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# SWINE PRODUCTION

BY

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AND

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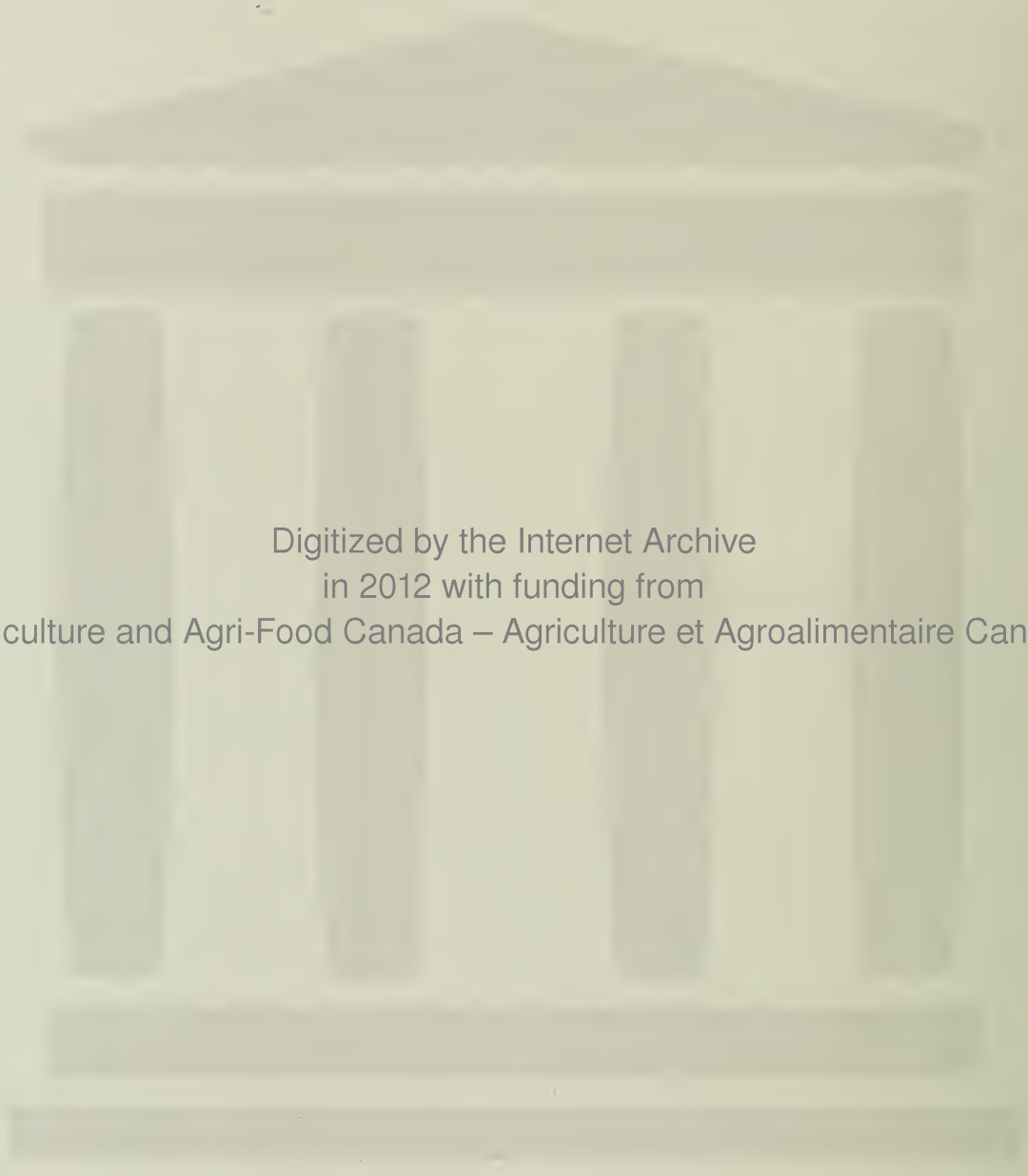

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## PREFACE

Hundreds of letters received annually, enquiring for information concerning the best methods of swine feeding and management, sanitary housing and shelter conditions, control of parasites and accepted treatments for such ailments as anaemia, rickets and iodine deficiency, attest the great interest being shown by farmers in the swine work which is being conducted at the Dominion Experimental Farms and Stations. These enquiries also indicate the general need for practical information on swine raising.

Swine have been maintained at the Lacombe Station for over thirty years, and several hundred pigs have been farrowed annually. Purebred herds of Duroc-Jerseys, Berkshires, Tamworths and Swedish Landrace were for several years tested at this Station. As these breeds did not prove satisfactory for present market requirements, and some of these breeds lacked prolificacy, they were gradually discarded and Yorkshires are the only purebred pigs now maintained at this Station. These pigs have been utilized in the carrying out of experimental work, and there is a vast fund of information available on many phases of swine husbandry. The material which is presented in this bulletin is based in the main on the results of these experiments.

