertible buildings and equipment is higher, but more pigs per litter should be weaned under confinement.

- Hogs produced on pasture are marketed twice yearly, often when the seasonal price cycle is low. Confinement production allows hogs to be marketed throughout the year, leveling out the cycle.

- Disease and nutritional problems may be more complicated under confinement, and a satisfactory waste disposal system must be developed. However, adverse effects from internal parasites are reduced, and mud and dust are eliminated.

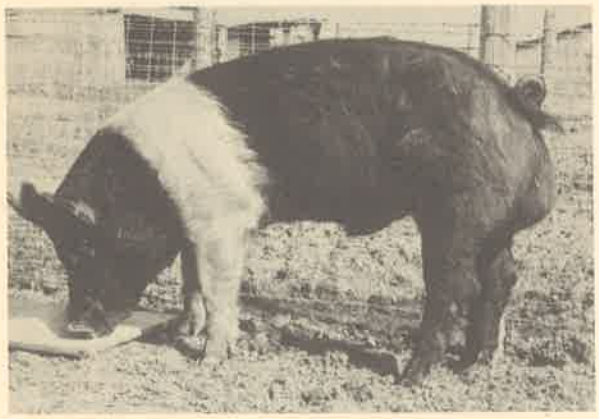
STOCK SELECTION AND BREEDING

Selection

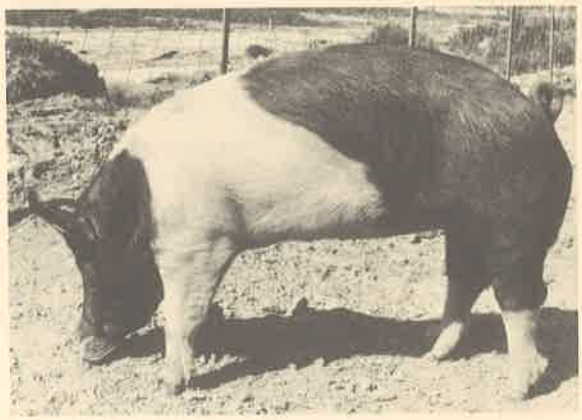
Every effort should be made to select foundation stock free from disease, particularly from atrophic rhinitis and vibrionic dysentery. Atrophic rhinitis causes a crooked nose and contributes to poor performance. The principal symptom of dysentery is blood and mucus in the manure. Mixing pigs from different herds often precipitates a disease outbreak; it is wise to obtain the boar and gilts from the same herd.

The purebred boar, whose qualities will influence every pig he sires, should have a superior performance record, including above average growth rate, as well as superior physical appearance and structural soundness, and masculinity. His sire and dam should have records of high fertility.

The same selection criteria are used for foundation female stock, except that females may be purebred or crossbred, and should exhibit feminine characteristics. Pay particular attention to the underside — females should have a minimum of 12 well-spaced, functional teats.



Masculine, structurally correct boar.



Muscular, yet feminine type gilt.

Breeding Programs

There are two types of swine breeding programs. Production of registered purebred stock requires great attention to details of breeding, reproduction, performance, disease, and registration, in addition to swine husbandry expertise. The objective of the purebred breeder is to supply high quality, healthy foundation and replacement stock to the commercial industry.

The other method involves producing swine for the commercial market where the ultimate product is pork. More than 90 percent of commercial swine production utilizes a crossbreeding program. There are three systems in current use:

1. Simple crossbreeding, in which a purebred male is mated to a purebred female of a different breed, and all of the offspring are sold as market swine.
2. Crisscross breeding, in which purebred boars of two breeds are used alternately, the gilts sired by the boar of one breed being mated with a boar of the other breed.
3. Rotational crossbreeding, in which purebred boars of three or more breeds are used successively in regular sequence.

The crisscross and rotational systems are advantageous, in that a cross-breed female produces crossbreed pigs.

Breeding Pens

High conception rates and large litters are essential. Matings must be spaced for maximum use of facilities without overcrowding. Serious attention should be given, therefore, to design and operation of a breeding area, and the breeding program must be tailored to the farrowing facilities. Since the reproductive process is a biological phenomenon, no system is exact. Group matings require the least management, but little will be known regarding due dates of the females. Placing one boar with one female during the heat period is a more precise breeding method, although this system requires additional labor and facilities.

Regardless of the system used, a comfortable environment should be provided. Nutrition should be correct and social disruptions held to a minimum.

A breeding pen designed for individual matings.

This facility is designed for pen breeding small groups as the pigs are weaned from the sows.

A breeding chute is sometimes used to facilitate mating.

Feed and Management for the Breeding Herd

Boars

- Boars should be 8 months old before being used for breeding, and can be used as long as they remain strong, reliable breeders. As daughters enter the breeding herd, however, replacement becomes advisable.
- Mature boars should receive 10 to 12 pounds of a balanced ration daily during a heavy breeding season. For young boars and those used lightly, reduce the amount of feed.
- In individual matings, limit the boar to one female per day. Service on two consecutive days should increase litter size by about one pig.

Females

- At time of breeding the females should be in a healthy, thrifty condition to insure high conception rates which will result in large litters of healthy pigs. Gilts should be at least 8 months old and weight about 240 pounds when bred.
- Adequate nutrition and protection from temperature extremes are the most important considerations during gestation. Except for the very thin, females should be limit-fed a nutritionally balanced, fortified feed. Depending on conditions, size, and weather, supply 4 to 6 pounds per head daily. Provide adequate shade or cool with water when temperatures exceed 85° F.
- The gestation period is 114 days, the estrous cycle 21 days. First heat after weaning occurs 3 to 5 days after pigs are removed; the heat period lasts 2 to 3 days.

GESTATION AND FARROWING

Housing Dry Sows During Gestation

The most successful system for maintaining dry sows will provide the best continuity of life style and nutrition from the dry sow unit to the farrowing facility. Even small changes in the living habits of the sow result in farrowing difficulties and litter deaths.

Care at Farrowing

About 3 to 6 days before farrowing, the sow should be moved into the cleaned farrowing area. She should be washed with warm, soapy water. The female should continue to be limit-fed until after farrowing, and then gradually increased to full feed (9 to 12 pounds daily) in a week. Before and during the week following farrowing, wheat bran, alfalfa meal, or beet pulp can constitute up to ⅓ of the ration, providing bulk which will alleviate constipation.

Occasionally a gilt or sow has difficulty farrowing. When this occurs call a veterinarian. Normal farrowing time is 4 to 6 hours.

Farrowing Facilities

Individual house units and central farrowing barns are the two types of farrowing facilities used. Whichever you choose, remember that the number of farrowing crates or houses limits the size of the herd. There are a number of ways each of these facilities may be used. The individual house unit can be located on pasture or in a drylot, and used seasonally or year-round depending on climate and construction. Sows and pigs can be left in these units until weaning, or can be removed to a nursery unit when pigs are old enough.

Central farrowing barns, the choice of many producers, can vary in size, shape, and interior design. A well-insulated and ventilated farrowing barn will provide a suitable environment in all seasons and climates.

Pasture is used along with individual house farrowing units when economics are favorable.

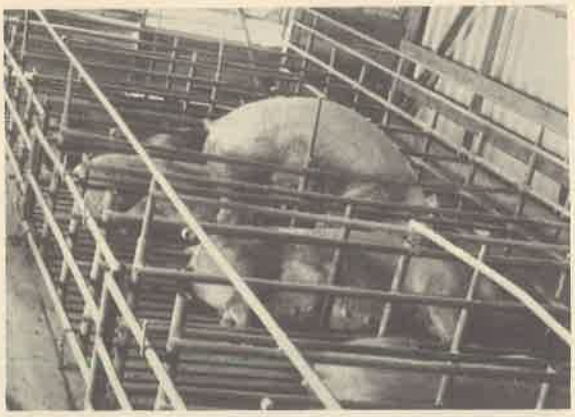
A definite sow and pig management schedule should be decided upon before a final floor plan is selected. Options to consider include:

1) Removal of sow and pigs to a nursery unit when pigs are 2 weeks of age; 2) Weaning pigs at 4 weeks of age to a weaning barn; or 3) Weaning pigs at 6 to 8 weeks of age to a fattening unit. Crate size and design depend on the schedule chosen.

Crate design. The floor of the crate should be built somewhat higher than the surrounding area. Expanded metal or slats located in front and back of the crate will keep area clean and dry.

Drylots for sows are economical and practical. Characteristics limiting number per pen are feeding, floor area, and shelter space. Overall pen size is less important. Mud and dust can be problems.

Complete confinement sow housing facility. Breeding stock that can withstand this environment must be carefully selected.



Individual sow stalls are useful for sows with physical or social problems. They are too expensive for housing the entire herd.

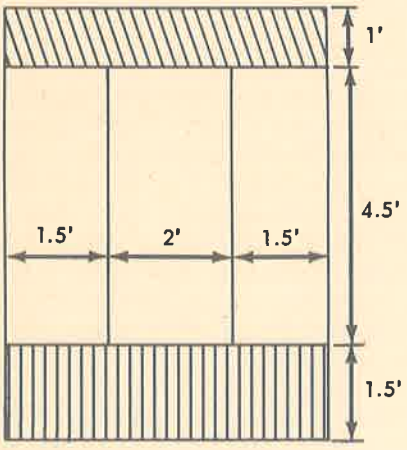
This individual farrowing house can be used seasonally or, in milder climates, year-round. The panel is used to lock the sow in when desired, and a burlap flap is used to reduce drafts. Interior features include guard rails, a heat lamp, and wood floor. This house is 6 feet high, 6 feet wide and 9 feet long.

A well-insulated central farrowing house provides year-round comfort. Note extremely flexible ventilation (windows, two-speed fan on cooler with water optional, and ridge top ventilators) — very workable house for all seasons.

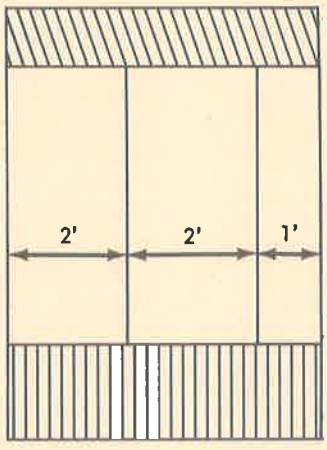
Interior view of 30-crate farrowing barn. Note heat lamps for additional warmth for newborn pigs.

An open-front unit is limited in use to spring and fall farrowings. Construction is of corrugated metal. Straw is used for bedding, and guard rails protect pigs from overlay. This house is 6 feet wide, 5 feet high, and 8 feet long.

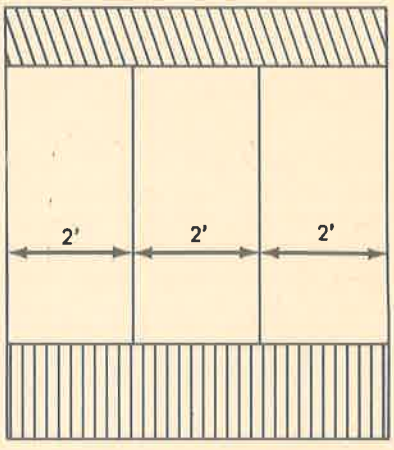
Interior view of a 16-crate farrowing barn. This is one of four individual barns. Farrowing is carried out in three while the fourth is depopulated and disinfected. These units have radiant heat in floor.



Sow and Litter Removal at 2 weeks

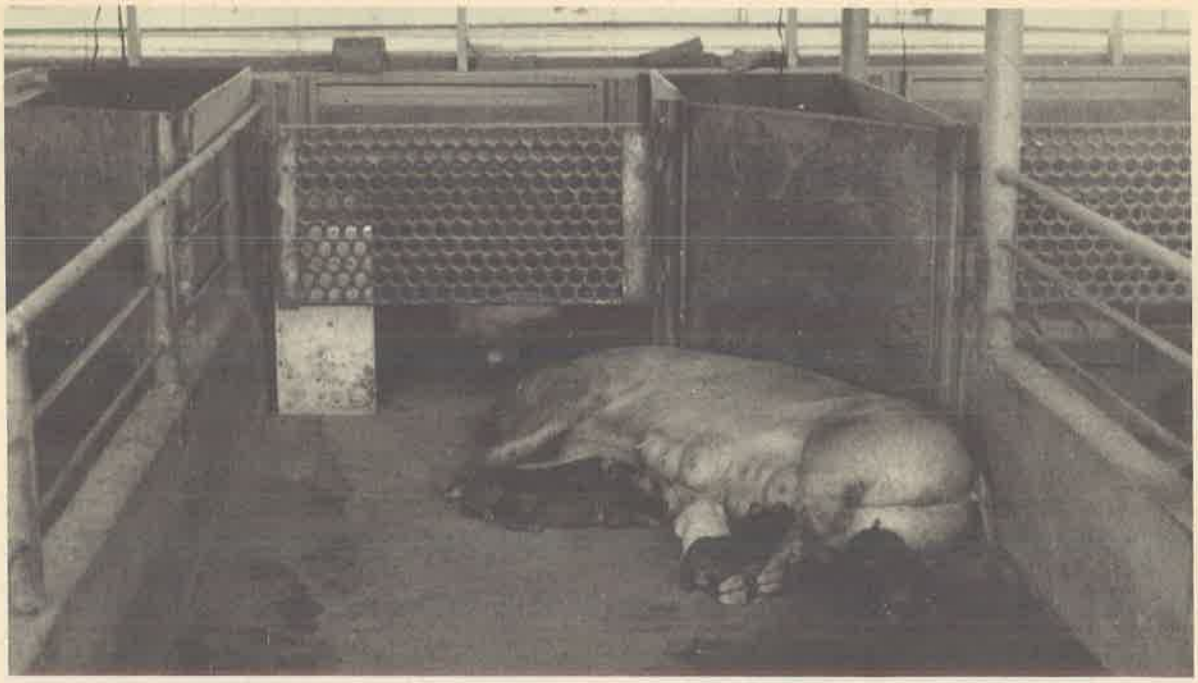


Sow and Litter Removal at 4 weeks.



