

UNIVERSITY OF FLORIDA
AGRICULTURAL EXPERIMENT STATION
Wilmon Newell, Director

SWINE PRODUCTION IN FLORIDA

By A. L. SHEALY AND W. J. SHEELY

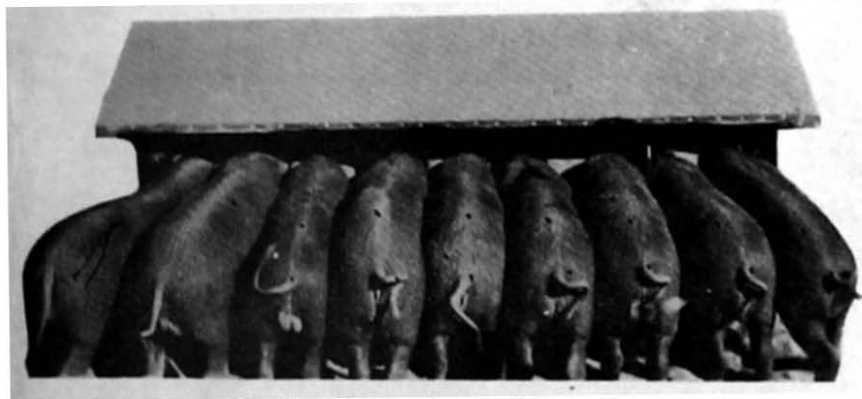


Fig. 1.—Making hogs of themselves.

Bulletins will be sent free upon application to
the Agricultural Experiment Station,
GAINESVILLE, FLORIDA

BOARD OF CONTROL

P. K. YONGE, Chairman, Pensacola
A. H. BLANDING, Bartow
W. B. DAVIS, Perry

RAYMER F. MAGUIRE, Orlando
FRANK J. WIDEMAN, West Palm Beach
J. T. DIAMOND, Secretary, Tallahassee

STATION EXECUTIVE STAFF

JOHN J. TIGERT, M.A., LL.D., President
WILMON NEWELL, D.Sc., Director
H. HAROLD HUME, M.S., Asst. Dir., Research
S. T. FLEMING, A.B., Asst. Dir., Admin.
J. FRANCIS COOPER, M.S.A., Editor

R. M. FULGHUM, B.S.A., Asst. Editor
IDA KEELING CRESAP, Librarian
RUBY NEWHALL, Secretary
K. H. GRAHAM, Business Manager
RACHEL McQUARRIE, Accountant

MAIN STATION—DEPARTMENTS AND INVESTIGATORS

AGRONOMY

W. E. STOKES, M.S., Agronomist
W. A. LEUKEL, Ph.D., Associate
G. E. RITCHEY, M.S.A., Assistant*
FRED H. HULL, M.S., Assistant
J. D. WARNER, M.S., Assistant
JOHN P. CAMP, M.S.A., Assistant

ANIMAL HUSBANDRY

A. L. SHEALY, D.V.M., Veterinarian in Charge
E. F. THOMAS, D.V.M., Asst. Veterinarian
R. B. BECKER, Ph.D., Associate in Dairy Husbandry
W. M. NEAL, Ph.D., Assistant in Animal Nutrition
C. R. DAWSON, B.S.A., Assistant Dairy Investigations

CHEMISTRY

R. W. RUPRECHT, Ph.D., Chemist
R. M. BARNETTE, Ph.D., Associate
C. E. BELL, M.S., Assistant
J. M. COLEMAN, B.S., Assistant
H. W. WINSOR, B.S.A., Assistant
H. W. JONES, B.S., Assistant

COTTON INVESTIGATIONS

E. F. GROSSMAN, M.A., Assistant
P. W. CALHOUN, B.S., Assistant

ECONOMICS, AGRICULTURAL

C. V. NOBLE, Ph.D., Agricultural Economist
BRUCE MCKINLEY, A.B., B.S.A., Associate
M. A. BROOKER, Ph.D., Assistant

ECONOMICS, HOME

QUIDA DAVIS ABBOTT, Ph.D., Head
L. W. GADDUM, Ph.D., Biochemist
C. F. AEMANN, Ph.D., Physiologist

ENTOMOLOGY

J. R. WATSON, A.M., Entomologist
A. N. TISSOT, M.S., Assistant
E. E. BRATLEY, M.S.A., Assistant
L. W. ZIEGLER, B.S., Assistant

HORTICULTURE

A. F. CAMP, Ph.D., Horticulturist
HAROLD MOWRY, B.S.A., Associate
M. R. ENSIGN, M.S., Assistant
A. L. STAHL, Ph.D., Assistant
G. H. BLACKMON, M.S.A., Pecan Culturist
C. B. VAN CLEEF, M.S.A., Greenhouse Foreman

PLANT PATHOLOGY

W. B. TISDALE, Ph.D., Plant Pathologist
G. F. WEBER, Ph.D., Associate
A. H. EDDINS, Ph.D., Assistant
K. W. LOUCKS, M.S., Assistant
ERDMAN WEST, M.S., Mycologist

BRANCH STATIONS AND FIELD WORKERS

L. O. GRATZ, Ph.D., Asso. Plant Pathologist in charge, Tobacco Exp. Sta. (Quincy)
E. R. KINCAID, M.S., Assistant Plant Pathologist (Quincy)
W. A. CARVER, Ph.D., Assistant Cotton Investigations (Quincy)
RAYMOND M. CROWN, B.S.A., Field Asst., Cotton Investigations (Quincy)
JESSE REEVES, Farm Superintendent, Tobacco Experiment Station (Quincy)
J. H. JEFFERIES, Superintendent, Citrus Experiment Station (Lake Alfred)
GEO. D. RUEHLE, Ph.D., Assistant Plant Pathologist (Lake Alfred)
W. A. KUNTZ, A.M., Assistant Plant Pathologist (Lake Alfred)
B. E. FUDGE, Ph.D., Assistant Chemist (Lake Alfred)
W. L. THOMPSON, B.S., Assistant Entomologist (Lake Alfred)
R. V. ALLISON, Ph.D., Soils Specialist in charge Everglades Experiment Sta. (Belle Glade)
R. W. KIDDER, B.S., Foreman, Everglades Experiment Station (Belle Glade)
R. N. LOBDELL, M.S., Assistant Entomologist (Belle Glade)
F. D. STEVENS, B.S., Sugarcane Agronomist (Belle Glade)
H. H. WEDGEWORTH, M.S., Associate Plant Pathologist (Belle Glade)
B. A. BOURNE, M.S., Associate Plant Physiologist (Belle Glade)
J. R. NELLER, Ph.D., Associate Biochemist (Belle Glade)
A. DAANE, Ph.D., Associate Agronomist (Belle Glade)
FRED YOUNT, Office Assistant (Belle Glade)
M. R. BEDSOLE, M.S.A., Assistant Chemist (Belle Glade)
A. N. BROOKS, Ph.D., Associate Plant Pathologist (Plant City)
R. E. NOLEN, M.S.A., Field Assistant in Plant Pathology (Plant City)
A. S. RHOADS, Ph.D., Associate Plant Pathologist (Cocoa)
C. M. TUCKER, Ph.D., Associate Plant Pathologist (Hastings)
H. S. WOLFE, Ph.D., Asso. Horticulturist in charge, Sub-Trop. Exp. Sta. (Homestead)
L. R. TOY, B.S.A., Assistant Horticulturist (Homestead)
STACY O. HAWKINS, M.A., Field Assistant in Plant Pathology (Homestead)
D. G. A. KELBERT, Field Assistant in Plant Pathology (Bradenton)
FRED W. WALKER, Assistant Entomologist (Monticello)
D. A. SANDERS, D.V.M., Associate Veterinarian (West Palm Beach)
M. N. WALKER, Ph.D., Associate Plant Pathologist (Leesburg)
W. B. SHIPPY, Ph.D., Assistant Plant Pathologist (Leesburg)
C. C. GOFF, M.S., Assistant Entomologist (Leesburg)
J. W. WILSON, Ph.D., Assistant Entomologist (Pierson)

*In cooperation with U. S. Department of Agriculture.

CONTENTS

| | Page |
|---|------|
| INTRODUCTION | 5 |
| THE HERD | 5 |
| MARKET TYPE | 12 |
| BREEDS | 16 |
| What Breed to Choose | 16 |
| Duroc-Jersey | 17 |
| Poland China | 17 |
| Hampshire | 18 |
| EQUIPMENT | 18 |
| Portable Hog House | 18 |
| Sanitary Hog Waterers | 19 |
| Shelter of Tin Roofing | 21 |
| Brush Shades | 21 |
| Water Supply | 22 |
| Pig Troughs | 22 |
| Self-Feeder | 23 |
| Box for Mineral Mixture | 24 |
| FEEDS FOR SWINE | 24 |
| Grazing Crops | 27 |
| Concentrates | 31 |
| FEEDING SWINE | 32 |
| Feeding the Breeding Herd | 32 |
| Feeding Pigs Before and After Weaning | 33 |
| Feeds for Fattening Shoters | 33 |
| The Use of Mineral Mixtures | 33 |
| MARKETING | 34 |
| HOG LOSSES IN TRANSIT | 37 |
| Loading | 38 |
| CURING PORK ON THE FARM | 41 |
| Slaughtering | 42 |
| Scalding | 43 |
| Removing the Internal Organs | 43 |
| Cutting the Carcass | 44 |
| Methods of Curing | 44 |
| COMMON DISEASES OF SWINE | 46 |
| Hog Cholera | 46 |
| Swine Plague | 49 |
| Necrotic Enteritis | 49 |
| Necrotic Rhinitis or Bull-Nose | 50 |
| EXTERNAL PARASITES | 51 |
| Lice | 51 |
| Mange | 52 |
| INTERNAL PARASITES | 53 |
| Large Roundworm | 53 |
| The Kidney Worm | 57 |

Shanajayarao Gadgil Library



GIPE-PUNE 047685

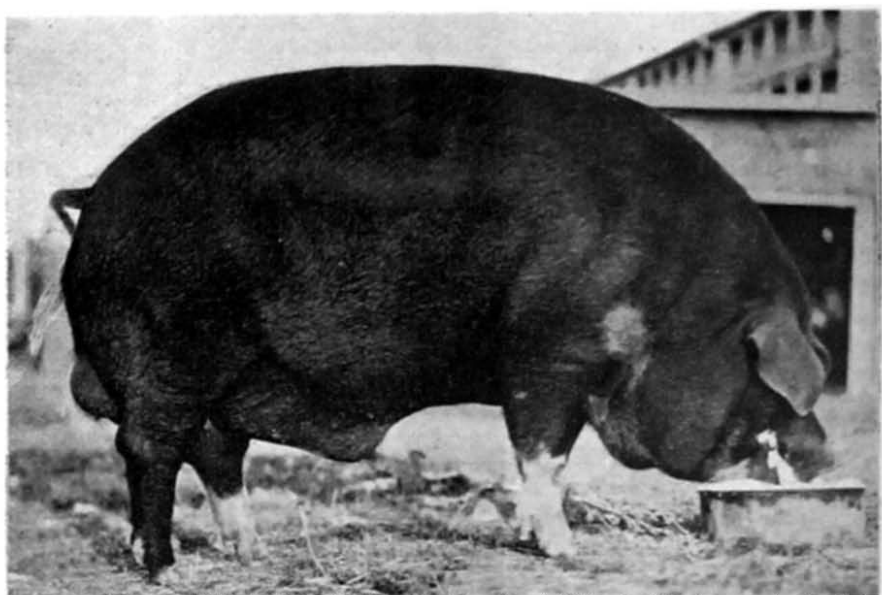


Fig. 2.—A boar of good type. (Courtesy Am. Poland China Record Assn.)

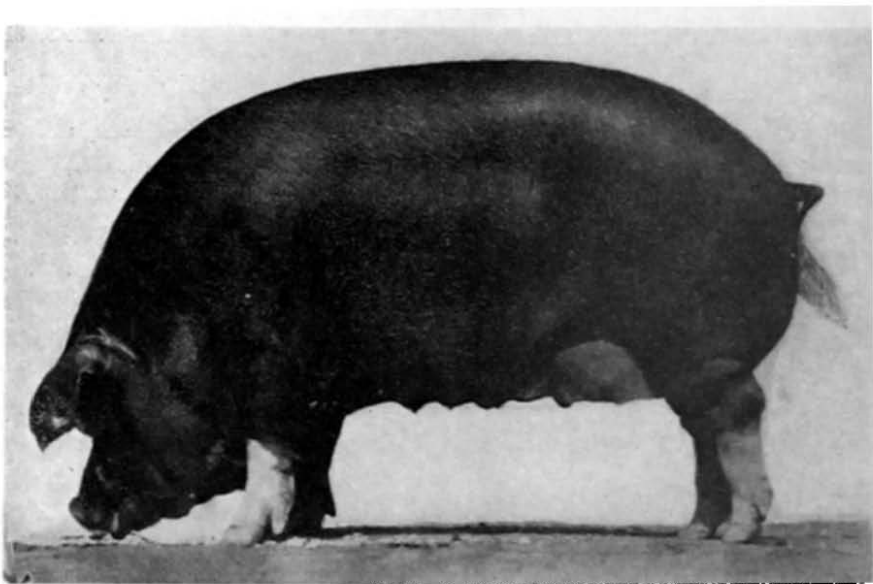


Fig. 3.—A sow of good type. (Courtesy Am. Poland China Record Assn.)

SWINE PRODUCTION IN FLORIDA

By A. L. SHEALY AND W. J. SHEELY*

INTRODUCTION

There are many reasons why Florida farmers should produce more hogs as a part of their general farming operations. At the present time the hog producers of Florida raise only about 25% of the pork consumed within the state; such a situation is a challenge to the farmers to produce more pork for local consumption. Further, there is always a market for hogs, and with the proper planning of feed crops, hogs can be economically raised in Florida.