## THIRD EDITION

This is the third edition of this bulletin. Most of the work in connection with its preparation was done by H. E. Wilson in charge of livestock at the Lacombe Station from 1927 to 1948 and now Superintendent of the Dominion Experimental Station, Melfort, Saskatchewan. This edition has been revised and brought up to date by J. G. Stothart, at present in charge of livestock at Lacombe.

## PERTINENT POINTERS IN PIG PRODUCTION

A. Profits result from:—

(1) Thrifty sows of good type, good mothers with 12 to 14 working teats.

(2) Sows whose litter mates were economical feeders and top grade market hogs.

(3) Thrifty boars of good type, from large litters of good feeding, top grade market hogs.

(4) Feeding well balanced rations.

(5) Sanitation of pens and yards to aid in control of disease and parasites.

(6) Including potassium iodide in the ration of the pregnant sow to prevent weakness and hairlessness in the litter.

(7) Preventing anaemia in suckling pigs by supplying an iron compound and sods.

(8) Creep feeding of nursing litters to avoid setbacks at weaning.

B. Losses are caused by:—

(1) Unthrifty sows of poor type, poor mothers with insufficient and blind teats.

(2) Sows whose litter mates consumed an excessive amount of feed and graded poorly.

(3) Unthrifty boars of poor type whose litter mates consumed an excessive amount of feed and graded poorly.

(4) Unbalanced or deficient rations.

(5) Filthy pens and yards which harbour disease and parasites.

(6) Lack of iodine in the ration of the pregnant sow, resulting in hairless and weak pigs.

(7) Anaemic pigs which are unthrifty and very susceptible to disease.

(8) Lack of sunshine or fish oil which supply vitamins A and D.

It is better nutrition, not medicine, that is needed in many cases when the swine herd is not doing well.

# SWINE PRODUCTION

BY

H. E. Wilson[1], J. G. Stothart[2] and G. E. DeLong[3]

## INTRODUCTION

Widely recognized for its efficient utilization of feed, the hog is one of the most dependable sources of agricultural income. The pig will produce more meat from one hundred pounds of grain feed than will any other farm animal. The hog's prolificacy and early-maturing qualities together with the excellent keeping qualities of the meat when properly cured add further to its usefulness and popularity. Moreover, pigs will convert farm-grown grains of low as well as high grade into a concentrated commodity with a much higher cash value. They will also utilize profitably many by-products of the farm often otherwise lost, such as kitchen and garden waste and dairy by-products.

These are some of the reasons why pigs find a place on about 500,000 Canadian farms and why approximately 65 per cent of farmers in Canada include pig raising in their farming operations.

## THE MARKET OUTLET

There is a keen demand for high quality Canadian bacon on the British, American and domestic markets. The latter in particular has expanded considerably in recent years with the increasing population.

The British like Canadian bacon. They like bacon of high quality — a product characterized by length, leanness, firmness of flesh and the maximum development of the best cuts such as hams and loins and carrying the minimum proportion of the cheaper parts such as the shoulders. This product is marketed in Britain in the form of Wiltshire sides, the highest price being paid for "No. 1 Sizeable." Sizeable Wiltshires can only be made from carcasses weighing from 143 to 168 pounds hot carcass weight which are obtained from pigs of the right type, properly finished, and marketed at 200 to 220 pounds live weight. Type, finish and weight are important.

Over the years, Britain has been the traditional export market. Naturally they buy where they can to best advantage and in order to compete on this or any other export market it is imperative that Canadian producers pay close attention to quality as well as economy of production.

The United States market is showing more and more interest in quality Canadian bacon as well as breeding stock of bacon breeds.

With the increasing world population and the accompanying demand for more meat, the Canadian producer with supplies of coarse grains, dairy by-products and protein supplements can be in a position to supply increasing quantities of pork and bacon.

### Areas of Swine Production

Pigs are being produced in practically all farming districts, although the main centres of production are found in areas where mixed farming is practised.

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1 Superintendent, Dominion Experimental Station, Melfort, Saskatchewan. Formerly in charge of livestock at Lacombe.

2 Sr. Animal Husbandman, Dominion Experimental Station, Lacombe.

3 Superintendent, Dominion Experimental Station, Lacombe.

In these areas a steady supply of coarse grains has been most certain and in addition, dairying supplies skim-milk or buttermilk which supplements the grains to great advantage. If the farmer has at his command an abundance of milk by-products, hog raising is simplified. On the other hand, the absence of supplies of milk by-products need not prevent production as the pig raiser can procure substitutes which will supply the required nutrients at a reasonable cost.

## WHAT IS A "BACON HOG"?

Most housewives demand finish without excess fat on bacon and pay the highest prices for lean pork products. They want just enough fat to make the lean meat tender, juicy and palatable but no more. Bacon of this quality comes from a properly finished hog or what in Canada is known as the "bacon hog." Coarse, thick-shouldered, short, stubby, plump pigs must be discarded and their place taken by hogs of bacon type if Canadian bacon is to maintain and improve its reputation.