Sow and Litter Removal at 4 to 8 weeks

Optional Crate Floor Plan and Dimensions



An individual nursery unit designed to hold one sow and litter.

CARE OF BABY PIGS TO WEANING

Pigs can get iron, which is deficient in sow's milk, from dirt. If the farrowing facility is on concrete, however, pigs will need an injection of iron at 3 days of age. Needle teeth should be clipped early in life to prevent udder damage during nursing.

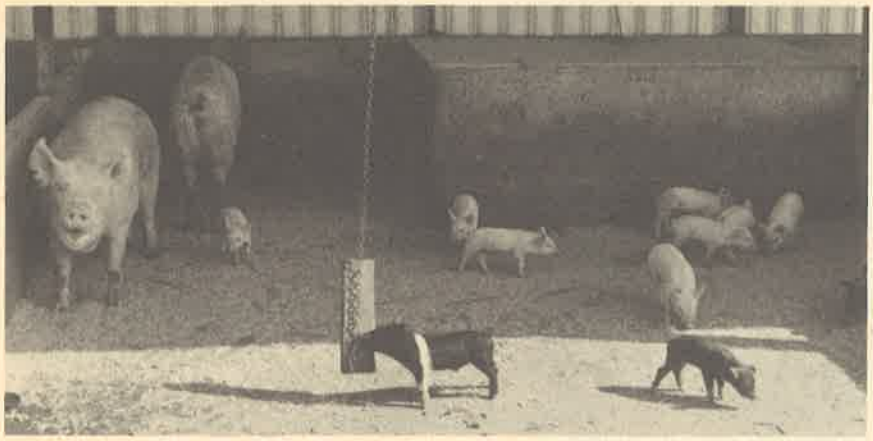
Young pigs' ears can be notched so the pigs can be identified and individual records kept. In addition, the tail should be docked to reduce the problem of tail biting in confinement. Castrate pigs when they are from 2 to 6 weeks old. To reduce stress, all of these operations should be done a week or more prior to weaning.

The baby pigs will begin to eat a prestarter feed in a creep area when they are 2 to 3 weeks of age. Depending on the facilities, pigs can be successfully weaned at 3 to 8 weeks of age; older pigs, however, have less problems following weaning. Perhaps a minimum weaning weight of 15 pounds is a better criterion to use than age.

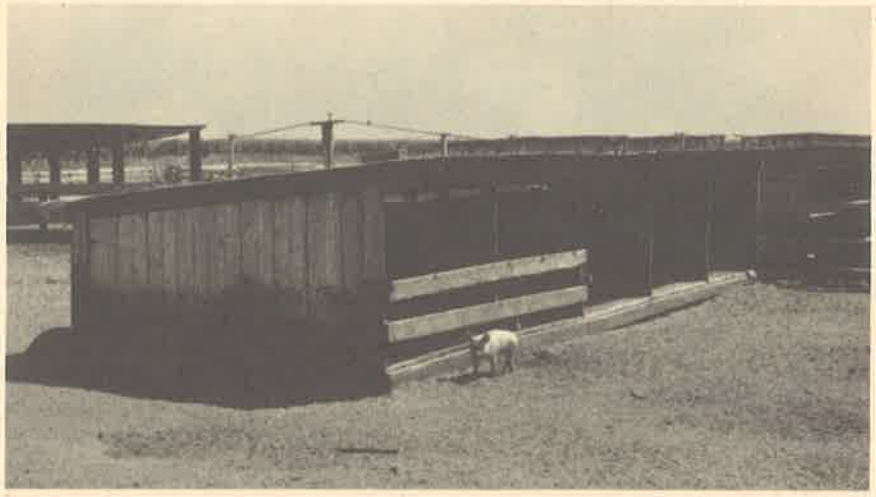
Facilities

Nurseries. Placing sow and litter in a nursey when the pigs are about 2 weeks old requires less investment per sow than does holding them in the farrowing facility, and it allows maximum use of the farrowing barn. Most nurseries have shelters and creep areas for baby pigs. While one sow and litter per nursery unit may be most desirable, a number of units are designed to accommodate more than one sow.

Weaning barns. A weaning barn, essential if pigs are weaned at a young age, must have adequate but draft-free ventilation, good insulation for environmental control, and a self-cleaning floor. Pigs tend to perform best on expanded metal floors, although concrete or wood slats also have been used.

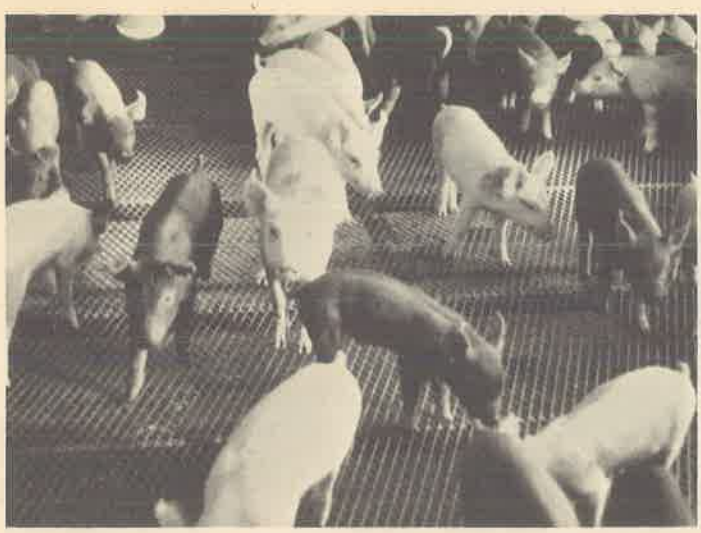


Three to four sows and litters are placed in this 15- by 24-foot pen. Floor is concrete.



This community nursery shelter is located in a drylot.

A 32- by 32- by 8-foot room was built inside this old barn, successfully converting it to a weaning unit — not fancy but functional.



Forty 4- to 8-week-old pigs occupy each 8- by 16-foot pen. Note expanded metal 8 inches over sloped concrete.

Interior of weaning barn featuring concrete slats and automatic feeding equipment.

Self-cleaning slats are spaced 1 inch apart. Pigs have access to bedding box for the first few days following weaning.

GROWING AND FINISHING

Feeding

Feed costs represent 75 to 80 percent of the total cost of producing a pound of pork. Most of this feed is consumed by pigs in the growing and finishing unit. Feeding, therefore, must be as economical and efficient as possible. Prevent waste from self-feeders; waste is costly if it continues over any length of time.

The feed must contain adequate energy, sufficient protein, and essential vitamins and minerals. Hogs cannot utilize large amounts of roughage such as hay or pasture. Use of by-products such as cull potatoes, cull beans or peas, pumpkins, and bakery waste must be limited to 25 percent or less of the ration. Often the additional handling and questionable quality of these feeds make them more expensive than the initial price indicates.

Garbage feeding is not recommended for most hog producers. California law forbids feeding garbage without meeting stringent cooking and handling regulations under state licensing and inspection. Costs of cooking are high, and extremely good management is needed for success.

Refer to UC Division of Agricultural Sciences leaflet 2342, A PRACTICAL GUIDE TO SWINE NUTRITION, for an excellent discussion of and recommendations for feeding hogs.

Feeding systems and equipment. The simplest method of handling feed on swine ranches is to buy all of the feed mixed and delivered to self-feeders by a feed manufacturer. This reduces the need for feed storage and eliminates the need for a delivery system, but requires large self-feeders. Alternatively, the supplier can mix the feed and deliver it to a bulk holding tank, from which it is distributed by an automatic delivery system. Relatively small self-feeders will suffice with this method.

On-the-farm storage bins.

If feed is mixed on the farm, it may be most practical for the protein supplement to be mixed and delivered by a feed manufacturer and then blended with grain that is stored and ground on the ranch.

Storing, processing, and mixing the complete feed requirements of the ranch is seldom undertaken because of the large inventory that would be needed.

Large self-feeders reduce feed storage requirements.

A complete on-the-farm feed processing center.

Finishing Facilities

Swine finishing units range from drylots on dirt enclosed by panels to highly sophisticated, enclosed and automated units.

Outside finishing. Finishing lots on dirt currently are used to a limited extent. A shelter for protection from heat and cold should be provided, as well as sprinklers or a wallow in summer. Mud and dust can be problems, and internal parasites may pose a threat as the land builds up a history of swine production. However, the low initial investment needed for this type of facility still appeals to some producers.

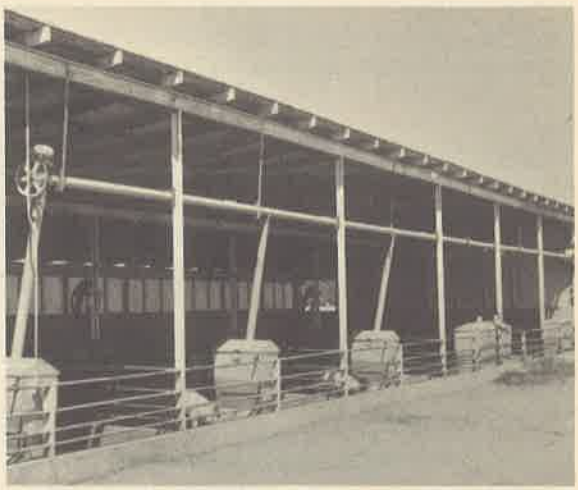
Confinement units. Open-fronted, solid-floored finishing units are successfully used on many swine ranches. Buildings are open to the south, with an adjustable opening on the north. Floors usually slope about ½ inch per foot. Pens accommodate 20 to 40 pigs, with each 150-pound or larger pig being allotted 8 to 9 square feet. Larger numbers of smaller pigs are often started in a pen and then sorted into smaller groups as they grow. Tail biting is a problem in all confinement units, and overcrowding increases this tendency.

Slatted floor units have gained in popularity because labor and water are not needed for removing manure from the floor. Costs are higher per square foot but since space allotment per pig is ⅓ less than on a solid floor, costs remain competitive. Field observations indicate that 4-inch slats with 1-inch openings between slats are satisfactory for pigs 20 pounds and over. As long as feeder and water facilities are adequate, pen shape is not important.

Fencing. Tight fences are essential. Good quality woven wire 36 inches high with strands of barbed wire at the bottom and top might be used. Some producers electrify one strand. Diamond mesh fencing with a barbed wire at the bottom and top is excellent. For small lots, a good fence can be constructed from 1- by 6-inch rough boards, 4 boards high with about 3 inches between the two bottom boards. Posts should be no more than 8 to 10 feet apart. Metal panels that can be joined together and anchored at the corners to provide flexible, sturdy and easily moved fencing are commercially available.

This dirt lot, located in an area of low rainfall and on sandy soil, functions well as a finishing facility. Sprinklers settle dust and cool the area in summer.

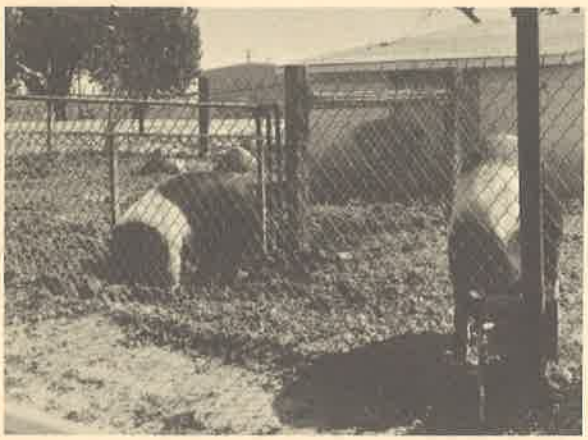
From 300 to 500 pigs can be grown out in this open-fronted fattening barn. Higher labor and water requirements for cleaning these solid floor pens will limit interest in this type of building. Note large capacity self-feeders. One feeder space for 4 to 5 pigs and one waterer per 30 head will adequately meet feed and water space requirements.



This finishing unit is equipped with an automatic delivery system for feed which allows self-feeders to be of smaller capacity.

This slatted floor building features adjustable plastic side curtains and concrete slats.

This building uses feeders for side of pen. Slats are made of 4-inch channel iron. Cooling is by overhead sprinklers. Note cleanliness of pigs and floors in both facilities.



A diamond mesh fence.

A woven wire fence with wooden posts.