Since hogs are prolific, and mature early, returns can be obtained more quickly than from other classes of livestock. A brood sow will produce a litter of pigs at 12 months and should produce two litters per year. Further, the pigs can be most profitably marketed at six to ten months. It will be seen, therefore, that there is a more rapid "turn over" in swine production than in almost any other line of livestock endeavor.

In hog raising less capital expenditure is necessary for stock and equipment than is required for other kinds of livestock. Hogs produce a pound of gain on less feed than do other farm animals. Hogs reduce labor costs, since they can harvest their own feed crops. Such crops as corn, peanuts, and chufas often can be marketed to better advantage through hogs than otherwise, and the hogs can be used as gleaners of crop remnants in fields, thereby utilizing feed for pork production that would otherwise go to waste. Swine production can be made practical and profitable in this state if producers grow feed crops and practice good herd management. The growing of hogs should be well planned and should receive the same careful attention as is given to other lines of business.

THE HERD

IMPORTANCE OF GOOD BLOOD

The question is often asked, "Does it pay to use purebred animals in swine production?" This may be answered by giving a

*A. L. Shealy, Veterinarian in charge, Animal Husbandry Department, Florida Experiment Station; W. J. Sheely, Agent in Animal Husbandry, Florida Extension Service and U.S.D.A. Bureau of Animal Industry.

on his pasterns, and should transmit this quality to his offspring. When shoters are fattened on grazing crops, as is the common Florida practice, it is very important that they have strong bones. The boar should have a well arched, strong back carrying much width, especially over the loins, with hind quarters well filled out, producing a well developed ham. The sides should be both deep and long. The forequarters should be well developed but free from coarseness, producing a well fleshed shoulder. The breast should be wide, providing good chest capacity. (Fig. 2.)

The young boar should not be used for service to any great extent before one year old unless he shows indications of early maturity, and is vigorous. He should be isolated from the sows except during the breeding season, and should be allowed only one service to each sow during time of breeding. He should breed only one sow daily, although if he is very strong and vigorous he might be permitted to serve two sows daily for a few services. If the boar is called upon for too many services the litters are likely to be small.

THE SOW

The brood sow should be of good breeding, quiet in temperament, not nervous, and possess those qualities which indicate that she will make a good mother. Further, she should be prolific, for her feed requirements will be but slightly greater with large litters than with small ones. It means much to the owner in a financial way whether or not she raises a small or a large number of pigs per litter. The sow should possess a well arched, strong, wide back. She should carry good development of fore and hind quarters, and have sides of good length and depth. She should have a wide breast, giving much chest capacity, thereby denoting a strong constitution. There should be a large number of teats on each side of the belly, indicating sufficient mammary development to supply milk for the young pigs. The sow should be smooth, fine haired, and free from coarseness. (Fig. 3.)

The proper time of breeding the sows will depend in a large measure upon the feed supply available for the pigs when they reach the "feeder" stage. Since practically all shoters are fattened in Florida by "hogging off" such field crops as peanuts, corn, chufas, and sweet potatoes, it is important to correlate the time of breeding with the time when grazing crops will be available for fattening.

few reasons for the use of good blood. In the first place, the law of inheritance operates to a pronounced degree in swine breeding. "Like begets like." Systematic breeding and selection through many years have produced desirable characteristics in the standard breeds of hogs and as a result the purebred of today carries excellent development in those parts of the body from which the highest priced cuts are obtained, such as hams, bacon, shoulders, and loin. Gilts and boars chosen for breeding purposes should be selected from prolific sows and if careful selection is continued it is possible to develop a highly prolific herd of sows. (Fig. 4.) The farmer will find hog raising very unprofitable if



Fig. 4.—Brood sows that bring prolific litters are desirable.

he does not begin with hogs of good type, possessing the desirable characteristics of early maturity, high quality, prolificness, and the ability to convert feed economically into high-grade pork. Hogs belonging to any well recognized, standard breed will mature earlier than scrubs and will produce pork at less cost. Probably the greatest advantage of good blood is that it helps to produce uniformity among both young and finished animals in the herd. Packers will pay a premium for animals uniform in type, quality, and finish.

THE HERD BOAR

Since the herd boar transmits his characteristics to many offspring, he should be of good type and quality, showing pronounced masculinity and vigor, and possessing a strong constitution. He should have strong bones which allow him to stand up well

The period of gestation is from 112 to 115 days, which means that the brood sow must be bred the latter part of October to furnish "feeders" for grazing early feed crops, as Spanish peanuts and early corn. When shotes are finished on such early grown crops they can be marketed during early fall when market prices are usually highest. The sow should be bred again

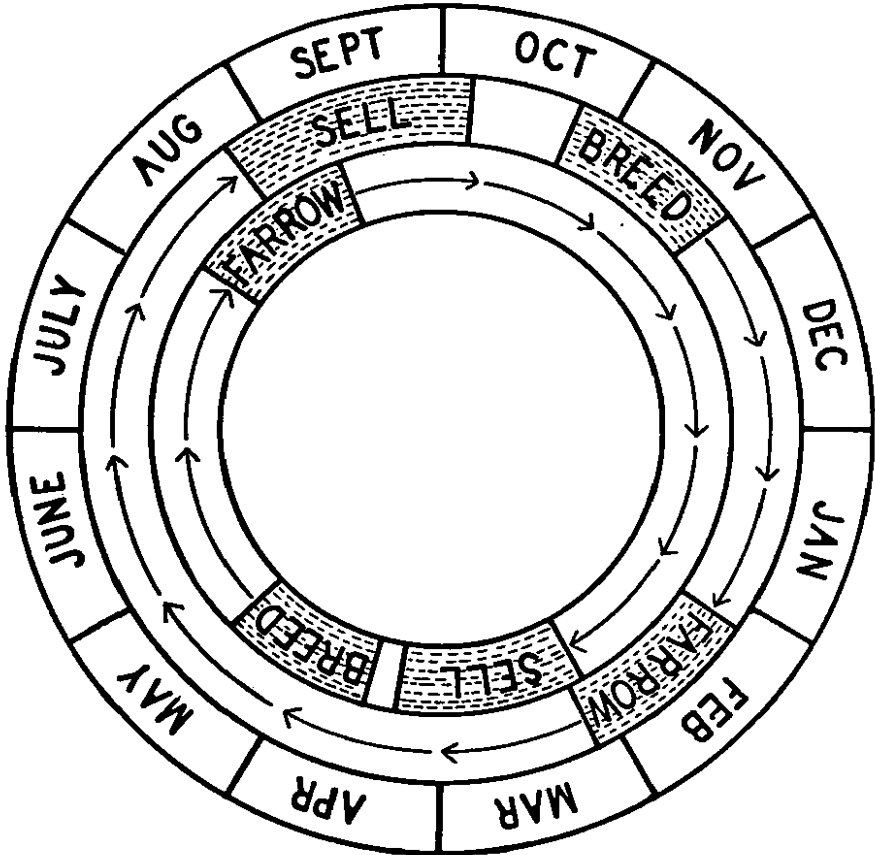


Fig. 5.—Diagram showing breeding, farrowing, and marketing cycle. Outer circle shows months, middle circle shows cycle for spring litter, and inner circle shows cycle for fall litter.

from April 15 to May 15 to furnish "feeders" for late grazing on such crops as runner peanuts, chufas, and sweet potatoes. These crops will remain in the ground during the winter months without sprouting, making it possible to defer grazing until the latter part of December, and hogs turned on these crops at that time should be finished for market in March. The sow should produce two litters each year, thereby reducing the cost per pig and giving greater returns on the investment.

If breeding to produce pigs for the show ring, the sows should be bred to farrow as soon as possible after March 1 and September 1 to permit the pigs to be shown in their proper classes.

WHEN TO BREED GILTS

The age at which to breed the gilt will depend largely on her development. If she has grown rapidly and is vigorous, showing signs of early maturity, she may be bred at eight or nine months of age, thereby allowing her to drop the first litter by the time she is about a year old. Oftentimes when a young gilt is bred too early, she does not develop into a good breeder but becomes stunted, and a producer of inferior pigs.

CARE OF THE BROOD SOW DURING PREGNANCY

The pregnant sow should be isolated from the rest of the herd and kept quiet at all times. She should have shade in summer, shelter in winter, plenty of clean, fresh water at all times, and an abundance of succulent feed supplied by annual crops or permanent pasture. Grazing on cultivated fields reduces the possibility of heavy worm infestation and the exercise secured will be very beneficial.

CARE OF BROOD SOW AT FARROWING TIME

Toward the end of the gestation period the abdomen becomes enlarged and the mammary glands swollen and congested. These symptoms indicate that the sow will farrow at an early date.

The sow must have shelter; a portable A-shaped hog house is very useful, since it is desirable that the brood sow farrow in a field planted to some annual grazing crop. The floor of the A-shaped hog house may consist of well packed clay or temporary flooring of boards, since holes are readily dug out in a sand floor, thereby increasing the danger of mashing the pigs. Very little bedding is needed at farrowing time; a large amount of bedding increases the danger of the sow lying on the pigs. A small amount of pine straw or leaves scattered over the floor is all the bedding needed. Shortly after farrowing, a liberal supply of bedding should be provided. The sow should be left alone during farrowing, since in most cases she will farrow normally and will need no assistance. Meddling will often be injurious to both sow and pigs, whereas if the owner had only relied on Nature to take its course no bad results would have

been experienced. However, if the owner definitely sees that the brood sow is in difficult labor he should give her such assistance as is possible for him to render in delivering the pigs.

The sow should receive all the fresh water she desires at farrowing time but should not be fed for 24 hours after farrowing, due to her feverish condition. On the second day she should receive about two single handfuls of shorts and one handful of corn meal given in a thin slop. These amounts should be gradually increased daily and at the end of the first week her ration may consist of any one of the rations listed for brood sows under the topic of "Feeding the Breeding Herd".

"PIG-EATING"

"Pig-eating" will be prevented if the sow has received plenty of succulent feed in addition to a well-balanced ration during the period of pregnancy. Fish meal or tankage should be included in the ration, since "pig-eating" is largely prevented if either of these protein feeds is supplied.

CARE OF YOUNG PIGS

Young pigs should be given shelter and protection from cool weather, and their sleeping quarters should be provided with bedding. Shelter is best furnished by a portable A-shaped hog house which should be placed in a cultivated field just a few days prior to farrowing so that the sow and pigs will be kept on clean land and supplied with succulent feed. Such measures are essential in preventing losses from worms. Fresh water should be available at all times and is best supplied by a sanitary hog waterer described under "Equipment". When pigs are raised under such conditions losses from worms are reduced, and the pigs make more rapid gains. Pigs should be given access to a grain ration when they are 10 days to two weeks old, receiving the feeds outlined under "Feeding Pigs Before and After Weaning". If lice are detected, applications of crude oil or waste oil from garages are effective in destroying these parasites.

MARKING YOUNG PIGS

If there are several litters, the pigs in each litter should be marked when only two or three days old by making a V-shape cut in the edge or tip of their ears. A hand notcher can be purchased at small cost, and this instrument will make a clean, well

defined notch usually $\frac{1}{4}$ " to $\frac{3}{8}$ " deep. Where herd records are kept, it is essential to mark each litter. The marking system shown in Fig. 6 is suggested.

REMOVAL OF BABY OR "NEEDLE" TEETH

Pigs are born with eight sharp teeth, four in the upper jaw and four in the lower, these teeth being sometimes referred to as "needle" teeth. These teeth often injure the teats of the sow in nursing, causing udder trouble; for that reason they should be removed. By using special forceps made for the purpose or a small pair of pliers, the teeth may be broken or cut off near the gums.

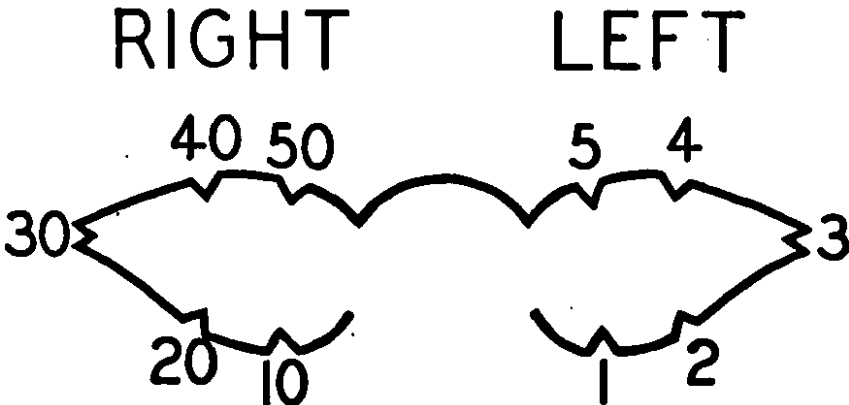


Fig. 6.—A method of marking pigs with ear notches. (After Day: Productive Swine Husbandry, Lippincott.)

CASTRATION

Young boars not chosen for breeding purposes should be castrated when four or five weeks old, since at that age they can be handled more easily, will lose less blood, and the wound heals more quickly than in older shoters. The scrotum should be washed with an antiseptic solution made preferably from some of the coal tar preparations. A clean sharp knife should be used, since infection is often introduced by using a dirty knife. The incisions should be long, extending to the lower part of the scrotum and directed over each testicle. Never attempt to remove both testicles through a single incision. After the testicle is exposed it should be pulled slightly through the incision and the cord severed by scraping briskly with the knife. There is practically no danger from hemorrhage when the cord is severed by "scraping" rather than by cutting or jerking. After the tes-

ticles are removed, zinc oxide powder, boric acid powder, or some other antiseptic powder should be dusted into the wounds. The pig should be kept in clean quarters until the wounds heal.

