Iowa is a hog-raising state. Hogs are the outlet for a large portion of the corn crop, as they convert it into pork products bringing in from 25 to 40 per cent of the total Iowa cash farm income.

9. Hog Raising—A Big Business

W. A. CRAFT, *U.S.D.A.*, and
ARTHUR L. ANDERSON, *Animal Husbandry*

HOG PRODUCTION BECAME IMPORTANT IN IOWA IMmediately after settlement of the state began. There was demand for pork and lard in the eastern part of the country and abroad. Corn was a staple crop in Iowa from the beginning. It was produced immediately in quantity in excess of the demand at prices profitable to the pioneer farmers. Usually hogs profitably converted corn to pork and lard. Accordingly hogs found a permanent place in Iowa agriculture, and for many years have accounted for from 25 to more than 40 per cent of the total farm cash income.

Most early settlers brought hogs with them. With access to almost boundless forest prairie, the hogs were raised with little trouble, feeding on grass, roots, and acorns. Most of the pigs were farrowed in the spring and allowed to run in the woods or on the prairie during the summer. Each owner had his own mark, made by cropping and splitting the ears of the pigs. In the fall, the owners would hunt their hogs from the free range. Shoats were penned and fed corn through the winter, and when spring came they were usually turned to the woods and prairie for a second summer. Under these conditions hogs grew slowly. Many farmers fed corn lightly to their hogs through the second summer. In the fall they would be penned near the homestead and fed corn until fat enough for the market. Hogs were fifteen months to two years old when marketed.

Slaughter on the farm during the winter provided the farmer with a meat supply that he spread throughout the year by curing the pork and rendering the lard. If there were more hogs than the farm family could consume, they were driven to market. Often a dozen men and boys, some on horseback and others on foot, would gather with clubs and whips and start the hogs across country to the market. Many

drives required several days, and wagons loaded with food for the journey followed the drivers, picking up hogs crippled in the drive. In some cases it was necessary to slaughter and dress the cripples on the road to save the carcasses. Members of the crew took turns watching the herd when it was necessary to camp over night en route. After the hogs had been sold, the drivers rode home in the wagon.

In 1865 a drive was made from Monona County to Yankton, South Dakota— approximately one hundred miles. Other drives are reported from eastern Iowa to Chicago and from Delaware County to Ft. Atkinson, Wisconsin. In some cases ox teams went ahead to leave corn for feed at suitable stopping places. Stories relate that hogs would not cross bridges but swam streams or crossed on the ice. Sometimes the ice broke and there were casualties from cut throats among hogs swimming amidst the broken ice. Not all hog driving was done by farmers, for there were men who made buying and driving hogs to market their business.

EARLY DEVELOPMENTS

Corn thrived on the new land. Although markets at which corn could be sold were established, first along the Mississippi, then along the interior rivers and later along the Missouri, corn had to be hauled to them in wagons, carts, and sleds. Many farmers were more than a day's journey away, and the price of corn was only 8 to 10 cents a bushel, so that an acre's production would bring only $4 to $5. As a result farmers fed the corn to hogs. The value of corn as hog feed had been demonstrated long before, and pork had become a staple food of most people in Europe and the New World. It could be cured and shipped long distances, retaining its flavor and nutritional qualities. Lard was used extensively for shortening and, until displaced by kerosene about 1870, for illumination as well. Many writers praised the hog highly for bringing farmers through hard times following the panic of 1857. By 1859 two towns in Iowa, Muscatine and Keokuk, were packing about one-fourth as many hogs as Cincinnati, pork-packing capital of the period. Hogs marketed in the early days averaged by various counties from 175 to as high as 400 pounds.

Hog production expanded during the Civil War, and interest in improved practices mounted. The manner of fencing for hogs, breeding, disease control, and methods of feeding were topics of discussion everywhere when a few farmers got together. Essays on hog raising were published by the State Agricultural Society and the farm press. During this period many city markets paid a small premium averaging

about one cent per pound for choice, fat, clean hog carcasses weighing 80 to 150 pounds. This intensified interest in the question of the kind of hogs to raise. Farmers often asked, shall we raise large or small hogs? Hogs weighing three hundred to four hundred pounds had been preferred generally at the packing centers.