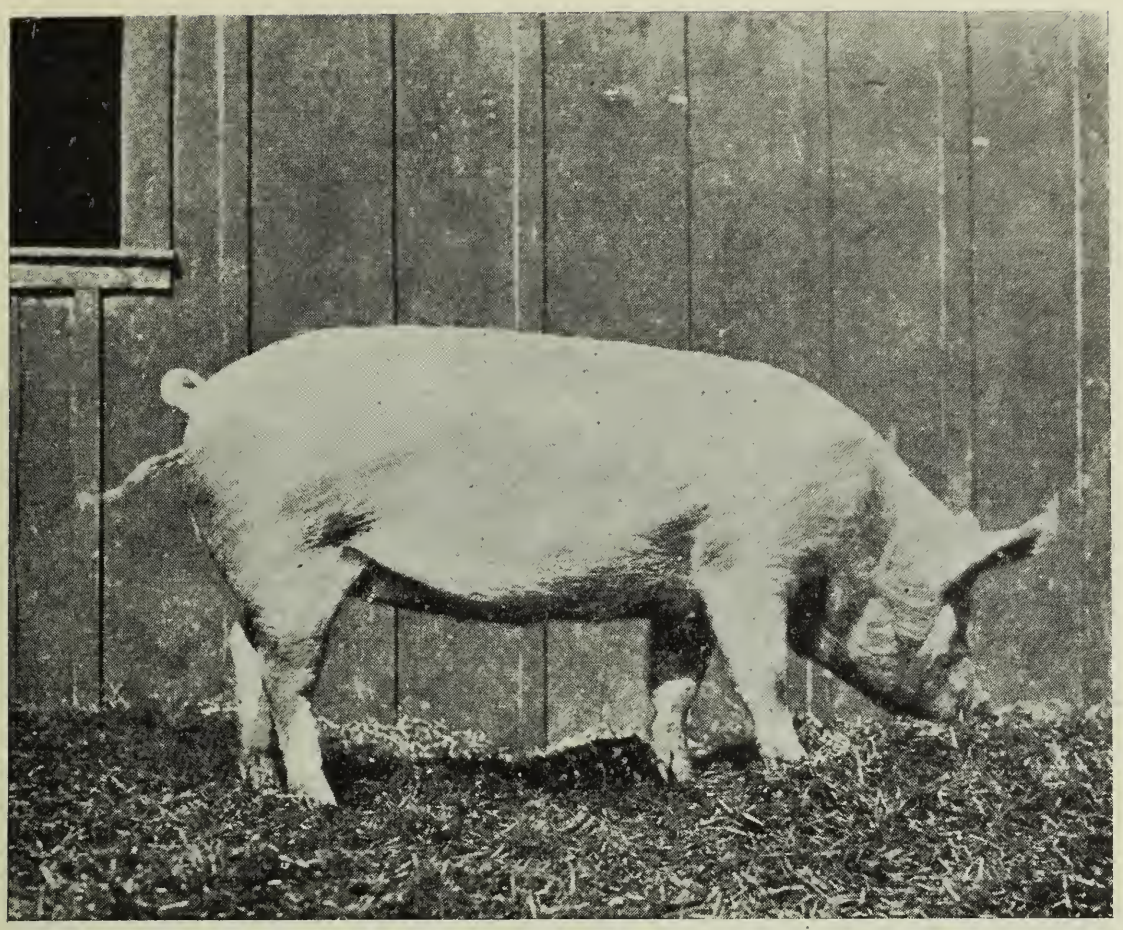
### Type of Hog

The type of hog required for the production of high quality bacon is a smooth, evenly developed pig of uniform depth with a straight, trim and neat underline. This type of hog must have length of side, as the middle is the most valuable part of the carcass. This length is estimated from just behind the shoulder to the hip joint. The jowl should be trim and free from excess fat. It is essential that the shoulder of the bacon hog be light, smooth and compact as the shoulder cuts are low priced. The flank should be deep, the loin full and deep and the ham trim but well developed and filled with meat down to the hock. A general smoothness in quality should be noticed throughout the body. The bone should be strong, clean and flinty and the body should show no tendency to wrinkle. The back should be slightly and evenly arched with a well-sprung rib dropping straight, giving a smooth, even side blending with shoulder and hind quarters. The whole body should show that muscular tendency which denotes lean meat rather than fat. In short, the bacon hog is a stretchy, smooth quality animal possessing economical feeding qualities, and when finished to an average weight of 200 pounds produces lean bacon which meets the requirements of a discriminating market.