WEANING THE PIGS

The age for weaning the pigs will depend largely on their size and vigor. If they have made rapid growth and eat their supplemental feed, they may be weaned at eight weeks, otherwise, defer weaning until 10 weeks old. In weaning pigs, separate them from their mother, feeding them three times daily and giving skimmilk if possible. The feeds referred to under "Feeding Pigs Before and After Weaning" should be used. Feed troughs should be kept clean and any feed left in the trough which might have become soured should be removed, since sour feed often causes digestive troubles. The pigs should have an abundance of green feed and plenty of good clean water.

MARKET TYPE

Hogs are bought and sold according to grades based on type, weight, quality, and finish. A novice considers a fat hog or one exceptionally fat, as an animal weighing possibly from 150 to 300 pounds which will bring a certain price when sold without taking into consideration the grade of the hog. The packer and experienced buyer do not purchase hogs in that manner, since hogs are graded according to type, weight, quality, and finish by such buyers. These experienced buyers not only judge hogs from their appearance in the stock pens but try to picture the kind of dressed carcasses that will be produced when the hogs are slaughtered. They judge the kind of cuts which will be obtained from the carcasses by the size, conformation, and degree of finish. If the buyers see that good quality hams, bacon, and loin cuts will be obtained from the dressed carcasses they will pay the highest market price for such hogs.

Progressive swine breeders and pork producers are interested in the type of pig that will make the most economical gains in the field or feed lot, that mature early, and sell for the highest market price. Hogs are being bred today to furnish a type that meets these requirements. There are three general types of hogs, as follows:

1. The short, chuffy type, which is compact, low set, having a tendency to put on excessive fat.

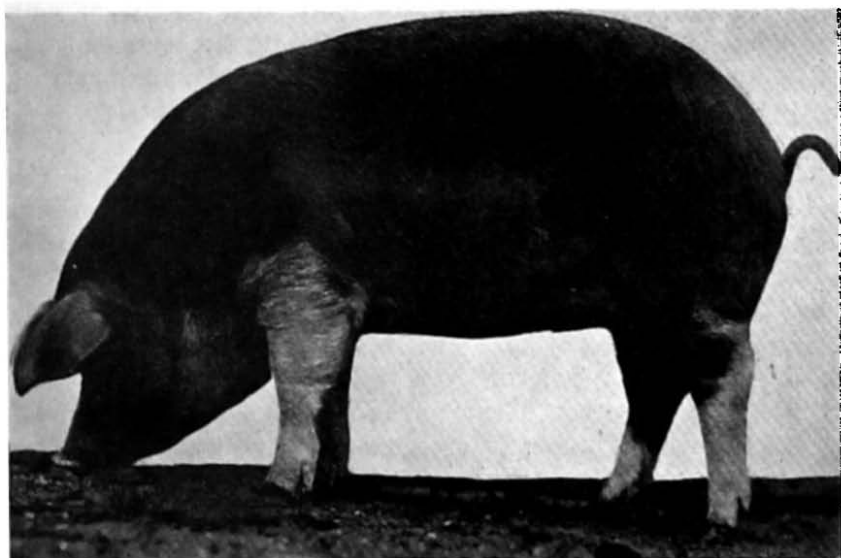


Fig. 7.—A gilt showing desirable market type. (Courtesy Am. Poland China Record Assn.)



Fig. 8.—Barrows showing desirable market type. (Courtesy International Live Stock Exposition.)

2. The rangy type, with extremely long narrow bodies, greatly arched backs, long legs, and carrying the bodies high off the ground.

3. An intermediate type, falling between the two extreme types.

It is possible for any of these types of hogs to reach the desirable weights of 165 to 225 pounds, yet the quality of the carcasses may be inferior and not satisfy the demands of the trade. The quality of the carcasses determines the real market value of hogs. Hogs that dress out carcasses of low quality are unprofitable both for farmer and packer.

The proper degree of "finish" is such that a uniform layer of fat of medium thickness covers the forequarters, back, and hind-quarters in such a manner that a smooth, even carcass is obtained.

The short, chuffy hog is finished too frequently when it weighs only 140 to 160 pounds, thus causing it to be graded in the light class and bring less per pound. Further, should a hog of this type be fed until the desired weights of 165 to 225 pounds are reached, it is usually "over-finished", that is, carries excessive fat. In such an over-finished, chuffy hog, the hams are too fat to permit them to be graded as regulars, the sides are too fat to make first class bacon, and too much internal fat, including leaf fat, is present. The market does not want a chuffy hog, carrying excessive fat, because the retail trade desires cuts with very little fat present. The extra lard from a fat hog brings a low price, since it has to meet the competition of cottonseed oil and other vegetable compounds. Thus a lower price is offered by the packer for the excessively fat hog. Because of this discrimination, producers should no longer breed the short, chuffy, compact type.

The extremely long, rangy hog grows rapidly and attains a large size, but generally does not carry the proper finish at the desirable market weights of 165 to 225 pounds. Such a hog if slaughtered when it reaches the desired weights, produces a thin, undesirable ham with a long shank. The carcass is too bony and there is a general lack of finish in all parts of the body. Should this type of hog be fed out to proper finish, it reaches heavier weights than can be profitably utilized by the trade. In addition to these criticisms, the cost per pound of gain is greater when extremely large rangy hogs are finished.

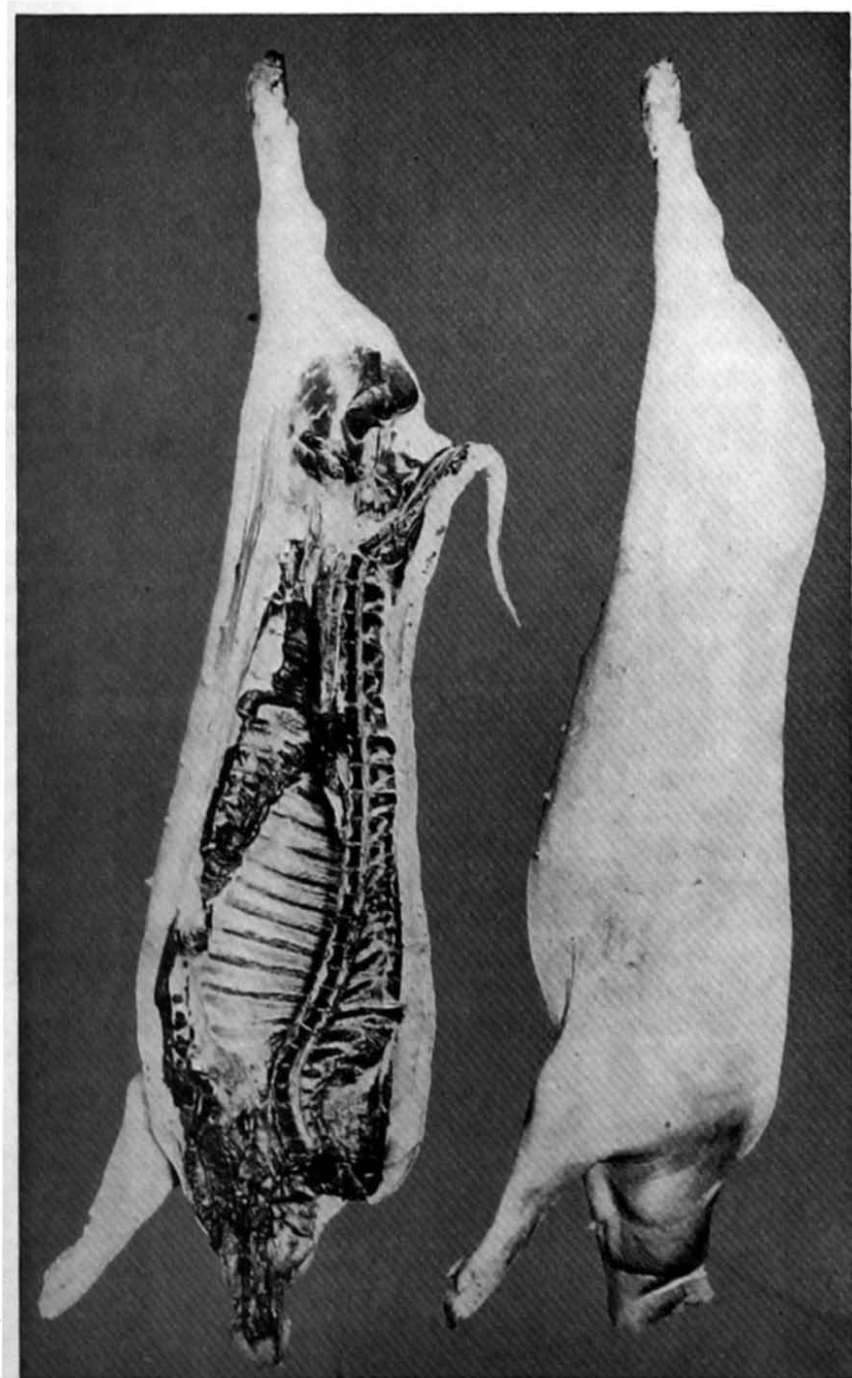


Fig. 9.—Carcass of intermediate type hog. (Courtesy National Live Stock and Meat Board.)

The most desirable market hog is of the intermediate type as illustrated in Figs. 2, 3, 7, and 8. This intermediate type is most profitable, since it has inherited the ability to attain the proper degree of finish at the most desirable market weights, either when turned in a field of grazing crops or fed a fattening ration in the feed lot. Shotes of this type mature early, and when slaughtered at 165 to 225 pound weights, produce a carcass of high quality meat. In proportion to its size, this carcass will cut out the maximum amount of high quality meat in such high priced cuts as the hams, loin cuts, shoulders, and sides, and will yield a minimum amount of lard and bone waste. Hence, the intermediate type is most desirable from the packer's standpoint and most profitable for the farmer.

Well finished hogs of the desirable type weighing from 160 to 225 pounds bring the highest prices on the markets, while those of lighter and heavier weights sell for less. It is evident that both the chuffy and rangy types of hogs are not desirable from the packers' and consumers' standpoint. Since it is more profitable for the farmer to produce the type desired by the packers, he should, therefore, keep himself informed regarding the market demands. The most prominent breeds of swine have animals of this type and such animals should be used as foundation breeding stock.

BREEDS

WHAT BREED TO CHOOSE

The choice of a breed is entirely a matter of personal preference. The breed which the farmer likes best is the one with which he will have the greatest success. It may be said, however, that white hogs generally do not prove successful in Florida, since they "sunscald" easily during the summer months. The breeds most common in Florida are: Duroc-Jersey, Poland China, and Hampshire. The matter of greatest importance is not so much the breed chosen, as the definite use of some pure-bred blood in the foundation breeding herd. By using good pure-bred blood the pigs will mature earlier, will be of higher quality, and will show uniformity in type when they reach the "feeder" stage and when finished for market (Fig. 10). All of these characteristics are important in swine production. The scrub hog has no place in swine production.

DUROC-JERSEY

The Duroc-Jersey breed originated in the United States during the period from 1822 to 1885 and is well adapted to Florida. Some of the characteristics of the breed are as follows: comparatively small head with straight or slightly dished face; outer third of ears drooped over or pendent; body of good length and depth, with good width across the loin; hams well filled out; shoulders smooth and well developed. The color of the Duroc-Jersey breed is solid red, varying from light to dark red. This breed is noted for its large litters, early maturity, and grazing qualities. In recent years breeders have followed the market demands by developing the intermediate type of hog within this breed.

POLAND CHINA

The Poland China breed is also an American breed, having originated in Ohio, and this breed is popular in Florida. It is noted particularly for its good quality, refinement, and early maturity. The color is black with white markings, the white usually being on the forehead, on all four feet and the tip of tail. White spots on other parts of the body are permissible. The ears are pendent, as with the Duroc-Jersey, and the nose is straight or slightly dished. Good development is noted in the hams and loin, and the back is well arched. In selecting hogs for breeding purposes, only those animals which have strong bones and a well arched back should be chosen. Only brood sows giving birth to large litters should be kept, since the Poland China breed was criticised formerly for not being prolific. In former years the conformation of this breed was inclined towards the extreme lard type, the individuals being very compact, low set, and chuffy, but in more recent years the intermediate type has been developed through selection.

HAMPSHIRE

The Hampshire breed originated in England and was imported first into the states of Massachusetts and Kentucky. They may be classed intermediate between the lard and bacon types. They are black in color, with a white belt or "list" which varies from 4 to 12 inches in width extending around the chest and including the fore-leg. The Hampshire is noted for its grazing



Fig. 10.—A uniform lot of feeder shotes. (Courtesy Atlantic Coast Line Railway.)

ability, and for that reason is gaining in popularity in this state. The sows make good mothers, and are quite prolific.

OTHER BREEDS

The Berkshire breed is quite popular in other sections of the southeastern states; however, very few are found in this state. Since hogs of the Tamworth breed are very rangy and belong to the so-called bacon type and do not mature as early as some of the other breeds, hog producers of this state have not used the Tamworth to any great extent. The Chester White breed is less suitable for most sections of Florida, due to the fact that white hogs often "sunscald" during the summer months.

EQUIPMENT

Hogs can be raised successfully without expensive equipment. Heavy overhead investments in expensive equipment, and extra labor costs above the amount actually needed, have been responsible for much of the financial loss experienced by many farmers who raised hogs in past years. Adequate equipment must be provided but the swine producer should attempt at all times to keep such overhead cost at a minimum. In constructing much of the equipment it is often possible to use odd pieces of board, timbers, and other materials already available on many premises.

PORTABLE HOG HOUSE

The portable A-shaped hog house is a most important piece of equipment for successful swine production. It can be con-

structed cheaply and can be used as shelter for the brood sow at farrowing time as well as for shade and shelter for the pigs and sow after farrowing. Another advantage of the A-shaped hog house is that if it is constructed on runners, it can be moved from field to field as the grazing crops are ready to be "hogged off". It is made of boards nailed together at the top, as illustrated in Fig. 11. The boards should be five to six feet in length and nailed to 4" x 4" pieces at the bottom. The house should be attached permanently to runners (see Fig. 11) so that it can be moved from one field to another.