By 1865 there were few communities that did not boast having some hogs of an improved breed. The hog population in the state then exceeded a million head. Clover also had become established as a crop in the state. It was to play an important part in hog raising in later years by providing pasture of high quality. In the decade following 1860 many farmers had begun to make a speciality of the hog enterprise.

In the 1870's, hog numbers on farms in Iowa were approximately doubled while the increase was only about 1.5 times in the United States during that decade. This marked the beginning of rather intensive hog production in Iowa, coincidental with expansion in farming. The numbers increased from 4.5 million head in 1880 to 6 million in 1890. Numbers of hogs on farms in Iowa, January 1 of each year, from 1890 to 1920 varied from about 5.5 million to more than 10 million head. During the years 1920–34 the numbers were less than 9 million in only three years. Numbers dropped in the drouth year of 1935 to 6.3 million head, the lowest number since 1897, with but one exception. Recovery began in 1936, however, and at the beginning of 1939 there were 8.2 million hogs on Iowa farms. Expansion of the hog enterprise occurred during World War II. Nearly 15 million head were reported on Iowa farms January 1, 1944. The all-time record of production was in 1943; Iowa raised approximately 21 million of the 122 million hogs produced in the United States that year.

The numbers of hogs in Iowa have varied in accordance with the favorableness of the feeding ratio. When corn became high priced, farmers raised fewer hogs. With cheap corn, hog production expanded. The profitableness of marketing corn through hogs is indicated by the hog-corn price ratio, which is the number of bushels of corn that is equal in price to 100 pounds of live hogs. The figure 12.0 has been used for many years as a base below which hog production is apt to be less profitable than selling the corn. That base is when 12 bushels of corn sell for as much as 100 pounds of live hog. For the past twenty years the yearly ratio has ranged from 8.1 to 19.6, with an average of 12.06.

Expansion occurred in World War I and World War II when there was an acute demand for more human food and hog prices were more favorable to the producer than the price of corn.

BREEDING

Not many of the hogs in Iowa prior to 1860 were of any recognized breed. In this respect Iowa was behind the older states. Its hogs were mixtures to which all the various kinds of hogs brought in from the older states contributed. With the coming of the railroad the type of hogs began to change to a more profitable form than the "prairie-rooters," "hazel-splitters," "razor-backs," "wind-splitters," and "dog-fennel-grazers"—names commonly used for native hogs. "Uncle" Henry Wallace is credited with the statement that the railroad shortened the nose, shortened the legs, removed the bristles, put a more lovely kink in the tail, and changed the color of hogs from mixed white and black to black, white, or red.

Farmers in the various communities observed that hogs of improved breeding which latecomers brought into Iowa from the older states and from Europe were more suitable to the improved practices which were increasing, than were the native stock. The imported hogs had shorter legs, wider and thicker bodies, shorter heads, and finer hair than the native hogs. They also matured earlier and fattened more readily than the "prairie-rooters." These traits became more important to the farmer as it became necessary for him to restrain the hogs from his neighbor's fields and feed them continuously.

From 1860 to 1870 one of the problems was that of fencing. The population during the preceding decade had increased from 192,000 to 675,000 and appeals were being made to the legislature to enact measures which would stimulate immigration. One of the measures stressed was a law requiring each man to keep his livestock under fence. Although such an act was not passed for ten years, some counties set up "hog-laws" of their own before that time. Black Hawk County, for example, had a "hog-law" as early as 1857 and Iowa County as early as 1859. It was argued that if pastures were fenced it would not be necessary to fence the fields. Such practices, it was claimed, would be cheaper than fencing the fields and allowing the stock to range in unfenced territory.

IMPROVED BREEDS

In England, pure breeding as a means of improving stock was well under way soon after the beginning of the Nineteenth Century. Accordingly, settlers who came from the British Isles after 1800 usually brought some improved stock with them, and by 1850 numerous importations had been made to the eastern states. By about 1850 improved breeding practices became well established in Ohio, Kentucky, Pennsylvania, Virginia, Indiana, Illinois, and other eastern

states. Many herds were bred "pure" and served as sources of seed stock, particularly boars. It was about 1860 that farmers in Iowa began to become breed conscious.

The Suffolk was among the first of the improved breeds to be introduced and used extensively in Iowa. Reports from the county agricultural societies reveal that use of the Suffolk in crosses on native stock greatly improved maturity and feeding quality of hogs. By 1860 hogs called Polands introduced from Ohio and Illinois, the Chester White from Pennsylvania and other states, and the Berkshire from England and eastern states had begun to contest the lead established by the Suffolk for crossing with native stock.