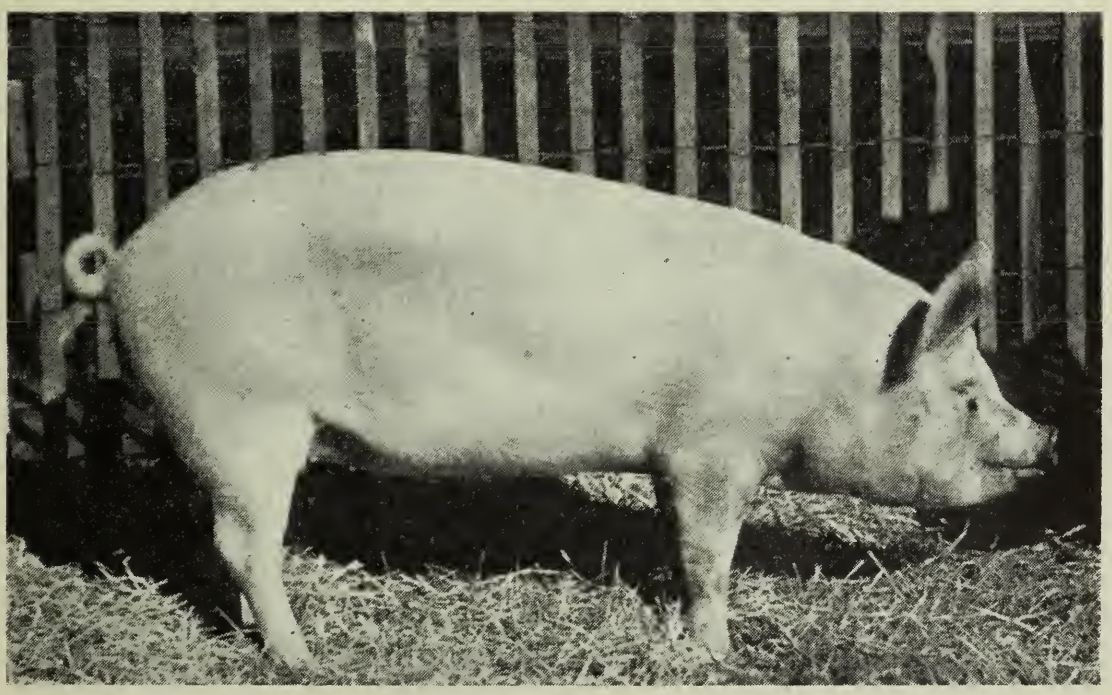
There is the mistaken impression that shorter, thicker hogs can be produced at lower costs than the longer, smoother, quality bacon type of hogs. Repeated feeding experiments with many hundreds of hogs at Government Institutions across Canada have amply demonstrated that 100 pounds of pork can be produced by the vigorous strains of the purely bacon breeds on as low or lower meal requirements than by the lower priced butcher type of hog. It should be borne in mind, however, that the strains of bacon hogs that carry an extreme length of body, are narrow in the back and restricted in heart girth are not easy feeders and cost too much money to produce.

### Bacon Type Breeding Stock

The bacon hog, as demanded by the home and export markets, points very clearly to the type of breeding stock that should be kept. It pays to exercise rigid selection of the breeding herd as when properly fed the offspring will develop very largely according to their inherited possibilities. In the selection of sows and boars for breeding, constitution, feeding capacity and good fleshing qualities should be emphasized.



A pig of Bacon type.

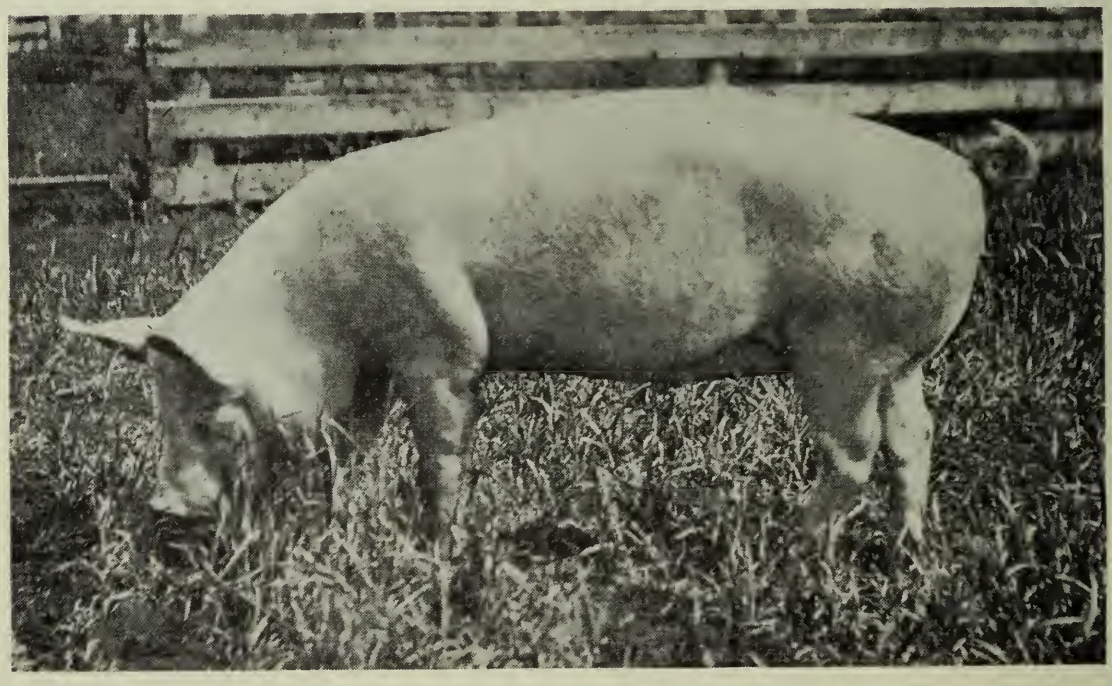


A gilt of desirable type. Note the constitution, smoothness and feeding capacity. Gilts of this type should be kept as replacements for the herd.