Fig. 11.—The A-shaped hog house is desirable for use with sow and pigs and grazing shotes.

SANITARY HOG WATERERS

A sanitary hog waterer can be constructed at very little cost, and will pay for itself many times in providing clean water free from disease germs and parasite eggs, thereby preventing loss in pigs. Filthy mudholes are often responsible for digestive disorders in pigs and serve as a source from which they may become infected with internal parasites. With a sanitary waterer such ailments and infections are prevented in a large measure. Fur-

ther, an adequate water supply can be maintained easily and water may be provided in cultivated fields when the sanitary waterer is used.

In making a waterer use an empty barrel with both ends still intact. The barrel must be air tight. Use 2"x8" boards in constructing the trough which is built large enough so that the barrel can be set directly in it, as shown in Fig. 12. A hole about



Fig. 12.—A sanitary hog waterer, such as is shown here, helps keep the hogs healthy.

one-half inch in diameter is bored in the side of the barrel about six inches from the bottom and through this hole the water flows from the barrel into the trough, filling the trough with water. The barrel is filled through a large bung hole in the top. A tight fitting plug must be used in this hole, for if air gains entrance into the barrel, all the water will flow out through the hole near the bottom. In filling the barrel the small hole near the bottom must be temporarily plugged, since the water would flow through that hole and overflow the trough. The trough is built on skids that it may be easily transported from one field to another.

SHELTER OF TIN ROOFING

A shelter constructed of corrugated tin roofing can be provided quite cheaply and can be used by several hogs at one time. It can be torn down and moved to other locations quite readily and with little expense. In its construction four posts are set in the ground with two cross-pieces of 2"x4" material nailed from post to post in front and rear and the ends of the tin roofing are nailed to the 2"x4" pieces. If further protection is



Fig. 13.—A plain shelter of tin roofing will provide shade for the hogs.

desired, boards may be nailed up for 3 to 3½ feet on the north and west sides. Such a shelter may furnish shade during the summer months. (Fig. 13.)

BRUSH SHADES

Since it is essential to provide shade during the hot summer days and since hogs will often be grazing in fields where no shade trees are to be found, it is, therefore, necessary to provide cheap shade. In addition to the A-shaped hog house or the shed of tin roofing just described, sufficient shade can be provided by simply cutting brush and piling them over a frame built of four posts with cross-pieces to support the brush proper-

ly. Such shade can be provided cheaply and the brush will amply supply the need for shade in summer. (Fig. 14.)



Fig. 14.—A brush shade is satisfactory if no other is available. It is easily and cheaply constructed.

WATER SUPPLY

An adequate and wholesome water supply is essential in swine raising. It is best to obtain water from a well, the water being kept in a sanitary waterer. However, if a spring or running water is available such water is generally wholesome, provided there is no contamination from drainage water. One should determine if the water flows through a hog pasture farther up the stream, since disease germs as hog cholera or swine plague can be carried for miles by running water.

PIG TROUGHS

Where self-feeders are not used, the little pigs will need a feeding trough soon after they are farrowed. An inexpensive trough can be constructed by nailing two 1"x6" boards together lengthwise making a V-shaped trough, then nailing a board at each end. Cross strips should be tacked on top to prevent the pigs from lying in the trough, and to keep one or two pigs from eating all the feed. (Fig. 15.)

SELF-FEEDER

If there are several litters of pigs to be farrowed close together, a small self-feeder can be used to a decided advantage in feeding the young pigs. When they are two to three weeks old they will learn to eat from the self-feeder and one self-feeder will hold sufficient feed for several pigs. Self-feeders save labor, reduce waste in feed, and furnish the feed in a sanitary manner.

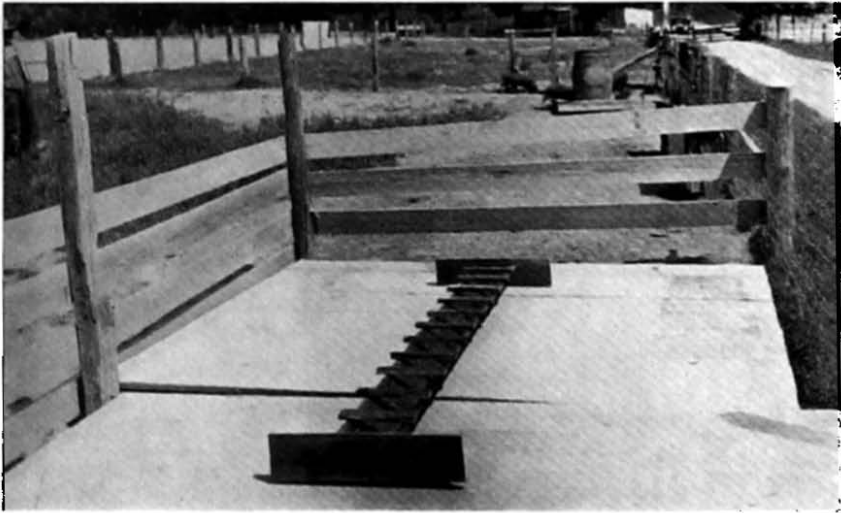


Fig. 15.—An inexpensive but satisfactory pig trough.

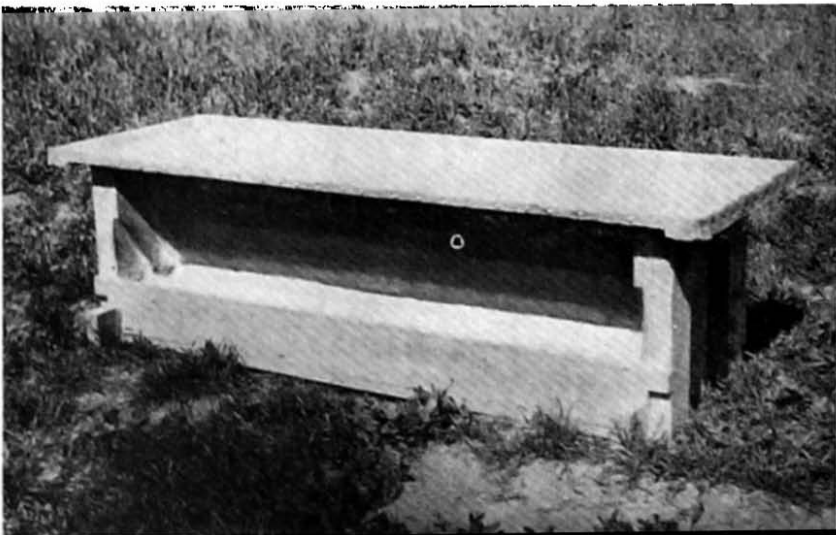


Fig. 16.—A small self-feeder for pigs.

The self-feeder can be used to advantage in furnishing supplemental grain mixtures for brood sows and boars on pasture and in providing supplemental feeds, as fish meal or tankage, to hogs grazing on corn, chufas, or sweet potatoes in fattening (Figs. 16 and 17).

BOX FOR MINERAL MIXTURE

Mineral mixtures should be kept before the hogs at all times in order that they may be kept in a thrifty condition. Supple-

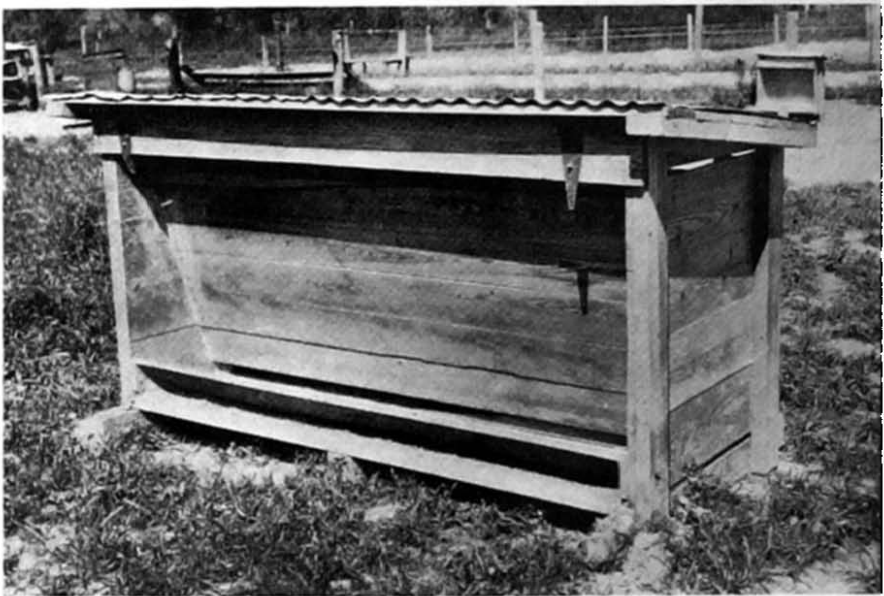


Fig. 17.—A large self-feeder.

mental mineral mixtures are essential for bone development and in maintaining a high state of nutrition in the hogs. A desirable self-feeder or box for supplying the mineral supplement, may be constructed cheaply as shown in Fig. 18.

FEEDS FOR SWINE

The use of field crops for grazing in swine production is important for several reasons. Losses from intestinal parasites are reduced to a minimum if the brood sow and young pigs are kept in a cultivated field planted to some annual grazing crop, and the pigs will make more rapid gains when succulent feed is supplied. The breeding herd is kept in better physical condition when provided with green feed. Shotes make more eco-



Fig. 18.—A box for the mineral mixture keeps the mixture sheltered, and yet it is always available.

nomical gains when turned on such crops as peanuts, corn, chufas, and sweet potatoes than if fed in the dry lot. Labor costs are reduced when grazing crops are provided, since the hogs gather their own feed.

By systematic planning, it is possible to have some grazing crop available every month in the year. The following outline will suggest some of the more important crops suitable for this purpose. Other crops may be added for different localities.

CROPS WHICH MAY BE USED IN PROVIDING ALL-YEAR GRAZING

| Month in Which Grazing Desired | Grazing Crop | Planting Date |
|--------------------------------|---|--|
| January and February | Oats Rye Rape Runner peanuts Chufas | October and November October and November October and November May and June May and June |

CROPS WHICH MAY BE USED IN PRODUCING ALL-YEAR GRAZING
(Continued)

| Month in Which Grazing Desired | Grazing Crop | Planting Date |
|--------------------------------|--|--|
| March | Oats Rye Rape Austrian peas Vetch | October and November October and November October and November September, October and November September, October and November |
| April | Austrian peas—late grazing Vetch—late grazing Oats—late grazing Rape Millet—early grazing Sorghum | September, October and November September, October and November September, October and November November and December March March |
| May | Millet Sorghum | March and April March and April |
| June and July | Early corn Spanish peanuts Sorghum Cowpeas Soybeans | March March April and May April April |
| August and September | Corn Spanish peanuts Cowpeas Soybeans Chufas | March and April March and April April and May April and May May and June |
| October and November | Corn Runner peanuts Sweet potatoes Velvet beans | April April and May May and June April and May |
| December | Early oats Rye Corn Runner peanuts Sweet potatoes Velvet beans Rape | October October April April and May May and June April and May October |

In addition to the above annual crops it is advantageous to provide permanent pastures sodded to such grasses as carpet, Bermuda, Dallis, and Bahia. A mixture of these grasses is often used in establishing the permanent pasture. Lespedeza can be added to the grass mixture in certain sections of the state. Permanent pastures can be used to advantage for the breeding herd but should not be used for the young pigs, since the latter are far more subject to worm infestation.

GRAZING CROPS

Corn:—Corn is one of the principal crops grown for swine production. It is preeminently a fattening feed, being very high in carbohydrates but low in protein and mineral matter. When early maturing varieties are used, grazing can be obtained as early as the latter part of June and with the use of early corn for fattening, shotes may be turned in the corn field sufficiently early to enable them to be finished for marketing in early fall. It is most economical to "hog off" the corn rather than to gather it and feed in the dry lot.

Where corn alone is "hogged off" or fed in a feed lot it should be supplemented with a small amount of fish meal or tankage. Experiments have shown that where corn is supplemented with fish meal or tankage considerable less corn is required to make one pound of pork than where no protein supplement is added to the ration. Many farmers follow the practice of interplanting corn with peanuts, thereby obtaining grazing from both crops.

Peanuts:—Since many of the soils in this state are well adapted to growing peanuts the majority of farmers raise them to furnish feed for fattening hogs for market. Hogs are turned into the fields and allowed to "hog off" the peanuts. Since large yields can be obtained and since they are high in fattening properties, due largely to the high content of fat, peanuts are considered the most economical and practical feed for finishing hogs in Florida. The varieties of peanuts most widely used in pork production are the Spanish and the Florida runner. The Spanish peanut can be planted early in the spring to furnish an early fattening feed. Very often it is possible to turn shotes onto Spanish peanuts the latter part of June and early July and such shotes will be finished for market early in the fall when market prices are usually highest.

Florida runner peanuts are grown for grazing at a later period than Spanish peanuts. The runner peanuts make larger yields and will remain in the soil for several months before they sprout. Many farmers use runner peanuts for fattening shotes for the early spring market, turning the hogs on the peanuts in December or early January.

The cured hams, bacon, and shoulders from peanut-fed hogs have a characteristic sweet flavor.