Each of the breeds had strong advocates, but for some reason the Suffolk, Essex, Cheshire, and some other breeds did not become permanently established in Iowa. The Yorkshire and Tamworth breeds became established but have not been produced so extensively as some other breeds. One historian tells us that the battle of the breeds that had divided English stockmen into rival groups was transferred from England to the United States at about this time. Adherents of some breeds stressed early maturity, shortness of legs, fineness of hair, plumpness of body, and smallness of head and ears. Others stressed with equal zeal large size or weight at market age of twelve to eighteen months, with large bones and ruggedness being the characteristics that made hogs profitable. Many farmers emphasized length of body and large frame for sows, and medium size with compact body for boars.

In 1869 the Secretary of the State Agricultural Society reported that breeders who had pigs of improved breeds were sending them all over the country by express and were getting enormous prices. Throughout the state interest was high regarding hogs of improved breeding.

Hogs exhibited at the first State Fair in 1854 totaled eleven head, but the breeds are not known. However, in 1856 there were eight different breeds and crosses reported. These included Suffolk, Cheshire, Essex, Suffolk crosses, Irish Grazier, Berkshire, Poland (often called Magie or McGee breed and later named Poland China), and crosses of China hogs. During the first two or three years of operation of the county fairs, only three or four hogs were exhibited and these were usually not "full-blood."

A visitor to the 1856 Iowa State Fair reported:

> The lovers of the noble horse, in heavy ranks, ranged along the stables, where the busy grooms were at the morning toilet of the steeds. Groups were scattered here and there over the extended grounds, watching the operation and listening to

the explanation of some new machine. Next came the swine pens, and being no great admirer of this class of stock in any other shape than well cured, well broiled, and flanked by fresh eggs, hot coffee, and warm rolls about seven o'clock, A.M., we shall not enlarge much upon the varieties on exhibition.

Pure breeds were not formally established in the United States until after 1870. But some farmers selected their stock with great care, using "full-blood" boars and grading up their herds. It was through the efforts of these men that stock was improved by selection and breeding and that the value of improved breeding practices was demonstrated for producing "seed stock" for crossing on native "razorbacks," "prairie-rooters," "hazel-splitters," etc.

Until the State Fair of 1860 all breeds and crosses of hogs were shown together, but in that year they were divided into two classes: small breeds (forty head exhibited) and large breeds (twenty head exhibited). Small breeds mentioned were Suffolk and hogs from Chester County, Pennsylvania. It is presumed that the latter were Chester White. Hogs shown in the class for large breeds included Poland China and Berkshire.

The premium lists for the State Fair in 1868–69, for the first time did not include small breeds. Entries in the class for large breeds included Berkshire and Chester White. A special award was given by pork packers of Keokuk for the best boar and the best sow for packing purposes. Both were won by exhibitors from Illinois. Illinois exhibitors were winners in some of the other classes, and complaints were registered against out-of-state exhibitors.

In the seventies immigration to Iowa was heavy and much interest prevailed in improving the quality of hogs through the importation of breeding stock. It was reported by the Secretary of the State Agricultural Society that "hog culture is a mania." It had, he stated, seized the people like an epidemic and enormous prices were paid for hogs claimed to possess desirable qualities. He pointed out also that it would be of tremendous advantage to know definitely which of the breeds was best for packing, and that steps were being taken to obtain such information.

In 1871 some importations of breeding animals were made from Europe. The diffusion of improved breeds through the state, resulting from the influence of showing the breeds at the State Fair, and a change from small to large hogs resulted in greater income from hogs than formerly.

The Suffolk breed had been removed completely from its position of favor by 1870 and had been replaced largely by the Berkshire,

Poland China, and Chester White. A new breed, the Jersey Red, later Duroc Jersey, was exhibited at the State Fair first in 1878.