HOUSING AND SPACE GUIDELINES

Pasture

Animals	Number Per Acre
gestating sows	8 or less
sows and litters	4 or less
growing-finishing pigs	20 to 25

Shade

Animals	Square Feet Per Animal
sow	15 to 20
sow and litter	20 to 30
pigs under 100 pounds	4
pigs over 100 pounds	6

Floor Space

Animals	Square Feet Per Animal
gestating sow	15
boar	15 to 20
pigs under 40 pounds	3
pigs 40 to 100 pounds	4
pigs 100 to 150 pounds	6
pigs over 150 pounds	8

Reduce requirement by ⅓ for slats

Feeders and Waterers

Equipment	Number of Pigs	Space
self-feeders	5	1 space
supplement feeders	15	1 space
waterers	30	1 waterer

HEALTH AND SANITATION

Herd health and sanitation require constant management and supervision. The most critical time in the life of a pig is during farrowing and the first few weeks following. Daily cleaning of pens with baby pigs is important. Provide warm, dry bedding and draft-free stalls. Avoid sudden changes in temperature and feed. Should pigs get scours, look again at sanitation and temperature control and treat the affected pigs with antibiotics and sulfa drugs.

All shelters, lots and equipment should be kept clean. A hog is as clean as it is allowed to be. Avoid wallows for cooling hogs. It is difficult to keep a mud wallow sanitary. Instead, use sprinklers, preferably over a concrete area, to keep hogs cool. Diseases to be most concerned about include enteritis (dysentery), transmissible gastro enteritis (TGE), atrophic rhinitis, erysipelas, leptospirosis, brucellosis, pneumonia and tuberculosis. Hog cholera is reasonably well under control.

Internal and external parasites also can cause health problems and should be either symptomatically or routinely controlled. A veterinarian can be very helpful in outlining an overall program for herd health.

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Swine Production

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Swine Production

The authors are Robert F. Miller, Tulare County Farm Advisor; William J. van Riet, Stanislaus County Farm Advisor; and James L. Farley, Merced County Farm Advisor.

Interest in swine production in California is growing. The California producer has several advantages over producers in other parts of the country:

Climate: Moderate to mild in much of the state.

Disease: Fewer problems compared with other parts of the country.

Markets: Less than 5 percent of the pork consumed in California is produced here.

Waste disposal: Convenient and inexpensive alternatives.

The California producer also faces some disadvantages:

Feed prices: Higher than many swine-producing areas of the nation.

Financing: Many lending agencies have had little experience with loans for swine production and are not comfortable with them.

County ordinances: Most counties have regulations restricting areas of production.

Marketing: While California has a good market for pork, processing plants are few. Therefore, many areas of the state are far removed from a market for the live animal.

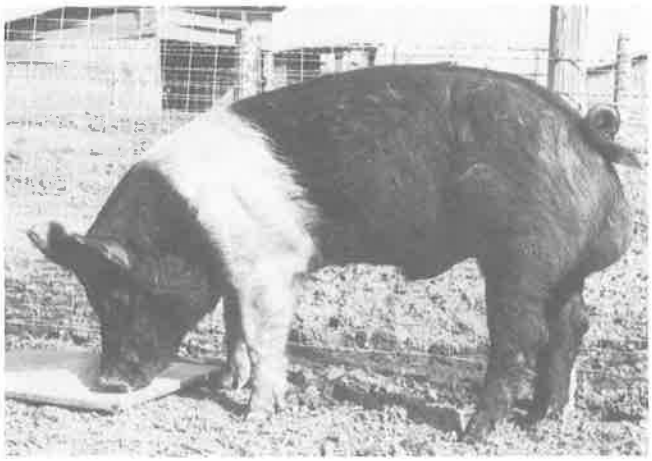
Selection

The most popular breeds of pigs are Hampshire, Duroc, Yorkshire, Poland China, and Chester White. These breeds are freely cross-mated because offspring from this type of mating will outperform those from purebred parents of the same breed.

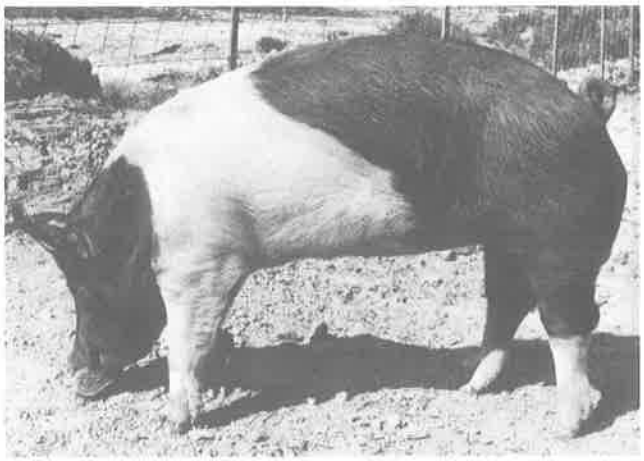
Every effort should be made to select foundation stock free from disease, particularly from atrophic rhinitis and swine dysentery. Atrophic rhinitis causes a crooked nose and contributes to poor performance. The principal symptom of dysentery is blood and mucus in the manure. It is wise to obtain the boar and gilts from the same herd because mixing pigs from different herds often precipitates a disease outbreak.

The purebred boar, whose qualities will influence every pig he sires, should have a superior performance record, including above average growth rate, as well as superior physical appearance and structural soundness, and masculinity. His sire and dam should have records of high fertility.

The same selection criteria are used for foundation female stock, except that females



Masculine, structurally correct boar.



Muscular, yet feminine type pig.

may be purebred or crossbred, and should exhibit feminine characteristics. Pay particular attention to the underside — females should have a minimum of 12 well-spaced, functional teats.

Feeder pigs should also be carefully inspected for disease and quality. Pigs more than 50 pounds are easier to feed and raise. It is generally easier to feed out two or more pigs at a time rather than feeding an individual pig. Feeder pigs should be dewormed as soon as they get home.

Breeding

Many producers prefer to have a portion of the breeding area on dirt, although some confinement units have small pens on concrete. Putting one sow with one boar results in the least stress during the mating period. However, when this is not possible, a boar can be turned in with a small group of females. It is best to rotate boars daily under this procedure. In individual matings, limit the boar to one female per day. Service on two consecutive days should increase litter size. Boars should be 8 months old before breeding and can be used as long as they remain reliable breeders. As daughters enter the herd, replacement of boars is advisable.

Females should be healthy when bred to insure high conception rates. Gilts should be at least 8 months old and weigh at least 250 pounds before they are bred. Mixing or moving gilts will often stimulate a heat period. So will having a boar nearby so that they can see, hear, and smell him.

The gestation period is 114 days and the estrous cycle is 21 days. The first heat following weaning occurs 3 to 5 days after pigs are removed, and the sow can be bred at this time.

Adequate nutrition and protection from temperature extremes for both boar and sow are important during the breeding and gestation period. Provide shade and shelter and cool the animals with water when temperatures exceed 80° F.

The most successful production system provides continuity of life-style and nutrition from the gestation area to the farrowing facility. In other words, don't make any major feeding or other management changes during this period.

Feed is the major cost of producing pork. Feeds that supply energy — barley, milo, and corn — form the basis of swine rations. Grinding is the usual way to prepare grain for swine, although rolling or crushing are also effective. Grain can be fed whole but lowered feed efficiency will result. High fiber feeds, such as hay or pasture, will also give disappointing performance.

Swine need adequate protein for best performance. Since grain is lower in protein, high protein feeds, such as soybean meal, meat scraps, fish meal, and alfalfa meal, are added to swine rations. Cottonseed meal may be used, but it is low in lysine and contains "gossypol" which can be harmful, if cottonseed meal is more than 10 percent of the ration. Minerals, such as calcium, phosphorus, salt, and zinc, and

TABLE 1. Nutrient Content of Some Common Swine Feeds

				Minerals (%)	
Grain Sources	**Dry Matter (%)**	**Protein (%)**	**Digestible Energy (%)**	**Calcium**	**Phosphorus**
Barley	89	9.0	71.0	.05	.32
Corn	89	8.8	79.9	.02	.28
Milo	89	8.9	78.0	.03	.28
Wheat	86	10.2	83.0	.05	.31
Protein Sources					
Alfalfa meal	92	17.5	58.5	1.44	.22
Fish meal	92	60.5	62.0	5.11	2.88
Meat scraps	93	50.4	65.0	10.10	4.96
Soybean meal	89	44.0	76.0	.29	.65
Cottonseed meal	92	41.4	61.0	.15	.97

vitamins, such as vitamin A, vitamin D, pantothenic acid, riboflavin, and B_{12}, also are often added to rations to insure efficient production.

Depending on the health of the herd, antibiotics in swine rations may be helpful. Antibiotics can: increase rate of gain; improve feed efficiency; reduce effects of some diseases and control others.

Antibiotics and other growth promoting additives work best with pigs that weigh less than 100 pounds. Many additives, by law, cannot be included in the ration for a specific number of days before slaughter. *Observe withdrawal times stated on the feed label or illegal drug residues will occur in the pork product.*

Boars should receive a ration moderate in protein and well fortified with vitamins and minerals. Mature boars should receive 8 to 10 pounds daily of a balanced ration during the breeding season. As breeding activity is reduced, the daily ration should also be reduced. Boars should be fed twice daily.

Gilts selected for the breeding herd are often removed from the finishing pens when they weigh 150 to 200 pounds. They are then fed a ration adequate in protein, vitamins and minerals, but the amount is restricted so energy intake is limited. The objective is to reduce the growth rate while reproductive development continues. By following this procedure gilts will weigh approximately 250 pounds, be in good physical condition, and will be ready to be bred at 8 to 9 months of age.

The pregnant sow or gilt also has specific nutritional needs. She should receive a feed moderate in protein and well fortified with vitamins and minerals. Energy intake should be restricted by limiting the amount of feed given so that she is not overweight at farrowing time.

TABLE 2. Recommended Protein Levels and Approximate Daily Feed Intake

Breeding Swine	Protein (%)	Feed Intake per Head (lbs)
Bred sows and gilts	14	4 - 6
Adult boars	14	4 - 6
Young boars	14	5 - 7
Breeding boars	14	8 - 10
Lactating gilts	15	9 - 11
Lactating sows	15	10 - 12

Fat sows have problems farrowing. Four to six pounds per head daily should be sufficient. Feed once a day and make sure each sow receives her share.

The sow should continue to be limit-fed until she farrows. After farrowing she should be given a laxative feed. Mixing 15 percent wheat bran, beet pulp or alfalfa meal with the "grower" feed will serve the purpose. Feed twice a day at regular times. When all body functions have returned to normal withdraw the laxative portion and over a period of 7 to 10 days gradually increase feed to 10 to 12 pounds daily.

Farrowing

The farrowing area must be warm, dry, draft-free, and clean for survival and growth of baby pigs. About 3 to 6 days before farrowing, the sow should be washed with warm soapy water to remove worm eggs, dirt, and manure from her body. Some producers also spray sows with a mild disinfectant for lice and mange control and deworm them before farrowing.

In individual houses or structures converted to a farrowing facility, guard rails 8 inches high and 8 inches out from the wall will help protect the baby pigs from being hurt or crushed by the sow. In a central farrowing house, crates that restrict sow movement are used for this purpose. Bedding should be provided. Straw is often used in individual houses and sawdust is common in the central house.

Remain with or near the sow until the afterbirth, or placenta, is shed. Until this occurs, there is always the possibility more pigs will be farrowed; sometimes the last one is in the afterbirth. Normal farrowing time is 4 to 6 hours.

Occasionally a gilt or sow has trouble farrowing. When this occurs call a veterinarian.

Care of Baby Pigs

Newborn pigs should be wiped dry. Occassionally pigs that appear to be lifeless can often be saved by wiping membrane from the nose and head, and, if necessary, slap them on the side to start them breathing. Cut the navel cord to about one inch and apply iodine to the navel. A crimper used on the navel cord above the area to be cut helps prevent bleeding. Keep the baby pigs from chilling. Heat lamps or gas heaters will provide additional warmth.

Sow milk is deficient in iron. Pigs can get

adequate iron from dirt, but if the farrowing facility is on concrete, they will need an injection of iron when they are 1 to 3 days old. Newborn pigs have a total of eight small needle-like teeth on each side of the upper and lower jaws. Cutting them off to about two-thirds of their length will prevent injury to the sow's udders. Infections from scratching and biting during fighting will also be reduced.

In addition, the tail should be docked to prevent tail biting if the animal is to be group-raised in confinement. Male pigs that will not be kept for breeding should be castrated when they are from 2 to 6 weeks old. To reduce stress all of these operations should be done a week or more before weaning.

Baby pigs will begin eating a prestarter feed in a creep area when they are 2 to 3 weeks old. They will be encouraged to eat sooner if some feed is put on the floor. As the sow eats they will learn to eat with her.

Weaning

Weaning can be done when pigs are 3 to 8 weeks old. This is one of the most stressful periods in a pig's life. Older pigs have fewer problems adjusting, but objectives and facilities of the producer will determine the exact weaning age.

An "early weaning" system is used by most medium- to large-scale producers because it is efficient, but it also requires sophisticated management and facilities. With this system pigs are weaned and put in a warm, dry, draft-free nursery or weaning barn, when they are 3 to 4 weeks old. They stay in this facility until they weigh approximately 40 pounds. A prestarter feed with 20 to 22 percent protein is necessary for these early weaned pigs.