Millet:—Cat-tail or pearl millet is an excellent crop to furnish grazing for hogs during the spring months (Fig. 19). This crop

is especially useful for the brood sow and pigs. One acre of millet of average production will furnish grazing for two to three brood sows and their pigs for several weeks. Grazing should begin when the millet is approximately eight inches high and may be



Fig. 19.—Millet provides good grazing for hogs.

continued for several weeks. The crop is planted in rows or broadcast. Since millet furnishes bulky, succulent roughage, it should be supplemented with a concentrate grain mixture such as the following: Corn 60 pounds, shorts 30 pounds, and fish meal 10 pounds. Two to three pounds of the grain mixture should be fed daily for each 100 pounds live weight.

Sorghum:—Sorghum is another crop often used for grazing in raising hogs. Sorghum furnishes an abundance of feed, yet the plants do not withstand grazing as closely as does pearl millet. Sorghum is coarser and more fibrous than pearl millet, and for that reason pigs do not thrive as well on sorghum as on millet. This crop may be planted in rows or sown broadcast for grazing purpose. In many cases, sorghum is used as a soiling crop, to be cut and fed to hogs in the lot. The amount of labor required should be considered in following such a practice. Two varieties of sorghum commonly grown for grazing purposes are the Early Amber and Orange. Where sorghum is used for grazing purposes or as a soiling crop it must be supplemented with a concentrate mixture the same as millet.

Cowpea Pasture:—Cowpeas make excellent pasture during the late spring and summer months and may be planted in rows or sown broadcast. Varieties of cowpeas best suited for Florida are the Brabham and Iron. It is best to defer grazing until the first peas begin to mature, in order to get the maximum feed from the crop. The peas are high in protein, while the green leaves and shoots furnish an abundance of succulent feed. Cowpeas and other legumes furnish more mineral matter for good

bone development than is supplied in grazing non-leguminous crops. If hogs are grazed on cowpeas alone they should receive a supplement of corn.

Soybean Pasture:—Excellent results have been obtained from soybeans as a green grazing crop for hogs. The tender leaves and vines furnish feed of high quality and may furnish grazing during June and July. If the crop is not grazed too closely the plants will continue to grow and put out new growth which will furnish continuous grazing for several weeks. Hogs grazed on soybeans should receive corn as a supplementary feed.

Rape Pasture:—The rape plant resembles the collard in many respects. The seed may be planted any time from late summer to early spring, thereby furnishing grazing over a long season. It is best to plant rape in rows rather than broadcast, since when sown broadcast much of the rape is destroyed by trampling. Rape requires fertile soil to produce satisfactory yields and if planted on poor land heavy applications of fertilizer are necessary. Due to its growth habits this plant will not withstand close grazing; if grazed too closely the plants will die. The plants should be approximately one foot high when grazing is commenced and a supplemental grain mixture is necessary. Dwarf Essex is the variety used almost exclusively for swine feed.

Sweet Potato Pasture:—Sweet potatoes are useful for fattening shotes but only shotes which have attained good size should be turned onto this crop, since the tubers are too bulky for small growing pigs. The plants may be set during May and June, and grazing obtained from August until November or even later. Since sweet potatoes are low in protein they should be supplemented with fish meal, tankage, or other protein feed.

Chufas:—In certain sections of Florida, chufas are used extensively for fattening hogs and provide feed for a long grazing period. Large yields of chufas are obtained per acre and the crop can be grown cheaply. Chufas may be planted in May and June and furnish grazing from September to March. This crop requires an abundance of plant food, and, therefore, depletes the soil of fertility quite rapidly, especially if grown on the same land each year. Since chufas are exceptionally low in protein they should be supplemented with a feed high in this nutrient, such as fish meal or tankage. Unpublished data obtained by the Animal Husbandry Department of the Florida

Agricultural Experiment Station show definitely that it is not economical to graze chufas unless a protein supplement is added.

Austrian Peas and Vetch:—Austrian peas and vetch are useful as grazing crops for hogs and may be grown singly or together for swine grazing. Oats are sometimes used in the mixture, especially where vetch is grown. Hogs often show a reluctance at first towards grazing Austrian peas and vetch, but in a few days they learn to eat these crops well and seem to relish them very much. Austrian peas and vetch should be planted from the latter part of September to the last of October and will furnish grazing from the latter part of February to April. A grain supplement should always be used when these crops are being grazed.

Oats Pasture:—There is no crop used quite so extensively as oats for winter pasture for hogs and, if not grazed too closely,



Fig. 20.—Sows and pigs like a winter pasture of oats.

they furnish grazing until late spring. Oats are often mixed with rye for grazing, especially in those sections of the state where rye grows well. When sown in October oats are ready for grazing in December. Oats furnish succulent feed so essential for best returns from the breeding herd and for young pigs. This crop is used advantageously to supply grazing for the pigs farrowed in February (Fig. 20).

When grazing on oats the breeding herd and pigs require a small amount of supplemental feed, such as corn, shorts, and a small amount of fish meal.

Rye Pasture:—Rye can be used alone or mixed with oats when grown for swine grazing. It furnishes an abundance of green feed for grazing during the winter months and is hardy in growth. A small amount of supplemental feed should be given hogs on rye pasture.

CONCENTRATES

Shorts:—Wheat shorts is used to a considerable extent in making up rations for swine, but should never be fed alone, since the ration would be unbalanced. Due to its protein content, shorts is used especially as a feed for young pigs, brood sows, and the herd boar. Shorts is useful in balancing rations whenever corn is used and when used to supplement corn, one pound of shorts should be used to approximately one and one-half pounds of corn. If fish meal or tankage is added to the ration as an additional supplement to shorts, the amount of shorts should be reduced to one pound of shorts to two pounds of corn.

Skim-Milk:—Skim-milk is a very valuable feed for use in swine production, especially for young pigs and brood sows. The protein is easily digested and is complete, containing all the amino-acids essential for growth. Skim-milk furnishes mineral matter in a readily available form to build bone. This feed may be used in supplying protein in the ration for fattening shotes, especially when corn is used. In feeding skim-milk give two to three pounds to one pound of grain mixture.

Tankage and Fish Meal:—Tankage is a high protein by-product of the meat packing industry useful in feeding swine. It is useful in supplying the protein supplement when hogs are being fattened on corn, and should be given to young growing pigs, since it furnishes much-needed muscle forming and bone building material. When tankage is fed, it should comprise from 5 to 10 percent of the ration.

Fish meal is used extensively as a protein supplement, especially near the coast. It is comparable to tankage as a protein supplement and is used in an identical manner. In choosing between these two products, their availability and cost will determine which will be most practical for use on any particular farm.

FEEDING SWINE**FEEDING THE BREEDING HERD**

The brood sow should have plenty of green feed every month in the year. The pregnant sow should receive feeds that supply muscle and bone building material and are not conducive to fattening, since during pregnancy the sow has a natural tendency to fatten. When sows receive a well balanced ration they do not acquire the habit of "pig-eating" and will farrow stronger pigs. The following feed mixtures are recommended for use with brood sows.

- | | | | |
|-------------------|-----------|-------------------|-----------|
| 1. Corn | 60 pounds | 2. Corn | 50 pounds |
| Shorts | 30 pounds | Ground oats | 25 pounds |
| Fish meal | 10 pounds | Shorts | 15 pounds |
| | | Fish meal | 10 pounds |
| 3. Corn | 60 pounds | | |
| Ground oats | 30 pounds | | |
| Fish meal | 10 pounds | | |



Fig. 21.—A creep should be provided for the young pigs as soon as they begin to eat.

The above mixtures are also recommended for sows suckling pigs. Any of these mixtures will satisfy the feed requirement for the herd boar as well. It is essential that the herd boar receive a liberal amount of green feed in order to keep him in the best breeding condition.

FEEDING PIGS BEFORE AND AFTER WEANING

The pigs should run with the mother on some green crop such as millet, sorghum, cowpeas, corn, oats, rye or any other suitable crop which might be particularly adapted to the local conditions. The little pigs will begin eating while very young—usually around two weeks old—and in doing so they supplement their mother's milk. At that time a "pig-creep" may be provided (see Fig. 21) and the little pigs fed in a trough, or self feeder.

The following mixture is useful for feeding suckling pigs:

| | |
|--------------------|-----------|
| Cracked corn | 60 pounds |
| Shorts | 35 pounds |
| Fish meal | 5 pounds |

Corn meal can be substituted for cracked corn. This mixture can be given in a slop or fed dry in the trough. Some pigs will eat slop more readily than dry feed. When the feed is given in a small self-feeder it will necessarily have to be given in the dry form. Locate the "pig-creep" near the place where the brood sow is to be fed, so as to allow the little pigs to "creep" to themselves, thereby preventing the mother from robbing them of their feed. As the pigs grow older, whole corn can be substituted for the cracked corn or corn meal, and the amount of fish meal increased until they receive from 10 to 12 pounds of this product per 100 pounds of grain mixture.

FEEDS FOR FATTENING SHOTES

Such crops as corn alone, corn interplanted with peanuts, peanuts alone, chufas, and sweet potatoes are used in fattening hogs in Florida. These crops are "hogged off" and the hogs sent from the field to market. Practically all hogs fattened in this state are finished on some grazing crop or crops rather than by being fed in a dry lot.

THE USE OF MINERAL MIXTURES

No feeds given to hogs furnish all the body requirements for mineral matter. It is necessary to supply these minerals in some manner to the hogs at all times. Some farmers put the mineral supplements directly into the grain mixture, while others put the mineral mixture in receptacles kept in a dry place, to which the hogs have access at all times. They will eat only as much of the mixture as they need. The latter method is recommended as being more satisfactory. Wooden boxes

preferably should be constructed, and the mixture kept in these receptacles at all times. (See Fig. 18.) The containers should be placed under a shed or else covered in such manner that the mineral mixture will be kept dry. The following are two desirable mineral mixtures used:

| | | | |
|-------------------------|-----------|------------------------|-----------|
| 1. Steam bone meal | 50 pounds | 2. Charcoal | 10 pounds |
| Air slacked lime | 25 pounds | Hardwood ashes | 10 pounds |
| Charcoal | 10 pounds | Air slacked lime | 10 pounds |
| Hardwood ashes | 10 pounds | Common salt | 4 pounds |
| Common salt | 5 pounds | | |

The following mixture is recommended by the Federal Bureau of Animal Industry:

| | |
|---|-----------|
| Steam bone meal | 50 pounds |
| Ground limestone or airslacked lime | 25 pounds |
| 16 percent acid phosphate | 25 pounds |
| Common salt | 5 pounds |

"Very often wood ashes are available and may be incorporated in the mineral mixture to advantage. When added to the mixture above they may be used to the extent of one-third of the mixture by weight. Thus 35 pounds would be the correct quantity to add to the ingredients listed."

The mineral mixture should by all means be kept before young growing pigs at all times. All classes of hogs are more thrifty if given access to a mineral supplement.

MARKETING

Hogs fit well into a diversified cropping system, thereby allowing many farmers to engage in hog raising. Since the market demands for cured and fresh pork of high quality have steadily increased during past years, it has become necessary to devise efficient methods of marketing small lots of hogs. Further, the development of modern transportation systems and improved methods of refrigeration and curing of meats have been responsible for organizing efficient central livestock markets. When farmers raised only sufficient pork for their own use, there was no need for a marketing system, but with the continuous increase in urban population there has grown a demand for cured and fresh pork at all seasons of the year. By having proper cold storage facilities at the packing plants, and by the use of refrigerator cars in distributing fresh pork,

the packing houses and killing plants can supply the demand for pork at all seasons of the year if the hog producer furnishes the hogs.

In supplying the needs of the market, the farmers can obtain better prices if they have a definite organization through which their hogs may be sold. The packer buys hogs in car lots, while the average farmer who practices a diversified system of farming does not raise enough hogs to sell in car lots. Such a situation brought into existence the local buyer who assembled hogs from many farmers and shipped them in car lots to the packers. More recently farmers' cooperative hog marketing associations have been organized, whereby the farmers now manage their own shipping of hogs. In marketing through cooperative associations, the farmers hold cooperative hog sales when the hogs in that community are finished for market. In holding these sales, certain days are set as sale days, and the members having hogs ready for market will bring them to the station designated as the shipping point. The hogs are hauled to the shipping point in wagons, trucks, and automobiles (Fig. 22). When hogs reach the shipping point they are graded according to type, weight, quality, and finish. Representatives from packinghouses and killing plants, having been previously notified of the sale, are present to bid on the hogs, while others submit bids by wire or telephone. The hogs are sold to the highest bidder. By marketing hogs in this manner, the small producer with one or two



Fig. 22.—Hogs come in on wagons and trucks on cooperative sale days.

hogs receives the same consideration at the market as does the man who produces hogs in large numbers. Greater net returns are received through cooperative sales, since the farmers can sell their hogs direct to the packing houses or killing plants.

Through cooperative hog sales farmers gain information concerning market demands for hogs in regard to type, weight, quality, and finish. Knowledge thus gained enables farmers intelligently to select, breed, and grow the packers' desirable type of hogs, and to feed them to the degree of finish the market desires. Another advantage of the cooperative sales is that they enable the farmers to meet on the sales days to exchange ideas and compare results obtained by their methods of feeding and management of hogs.

The success of any cooperative hog sales association depends largely upon the local manager elected to direct the affairs of the association. It is imperative that the manager be a good business man. He must gain the confidence of the producer, and have a thorough knowledge of handling hogs through cooperative sales, including the weighing, grading, loading, and proper shipping. As a business man he must gain the confidence of the packer, butcher, and meat dealer, and must know the market conditions and demands at all times.

Cooperative marketing is an integral part of the federal and state agricultural extension work and to carry out this program the Agricultural College, Experiment Station, and Extension workers furnish the farmers with information concerning better methods of swine breeding, feeding, and crops to be used in finishing out hogs for market. Cooperative marketing of hogs, therefore, includes more than just the selling of hogs on certain days. It means that the farmer must plan his farming operations to have a complete yearly cycle of feed and pasture. When he markets his hogs on cooperative sales days, he is marketing—through the hogs—crops raised during several months of the year.