Sows that are to produce market hogs of the proper type must show good length of side, good depth and plenty of constitution, combined with smoothness and a distinctly feminine appearance. Strength of constitution should not be sacrificed for length. The long-legged, stilty and often narrow-chested type of

pig should never be kept for breeding purposes. The flank should be deep, the loin strong, and the ham full but trim. The bone should indicate quality by being strong and clean cut and the legs should be entirely free from puffiness. A sow intended for breeding purposes should stand straight and strong at the pasterns. The young sows should be picked from good-sized litters of thrifty pigs and preferably from mothers with docile dispositions and possessing good milking qualities. The udder should be well developed and have 12 to 14 working teats.

Length and strength together with good feeding and fleshing qualities are evident in the breeding gilts shown above.



A pig of undesirable type. Note the extreme length, lack of depth, and restricted heart girth, indicating a lack of constitution and feeding capacity.

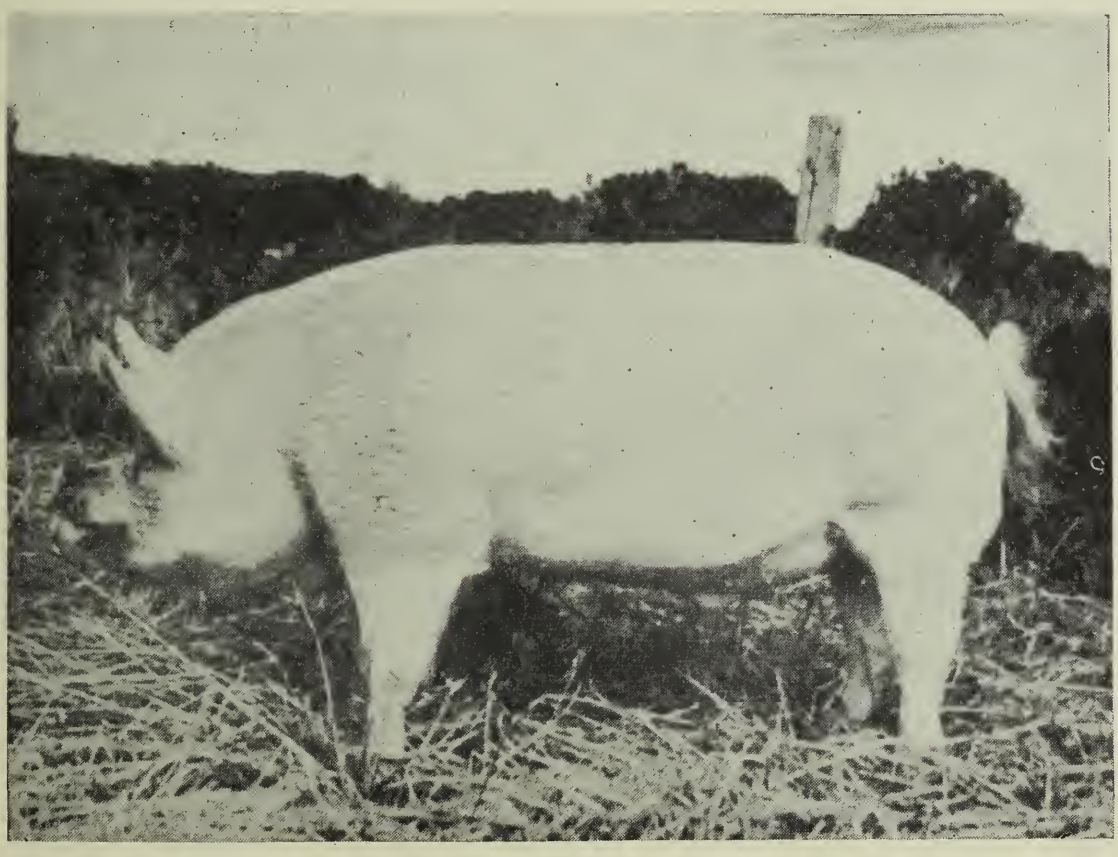
The swine herd will never be developed to a high degree unless care is taken in the selection of the breeding stock and in mating the sows to a boar of high quality. No matter whether the herd is grade or purebred nothing but a high-class, purebred boar should be used. He should not only be of the bacon type and typical of the breed of which he is a representative, but should be a fertile, active individual with sufficient depth of body along with width of chest floor to ensure a strong constitution. Without that strength the best feeding results cannot be expected. Of equal importance to the individuality of the boar is his pedigree and he should be from stock that has demonstrated ability to produce pigs of the right type and finish. A boar of breedy appearance usually produces more desirable progeny than one that is plain and lacks character. Boars should be picked from large litters of thrifty pigs.

## BREEDS OF BACON HOGS

Of late years the breeds of swine in general favour in Canada have been narrowed down to three, namely Yorkshire, Tamworth, and Canadian-type Berkshire. These breeds all produce pigs of correct bacon type although the Yorkshire is by far the most popular.