It is easier to wean pigs when they are 5 to 8 weeks old. Because milk production in the sow peaks about three weeks after farrowing and then declines, baby pigs should be given a pre-

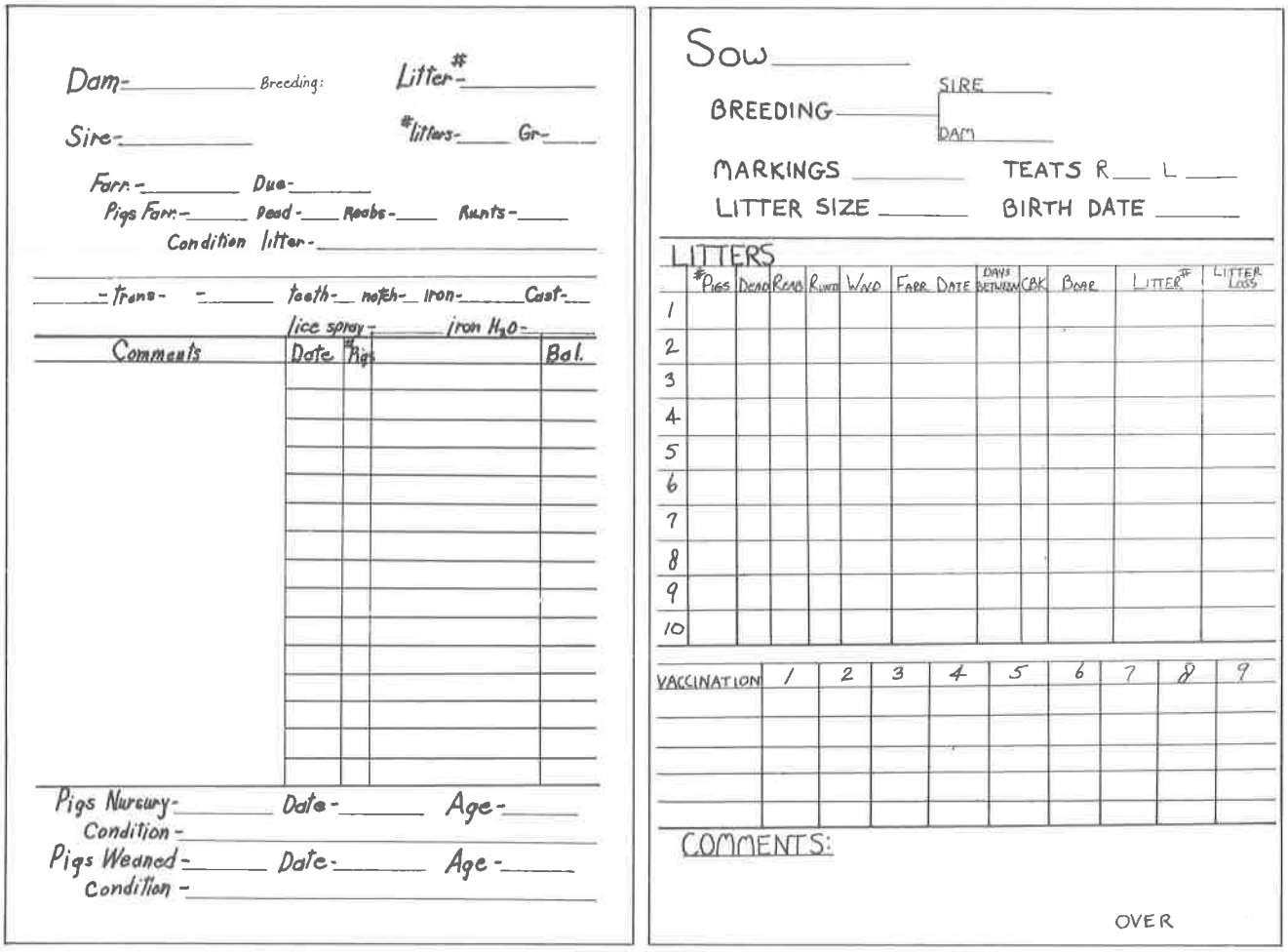


FIGURE 1. Records.

starter feed in a creep area. As the pigs grow, the farrowing area is not large enough and more living space will have to be provided. Shade and shelter and a slab or trough for feeding and a creep feed area for the pigs are necessary. Often several sows and litters are turned together during this period.

Growing and Finishing Swine

Weaned pigs are called feeder pigs and progress through growing and finishing stages. Pigs 40 to 75 pounds should receive a 16 percent protein feed called a "starter." Pigs from 75 to 125 pounds should receive a 14 percent protein "grower" feed, and pigs from 125 to 200 pounds are fed a 13 percent protein "finisher" feed. Growing pigs should gain about 1.2 pounds daily, and finishing pigs should gain around 1.65 pounds daily.

Wt. of Pig (lbs)	Name of Feed	Protein (%)	Approx. Quantity (lbs)
20 - 40	Prestarter	18 - 20	1.0 - 2.5
40 - 75	Starter	16	2.5 - 4.0
75 - 125	Grower	14	4.0 - 5.5
125 - 220	Finisher	13	5.5 - 7.5

Water and Salt

Pigs drink a quart or more of water for every pound of dry feed they eat. High temperatures increase consumption to a gallon or more. A weaner pig will consume up to one-fifth of its body weight daily, while a 200-pound finishing pig will consume up to 7 percent of its body weight.

To produce an adequate milk supply, lactating females need unlimited access to water. Young pigs will not eat enough creep fed unless water is available.

Swine require salt, as do all farm animals. It usually is added to commercial swine feeds, or it can be supplied in a box or trough.

Records

Many producers keep records on the sow and litter in the farrowing house. Information recorded will include breeding and health data, number of pigs born and condition of litter and dates of all farrowing house procedures. At weaning all pertinent data will be transferred to a permanent sow card. This data will be extremely important in breeding and selection decisions. A standard ear notching system with 399 variations allows you to identify litters or individual pigs for record-keeping purposes.

Swine Production Facilities

Swine growing and finishing units range from drylots enclosed by panels or wire fencing to highly sophisticated enclosed and automated units constructed of steel and concrete. Growing and finishing lots on dirt work well and the

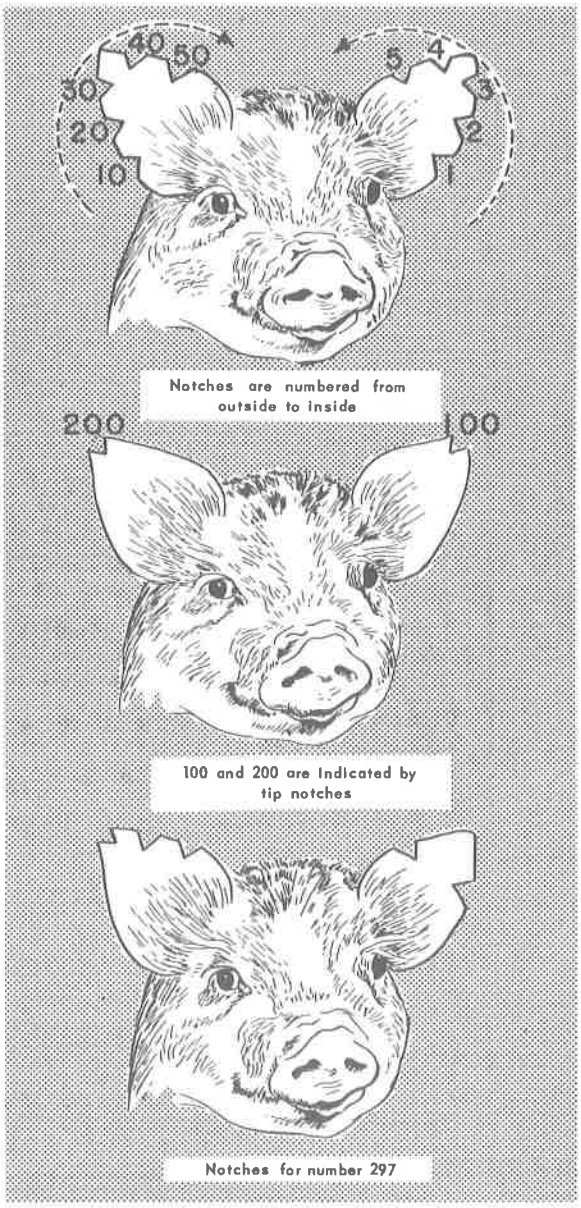


FIGURE 2. Ear Notching.

low initial investment makes this type of facility practical, particularly if small numbers of pigs are involved. Shelter and shade and sprinklers or a wallow for cooling in summer must be provided. Pigs can be fed on a slab, in a trough, or with a self-feeder. Mud, dust, and internal parasites can be problems in dirt lots. However, there are excellent products on the market for parasite control.

Tight fences are essential. Good quality woven wire 30 to 36 inches high with strands of barbed wire at the bottom and top can be used. Some producers electrify one strand. Diamond mesh fencing with a barbed wire at the bottom and top is excellent. For small lots, a good fence can be constructed from 1- by 6-inch rough boards, 4 boards high with about 3 inches between the bottom boards. Posts should be no more than 8 feet apart. Metal panels which can be joined and anchored at the corners to provide flexible, sturdy and easily moved fencing are commercially available.

Make sure the pen is ready before the pigs are put in it. The shade, shelter, and feeding area will limit the numbers of pigs per pen. Overall pen size should provide 25 or more square feet per pig.

Most large swine operations use the confinement system of production. Open-fronted, solid-floored buildings are often used. The buildings are open or semi-open to the south, depending on local weather conditions, and have an adjustable opening on the north side. A flushing gutter system may be incorporated into the construction scheme. This concept calls for use of a sloped, shallow gutter that is flushed periodically to remove waste to a lagoon or manure storage area. Periodic flushing attracts the pigs to the gutter, essentially "toilet training" them. Length of pen should be twice the width. Feeders should be in front and waterers over the gutter at the lower end. Pens should hold 20 to 40 pigs with approximately one square foot of space allotted per 25 pounds of live pig. (A 100-pound pig would have 4 square feet.) Larger numbers of smaller pigs are often started in a pen and are sorted into smaller groups as they grow. When planning for this type of system consult your farm advisor for construction details and waste management information. Also, consider visiting some swine operations where gutter flushing is used.

Slotted floor units are the choice of some producers because of their self-cleaning characteristics. However, a flushing system must be provided to remove the manure from under the slats. Construction costs are higher per square foot, but, because space allotment per pig is less, costs can be competitive. Concrete slats are the most economical and durable. Four-inch slats, spaced one inch apart, are satisfactory for pigs weighing 40 pounds or more. Pen shape is not important as long as feeder and water facilities are adequate.

Housing and Space Guidelines

Pasture

Animals	No. per Acre
Gestating sows	8 or less
Sows and litters	4 or less
Growing-finishing pigs	20 to 25

Shade

Animals	Sq. Ft. per Animal
Sow	15 to 20
Sow and litter	20 to 30
Pigs under 100 pounds	4
Pigs more than 100 pounds	6

Floor Space

Animals	Sq. Ft. per Animal
Gestating sow	15
Boar	15 to 20
Pigs under 40 pounds	3
Pigs 40 to 100 pounds	4
Pigs 100 to 150 pounds	6
Pigs more than 150 pounds	8

(Reduce requirement by ⅓ for slats)

Feeders and Waterers

Equipment	No. of Pigs	Space
Self-feeders	5	1
Supplement feeders	15	1
Waterers	30	1

Feeding Systems

The simplest method of handling swine feed is to buy it ready mixed, either sacked or delivered in bulk. If small numbers of pigs are involved, purchasing complete feeds is most practical. A

bulk-handling system should be designed if larger numbers of swine are involved. Automatic delivery systems are often incorporated into the housing plan. Market swine are most often self-fed in feeders designed for this purpose. Four to five head can be fed per feeder opening. Make sure the feeder opening is properly adjusted to prevent waste. Because of more precise requirements or restrictions, the breeding herd should be hand fed. Substantial amounts of time and money can be saved by planning an efficient and waste-free feeding system.

If feed is mixed on the farm it may be most practical for the protein supplement to be mixed and delivered by the feed manufacturer and then blended with grain that is stored and ground on the ranch.

Storing, processing and mixing the complete feed requirements of the ranch is economical only in larger units.

Health and Sanitation

All shelters, lots, and equipment should be kept clean. Swine are as clean as they are allowed to be. If pigs are uncomfortable because of heat, cold or wet and drafty conditions, health and economic performance will be reduced. It is important to construct and manage facilities to overcome these conditions. If flies are a problem, look for areas where they are breeding and eliminate the source.

Pigs are affected by internal and external parasites and can get sick from viral and bacterial caused diseases. Several effective dewormers and insecticides are available to reduce parasite problems. Spraying periodically for lice and deworming weaner and feeder pigs and the sow before farrowing should take care of parasite problems.

Disease problems are not as easily defined or routinely solved. Vaccines for preventing or arresting some diseases can be used. A veterinarian can be very helpful in outlining a program for herd health.

The Manure Disposal System

The best approach to planning a swine production unit is to design the manure disposal system first and then organize production facilities around it. Dirt pens require little if any attention and seem to be used indefinitely without cleaning. Solid-floor pens require frequent hosing down, using both labor and water. Self-cleaning slatted floors must have a pit underneath large enough to store the wastes between flushings. With the exception of the dirt pens, a disposal system must be engineered to meet county and state pollution control standards and not be offensive to those living or working nearby.

There are three basic manure disposal systems. The least complicated is the field flush system, where swine wastes are flushed out in the irrigation water and used as fertilizer on growing crops. This system requires a certain amount of cropland in conjunction with the swine enterprise, as well as a storage area that can be used when crops do not need supplemental water. This is probably the most effective system in that more of the nutrients in the waste are utilized productively, and the least storage area is required. Labor and investment are lowest with this system. This system is also least favorable to *culicoides* gnat and fly breeding if managed properly.