At the present time hogs are graded in Florida and other Southern states as follows:

No. 1. Hogs weighing 165 pounds and over with good, smooth finish.

No. 2. Hogs weighing 135 pounds to 165 pounds with good, smooth finish.

No. 3. Hogs weighing 110 to 135 pounds with good, smooth finish.

No. 4. Pigs weighing 80 pounds to 110 pounds.

Roughs, sows, stags, and piggy sows.

Stags are docked 70 pounds.

Piggy sows are docked 20 to 40 pounds, according to condition.

Thin, rough sows are discounted according to condition.

In holding a cooperative sale each farmer is given a ticket as his hogs are weighed and graded, this ticket being his receipt, showing the number and weight of hogs of each grade he furnished for the sale.

After the weighing and grading is completed, hogs are sold by the manager of the cooperative association. After the hogs are sold, each farmer is given a ticket showing the price, value, and net cash due him for his hogs. This ticket is a basis of settlement and can be cashed at the bank. The following is a sample of tickets that are made in duplicate for each farmer furnishing hogs for the sale. Such a ticket also furnishes a good method of keeping records of sales.

| | | | | |
|--|--------|-------|----------------------|-------|
| No. 19..... | | | No. 19..... | |
| Name of Association | | | | |
| Received of: | | | Pay to: | |
| | | | | |
| Grade No. | Weight | Dock | Price | Value |
| 1 | ..... | ..... | ..... | ..... |
| 2 | ..... | ..... | ..... | ..... |
| 3 | ..... | ..... | ..... | ..... |
| 4 | ..... | ..... | ..... | ..... |
| R | ..... | ..... | ..... | ..... |
| S | ..... | ..... | ..... | ..... |
| | | | TOTAL | |
| | | | Less 1 percent | |
| | | | Net cash | |
| I certify the above weights to be correct. | | | Name of Association | |
| Weigher | | | By: | |
| | | | Sales Manager. | |

The cooperative hog marketing associations properly managed can become a clearinghouse for not only finished hogs but for feeder pigs and breeding stock as well.

HOG LOSSES IN TRANSIT

Each year hog producers bear a large financial loss due to the death of hogs in transit. In 1929, this loss for the United States was estimated at four million dollars. In addition to dead hogs, many crippled and bruised hogs reach the packinghouses, and are responsible for considerable loss. Many deaths in transit result from suffocation, congestion of the lungs from overheating, and from pneumonia. Many of these losses could be prevented by exercising proper care and management on the farm and during the time of loading and shipping.

The proper marketing and handling of hogs begins on the farm. While on the farm hogs must have been fed a well balanced ration supplemented with a mineral mixture so that when the hogs have reached marketing weight they will be in the best condition for shipping. Such feeding practices will produce good strong bones. It is necessary that hogs have strong bones to come through the shipping process in good condition. See section on "Feeds for Hogs" for additional information on feeds and feeding, and use of mineral supplements.

LOADING

In addition to proper feeding as a means of preventing hog losses in transit, the proper handling of hogs while they are being loaded in trucks or wagons on the farm is a very important consideration. The hogs should not be fed heavily prior to loading. They should not be exercised to any great extent, especially in hot weather. Many injuries and broken bones are the result of rough handling of hogs at time of loading into wagons or trucks. Careful and gentle handling avoids these losses.

Since it is so essential that hogs be handled in the proper manner from the farm to the cars in order to reduce losses in shipping, the following instructions are suggested:

1. Give only about one-half the regular amount of feed on the night before hogs are to be loaded the following day. Allow them to have all the fresh water they desire. On the morning the shipment is to be made, give only a light feed and allow them to have plenty of water. If there are boars and stags in the

shipment, clip off their tusks. This precaution often prevents serious injury to other animals while in transit.

2. Cover the bottom of the truck or wagon with a layer of sand about an inch deep.

3. Drive hogs into wagon or truck, using a loading chute rather than catching them by their legs and lifting them into the truck or wagon. Rough handling in loading often breaks a leg, or otherwise injures the animal. A loading chute can be constructed very cheaply.

4. Do not crowd the hogs in the truck or wagon. Provide for good ventilation. Hogs easily become overheated if they are overcrowded in the truck or wagon.

5. Deliver the hogs at the station in time to allow one or two hours before they are loaded into the stock car. Such a practice allows time for the hogs to cool off and become rested.

6. Have a chute provided for unloading hogs at station. Allow the hogs to take time in walking down the chute, since hurrying and beating them causes unnecessary bruises. Handle them carefully at all times, avoiding excitement and overexercise.

When hogs are unloaded into the stock pens at the station they should be allowed to drink all the water they desire, but should not be fed. Feeding hogs immediately before loading or feeding in cars at loading time often has increased the death loss in transit as much as 25 to 30 percent. Hogs which have been fed and handled roughly at loading time become exhausted and hot. Many of them will suffocate while others are apt to develop congestion of the lungs. This ailment is responsible for more than 60 percent of the deaths of hogs in transit.

Before loading, inspect the car to see that the doors close securely; that there are no nails projecting from floor or sides of car; no protruding bolts present, or broken slats on the side or in the floor of the car, since these objects are often responsible for injuries in transit. Such injuries may be prevented if the shipper exercises care. See that the car is bedded with four inches of clean sand to furnish good footing for the hogs. In hot weather wet the sand down before loading. Do not load hogs in cars containing old bedding of organic material, since such bedding heats, and becomes an extra source of losses.

The hogs should be loaded carefully by driving them slowly up the loading chute, avoiding all the excitement possible. Never force them up the loading chute hurriedly, for in doing so, some

hogs will be trampled upon, thereby causing bruises; the hogs will become excited and hot, all of which add greatly to the risk of loss in shipment. Hogs should never be beaten or prodded with sticks, since such practices cause bruises which will often result in crippling the animal. When hogs become crippled and get down on the floor of the car they are often trampled to death.

Small hogs should be separated from the large ones by substantial partitions.

The load should not exceed 16,000 pounds when hogs are shipped in standard 36-foot cars during warm weather. The overloading of cars is responsible for greatly increased losses of hogs in transit. Table I shows the number of hogs of various weights which might be loaded into cars of different lengths. When double deck cars are used, do not put more than 40 percent of the total weight on the upper deck. After loading into car, see that all doors are properly closed. The use of common sense in loading hogs is a great asset to all concerned in the shipment by preventing losses, deaths, and claims.

TABLE I.—SUGGESTED NUMBER OF HOGS OF DIFFERENT WEIGHTS TO LOAD IN A STOCK CAR IN SHIPPING.

| Average weight per head (pounds) | Number of hogs per single deck car | |
|-------------------------------------|------------------------------------|--------|
| | 36 ft. | 40 ft. |
| 100 | 130 | 145 |
| 125 | 115 | 127 |
| 150 | 100 | 110 |
| 175 | 89 | 98 |
| 200 | 79 | 88 |
| 225 | 73 | 82 |
| 250 | 68 | 76 |
| 275 | 62 | 69 |
| 300 | 59 | 65 |
| 325 | 56 | 62 |
| 350 | 53 | 59 |
| 400 | 47 | 52 |

The losses in transit come mainly from two sources, from improper feeding and handling on the part of the owner and from improper handling on the part of the railroads. If the farmer does not carry out his duties and responsibilities in attempting to deliver the hogs to the railroads in a healthy condition, free from bruises and broken bones, it is a certainty that the railroads cannot deliver the hogs to the packer in good condition. Further, if the farmer delivers his hogs to the railroads in good condition and these carriers fail to meet their responsibilities,

the hogs will not reach the packer in good condition. Thus it will be seen that it takes complete cooperation of all parties interested in any shipment of hogs to insure them reaching the packer in good condition. If all parties concerned cooperate thoroughly, much of the losses of hogs in transit will be prevented.

CURING PORK ON THE FARM

A good home cured ham is very much in demand at all seasons of the year for home use and for marketing. The sides can be sugar cured and made into breakfast bacon of high quality. The shoulders can be cured in such manner that they will be very palatable, and be relished almost as much as a ham. The farmers in Florida can have cured meats of high quality by giving attention to the few necessary details in the cutting and curing operations.

The expense of such curing is small when compared to the palatability and high food value of properly cured meats.



Fig. 23.—Showing proper position of knife in sticking a hog.

SLAUGHTERING

If pork of the highest quality is desired it is necessary to have the hog slaughtered in a proper manner. Feed should be withheld from the hog for 24 hours before it is slaughtered. However, the animal may have access to fresh water during that period. The hog should be well bled at the time of slaughtering, to reduce the danger of spoilage when the meat is being cured. Bleeding is more thorough when the hog is not stunned and since the keeping quality of the meat depends very largely upon the thoroughness of the bleeding operation it is important not to stun the hog in slaughtering.

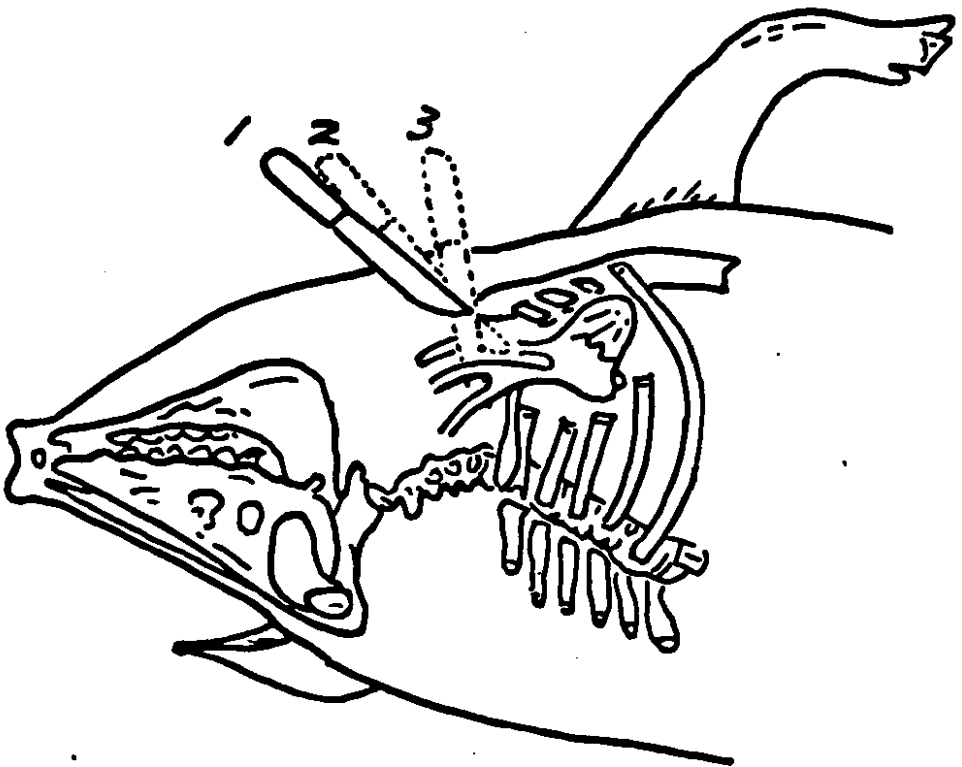


Fig. 24.—Showing proper positions of knife in bleeding hog; also location of heart and arteries. (From Circular 119, La. State University.)

When possible to handle, the hog should be turned up on its back and the sticking knife should be directed at an angle towards the chest cavity (Fig. 23). The knife should pass directly in front of the breast bone, then with a quick downward thrust, an artery leading to the heart will be severed and the

knife should be removed at once (Fig. 24). After sticking let the hog get up and move around, since more thorough bleeding will be obtained. Do not attempt to pierce the heart in bleeding. If the heart is punctured, the animal will not bleed thoroughly. Do not exercise the animal to any great extent prior to bleeding. If the hog cannot be handled without being stunned it should be given a blow on the forehead with a hammer or light axe or shot with a small caliber rifle, and then immediately bled.

SCALDING

After bleeding, the animal should be immediately scalded. The proper temperature of the water for scalding hogs is from 145 degrees to 155 degrees Fahrenheit. Do not have the water too hot, for it will "set" the hair, and much difficulty will be experienced in removing it. The hair and scurf can be removed quite easily by using bell-shaped scrapers designed particularly for that purpose. These scrapers can be purchased very cheaply. The scalding is best accomplished by using a wooden barrel attached to an adjoining platform on which the hog is placed after scalding. The rear end is scalded first, since it is much easier to remove the hair from the hind parts if the water is too hot and causes the hair to "set". After the hair and scurf are removed, the carcass should be hung up and washed with first warm water and then cold water. The entire skin surface should then be scraped with a knife to insure thorough cleansing.

REMOVING INTERNAL ORGANS

In removing the internal organs an incision is made along the mid-line extending the entire length of the body. The incision must be made through the skin and abdominal muscles, extending completely through these structures, thereby opening the abdominal and chest cavities. The pelvic bones are cut through at the mid-line. An incision is made around the rectum, detaching it from the surrounding structure, and it is pulled out through the opening made in the pelvic bones. Then the intestines, urinary bladder, stomach, liver, diaphragm, and pluck are all removed from the carcass. After removal of the internal organs the carcass should be split down the back, dividing it into halves. By dividing the carcass into halves, it is possible to obtain more thorough chilling.

CUTTING THE CARCASS

After the carcass has been chilled it should be cut into the following four main cuts: hams, loin and back cuts, sides, and shoulders (Fig. 25). The head is generally removed before the carcass is chilled; however, if it has not already been removed, it should be severed from the carcass before these pieces are cut.

The ham should be trimmed as smooth as possible; the trimmings should be used for sausage meat. The foot is cut off at the hock joint or about one inch below this joint.