### The Yorkshire

This breed originated in Yorkshire, England, and surrounding counties. In colour, a clear white is desirable, but dark or bluish spots in the skin, while objectionable, do not disqualify, provided the hair is all white. Black hairs or black patches of hair are a disqualification.



The Canadian-bred Yorkshire boar, Fairholm 95T—212087. This boar shows good length and strength of constitution.

The value of pure white breeding stock in reducing losses from seedy bellies and in improving the whole general appearance of the side is becoming more and more appreciated. The Yorkshire being a white breed is the only bacon

breed entirely free from this objection and in the light of this fact it would seem that the Yorkshire breed will need to be used extensively if not exclusively in gaining and holding the bacon trade.

Yorkshire sows of good strain produce large litters of uniform, easy-feeding pigs of good length, a high percentage of which, with proper feeding, will grade top quality. Its white colour and consequent tendency to sunscald under certain conditions has made the breed unpopular in some districts. However, supplying suitable shelter and oiling the pigs will greatly lessen the damage done by the sun. The breed is noted for its size, boars weighing from 700 to 800 pounds and sows from 600 to 700 pounds when mature. The Yorkshire, being an active hog, makes a splendid winter feeder whether bred pure or crossed.

### The Tamworth

The Tamworth, like the Yorkshire, originated in England and is one of the oldest breeds of pigs. In size this breed is scarcely as large as the Yorkshire, mature boars weighing from 600 to 700 pounds and mature sows from 500 to 600 pounds. The colour is described as a golden red with a flesh-coloured skin free from black. The shade of red, however, varies a good deal from a very light to rather a dark shade. Tamworths satisfy the demand for a coloured bacon hog. In other words, owing to the slight tendency to sunscalding in the Yorkshires, some farmers prefer the red hog, notwithstanding evidence of sunscalding in this breed too.

The Tamworth boar, Maplehurst Rufus—20976.

Most strains of Tamworths, unfortunately, are not so prolific as Yorkshires and young sows especially are inclined to give rather small litters. The pigs have good depth of side, are economical feeders, but many strains are lacking in length and in filling of the hind quarters. However, Tamworths almost invariably show good fleshing of back and loin and are well finished at a weight of from 190 to 210 pounds.

### The Berkshire

The Berkshire is one of the oldest of the improved breeds of swine. It was originated and developed in England. Owing to the black hair and the tendency toward the production of "seedy" bacon there is an objection on the part of packers and exporters to the Berkshire carcass. Mature boars of this breed usually weigh from 550 to 650 pounds and mature sows should weigh from 450 to 550 pounds.

In prolificacy, the Berkshire is about midway between the Yorkshire and the Tamworth. Berkshire pigs, too, are easy feeders but there is still a percentage of individuals from even the best strains of this breed that reverts back to the short, thick type which makes it difficult for their carcasses to make the top grade.

### Cross-Breeding

The mating of purebred sows and boars of different bacon breeds is a practice which may be followed with good results in many instances if outstanding individuals are secured for foundation stock of the breeds it is proposed to cross. A great difficulty that the swine raiser who raises cross-bred hogs has to contend with is the necessity of continually buying new foundation stock for breeding purposes. The cross-bred litters should be used generally for market purposes.

One reason why greater progress is not being made in the percentage of hogs that will actually make bacon of export quality is because in many herds crossing is being carried on haphazardly until the herds are but jumbled mixtures rather than pure cross-breeds. Mongrel breeding stock produces progeny which is lacking in quality of carcass as compared with well-bred hogs.

The Yorkshire is desirable for crossing purposes as the progeny of a Yorkshire boar mated with sows of another breed are invariably white, and it is only occasionally that a spotted pig is produced from mating Yorkshire sows with boars of another breed. The Yorkshire and Tamworth cross particularly well in regard to producing bacon hogs, as well as good thrifty pigs.

It should be kept in mind that it takes good breeding on both sides of the pedigree in order to gain whatever benefits may accrue from the cross-breeding process.

### Prolificacy of Different Breeds

The prolificacy of a breed of pigs is a very important point, directly affecting the profits of the breeding and feeding operations. The figures presented in the following table are compiled from farrowing records at Lacombe for the years 1925 to 1947 inclusive:

AVERAGE SIZE OF LITTERS OF DIFFERENT BREEDS

| —— | Yorkshire 23-year average | Berkshire 8-year average | Tamworth 10-year average |
|---|---|---|---|
| Total number of litters | 815 | 77 | 139 |
| Total number of pigs farrowed | 9,767 | 722 | 1,191 |
| Average number of pigs per litter | 11.98 | 9.38 | 8.57 |
| Total number of pigs raised to weaning | 6,614 | 529 | 844 |
| Average number of pigs weaned per sow | 8.12 | 6.88 | 6.07 |

## THE CARCASS GRADING OF HOGS

In order to standardize and improve the quality of Canadian bacon, carcass or "rail" grading of hogs was adopted as the official system of grading in 1940. Prior to that time hogs could be graded either alive or on the rail (as carcasses) but the latter method was found to be decidedly more accurate in determining the value of a hog.