Poland China breeding was present in approximately one-third of Iowa's hogs in 1885. Ten years later approximately half the hogs exhibited at the State Fair were Poland Chinas. West Liberty proclaimed itself the world center of Poland Chinas. Breeds exhibited at that time included Berkshire, Poland China, Chester White, Duroc Jersey, and Victoria. The Duroc Jersey breed had been introduced in most of the counties by 1885. Hampshire hogs were first exhibited at the State Fair in 1908, with seven exhibitors showing 150 head. Hereford hogs, the newest breed, were exhibited in 1931, but a class was not provided for them until 1939. Suffolk, Victoria, Cheshire, and Essex breeds were smothered under the avalanche of Poland China and the rise in popularity of other breeds. Yorkshire and Tamworth breeds persisted to a limited extent.

The old question, Which is the best market breed? was still a matter of concern even after 1900. The Iowa Experiment Station and those of other states studied the performance of breeds beginning about 1890, and many farmers conducted trials of their own. Experiments have not yet answered the question as to the best breed in every respect, but they have served to indicate that breeds differ in regard to certain functional characters. Some breeds appear to excel in growth rate, others in size of litters, and still others in desirability of carcasses.

Leaders in agriculture in Iowa assembled in 1873 and formed a Fine Stock Breeders' Association. Annual meetings were held and the various aspects of improving the livestock in Iowa were discussed. Some years later associations, organized to represent the various classes of livestock, took over the functions performed by the former association.

Breed associations, usually national in scope, were organized beginning in this decade. The first was for the Berkshire breed, in 1875. These associations soon began publication of record books containing pedigrees of registered animals, but publication of the books was suspended in the 1920's. The breed associations have served to establish and maintain standards of characteristics, register animals whose pedigree was acceptable, and promote the sale and distribution of stock.

TYPE

Type in hogs has been a matter of controversy from the beginning of man's effort to improve hogs through selection and breeding. Be-

ginning about 1870 attention in Iowa was focused on two types, so-called lard type and bacon type.

Under influences of a rising demand in cities for cuts from hogs of light weight, and preference for light hogs in foreign trade, controversy increased during the decade regarding merits of various breeds and the most desirable weights of marketed hogs. In earlier years highest prices had been paid for heavy hogs. This problem of most desirable market weight still perplexes the hog producer. The change to less fat and more lean was caused by the expansion of the number of foods in the diet and the lessened demand for calories from pork and a decreased demand for lard.

Boars of bacon-type breeds have been used at various times in the state to improve the carcasses of pigs farrowed by lard-type sows. Since 1900 the Iowa Experiment Station and many others have conducted trials comparing lard- and bacon-type hogs as to performance and carcasses. Breeds of bacon type yielded a higher percentage of first rate bacon carcasses than the breeds of lard type. Likewise crosses of lard type and bacon type produced carcasses superior to those of lard-type hogs. But hog markets in this country have not consistently paid enough premium for superior bacon carcasses to overcome the Iowa hog producer's preference for so-called lard-type hogs. Accordingly the breeds regarded as lard type still prevail in Iowa.

Within the lard-type breeds, type varies from a small, early-maturing, excessively fat hog, such as the Suffolk of early days, to a large, heavy-boned, late-maturing, and rangy type that must be fed to weights of 250 pounds or more to show enough finish to yield carcasses with desirable quality. These variations, together with several other factors, gave rise to designation of three types—small, intermediate, and large, particularly within the Poland China breed. Many experiments have been conducted with respect to the virtues of the three types. One of the earliest of these began at the Iowa Station in 1917. Results agree in general that hogs of intermediate type are more suitable to producers and consumers than those of the extreme types.

The question of type, however, is still one of much concern. History of shifts in type in the pure breeds of hogs would be a study within itself. There appears to be a tendency to move from one extreme to the other. Such shifts are made more rapidly with swine than with larger farm animals. The tendency to shift type is so great that since 1939 several of the hog breeders' associations have sponsored "type conferences" annually to discuss the problem. Likewise, for several years Iowa State College, and the Iowa Swine Producers' Association

with the co-operation of packers, have held hog type and carcass demonstrations at various points in the state. The purpose of these conferences and demonstrations is to keep attention of breeders, judges, field representatives, market hog buyers, and others focused on the type of hog seemingly most suitable to hog producers and to the markets.

Even today a difference of opinion exists in the matter of size. Reasonably large-sized parents are needed to produce fast-growing pigs. However, when size is carried to the extreme, the market pig produced may be unfinished at the desired market weights. The desirable goal is high productivity of sows, rapid gain of pigs combined with sufficient finish to insure desirable quality at a market weight of about 225 pounds.

PRACTICES

Optimistic predictions that breeding had reached its limits were not unheard of before 1900.