The ribs are removed from the sides or middlings; in cutting out the ribs from the middlings, trim them "spare", thereby leaving as much lean meat as possible on the sides. The sides should be cured into breakfast bacon, and for that reason it is desirable to leave just as much lean meat on them as is possible. After the ribs are removed, the sides should be trimmed neatly, the lean meat trimmings being used in the sausage meat while the fat should be rendered into lard. (Fig. 26.)

The back and loin cuts are choice cuts. The back fat should be removed, and the back and loin cuts used as pork chops or cut into pieces to be used as fresh pork roasts. These pieces can be cured similar to hams and shoulders.

The shoulders should be trimmed as smoothly as possible and the feet removed at the knee joints or about one inch below.

Immediately each piece is trimmed, it should be covered with a thin layer of salt and laid aside until put in the cure mixture (Fig. 27).

METHODS OF CURING

There are two methods of curing meat, the brine or sweet-pickle method and the "dry cured" method.

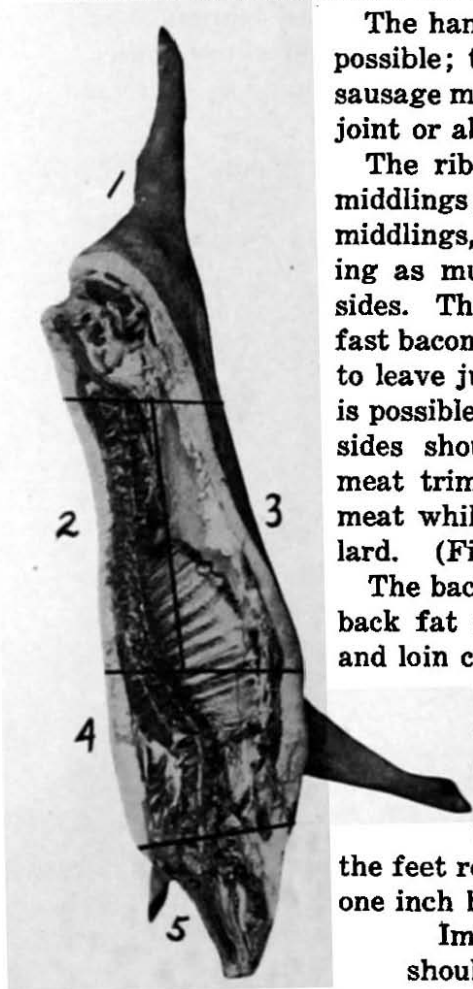


Fig. 25.—Hog carcass, showing main cuts. 1. Ham. 2. Back and loin. 3. Sides. 4. Shoulder. 5. Head.

The following formula for the sweet-pickle method of curing meats has proven satisfactory:

For each 100 pounds of meat use

- 12 pounds of salt
- 3 pounds of brown sugar (or 3 pints of syrup)
- 3 ounces of saltpeter
- 6 gallons of water

Mix the above ingredients thoroughly. The solution should be poured in a tub or barrel into which the meat is to be placed. After the pieces are cut and trimmed they should be placed in

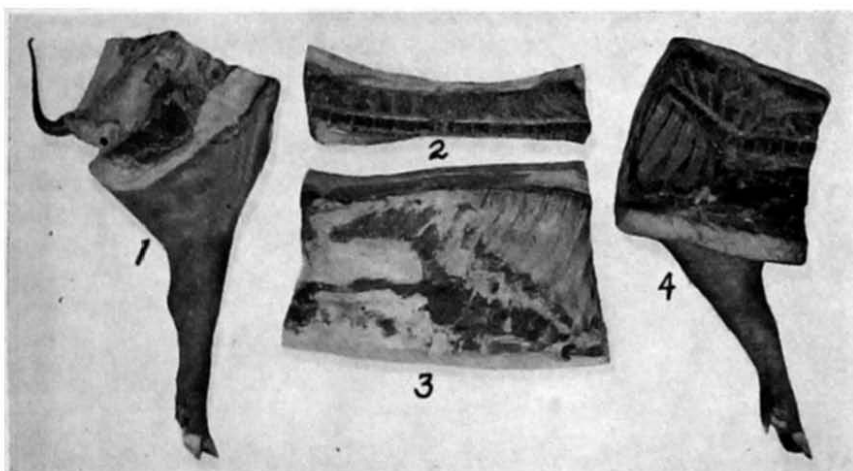


Fig. 26.—Hog carcass divided into main cuts. 1. Ham. 2. Back and loin. 3. Side or middling. 4. Shoulder.

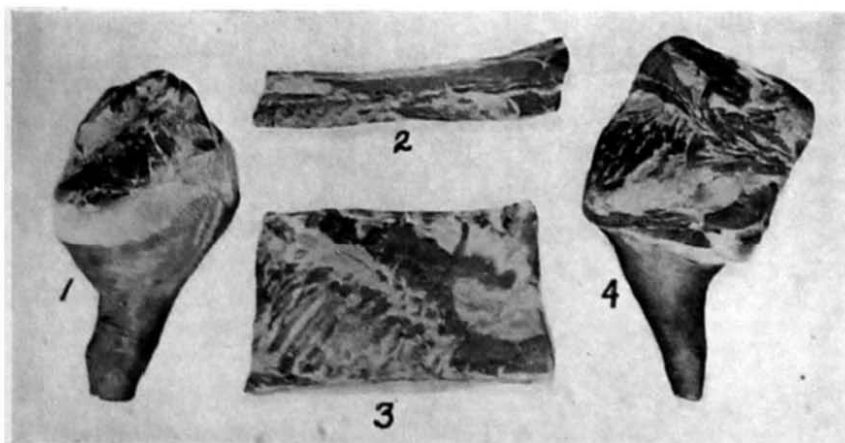


Fig. 27.—The main cuts of a hog carcass trimmed and ready to be cured. 1. Ham. 2. Back and loin. 3. Side or middling. 4. Shoulder.

the curing solution. Put the hams and shoulders on the bottom in packing the meat in the curing solution. Pack the meat with the skin side down. Leave the hams and shoulders within the sweet-pickle solution for three to four days for each pound weight. For example, a 10-pound ham would remain in the solution for 30 to 40 days. The sides should remain in the curing solution for two to three days for each pound weight. After remaining in the solution for the proper length of time the pieces should then be taken out and smoked with smoke from hickory chips.

The formula for the "dry cure" method is as follows:

For each 100 pounds of meat use:

- 8 pounds of salt
- 3 pounds of brown sugar (or 3 pints of syrup)
- 3 ounces of saltpeter
- 2 ounces of black pepper
- 3 ounces of red pepper

Mix all of the above ingredients thoroughly. The curing mixture should be thoroughly rubbed into the meat and placed between the pieces as they are packed in a wooden tub or barrel. The meat should be kept in the curing mixture for at least three days for each pound weight of the pieces. For example, a ten-pound ham should remain in the mixture for at least 30 days. After the meat is cured it should then be smoked in hickory smoke.

In most sections of Florida, to obtain the best results, it is necessary to keep the meat in cold storage during either of the above curing processes.

After the meat is smoked it should be well wrapped in paper and put in muslin bags. The bags containing the meat should be covered with a thick whitewash made by adding waterslacked lime to water, making a thick paste. After the bags containing the meat have been treated with the whitewash, the meat should be stored in the coolest place on the farm.

COMMON DISEASES OF SWINE

HOG CHOLERA

Hog cholera causes a greater annual loss to the swine industry than any other disease. It is very contagious and spreads rapidly through the herd, causing the death of practically all hogs infected. Quite often it appears in widespread epidemics and in such outbreaks it is responsible for the death of large numbers of hogs. Such epidemics are especially apt to occur when

swine raisers decide to take a chance and do not vaccinate their hogs against the disease. Such a choice is always accompanied with great risk. The cost of vaccination is not very great when done at the proper age, which is at weaning time. It will be found that the cost of vaccination over a period of years is far less than the financial loss resulting from hog cholera outbreaks in herds not vaccinated (Fig. 28).

Cause: Hog cholera is caused by a specific germ technically known as the filterable virus of hog cholera, and hogs must become infected with this germ before they develop the disease.



Fig. 28.—Hogs infected with hog cholera. (Courtesy Bureau of Animal Industry, USDA.)

The virus gains entrance into the body mainly through contaminated feed and water. Sick hogs discharge the virus through the intestinal droppings, the urine, and discharges from the nose and eyes. Usually, the symptoms are manifested within a week or 10 days after exposure to the virus. The sick hog is the most dangerous agent in spreading the virus. However, the virus may be carried on the feet of persons, or wagon or truck wheels, and by running water.

Symptoms: There are two types of hog cholera, acute and chronic. In the acute type the following symptoms are present: sluggishness, a desire to remain in the accustomed sleeping quarters, loss of appetite, vomiting, coughing, labored and rapid breathing, discharge from the eyes even causing eyelids to be glued shut, high temperature, profound weakness, and consti-

pation at onset of disease followed by diarrhea. The mortality rate is exceedingly high.

In the chronic type, the animal becomes greatly emaciated, weak and unthrifty. A pronounced cough is present. The hair may be shed in some cases and sore areas often develop over parts of the body.



Fig. 29.—Vaccinating a pig against cholera.

Post-Mortem Changes: Upon a post-mortem examination a hog which died of cholera will show the following changes: hemorrhages (small blood spots) on the heart, lungs, spleen, kidneys, and inner lining of urinary bladder. The intestines are congested. The lymph glands are also hemorrhagic.

Control: All hogs should be vaccinated against hog cholera. The vaccination should be done when the pigs are eight to ten weeks old (Fig. 29). If the disease is detected at its onset a large dose of anti-hog cholera serum sometimes proves helpful, but in the advanced stages of the disease, the serum is of no use whatever in treatment. There is no medical agent useful in treating the disease. When cholera is first observed in the herd the well hogs should be separated from the sick ones. All hogs that die of the disease should be buried deeply or burned, preferably burned.

SWINE PLAGUE

Cause: Swine plague is technically known as hemorrhagic septicemia and is found present in some outbreaks of hog cholera. The disease is caused by the germ, *Pasteurella suisepitica*, which is often found in the respiratory passages of healthy hogs. When some disease or other condition exists that lowers the vitality of the hogs, the swine plague organism often becomes pathogenic, producing the disease.

Symptoms: It is quite impossible to distinguish between symptoms of swine plague and hog cholera in the field. It seems, however, that in swine plague the respiratory passages are involved more pronouncedly than in cases of hog cholera. Even on post-mortem examination the two diseases are indistinguishable. Swine plague very rarely occurs as an independent disease.

Control: When vaccinating hogs against hog cholera it is well to vaccinate them also against swine plague, since such vaccination requires very little extra expense. At the first occurrence of the disease within the herd, all well hogs should be isolated from the sick ones. The hogs that die of swine plague should be buried deeply or burned.

NECROTIC ENTERITIS

Necrotic enteritis is a disease which assumes somewhat of a chronic form when it first occurs, but as the disease later spreads through the herd it may cause quite acute symptoms.

It is found most frequently in hogs kept under insanitary conditions as in filthy and wet pens, and where they have access to filthy wallow-holes.

Cause: The cause of necrotic enteritis is a germ known as *Salmonella suispestifer* which invades the mucus membrane lining the inner surface of the intestines, and then the *Bacillus necrophorus* attacks the injured mucus membrane and causes extensive ulceration. Both of these organisms are responsible for the disease.

Symptoms: The disease is found most frequently in pigs and shotes under six months of age. The symptoms are unthriftiness, weakness, staggering gait, loss of appetite, diarrhea, the intestinal discharges having a very foul odor, and very rough skin. The temperature is generally normal or very slightly elevated. Death sometimes occurs within a few days after the first symptoms are noticed, while in other cases the sick animal may linger for several days and finally die.

Post-Mortem Changes: Upon a post-mortem examination an animal dying of this disease shows marked changes in the intestines. Numerous ulcers of varying sizes will be detected on the mucus membrane lining the intestine. These ulcers are somewhat elevated from the surface of the mucus membrane and have a pit in the center. The entire ulcer is composed of dead tissue and large areas of such tissue can be scraped off easily with a knife blade. The walls of the intestines are greatly congested.

Control: Very little benefit is derived from the use of drugs in treating necrotic enteritis. After the ulcers have already formed in the intestines there is no drug that can restore the diseased tissue to normal. The pigs should be changed to clean quarters when the first indications of the disease appear. To prevent infection, pigs should never be kept in dirty, filthy, wet pens and lots, since such places often harbor the germs that cause the disease.

NECROTIC RHINITIS OR BULL-NOSE

Cause: The exact cause of necrotic rhinitis is probably the *Bacillus necrophorus*, a germ often found in insanitary quarters. The infection gains entrance through skin injuries of the nose and face or through injured mucus membranes.

Symptoms: The first symptom observed is the occurrence of numerous small ulcers in the region of the nose. The nasal

mucus membrane is congested and swollen. The infection continues to invade the deeper structures in the nasal region until finally a pronounced swelling of the entire face is noted. Even the facial bones become infected and in severe cases the nasal discharge consists of a large amount of foul smelling pus which is streaked with blood. The infection is quite fatal in young pigs while older shots will linger for several days, during which time the infection continues to invade the bones of the face, causing the face to become greatly disfigured.

Treatment: When the animal becomes so badly diseased that the bones of the face are infected and disfigured the most humane treatment is to destroy such an animal. Preventive treatment would consist in keeping pigs in clean quarters at all times. In the early stages, medical treatment sometimes proves helpful. This consists of scraping off as much of the diseased tissue as is possible and painting the areas with tincture of iodine or cauterizing them with lunar caustic.

EXTERNAL PARASITES

LICE

The hog louse is the most troublesome external parasite infesting hogs. This parasite is a blood sucker and lowers the vitality of infected hogs, making them more susceptible to other diseases. Lice also produce skin eruptions which become serious in severe cases.

The parasite is approximately one-fourth inch in length. The female lays her eggs on the hair of the hog, laying from three to six eggs daily. The eggs hatch in about 14 days. After hatching, it requires from 10 to 14 days until sexual maturity is reached, at which time the females begin laying eggs and the cycle is repeated.