Under rail grading each farmer's hogs are clearly and permanently identified prior to slaughter. After the hogs are slaughtered and dressed, the carcasses are weighed, and while still on the "rail" they are graded. In determining grade, type, weight and finish are appraised from the standpoint of the value of the carcass to make high-quality bacon.

Grading results are an excellent measure of whether a farmer's methods of feeding and management and the type of his breeding stock are producing the type and quality of bacon hogs the market wants.

Full information for farmers on the carcass grading of hogs has been issued by the Canada Department of Agriculture, Ottawa, and may be obtained free in pamphlet form on application.

### Marketing Hogs Too Heavy or Too Light

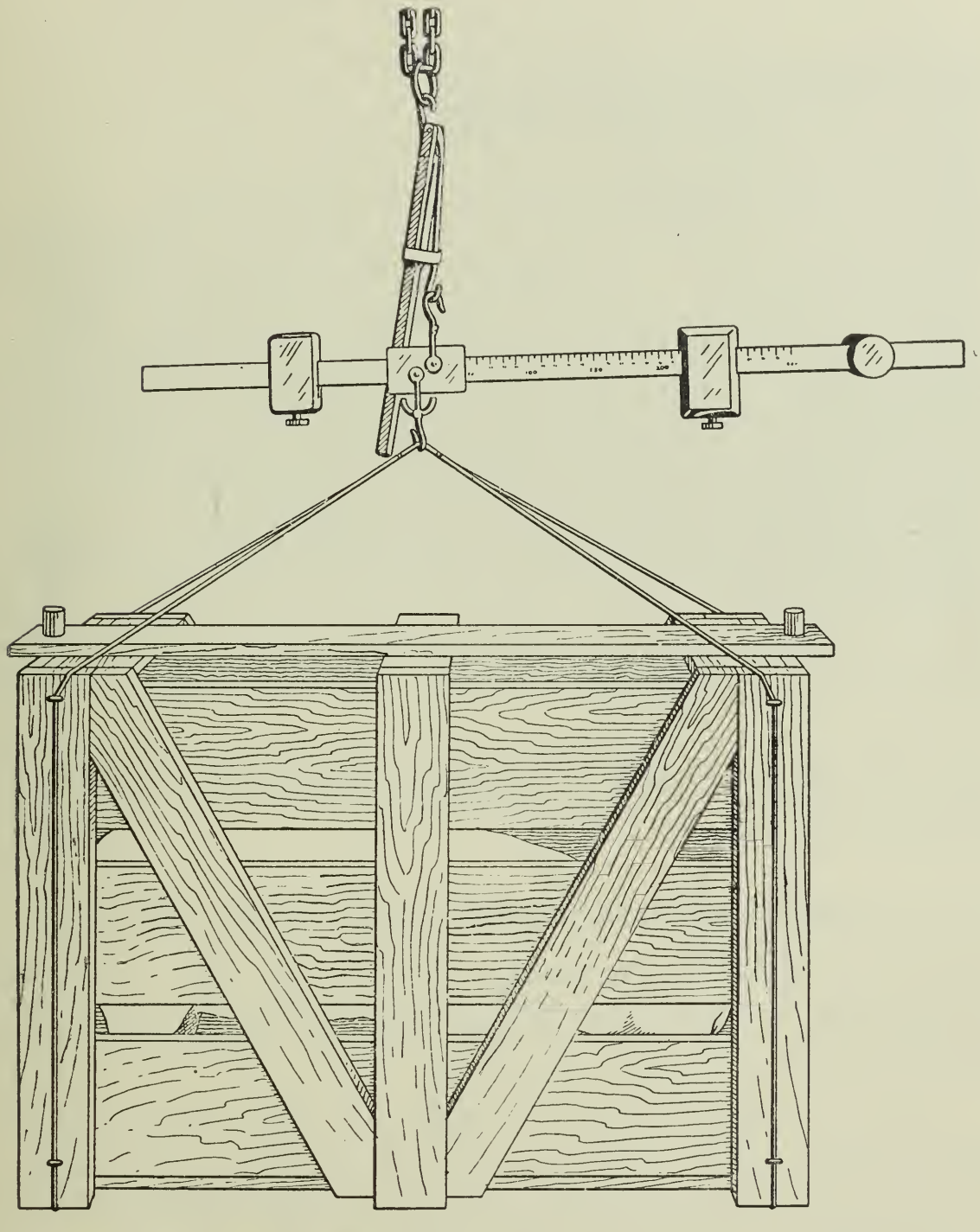
The marketing of hogs only when they have reached the correct weight of from 200 to 220 pounds at the farm and have acquired the proper finish is one of the greatest problems of the Canadian bacon industry. Live hogs of lighter or heavier weights are likely to yield off-weight carcasses on which the producer loses the premium on A grade, and possibly has to take a discount as well. Therefore the marketing of over-weight or under-weight hogs causes a considerable loss in revenue to the hog producers and the industry as a whole. Equally important is the fact that these off-weight hogs will not produce the quality and weight of Wiltshire sides desirable for export to the United Kingdom. The Wiltshire side is the complete side of a pig from which has been removed in the process of manufacture, the head, the feet, the backbone and the shoulder blade. The preferred Wiltshire weight range, the range within which the British market wants most of its bacon, is from 55 to 65 pounds. These weights are known as "sizeable" and are best obtained from hogs weighing from 200 to 220 pounds.