The Secretary of the State Agricultural Society reported in 1885: "It may be safely stated that the race of native, ill-shapen and profitless hogs of a quarter century ago, has disappeared." He pointed out also that hogs at that time had enough admixture of the blood of some recognized breed to bring them to a high standard. And in 1891 the secretary suggested:

> Perhaps the ideal of perfection has been reached in the production of the hog. The limit of all these points as early maturity, economy in preparing, size, symmetry, etc., appears to be reached. The skillful breeding and raising of swine is so general that the standard is practically uniform. There are preferences by the individual or the neighborhoods for special varieties or crosses; and packers have a choice for various meats for different markets. But the end of improvement is attained and there remains only the duty of maintaining it, and obviating all cases of degeneracy.

The value of purebred boars for producing market hogs has been emphasized continuously since the breeds were formed. The advantages commonly ascribed to the purebred over the scrub or nondescript hog were: greater size or weight for age, proper finish for the market at a younger age, more efficient conversion of feeds into gain, more desirable carcass, and the sow excelling in fertility and suckling ability. Farmers generally have used boars of a pure breed during the last half century. Experiment stations have compared the performance of pigs by purebred boars with pigs by nonpurebred boars at various times since 1890. The results were favorable generally to the purebred boars.

Crossing of stocks from different localities was practiced in Iowa

(and elsewhere) long in advance of the pure breeds. Some farmers used a boar from one breed and then one from another breed the next year on the sows produced the preceding year. It was one of the methods used in forming and improving the pure breeds. Farmers have insisted generally that crosses exceed purebred stock in performance. Experiments conducted at the Iowa and other stations comparing crossbred and purebred hogs have shown that the differences were small but the results usually were favorable to the crosses.

Grading and crossing were practiced objectively and extensively. Reports indicate that it was common practice to cross to a breed with a definite purpose in mind, and then backcross the progeny to the favorite stock. Packers often expressed preference for crosses. Crossing of breeds for market hog production was found generally advantageous because of the hybrid vigor attained.

Hogs and other classes of livestock have been brought to their present degree of perfection by efforts of breeders applying their skill through trial and error. They have tried crossing stocks of various breeds and types, inbreeding, linebreeding, outcrossing, outbreeding, and selection. The most recent development is sow testing. This is based on weights of litters at weaning, and the information gathered is used in making selections for increased productivity.

In many purebred herds the use of moderate inbreeding was practiced for a time, which helped in purifying the stock. Linebreeding was practiced in many herds, usually for short periods only, to increase the relationship of a herd to a noted animal, usually a sire. A decline in vigor was often observed among inbred or linebred animals. Accordingly, hog breeders have not consistently used these methods. Outcrosses within a breed have served a useful purpose in swine improvement by bringing in new inheritance and remedying declines which resulted from inbreeding. Changes in certain characteristics were sought usually through the use of a boar not related to the sows with which he was to be used. Often a breeder would get a boar from a herd with the idea that such an individual would impart something such as increased gaining ability to the herd.

Not until after 1900 did experiment stations begin to explore the possibilities of extending purebreeding principles. In 1930 the Iowa Experiment Station started an experiment to develop and test the usefulness of inbred lines. Some other stations are conducting similar experiments. Early experience in these experiments made it clear that large numbers of animals would be necessary to test application of the principles which have been used in corn breeding with marked

success—that is, developing and crossing inbred lines. In 1937 the experiment stations in the Corn Belt, in co-operation with the United States Department of Agriculture, established the Regional Swine Breeding Laboratory with headquarters at Ames, to explore possibilities of using new methods in hog breeding.

In 1941 a plan of recognizing outstanding hog raisers of the state was initiated by the Iowa Swine Producers' Association, Radio Station WHO, and the Iowa State College Extension Service. Each year twenty-five market hog producers are selected and awarded a certificate of merit, as Master Swine Producers. The award is based upon the number of pigs raised per sow to market weights and the approximate average daily gain made by the pigs.

CLEAN-GROUND SYSTEMS

As the hog population of Iowa increased it became more difficult to raise crops of pigs free from parasites and infectious diseases. Several practices have been developed for controlling parasites through swine sanitation. The clean-ground system is one of these. In 1919 two representatives of the United States Department of Agriculture went to McLean County in Illinois to demonstrate a system of hog sanitation. A few farmers became interested in trying this plan in the fall of 1919, and by the spring of 1920 many more hog men in that county became interested. Tours were conducted and the effectiveness of the method demonstrated. Subsequently this clean-ground system was widely adopted in Iowa and other hog-producing sections.