Lice can be observed quite readily as they move over the skin and through the hair of infested hogs. They crawl from hair to hair, and are found most abundantly in the region of the flanks, at the base of the ears, and on the shoulders.

Treatment: Oily preparations are useful in killing lice. Crude oil is inexpensive and is very useful. Waste oil from garages is often used very effectively. A mixture of one part kerosene to three parts lard or linseed oil is useful, though quite expensive. The oil is best applied by hand, using a mop made by tying a piece of cloth to the end of a stick. Another effective way is to

spray the oil on the hog with a hand sprayer: Rubbing or oiling posts are somewhat useful in controlling lice, but they are not as efficient as hand applications since the oil does not reach the infested parts in many cases. Lice very rarely leave the skin surface of infested hogs, yet in eradicating these parasites from the premises all litter should be burned and fresh litter added to the sleeping quarters at least once a week.

MANGE

Mange is a very troublesome parasitic disease affecting swine. There are two types of mange, the sarcoptic or common mange and the red mange or demodectic type. Common mange is caused by very minute mange mites which burrow into the layers of skin, and produce small galleries in which the female mite lays eggs. A female lays from 15 to 25 eggs, and then dies. The eggs hatch within these galleries in about a week or 10 days. The young mites undergo several molts and reach sexual maturity in about two weeks. These newly hatched mites crawl out of their galleries, move about over the skin surface of the infested hog, and finally burrow into the skin on other parts of the body. The cycle continues in that manner, and if the parasites are not destroyed they infest larger skin areas until finally the entire skin surface will be infested. Such an infested hog presents a very unsightly appearance.

Symptoms: The skin is very rough. Small pimple-like eruptions, reddish in color and covered with scabs, are found over the infested areas. As the infestation spreads, the diseased areas become larger and unite, forming large raw areas over the body. The infested hog rubs these areas as a result of the severe skin irritation, and in doing so the condition is aggravated. In severe cases the skin becomes extremely scabby, crusty, and will crack open in places.

In case of red mange the mange mites burrow into the hair follicles. The infested areas are covered with numerous red pimple-like eruptions containing pus, the hair falls out, and the disease spreads rapidly to adjoining areas. This form of mange is more serious than common mange since the mange mites burrow deeper into the tissues and this form is more difficult to treat.

Treatment: Since the mange mites burrow into the skin and hair follicles, it is very difficult to apply effective treatment. In treating mange, the scabs over the diseased areas should be re-

moved by bathing the parts with an antiseptic solution, using a stiff brush to remove the scabs. The coal tar products are very effective in treating external parasites, hence these products could be used advantageously in making up the antiseptic solution. Add three or four ounces of any reliable coal tar product to one gallon of water in preparing the solution. After washing the areas thoroughly, allow them to dry for a few hours, then apply either of the following mixtures:

- | | | | |
|-----------------------|----------|------------------|----------|
| 1. Sulphur | 4 ounces | 2. Sulphur | 4 ounces |
| Kerosene | 1 pint | Kerosene | 1 pint |
| Raw linseed oil | 1 quart | Lard | 2 pounds |

Crude petroleum and waste oil from garages are used in treating mange, but these products are not as efficient as the mixtures above mentioned. It may require three or four treatments at intervals of a week or 10 days to cure mange. Red mange is practically incurable.

INTERNAL PARASITES

The swine industry bears a heavy financial loss each year from the ravages of internal parasites. It is possible to prevent this loss if the swine breeders care to

do so. Planting of grazing crops is necessary, and perhaps a little extra money for fences will be required, but the increased returns from healthy hogs will more than repay for the cost of these efforts. The large roundworm and the kidney worm are largely responsible for these losses.

LARGE ROUNDWORM

The large roundworm, technically known as *Ascaris lumbricoides*, is the most destructive internal parasite of swine (Fig. 30). The exact life history of this worm has been determined within the past few years. It was discovered that the large roundworm took a journey through the body of the pig, and in

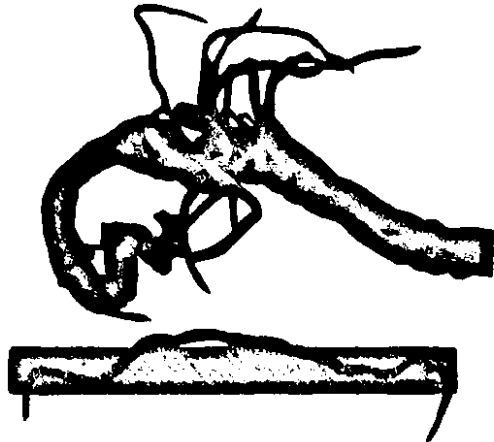


Fig. 30.—Large roundworms completely obstructing the intestinal tract of a pig. (The rule is 6 inches long.)

this journey such vital organs as the liver and lungs were infected by the larval forms of the parasite. It is essential to know the life history in order to appreciate fully the importance of the parasite (Fig. 31).

Life History: The adult worms are found in the small intestines. The adult females lay millions of eggs which pass out with the droppings, contaminating the soil with worm eggs. Such newly laid eggs are not capable of producing infection,

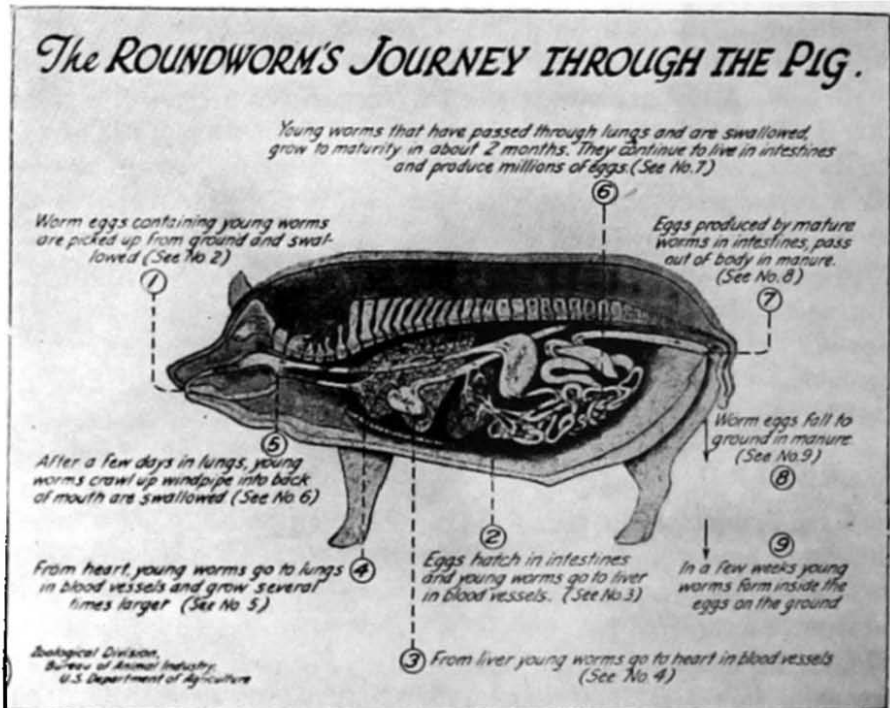


Fig. 31.—Pictorial story of the life cycle of the roundworm.

since they require an incubation period of from three to six weeks before they become infectious. During the incubation period the young microscopic worms develop within the eggs, producing what is technically known as embryonated eggs. When the embryonated eggs are swallowed they pass to the small intestines where they hatch. Shortly after hatching the small worms, microscopic in size, burrow through the mucus membrane of the intestines and gain entrance to the blood stream. The circulation of blood carries them to the liver where they remain for three or four days, causing certain degenerating changes in this organ. Then they leave the liver by means of

the outgoing blood and pass through the heart to the lungs. They remain in the lungs for four or five days, during which time they cause irritation within these organs and may even produce pneumonia. Then they crawl up the bronchial tubes and windpipe to the rear of the mouth. Upon reaching the rear part of the mouth they are swallowed, passing down the gullet to the stomach and intestines. When they reach the small intestines the parasites remain in that portion of the digestive system and develop to maturity. It takes about 10 days to complete the journey and in about 10 weeks after they reach the small intestines they become sexually mature. Then the life cycle is repeated. The late Dr. B. H. Ransom, former Chief of the Zoological Division, Bureau of Animal Industry, deserves the credit of having worked out the life history of the *Ascaris lumbricoides* in pigs.

How Pigs Become Infected: Pigs become infected with worms from exposure to filthy hog wallows, mudholes, and from grazing over pastures on which hogs have been kept continuously. If the brood sow has access to a filthy hog wallow she will take a mud bath in the dirty wallow hole. Such places are generally heavily contaminated with worm eggs and the eggs contaminate the teats of the brood sow when she is permitted to wallow in such mudholes. Immediately after wallowing she often allows the little pigs to nurse, and in doing so, they take numerous embryonated eggs into their digestive systems where these eggs hatch into worms. Thus when the little pigs are only a few days old they become infected with worms when the brood sows have access to insanitary surroundings. Pigs become infected also from grazing over infected soil.

Symptoms of Worm Infection: The large roundworm infects young pigs primarily; however, old sows sometimes harbor a few of these parasites. When young pigs are infected they become very stunted, unthrifty, and weak. They lose flesh, become emaciated, and have a rough coat (Fig. 32). Diarrhea is often present, and the abdomen sometimes enlarges, producing a condition often called "pot bellied". At times the worms are so numerous that they partially or even completely obstruct the intestinal tract. Many pigs infected with the large roundworm die, while those having resistance sufficient to withstand the infection will always be runty, and never make good "feeders". When pigs are stunted as a result of worms, they require much

more feed to produce satisfactory gains. It is, therefore, very uneconomical to raise pigs infected with worms.

Control of the Large Roundworm: The Federal Government, through experiments conducted in McLean County, Illinois, and at Moultrie, Georgia, has shown that the large roundworm can be controlled by using the following precautions: Wash the teats, mammary glands, and feet of the brood sow and put her on a clean pasture a week before she farrows. By clean pasture



Fig. 32.—Pig heavily infested with worms. (From *Livestock and Poultry Diseases*. Courtesy The Macmillan Co.)

is meant land which has been planted to some annual crop. Such land has been cultivated several times in growing the crop and the cultivation destroys worm eggs, hence the reason for referring to such land as clean pasture. A portable A-shaped hog house should be placed in the field where the sow is to farrow. The pigs should remain on the cultivated land for at least four months, for during that time they are very susceptible to worm infection. The brood sow should be taken out of the field when the pigs are from eight to ten weeks old, as the pigs are old enough to be weaned at that age. This method of control is being used very extensively throughout the corn belt and in the south. Such practices have shown definitely that it pays to raise pigs free of worms.

Advantage of Raising Pigs Free of Worms: The following advantages are derived from raising pigs free of worms:

1. Pigs will not be stunted in growth.
2. More pigs will be raised per litter.
3. Pigs will make far more economical gains.
4. When the shotes are fattened they will be uniform in size and quality. The markets demand such uniformity.

THE KIDNEY WORM

The Kidney worm, technically known as *Stephanurus dentatus*, is another destructive parasite of swine. This parasite infects older hogs and when it attacks the brood sow much loss is experienced, since it is then infecting the foundation of the herd.

The kidney worm is from one inch to one and one-half inches long. It is a mottled worm, having a semi-transparent covering through which the internal structures of the parasite can be seen. In the infected hog the parasites are found most abundantly in the sublumbar region, chiefly in the tissue around the kidneys and along the course of the ureters (the two small tubes leading from the kidneys to the urinary bladder) (Fig. 33). They are often present in other portions of the body, including the liver, lungs, and kidneys. The presence of the kidney worm gives rise to numerous cysts and abscess formations varying from one-fourth inch to over one inch in diameter. Within these cysts are usually found a male and a female kidney worm, although four or five parasites may be present in the same cyst. The parasites may likewise occur within the recently formed abscesses. However, in the old formations they are not present.

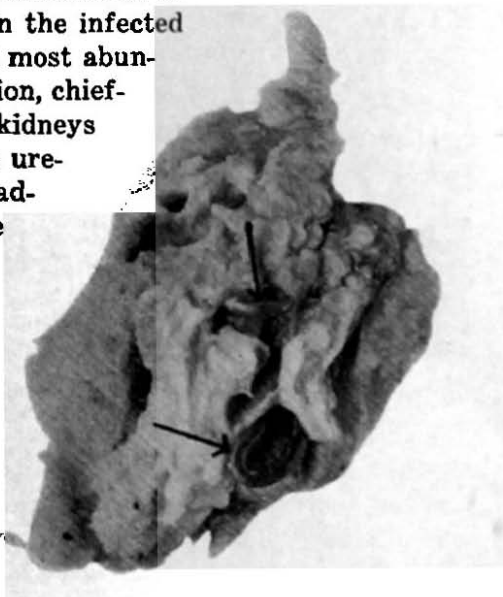


Fig. 33.—Kidney worms often are found along the course of the ureters.

The cysts occurring along the course of the ureters have small tubes or tracts leading into the ureters. The adult female parasites, being present within these cysts, lay eggs which pass through these small tracts into the ureters, and as the urine passes down the ureters the eggs are carried to the urinary bladder and pass out with the urine as it is voided. When cysts are found along the course of the ureters the urine always contains numerous eggs.

Recent investigations by the Zoological Division of the Federal Bureau of Animal Industry show that the larvae pass from the intestines to the liver by the blood circulation. They produce certain degenerative changes in the liver and wander from the liver to adjoining structures.

There is no medical treatment useful in controlling kidney worm infection. If the breeding herd is kept on clean premises, and allowed to graze in clean pastures as outlined under "Control of the Large Roundworm" it will be found that kidney worm infection also will be controlled.