Storage ponds are used on some ranches where cropland for disposal is limited. With this system there may be a series of ponds, one draining into the next with the water being reused as wash water, or one pond may be used to receive the wastes while the second is being cleaned by whatever means are practical and economical. This system requires more storage area, more labor to clean the ponds, and substantial nitrogen loss occurs, reducing the manure value.

The third disposal method uses an aerobic lagoon. This technique is not often used because of the relatively large lagoon area necessary for proper operation. About one acre of lagoon, 5 to 8 feet deep, is necessary for every 500 head of 100-pound swine, if an aerobic state is to be maintained.

Economics

Because of the rapid turnover, swine generate an income in a shorter time than many domestic farm animals. The major risks are poor production performance, a drop in pork prices, or a rise in feed prices.

Seventy to 80 percent of the cost of raising pigs is for feed. It takes about 2,500 pounds of feed per year to feed a sow for two pregnancies and lactations. In return for this feed she should produce at least 15 pigs in two litters. It will take

3¼ pounds of feed per pound gain, or a total of 585 pounds of feed, to raise a pig from 40 pounds to 220 pounds. The boar will require about 2,000 pounds of feed annually. Because feed is the major expense, costs should be estimated and budgets prepared. In a feeder operation cost of pigs should also be calculated and financing arranged.

Buildings and equipment also may require a sizeable investment. These facilities may have to be financed over a long period to obtain a reasonable repayment schedule.

Any swine enterprise should be sufficiently financed to withstand one adverse year without danger of bankruptcy.

The Yield

Unless you are skilled in slaughtering, call a professional butcher from a locker service to kill your pig.

Pork is highly nutritious and all of the carcass can be used. It is perishable and deteriorates more rapidly than do other meats. It does not improve with aging and should be processed within several days after slaughter. It can be preserved by freezing, curing, or canning. Hogs are usually slaughtered when they weigh 200 to 220 pounds. A 220-pound porker should yield the following:

	Pounds
Loin pork chops	27
Picnic butt	25
Spareribs	5
Pig's feet	4
Neck bones	1
Sausage material	19
Lard	15
Ham	31
Bacon	19
Miscellaneous	9
TOTAL	155

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GLOSSARY OF LIVESTOCK TERMS

BARROW	A male hog castrated at an early age.
BOAR	A male hog of any age.
CASTRATE	To remove the testicles.
CREEP AREA	An area accessible to nursing pigs but not their mother where supplemental feed is provided.
CROSSBRED	The progeny of pure-bred parents of different breeds but of the same species.
DAILY RATION	The amount of feed supplied each day.
FARROW	To give birth to pigs.
FEEDER PIGS	Animals with sufficient growth and flesh suitable for feedlot feeding.
GESTATION PERIOD	The time interval between conception and farrowing.
GILT	A young female hog which has not farrowed.
PACKING SOW	A hog that has been used as a brood sow, usually weighty and frequently rough.
RAZOR BACKS	Thin, narrow-backed hogs of no breeding program, usually from the South.
RUNTS	Small, undersized or weak pigs in a litter.
SELF FED	Feed available at all times.
SHRINK	Weight loss.
SOW	A mature female hog.
TAIL ENDS	The animals left over after the more desirable individuals have been sorted from a group.
WEANING	Removing the young from their mother.
WEANLING	A newly weaned animal.
YIELD	Percent of carcass usable after slaughter compared with live-weight. (Usable meat ÷ live slaughter wt. × 100 = yield.)

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SWINE RATION WORKSHEET

Ration _____

Ingredient	Percent	Calculated Analysis: Protein %	Calcium %	Phosphorus %	Vit. A units/lb	Vit. D units/lb	Vit. B12 mcg/lb	Riboflavin mg/lb	Pantothenic acid mg/lb	Niacin mg/lb	Choline mg/lb
TOTALS											
Calculated analysis											
Nutritive requirements											

SWINE TERMS

General Terms for Market and Breeding Swine

Finish - Positive comparative terms

1. A trimmer, more correctly-finished barrow.
2. More shapely turned over the loin.
3. Cleaner and smoother through the shoulder.
4. Neater through the jowl.
5. Tighter middled. Trimmer middled. Trimmer underline.
5. Smoother sided
7. Tighter, firmer-finished pig.
8. Cleaner at the base of the ham.
9. Trimmer flank. Cleaner flank.
10. Harder finished.

Finish - Negative terms or criticisms

1. A wasty, soft barrow.
2. Heavy in the middle and jowl.
3. A right angle spread over the top.
4. A flat-topped, heavy-shouldered pig.
5. A soft, flabby-hammed pig.
6. Loose at the base of the ham.
7. A loose, wrinkled side.
8. Rolling over the shoulder.

Muscling - Positive comparative terms

1. Meatier, heavier muscled.
2. Firmer, heavier-muscled ham.
3. More bulging, wider, flaring ham.
4. More natural width at the loin.
5. Wider loined (preferred to thick).
6. More muscular topped
7. Longer ham
8. Greater width at the stifle.
9. Longer rumped
10. Deeper sided
11. Higher tail setting
12. Nicer turn over the rump.
13. Wider, more muscular rump.
14. Neater, more muscular shoulder.
15. Greater total dimension of ham.
16. Wider walking.

Muscling - Negative terms or criticisms

1. Narrow-tapered ham.
2. Light-muscled ham.
3. Narrow at the stifle.
4. Flat hammed.

Muscling - Negative terms or criticisms, cont.

5. Short, steep-rumped pig.
6. Low at the tail set.
7. A ham that lacks flare.
8. Narrow over the top.
9. Narrow loin
10. Heavy-shouldered, narrow-hammed barrow.
11. Narrow rumped
12. Walks narrow

Type - Positive comparative terms

1. Longer-sided, stretchier (gilt, barrow, etc.)
2. Taller, more upstanding.
3. Growthier
4. More uniform arch.
5. Tighter framed
6. Nicer blanced
7. More nicely turned top.
8. Stronger over the top.

Type - Negative terms or criticisms

1. Short legged, low set.
2. Short sided
3. Flat over the top.
4. Slack framed, loose framed.
5. Off type
6. Old-fashioned type
7. Heavy fronted
8. Shallow ribbed
9. Coarse fronted

Breeding terms - Positive comparative

1. Rugged, heavy boned gilt.
2. More correct on her feet and legs.
3. Broodier, more feminine.
4. More prominent underline.
5. Uniformly-spaced teats.
6. Shorter, straighter pasterns.
7. Longer sided
8. More stylish, high-quality gilt.
9. More (breed name) character.

Breeding terms - Negative terms or criticisms

1. Light-boned, refined gilt.
2. Stands incorrectly on her feet and legs.
3. Coarse gilt lacking femininity.
4. Uneven in her underline.
5. Large sloping pasterns.
6. Stands close behind.
7. Shorter-sided, heavy shouldered.
8. Plain about the head.

MARKET HOG TERMS

Comparative Terms	Criticisms
Would yield a higher percentage of lean cuts	Would have a low yield of lean cuts
Would yield higher; would dress higher	Would yield low
Trimmer middle	Wasty middle
Trimmer underline	Wasty underline
Trimmer flank	Wasty flank; shaky flank flabby flank
Would hang up a:	Would hang up a:
Trimmer carcass	Wasty carcass
Meatier carcass	Light muscled carcass

BREEDING HOG TERMS

Comparative Terms	Criticisms
Broodier	Lacked broodiness
More prominent underline	Lacked prominence (development) of underline, had blind nipples
More evenly spaced nipples	Nipples unevenly spaced
A larger number of nipples	Doesn't have enough nipples
More (Hampshire, etc.) breed character	Plain head; coarse head; heavy ear
More rugged, heavier bone	Light bone, fine bone
Straighter front (or hind) legs	Cow hocked; sickle hocked (too much angle or set to the hock); toed out; close at the knees; back at the knees
Stronger pasterns	Weak pasterns
Wider fronted	Narrow fronted

PHRASES USED IN LIVESTOCK JUDGING

Hogs

1. A more stylish, meatier barrow that is stronger and more uniform in his arch.
2. 1 had a plumper, more-bulging ham and is trimmer and firmer in his underline and jowl.
3. 1 will yield a higher percentage of lean cuts.
4. ...was somewhat longer-sided that he was neater in the shoulder.
5. He was a meatier barrow that was more nicely turned over his back.
6. A longer-sided barrow that had a larger, trimmer ham.
7. Should have a meatier carcass that will yield a higher cutout value.
8. Higher-quality barrow that was trimmer about the middle and jowl.
9. A longer-sided barrow that was firmer in his finish.
10. A coarse-shouldered, light-muscled barrow that was wasty about his middle and jowl.
11. A cleaner-jowled, trimmer-middled barrow that was firmer in the ham.
12. Carries down deeper and fuller in the ham.
13. A stretchier longer=bodied gilt with a longer underline.
14. A broodier, more stylish-headed, heavier-boned gilt having more prominence of underline.

BREEDING HOGS

1. A higher-capacity, broodier, roomier gilt that was stronger in her constitution, wider in the chest floor, larger in the heart girth, with a greater spring of forerib.

2. 1 was the most structurally-correct gilt in the class standing squarely on sound feet and legs.

3. 1 was a larger-framed, growthier, more rugged, heavier-boned gilt that stands straighter and stronger on her feet and legs.

4. A coarse-headed, heavy-eared gilt with a soft, flabby, wasty jowl.

5. Higher-quality, nicer-balanced, more stylish gilt that exhibited more broodiness about the underline in that she was more evenly spaced in her teat placement and more pronounced in her underline.

6. The heaviest-muscled gilt in the class that was wider, fuller, and longer in her loin and rump, and let into a deeper, fuller, more bulging ham, with more flare and fullness to the center of the ham.

7. Was a longer-sided gilt that possessed a longer ham and rump that tied up higher into the loin and further into the side.

8. Was a tighter-framed, stronger-topped gilt with the must prominent, uniform arch in the class.

9. A gilt with a higher tail setting, more flare to her rump, and more thickness through the center of the ham and was especially trimmer and firmer about the base of the ham.

10. A gilt that is stronger on her pasterns and standing on a more uniform length of toe.

11. Was a sound-footed gilt that moved free and active.

MARKET HOG TERMS

1. 1 should hang up a trimmer, more shapely carcass in that 1 was cleaner over the top, tighter and trimmer about the middle, cleaner about the jowl, and firmer about the base of the ham than 2.

2. 1 should hang a longer, meatier, more correctly-finished carcass that should yield a high proportion of lean meat and muscle.

3. Longer-sided, longer-rump barrow that should hang a carcass yielding a lesser percent waste and a larger percent red meat and muscle.

4. A longer-sided, larger-framed, growthier barrow that was trimmer throughout and stood on more length of leg than 2.

5. Will hang a narrow, flat-muscled, long-shanked, meatless carcass.

6. 1 should hang a trimmer, meatier, longer, leaner, more shapely carcass yielding a higher percentage of lean cuts.

7. A barrow that is harder, firmer, and trimmer about the base of the ham and through the crotch.

8. Should yield a higher percentage of lean cuts.

9. Should yield a higher percentage ham and loin.

10. Should yield a carcass with a higher ham loin index.

Minimum carcass standards for a modern meat-type hog:

length - 29" or more

backfat - 1.3" or less

loineye area - 4 sq.in. or more

YOUR 4-H CLUB SWINE BREEDING PROJECT

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SELECTION

SELECT A GOOD ANIMAL. You'll need a good start if you want your project to be successful. No matter what breed you choose it will pay if you select your animal carefully.

When you get your gilt, try to meet these standards:

1. Six to eights months old
2. From a large litter of fast-growing pigs
3. Well grown, healthy, vigorous
4. Sound, especially in the legs and feet
5. Well-developed mammary system with 12 to 14 evenly spaced functional teats
6. Healthy, free from brucellosis and immunized against cholera
7. A good disposition.

CONSIDER THE AGE. Buy a gilt that is about breeding age. This means a vigorously growing animal of six to eight months.

KNOW SOMETHING ABOUT THE BACKGROUND It pays to get a gilt from a large litter. If she weighed about 40 pounds at weaning time (56 days), and came from a litter of eight or more pigs, you know that her dam was prolific and a good milker. Chances are that these characteristics will be passed on to your gilt.

LOOK FOR LARGE SIZE AND GOOD GENERAL CONFORMATION. Healthy and valuable pigs come from sows of large size and proper breeding.

Gilts six to eight months old should weigh between 200 and 250 pounds and show meat type qualities. Such animals should have strong arched backs and refined heads. They should have large, full and deep hams. The bodies from front to rear should be reasonably wide and uniform. Sides should be smooth, deep and long. Appearance should be firm and meaty rather than flabby and fat. Smooth and refined coats are desirable.

CHECK FOR SOUNDNESS. A good brood sow should have 12 to 14 well-developed teats. In addition, she should have strong straight legs and feet with rugged bone structure as well as strong short pasterns.