The four essentials of this system are: 1. Thoroughly cleaning the farrowing pen and scrubbing with scalding water and lye; 2. Washing the sows with warm water and soap, especially the udder, before they are put in the farrowing pen; 3. Moving the pigs to clean-ground pastures equipped with houses that have been thoroughly cleaned and disinfected; and 4. Keeping the pigs on the clean-ground pasture until they are four months old or weigh about one hundred pounds.

A modification of this system developed in Iowa, the confinement system of raising pigs on concrete floors, has been widely publicized. It has become increasingly important as hog production continues to follow practices which keep the young pigs away from old contaminated hog lots.

FEEDING

Today from two-thirds to four-fifths of Iowa hogs are farrowed in the spring. In 1945 about 33 per cent were farrowed in April, 20

per cent in March, 15 per cent in May. September, with about 10 per cent, led fall farrowings. August and October followed with approximately 5 per cent each. For many years, heaviest marketings have been in November, December, January, and February.

In the early years of statehood most sows were bred as now, to farrow in the spring. Such feed as the hogs could find on the prairie and in the woods enabled the farmer to maintain his herd at little expense of money or labor. Feeding became more of a problem with spring farrowing.

Sows farrowing in the spring were fed corn, supplemented with oats and such waste as was available around the farm, until the pigs were weaned—a period of from eight to twelve weeks. Creeps were used by some farmers for pigs during the suckling period. The pigs after weaning were kept often in a pen or small lot and fed corn, oats, wheat shorts, and such waste as was available until summer. Then they were turned to the woods or prairie, or into wheat or oats fields after the crops were harvested. Finally in the fall the shoats were placed in small pens or lots and fattened so that they could be marketed some time during the winter. Some farmers turned the shoats into corn fields to "hog-down" the corn, but this practice was not general.

After weaning, pigs farrowed in the late summer or early fall were wintered in a small pen, lot, or a wood lot when such was available. They were fed corn, oats, potatoes, pumpkins, wheat shorts. On many farms some skim milk or buttermilk was available for the pigs. In the spring the shoats were turned out to forage on the prairie or in the woods until fall when they were brought in and fattened with corn for market in the winter. On farms where a herd of cattle was raised or steers were fed for market it was a common practice to let fall pigs follow the cattle. Corn supplied additional feed needed.

By 1865 improvements in feeding practices were sought. Many essays were written and many talks given as to the best feeding practices. Soaking or cooking of corn, potatoes, pumpkins, and oats was advocated by many of the best hog raisers. Because of the extra labor the cooking of feeds was not practiced as extensively as soaking feeds. Grinding corn and other grain was advocated by many farmers but the cost restricted its use. It was a general practice, however, to feed sows during the suckling period and pigs for a month or so after weaning some sort of slop or gruel made by mixing a ground feed with water or skim milk.

A feeding practice recommended in 1859 for profitably making pork included the following: "Put pigs on pasture in the summer.

Shut them up in September and feed cooked swill made of pumpkins, potatoes, beets, and carrots, adding two bushels of corn and oatmeal to the barrel. Increase the meal gradually, eliminating roots the last six weeks of feeding." In general, reports indicate that farmers calculated about thirty bushels of corn were necessary to produce a hog weighing 200–250 pounds. Some farmers maintained that thirty bushels of corn would produce a hog weighing 300 pounds or more.

There were a few farmers who conducted feeding trials to measure the amount of feed required by pigs of different weights and the rate of gain when the pigs were fed well. In 1867 such gains as the following were reported:

1. A 55-pound boar pig gained 32 pounds in 17 days.
2. A 98-pound boar pig gained 17 pounds in 7 days.
3. A 66-pound sow pig gained 14 pounds in 7 days.
4. A 198-pound boar pig gained 44 pounds in 21 days.
5. A 186-pound sow pig gained 52 pounds in 21 days.

These gains would be considered favorable today for pigs being fed a well-balanced ration.