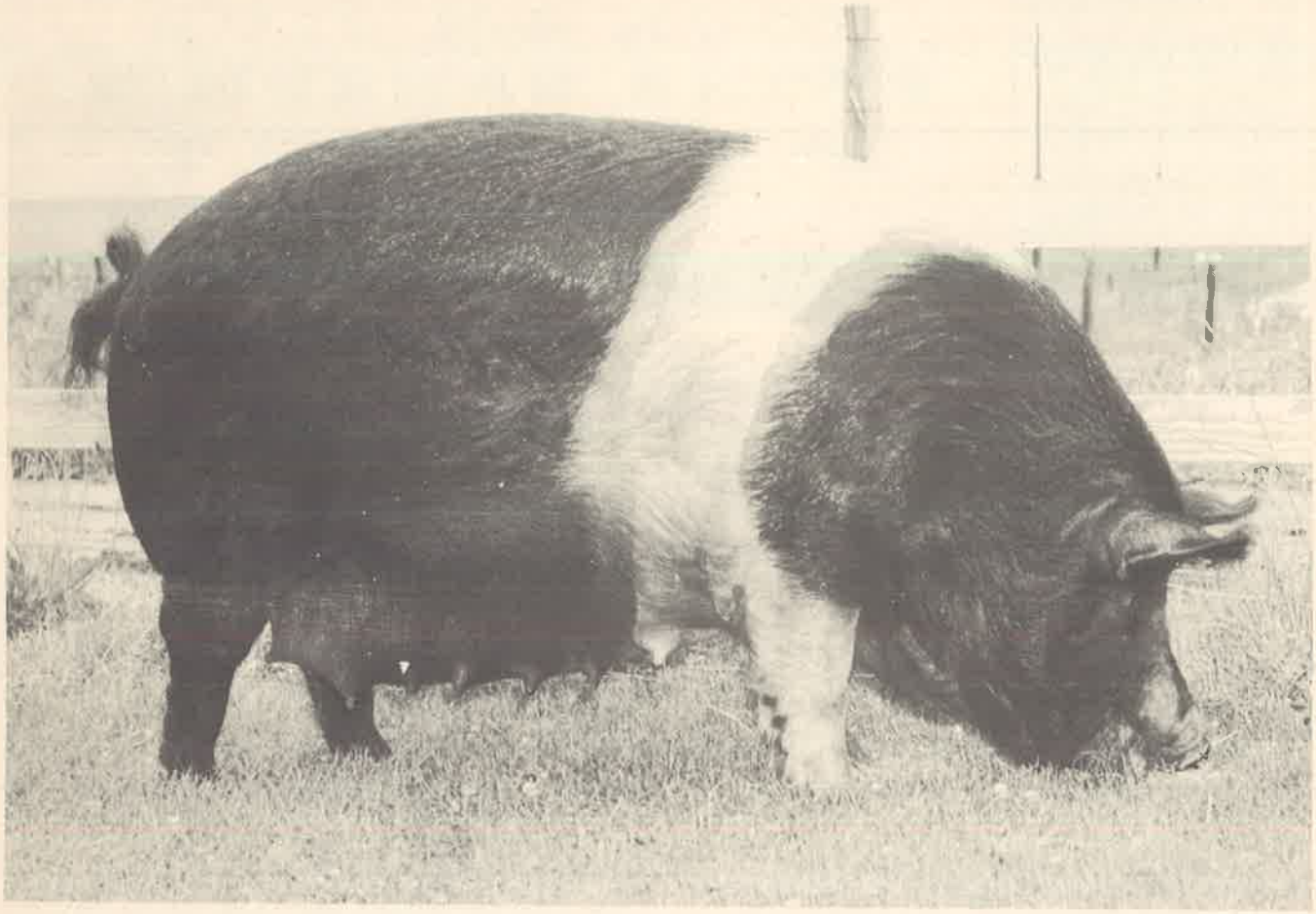
CONSIDER GENERAL HEALTH. Young pigs in good health and vigor are lively and energetic. They have bright, clean skin of deep pink color, except in some individuals of the dark breeds. Their eyes are bright and there is plenty of red blood showing in the veins inside the eyelids.

Poor health is indicated by coughing, pale skin, chronic scouring, and thinness. Avoid unthrifty gilts or sows for they may be infested with internal parasites or not have a good constitution.

NOTE GENERAL DISPOSITION. You'll find that your animal is easier to raise and breed and will be a better mother if she has a good disposition.

GET SOMEONE TO HELP YOU SELECT YOUR ANIMAL. Select your animal from a reliable breeder. Get your parents, your 4-H group leader, or your farm advisor to help you.

4-H-Ag71



If you choose your gilt properly, she will grow into a good brood sow like this one. Note the arched back, smooth shoulders and sides, firm, full hams, well-developed udder, and straight, strong legs.

EQUIPMENT

You will need the following equipment and facilities:

1. Pasture, preferably clover or alfalfa
2. Ample water
3. Tight fences
4. A simple farrowing house
5. A shelter
6. A feed trough.

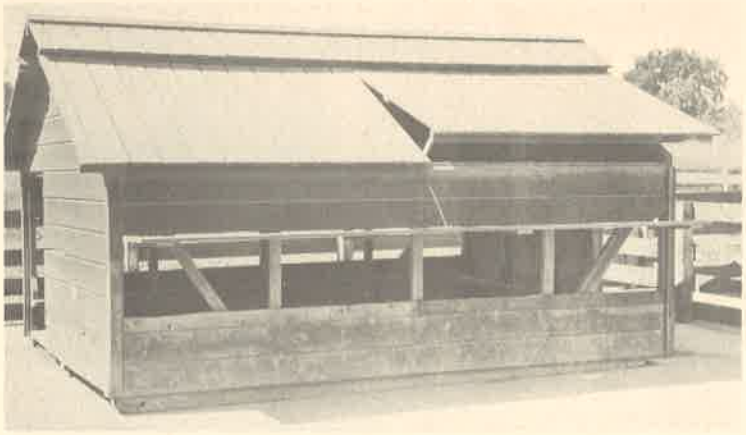
In addition you will need to be able to use other equipment such as brushes, hoof trimmer, side cutters (for needle teeth), ear notchers, hog ringer, and rings.

It is desirable, but not essential, that you have an electric brooder.

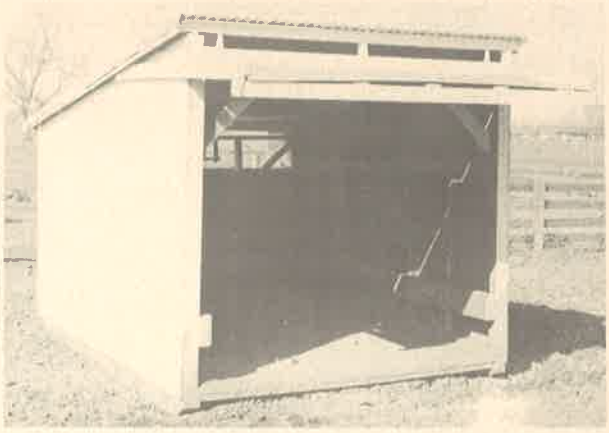
Pasture. You will need a large lot which contains plenty of pasture, preferably alfalfa or clover. On this pasture your pigs can get the excercise and direct sunlight they need as well as many of the proteins, vitamins, and minerals that will help your animals grow fast.

Water. In any animal project it is essential to have adequate clean water available at all times.

Fences. You must be able to tightly fence in your swine area. For a small lot, you can build a good fence from 1 by 6 inch rough boards, four boards high, with about three inches between the two bottom boards. Woven wire (diamond mesh) 32 inches high is the width used. The main thing is to have a fence that your pigs cannot get through or under.



This small type hog house will take care of two sows and their litters. It is portable and provides good protection from sun and rain.



This portable, three-sided shelter with a corrugated metal roof gives good protection from the sun.

Farrowing house. A farrowing house is the shelter where the pigs are born. It can be a part of the barn, or it can be as simple as a pen covered by a roof. The pen should be at least six feet wide by eight feet long. It will take care of one sow and litter at a time or will provide shelter for five to seven 100-pound pigs. The farrowing pen should have a floor of wood or concrete to allow adequate sanitation. A door should lead to an outside pen where the sow and her pigs can get direct sunlight and can exercise naturally.

The farrowing pen should have a guard rail around the walls about eight inches above the floor and eight inches from the wall and, if possible, an electric brooder in one corner. You can make the guard rail from 2-inch lumber or from gas pipe.

Shelter. You may want a small type hog house that can be ventilated, yet kept dry and clean. Such a house gives protection from rain in the winter and provides shade in the summer. A good size is eight feet wide by fourteen feet long with sides at least three feet high. The one illustrated takes care of two sows and their litters if a partition is put in the middle. In many areas of the state—where the weather is not too severe—you can build the shelter with one side open. If you plan properly, the farrowing house and shelter can be a building used interchangeably.

Feed trough. You should have a small trough to feed concentrates. A small pig needs about a 6-inch trough space, a full-grown hog about a 16-inch space. But remember that several pigs can eat in turn from the same space.

Electric brooder. This is a valuable piece of equipment to have. It can save the lives of many little pigs. It is actually a triangular shelter fastened securely in one corner of the farrowing pen. The two closed sides are about three feet long. A 100-watt bulb with a reflector is placed over a hole in the top of the brooder about 12 inches above the floor. This furnishes enough heat to draw the pigs away from the sow, so that there is less danger that she will step or lie on them. Remember to comply with any building codes. Fires sometimes start in poorly built or inadequately wired brooders.

Miscellaneous equipment. You will need such equipment for certain operations as hoof trimming, etc. You can own this equipment by yourself, or perhaps several members of your club could invest together in this equipment. Then you could use it when you need it. This list includes such items as brushes, side cutters for removing needle teeth, ear notcher, hoof trimmer, and hog ringer. You must provide the rings yourself.

Pigs on pasture are healthier, gain faster, and eat less feed per 100 pounds of gain. In addition, they exercise naturally and get direct sunlight. Legume pasture cuts the amount of high-priced supplements you must buy.

FEEDING

Pigs need more concentrate feed (barley and corn) and less roughage than cattle and sheep because they have a different kind of digestive tract. Rations for raising and fattening pigs are given in the 4-H leaflet Your 4-H Swine Feeding Project. Special rations for pregnant sows and sows with nursing litters are given in the sections on breeding and care and management below.

BREEDING

In general, it is all right to breed a gilt between the ages of eight and nine months. Then she will farrow about 12 months of age. Her heat period will last about three to four days.

At breeding time your gilt should be medium fat and gaining one half to one pound daily. For best results put her on good pasture, preferably alfalfa or clover, and feed her six to seven pounds of barley and one half pound tankage per day.

Time from breeding to farrowing averages 114 days, but may vary from 112 to 116 days. Keep accurate breeding records and give special care at farrowing time.

Breed your animal the second day of the heat period or twice if possible at a 12 to 24 hour interval. The gilt should be bred to a high-grading registered boar that is typical of the breed. He should be of a large family so that his offspring, in turn, will provide large, healthy litters.

Normally a brood sow should produce two litters a year with proper management – one in spring and another in fall.

Breed for spring litters about November 10, and for fall litters about May 10 in order to farrow pigs in March and September.

PREGNANCY

A SPECIAL FEEDING RATION is needed for a pregnant gilt or sow. For the first 12 weeks after breeding, your gilt will eat from one to one and one-half pounds of concentrate mixture for every 100 pounds live weight if she is on legume pasture. Thus, a 300-pound sow should have about 4 pounds of concentrate per day in addition to legume pasture. Here is a good concentrate mixture to feed when animals are on legume pasture:

90 pounds ground barley
8 pounds of tankage (dried meat and bone scraps)
1 pound salt
1 pound bone meal

If pasture is not available, reduce the amount of barley and add 10 to 20 pounds of high-quality alfalfa meal.

GIVE A HEAVIER RATION to the gilt during her last month of pregnancy because 75 percent of the growth of her litter takes place during this period.

A good ration to give your gilt for a month before farrowing is:

90 pounds ground barley
4 pounds soybean meal
5 pounds meat scraps
½ pound oyster shell flour
½ pound salt

You can substitute leafy alfalfa hay for alfalfa pasture, and feed it directly or chopped and mixed with grain. Although alfalfa hay is bulky, it should make up 10 to 25 percent of the ration when there is no alfalfa pasture.

A WEEK BEFORE FARROWING

The week before farrowing reduce your gilt's ration 30 to 50 percent. Add 25 to 30 percent wheat bran to the ration to prevent constipation and help encourage normal birth of pigs.

SCRUB THE FLOOR AND WALLS of the farrowing pen with a scalding lye solution (1 pound of lye to 30 gallons of water) and thoroughly disinfect the pen. If it is dry, airy, well-lighted, and free from drafts, you find more pigs will survive.

PLACE THE SOW IN THE FARROWING PEN about four days before her pigs are due. Wash her thoroughly with soap and warm water before bringing her into the farrowing pen, and disinfect her with a mild germicide such as Lysol or other coal-tar preparations. You can do this with a common sprinkling can.

USE CLEAN BEDDING FREE FROM DUST. Straw, hay cut in 6-inch lengths, or wood shavings make good bedding. Use enough bedding to keep the sow clean and warm, but avoid using too much. All bedding should be removed at least once a week and replaced with clean material. Manure should be removed daily.

AT FARROWING

One light feeding of bran as a thin slop, plus fresh, clean water, will be enough for your gilt during the 24 hours before her pigs are born.

Sows ordinarily have little difficulty in farrowing on their second and later litters if they have been handled properly during pregnancy. However, a gilt sometimes has trouble bearing her first litter.

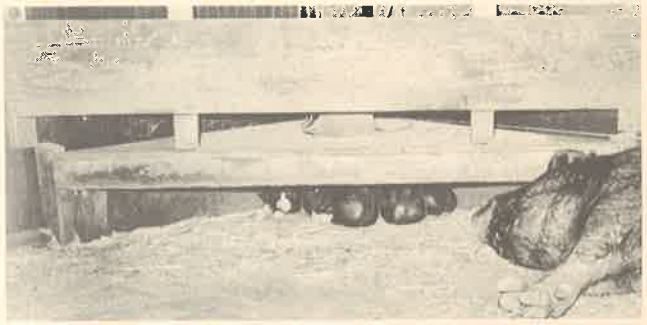
Give your gilt careful attention. If she is having trouble, get an experienced person to help. If the sow is having extreme trouble delivering her litter, get a veterinarian quickly.

AS EACH PIG IS BORN remove the membrane from the nose and mouth, and wipe the body dry. Then disinfect the navel with a mixture of tincture of iodine and alcohol.

As soon as they have gained a little strength, newborn pigs should be allowed to nurse. If a pig is weak or cannot nurse, you can probably get him started by stripping a little milk into his mouth. If you can make him swallow, he will soon gain strength and manage by himself.

IF THE PIGS GET CHILLED, you can generally revive them in a warm box, in direct sunlight, or by rubbing them vigorously between your hands. Here is where the brooder helps. Often a pig looks dead when born, but you can sometimes start his breathing by removing the mucus covering his mouth and nose, and gently slapping his side.

Let the pigs nurse and then put them in a warm brooder lined with straw. When farrowing takes a long time, it is good practice to return the pigs to the sow every hour or two and let them nurse. If some small, weak pigs are born in a litter of strong pigs, take the stronger ones away occasionally giving the weaker ones a chance to nurse.



Build a pig brooder in the corner of the farrowing pen. The 100-watt bulbs and reflectors provide warmth for baby pigs and draw them away from the sow so that there is less danger that she will injure them.

WATCH YOUR GILT CLOSELY during all the farrowing season. You may save pigs by inspecting the litter every two or three hours, because some newborn pigs may wander away, become chilled, or be unable to suckle. Leave the pigs in the farrowing barn until they are seven to ten days old.

UP TO WEANING

The time from birth to weaning is the most critical in a pig's life. Let the pigs use the brooder as long as they will. While they keep crawling under it for warmth it will pay you to leave it on.

REMOVE THE EIGHT NEEDLELIKE TEETH in the upper and lower jaws of each young pig. Do this about a day after farrowing by carefully cutting them with special pliers called "side cutters". Get an experienced person to help you with the operation, not removed they may cause trouble.

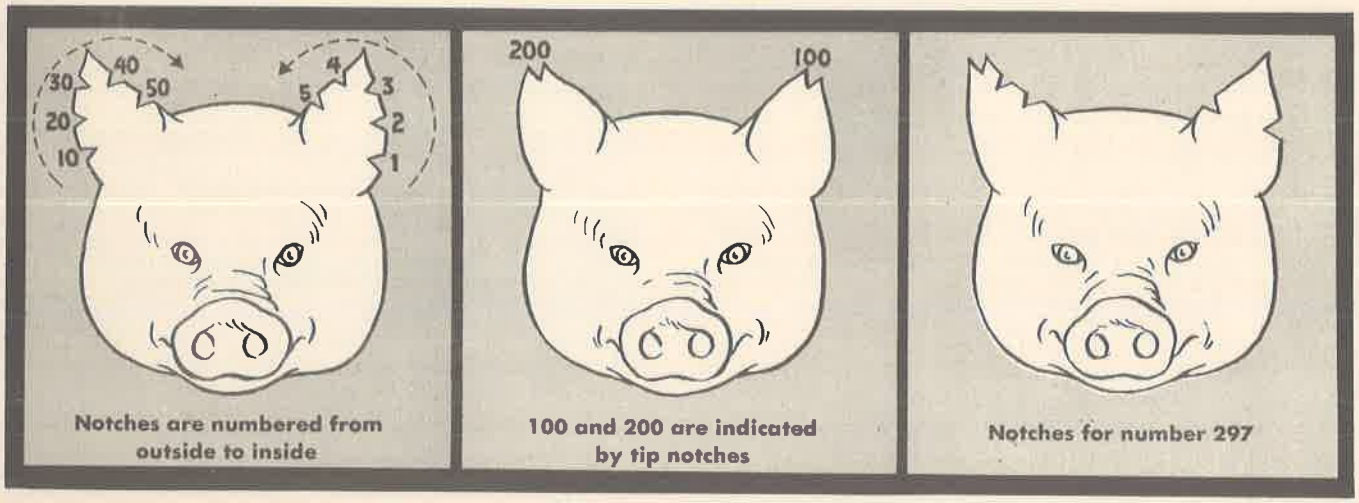
MARK THE PIGS when they are a few days old, with either an individual number or a litter number—that is, the same number for every pig in one litter. Most growers use the ear-notch system because it is easiest and best. You can mark young pigs only a few days old without injury (see illustration), and they stay marked for life. The numbers are easy to read if you make the notches large enough.

INCREASE THE SOW'S RATION SLOWLY AFTER FARROWING. You may or may not feed her the first 24 hours after her pigs are born, just as you choose. Sows have to be fed lightly the first 3 or 4 days after their pigs are born.

A good rule to follow for the first feeding is to give one or two pounds of a suitable concentrate mixture, such as rolled barley and wheat bran, equal parts by weight. On the next day, give two or three pounds, and increase the amounts daily until you are feeding eight or nine pounds at the end of the first week. Under normal conditions, the sow can be on full feed in 10 to 14 days after farrowing.

WATCH FOR DIGESTIVE UPSETS that may show up in nursing pigs and regulate the sow's feed accordingly. Overfeeding the sow, constipation, and lack of exercise may cause scours in pigs. If this happens, it is often helpful to reduce the sow's feed. If she is constipated, give her five ounces of Epsom salts in her feed.

Your sow needs body building nutrients to maintain her body and to produce plenty of milk for her litter. Feed her a ration high in proteins, vitamins, and mineral matter, especially calcium and phosphorus. You can supply these materials with materials with home-grown grains, and added high-protein feeds as wheat middlings and tankage. Under-feeding often makes the sow lose too much weight.



Ear notches may be used to number litters or pigs up to number 399.

Your sow needs body building nutrients to maintain her body and produce plenty of milk for her litter. Her ration should be especially high in proteins, vitamins, and mineral matter – especially calcium and phosphorus – while her pigs are nursing.

SOME SUGGESTED RATIONS FOR SOWS AFTER FARROWING are given below. Changes in rations should be gradual. Feed the first ration carefully, not more than two pounds for the first three days, and gradually increase it up to eight or nine pounds on the seventh day.

DURING THE FIRST 7 DAYS

	Lbs. feed per 100 lbs. mix
Barley or other grains	62½
Alfalfa meal	15
Soybean or cottonseed meal	6
Wheat bran	10
Meat and bone scraps (50% protein)	6
Common salt	½

By seven to ten days after farrowing, the sow will be on full feed. This is as much feed as she will clean up readily twice daily in 20 to 30 minutes. From seven to fourteen days after farrowing, the ration is gradually changed so that at ten to fourteen days the sow will be on the ration which she will receive during her entire lactation period. Typical rations for a sow on pasture is as follows:

FROM 14 DAYS UNTIL WEANING

	Lbs. feed per 100 lbs. mix
Barley or other grains	87
Soybean or cottonseed meal	7
Meat and bone scraps (50% protein)	5
Oystershell flour	½
Common salt	½

PUT SOW AND PIGS ON CLEAN PASTURE from ten to fourteen days after farrowing, weather permitting. Your pasture should be large enough for your sow and her litter, and it should be tightly fenced. A clean, warm, well-bedded house is essential. A good type of house is shown on page 3. The one shown is big enough for two sows and litters.

When pigs are a week old, they will eat a little grain. Ground wheat and barley, half and half, plus about 10 percent tankage is a good ration. Feed in a creep away from the older hogs. As the pigs grow older and eat more grain, give them some protein supplement like skim milk, dried skim milk, middlings, or tankage.

YOUNG MALE PIGS SHOULD BE CASTRATED if they are not going to be used for breeding. This can be done easily and without much danger if you take proper precautions. The best time to castrate is while the pigs are from two to three weeks old and still nursing. A good plan is to feed nothing but mother's milk the day before and the day after castration. Be sure instruments and surroundings are clean and disinfected before the operation. Get an experienced person to help you the first time.

PIGS SHOULD BE WEANED between seven and nine weeks of age. About a week before weaning, gradually reduce the sow's ration slightly to decrease her flow of milk. The best practice is to leave the pigs on the same pasture that they used while nursing and put the sows on another pasture.

Keep feeding the same grain ration to pigs. If you must change the feed, stretch the change over a three to five day period. Any sudden change probably will upset the pigs, and sometimes even kill them.

After the pigs are weaned, put the sow in a separate pasture and feed her lightly until her milk flow stops. Then increase her feed, according to her condition. You should be feeding her heavily enough at breeding time so that she gains from one-half to one pound daily.

BUILDING A BREEDING HERD

SELECT THE GILTS AND BOARS that you intend to save for breeding stock at weaning time. Separate them from those to be fattened. As a rule, only gilts and boars of excellent type and out of good producing sows should be kept. For fattening pigs for market, see Your 4-H Swine Feeding Project. This tells you what you need to know to raise fat hogs.

ACCURATE BREEDING RECORDS are important, whether your herd is grade or purebred. Keep them up to date. Your records for each sow should show breeding date, boar used, farrowing date, number of boars and gilts farrowed, and number of each raised. You can make up 3 x 5-inch cards showing this information.

PROTECTION AGAINST DISEASE

1. Keep the shelter and lot clean
2. Keep equipment clean
3. See that the barn or shelter keeps well ventilated.

VACCINATE THE PIGS FOR CHOLERA about two weeks before weaning. Use a modified live virus vaccine. It is not recommended to use serum and virus. Your veterinarian can help you with this vaccination.

LICE CAN BE CONTROLLED with lindane spray or dip. Follow the directions on the package. It is important when applying this material that the animal be fully covered and that sensible precautions be taken to protect yourself.

CONTROL ROUNDWORMS using one of the recommended drugs. Follow the directions on the package. You will find that other worms will not be serious if you prevent the pigs from rooting by putting rings in their noses.

MARKETING

More information about marketing can be found in Your 4-H Swine Showing Manual. Some general pointers are:

See that the hogs are in good thrifty condition, are well groomed, and of high market grade. In fitting a hog for sale or show, first wash it thoroughly so it will be clean and free of dirt. A brush, plenty of soap and water, and a lot of elbow grease will do the job. Trim the hair around the outside of the ears. Apply light oil to the hair and skin of the hog the evening before it is to be shown or sold. This gives the animal a sleek, attractive appearance. The animal should be trained so it can be driven and shown to its best advantage in a quiet attractive manner.

An animal properly fitted and trained will show off to its best advantage and may bring you extra profit from your Swine Breeding Project.

BUILDING PLANS . . .

for the swine structures listed below may be purchased from:

Agricultural Publications
22 Giannini Hall
University of California
Berkeley 4, California

Please give the plan number when ordering, and make checks or money orders payable to The Regents of the University of California.

PLAN NO.		PRICE
13	Farrowing crate	$ .25
18	Portable shade. 12′ x 12′. Shed roof of corrugated metal	.25
40	Self-feeder made from 55-gal. oil drum	.15
81	Breeding crate	.25
85	Shipping crate	.15
119	House, shed roof, movable	.25
120	House, gable roof, movable	.25
172	Hoof trimming crate	.25
195	Waterer. All concrete	.15
234	Self-feeding pig creep, gable roof	.15

This publication was prepared by the State 4-H Meat Animal Committee of Farm Advisor William B. Hight, Madera County, Extension Husbandmen Reuben Albaugh and Horace T. Strong, 4-H Club Specialist A.D. Aulenbacher, and Farm Advisors Willard C. Lusk, Lake County, and S.W. Thurber, Stanislaus County. Acknowledgement is made of material adapted from Extension publications of Oregon State College and the University of California.

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YOUR 4-H CLUB SWINE SHOWING MANUAL

UNIVERSITY OF CALIFORNIA • AGRICULTURAL EXTENSION SERVICE

TRAINING

Pigs must be trained to be driven and shown by the club member. This training must start soon after the feeding period has begun.

First, gentle the pig by scratching or brushing him at each feeding period, but do not play with pig. Do not make a pet of this project. A "pet pig" becomes contrary and is sometimes difficult to show.

Use a very light stick for training. The pig will run at first. You may become irritated with your pig but if you hold your temper he will soon learn what you want him to do.

You have no show halter, so the pig must become acquainted with your directing him with a stick. He will soon learn to stop or turn as you apply the stick to various parts of his body.

Tap the pig on the side of the head to turn him right or left, and on the nose to stop. Don't beat pig on the head when you want him to go forward. Slap his side or back with hand or stick. Tapping his hind legs will often work quite well, too.

Drive the pig often. If you have a large lot, try directing the pig to various places within the lot. Let your parents serve as judges while you practice moving the animal as you would in a show ring. Observe positions in which your pig looks best.