Wood ashes, lump coal, and salt were used by many farmers to supplement the other feeds. Some farmers as early as 1865 claimed that pigs got something in following cattle that was of healthful value to them. Trials at the Wisconsin Experiment Station in recent years have shown that cow manure contains certain essential vitamins. After clover became established about 1865 and fencing permitted, sows, and particularly pigs, were allowed to run in clover pastures and were fed corn. This practice was followed by the best hog producers because the results were good and free range was becoming scarce. Futhermore, the legislature after 1870 restricted the use of free range by requiring animals to be kept under fence. By about 1870, farmers whose success with hogs rated them as authorities on the subject advocated full feeding from the time that the pigs began eating.

It was not until agricultural colleges and experiment stations demonstrated the value of supplements to grain and industry made such by-product supplements available that feeding practices underwent further changes. Cereal processing, the extraction of oil from seeds, meat packing, and other industries provided a vast number of useful feeds.

Iowa farmers have long appreciated the need for supplements to corn in feeding hogs. Some farmers in northwest Iowa trapped fish and fed them with corn to the hogs in the early days, getting favorable

results. Scientific checking of supplementary feeds proved to be one of the most fruitful fields in swine investigation.

EXPERIMENTS UNDER OBSERVATION

In February, 1888, the Iowa Legislature accepted grants authorized by the federal Hatch law and placed the organization and management of agricultural experiments under the board of trustees of the Iowa Agricultural College. Swine investigations, however, did not begin immediately.

R. P. Speer, director of the Iowa Agricultural Experiment Station, said in 1890, "We will not promise many experiments in breeding or in feeding the domestic animals, because thousands of skillful breeders and feeders are conducting such experiments in all parts of the West."

In the first twelve bulletins issued by the Iowa Agricultural Experiment Station from 1888 to 1891, the only reference to hogs mentioned the occurrence of hog lice in the college herd, and the use of kerosene emulsion as a control measure.

The first hog experiment is that reported in 1891. A Poland China sow and a litter of four pigs were the experimental animals. It was found in this initial experiment that every bushel of corn or equivalent fed produced 17.3 pounds of growth. This experiment demonstrated, according to the investigators, "what great possibilities are locked up in the Iowa hog. He is eminently the great corn condenser of the state. His torpid nature and fat-forming function enable him to burn the carbohydrates of corn into bacon. His omnivorous appetite prompts him to gather up all the waste food products of the land and convert them into gold."

The second experiment reported concerned the winter feeding of hogs. Three old Chester White sows were compared with six cross-bred Chester White and Poland China five-month old shoats. From this feeding trial it was concluded that younger hogs will yield greater profit than old hogs. In discussing the results it was observed that there is no doubt that many a lot of fattening hogs have been carried so far beyond the ripened period as to greatly reduce the profit.

In 1892 an experiment was made on the feeding of buttermilk to pigs. The authors stated that Iowa corn is nearly a balanced ration for hogs and needs only a small addition of protein to bring out the highest nutritive value.

An experiment was conducted on the use of cottonseed meal in swine rations in 1895. High feed prices followed the drouth year of 1894 and as a consequence much cotton seed meal was brought to Iowa

for feeding. This prompted the swine feeding trial which demonstrated that cottonseed meal is fatal to hogs when fed in quantities of 27 to 33 pounds per hog. Subsequent investigations have demonstrated that limited quantities of cottonseed meal can be used with safety for swine.

A series of experiments was started in 1896 on comparison of breeds and crosses, the demands of the market, and a comparison of bacon- and lard-type hogs, on many of the leading features connected with the production and consumption of pork. An outbreak of cholera in 1896 interrupted the series but it was continued in 1897 and 1898.

A swine feeding trial in which tankage and other supplements fed with corn were compared with lots fed corn alone was first tried in 1902. It was concluded that in fattening young hogs, a ration containing more protein and ash than corn alone gave better results than a sole corn ration.

Comparative swine feeding trials similar to those conducted currently were first reported in Bulletin 91 of the Iowa Agricultural Experiment Station in June, 1907, which reported results of rather extensive feeding trials in which various feeds were compared. In 1909 a somewhat similar publication was issued dealing with the preparation of corn for hogs.

In recent years the swine herd used in the various investigations numbered over one thousand head. Iutstanding have been the research on feeding and management, development of the self-feeding method, requirements of growing, fattening pigs and brood sows, mineral and protein requirements, efficiency of various grain and protein feeds, and carcass yields.