FITTING

A part of the training program is the beginning of fitting the pig for the show ring. Remember that no amount of fitting and showing can make a scrub win a blue ribbon. Good feeding is part of fitting, too.

Frequent brushing of the hair coat trains it to lie down properly. A light coat of edible vegetable oil before brushing will aid in training rough hair coats and will soften hard, scaly hides.

Fig. 1 The soap and water treatment

Wash your pig at least once per month. Use a stiff scrub brush and a bar of mild laundry soap. Only a clean skin and hair coat will look good in the show ring.

If possible, weigh the pig often to be sure he is gaining properly.

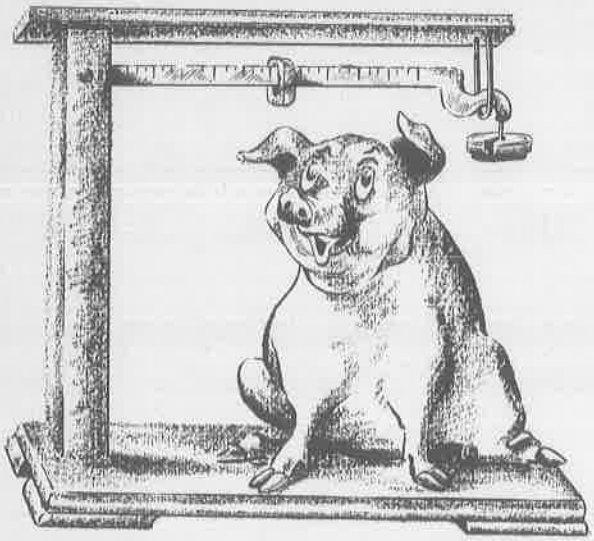

Fig. 2 Watching his figure

If hoofs become long, trim feet evenly. Do not trim just before the show. About three to four weeks before the show is time to do this.

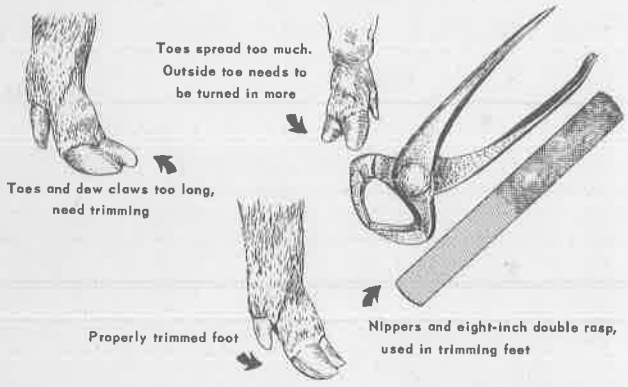

Fig. 3

About two months before the show, fill out your entry forms. Have your leader check and sign them. Get them in on time.

PREPARATION FOR THE SHOW

Several days prior to the show dates, start getting the necessary feed, supplies, and equipment together.

A property box will help you carry your supplies to the show. Have your supplies available when needed. Equip your box with a lock.

You'll need these supplies and equipment at the show:

Feed. Same ration you have been using at home; do not change ration now. Figure about six pounds of feed per day for a 200-pound pig.

Bedding. Bright clean straw. Use 1/3 bale per pen daily.

Feed trough. A short, deep, wide-based trough is best. Such a trough is difficult to overturn, the feed will stay in better, and the pen will stay cleaner.

Water bucket. To carry water and mix feed in.

Fig. 4 Show equipment – brush, hose, spray gun, rubber boots, soap, mineral oil, show cane, show stick, water bucket

Show cane.

Soap, brushes, light oil, wool cloth, powder and blueing for white pigs. Clippers are often useful.

Old clothes, boots, etc. For pig washing.

Equipment box. Don't build it too large. 15"x36" x 12" is a good size.

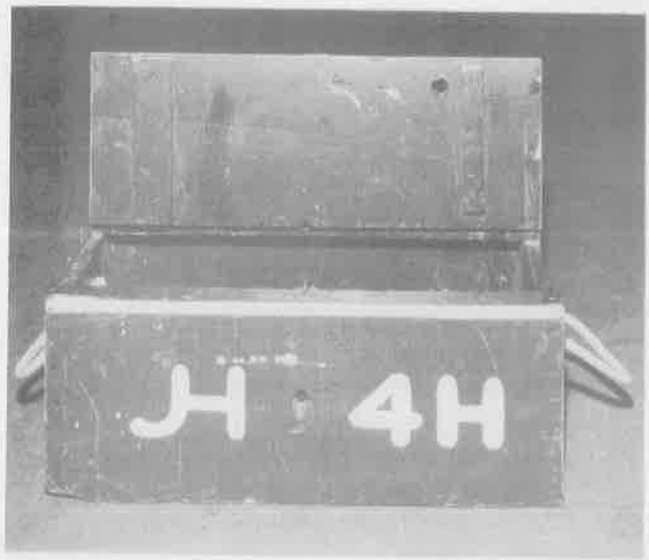

Fig. 5 Equipment box. Handy storage for show gear

Make arrangements for transporting pigs to show in advance. If a health certificate is required, obtain it early. Check your premium book for information.

GROOMING PRIOR TO SHOW

Just before leaving home, or soon after arriving at the show, clip ears and tail of pig.

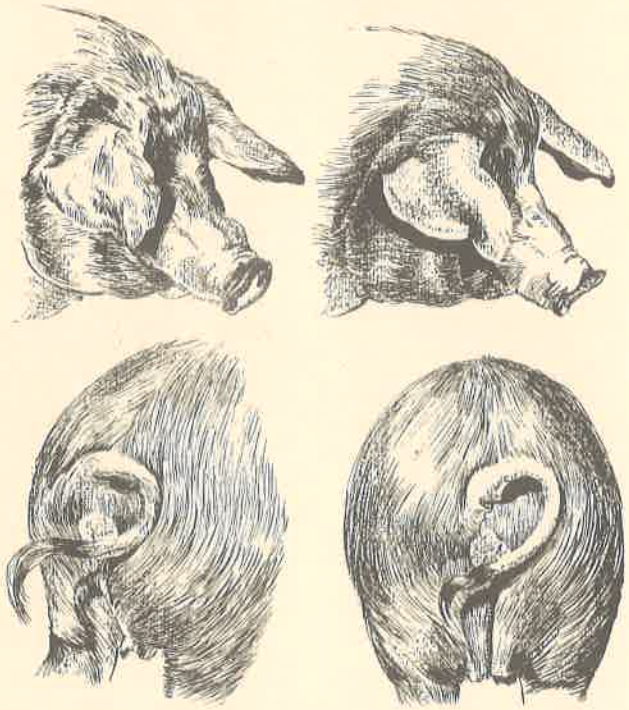

Fig. 6 Ears on left, before trimming, on right, after trimming
Unclipped tail on left; on right, after clipping

Ears. Clip off all long hair from under ear and around the edge. Clip closely the hair from top of ear.

Tail. Closely clip hair from tail setting back to switch. Leave 4- or 5-inch switch on end.

TAKING PIG TO SHOW

Check loading chute for loose nails and wide spaced boards. This would be a poor time to injure your pig.

Have the truck or trailer properly bedded. Use sand in summer, and sand and straw in winter.

Skip the feeding before leaving for the show. Hungry pigs ride easier and stand a better chance of remaining healthy.

Load your pig carefully. It is easy to break a leg or cripple him in loading.

Protect pigs from weather enroute to show. Use a covered truck or trailer to prevent draft and cold rains in winter. Haul during cool of day if weather is hot. Provide ventilation and protect pig from the sun.

AT THE SHOW

Find your assigned pen. Pen assignment charts are usually posted. Put straw bedding in the pen. Use straw sparingly and don't wet it down.

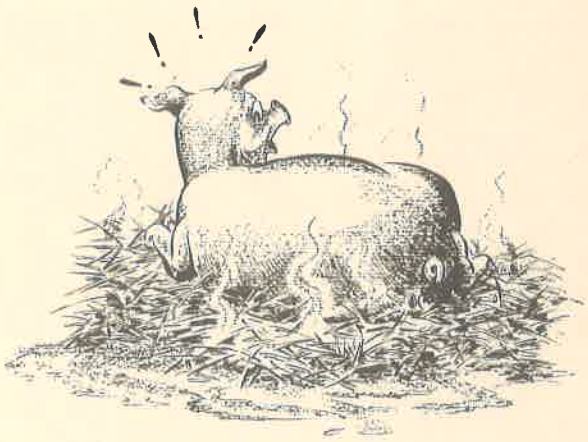

Fig. 7 Wet straw heats and steams

Unload your pig carefully and drive him to the pen slowly. Undue haste and excitement now or at loading time can completely ruin the pig's disposition. Do not sacrifice hours of training by careless handling. In hot weather you can easily overheat him too. Let the pig rest.

Fig. 8 He needs a rest

Before feeding or watering, check with your Farm Advisor, club leader, or teacher. Your pig might be near a weight division mark. It is possible the pig should be weighed before feeding or watering.

Exercise the pig after he has rested. This will prevent his becoming stiff and sore from the ride.

Exhibitors have a definite obligation to their organization and to those sponsoring the show. Read catalogs carefully and abide by all rules and regulations.

Fig. 9 Keep your pen and aisle clean

Keep your pen and the surrounding area clean. Clean your pen early each morning. Stay close to your assigned pen. Prevent accidents, keep your pig from getting out of his pen. Be available in case the show management needs information.

Keep your pig cool and well watered during hot spells. Wash him when the wash rack is not crowded. The pig will usually need at least one washing at the show. Panel your pig in a small corner for easier washing and less pig fighting. Return the pig to clean pen and brush dry.

FEEDING AT THE SHOW

Don't feed your pig right after arrival. Feed approximately one-half to three-quarter normal ration at the show. Hungry pigs rarely become sick. Being confined to small pens, the pigs need less feed. Do not leave feed before your pig at the show.

Fig. 10 Don't do this at show

Exercise the pig before feeding time. Pigs should be let out of their pens for exercise at least once daily. Panel off alleyway and let them run while you are cleaning the pen.

Prior to show day, watch your pig eat and decide when he looks the best. Too much feed before show time could put on a heavy, wasty middle. A pig fed too little and too late might appear gaunt. (Sides tucked in or hollow looking.)

SHOW DAY

Check the show catalog for the time your animal is to be exhibited, but allow for the show moving slowly. Do not feed or put final touches on fitting too early.

Your pig probably will need washing show day. Ask your Farm Advisor or leader for advice.

Don't forget that you are part of the show. Dress in your full 4-H uniform. Stay as neat and clean as possible.

Fig. 11 Look your best

White pigs may be evenly and well covered with powder before entering the ring. White areas of other breeds may be powdered.

For black and red pigs, use a light oil (1/2 mineral oil and 1/2 alcohol or some prepared dressing oil). Oil lightly and evenly. A wool cloth soaked in oil or a fine mist sprayer should be used for this application. If weather is very hot use cool clean water instead of oil. Sprinkle on lightly, then brush off.

Brush pig in a back-and-down fashion. Do not brush straight back. Do not part the hair in the middle. A pig's hair looks natural when you brush back and then down over the sides. Brush all straw off the animal just before entering ring.

When your class is called, slowly drive pig to the show ring. Don't rush him.

IN THE SHOW RING

Fig. 12 Tend to business

Keep your eyes on the judge and your pig. Pay no attention to anyone on the sidelines. Keep your pig between you and the judge.

Drive your pig slowly about the show ring. Don't ever try to rush a pig.

Do not try to keep your pig under the

Fig. 13 Don't run your pig under the judge

judge's nose. Seek the open areas of the ring at a distance from the judge. Your pig looks his best when approximately 15 to 20 feet from the judge. Be sure the judge gets a good look at your pig. You will know when he has, if you watch closely.

Do not keep your animal on the run; let him stand and rest when the judge is looking at other pigs in the ring. Don't keep forcing him around the ring, or he might become very stubborn.

Do not lean on your pig's back. Keep brush and hands off the pig. Do not beat the animal on rump with a brush. Pigs hit on the rump with a brush or cane straighten out their tail. No pig looks good with a straight tail! It also gives your pig a steep-rumped appearance.

Be sure to close and latch the gate if the judge tells you to put your pig in one of the ring pens. Be prepared to answer any questions concerning your animal such as—age, feed, how long you fed him, etc.

Sportmanship in the ring includes proper respect for the judge and fellow exhibitors. One wild, fighting pig can upset the entire ring. Win or lose fairly and gracefully. Everyone admires and likes a good sport. No matter what happens—grin and take it!

A poor job of showing will not help your chances of winning. Study these suggestions carefully. The time you spend fitting and showing properly will be well spent. Win or lose, you will be a better person because you tried. You've learned a lot and there will always be another show. The best of luck to you!

This publication was prepared by the State 4-H Meat Animal Committee of Farm Advisor William B. Hight, Madera County, Extension Husbandmen Reuben Albaugh and Horace T. Strong, 4-H Club Specialist A.D. Aulenbacher, and Farm Advisors Willard C. Lusk, Lake County, and S.W. Thurber, Stanislaus County. Acknowledgement is made of material adapted from Extension publications of Oregon State College and the University of California.

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OUR MOTTO
"TO MAKE THE BEST BETTER"

This is worth working for.

PROJECT COMPLETION

After your pig is sold, all you have left to do to complete your project, is to fill out your meat animal project record. Do a good job of it. Those records may mean a lot to you during your later 4-H Club years.

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