The marketing of more hogs at correct weights is one of the most important tasks confronting the hog industry. Hogs of the right type and quality when marketed weighing 200 to 220 pounds alive will not be degraded because of weight and should yield A grade carcasses unless they are over- or under-finished. Too many hogs are over- or under-finished or are marketed at the wrong weights to yield premium carcasses.

In view of the great importance attached to the marketing of hogs at the correct weight, hog producers should be encouraged to weigh their hogs from time to time during the finishing period as it is difficult to estimate the correct weight at market time. Hogs weighing not more than 220 pounds alive when marketed are not only more likely to receive the premium on A grade but they will also cost less to produce than will hogs marketed at heavier weights.

A special pig scale which is well suited to the job of weighing pigs on the farm has been developed under the auspices of the Production Service, Department of Agriculture, Ottawa, and is being offered at cost to farmers.

Information on this scale can be procured from District Fieldmen of the Production Service, Canada Department of Agriculture, or the Superintendent of the nearest Dominion Experimental Farm. The use of this or any other type of weighing device will enable swine producers to market their hogs at the proper weight and thereby reduce the chances of the hogs being over- or under-weight, thus improving the quality of Canadian bacon and particularly carcasses for export purposes.



This specially-designed pig scale provides an easy means of weighing market hogs.

## Cost of Gains at Different Ages

Experiments at Lacombe have shown that it pays to feed hogs well from the time they are weaned, and to try to have them as near 200 pounds as possible when marketed. In reviewing the growth and feeding data recorded in connection

with the 15 litters entered in Advanced Registry at the Lacombe Station during the year 1930, information is available relative to the cost of producing pork during different feeding periods as well as the total cost for the full period.

It will be noted from the following table that as the pigs grew older they required more and more feed for 100 pounds gain with a resultant increase in cost of gain.

The average daily gain per hog started at 0.87 pounds for the first 30 days; 1.14 pounds for the second 30 days; 1.51 pounds for the third 30 days; and 1.62 pounds for the last 38.7 days, the average daily gain for the full period being 1.31 pounds.

The following table gives the information secured:

Cost of Production During Different Periods

| | First 30 days from weaning | 31 to 60 days | 61 to 90 days | 91 to 128.7 days | Total period |
|---|---|---|---|---|---|
| No. of pigs | 109 | 109 | 109 | 109 | 109 |
| Average initial weight lb. | 31.7 | 57.9 | 92.1 | 137.4 | 31.7 |
| Average final weight lb. | 57.9 | 92.1 | 137.4 | 200.0 | 200.0 |
| Average daily gain lb. | 0.87 | 1.14 | 1.51 | 1.62 | 1.31 |
| Meal eaten per pound gain lb. | 3.19 | 3.75 | 3.78 | 4.42 | 3.92 |
| Buttermilk eaten per pound gain lb. | 5.28 | 3.81 | 4.11 | 5.04 | 4.58 |
| Relative cost of feed per 100 pounds gain $ | 5.88 | 6.42 | 6.31 | 6.93 | 6.50 |

Feeders are frequently misled by the gains made by their hogs when about 200 pounds in weight. Because they are making more rapid gains than when they are younger and smaller, they believe they are making cheaper gains. It is true that they are making greater gains, but each pound is put on at a greater cost than when they are younger.

Because of the steadily increasing cost per pound of gain as pigs gain in weight and the undesirable bacon obtained from "heavy" hogs, pig raisers should make absolutely certain that their hogs are above 190 pounds and below 220 pounds when shipped.

## ADVANCED REGISTRY POLICY FOR SWINE

In an endeavour to standardize bacon type and form a basis for an intelligent breeding program the Canada Department of Agriculture began in the year 1930 an active program of pig testing known as the Advanced Registry Policy for swine.

Briefly, the policy represents an attempt to measure accurately and record authentically the productiveness, the feeding qualities, the maturing tendencies, and the slaughter merits of the foundation breeding stock. Advanced Registry of swine is based on performance. This policy gives official recognition to breeding stock in Canada, the progeny of which other breeders may purchase with confidence for the improvement of their herds. The value of the policy to a breeder lies in the fact that it provides a knowledge of the performance of his sows as a result of the test. By this method he will be able to weed out the strains that are slow to mature and costly to feed. In this way Canada will gradually build up a number of valuable family strains which will have much to do in lowering pork production costs.

Pig Testing Stations which provide facilities for breeders to test four pigs from the nominated litter have now been established to serve every province in Canada. The demand today is for breeding stock from tested ancestors and an opportunity is now afforded for official Advanced Registry tests at Testing Stations throughout the country. Information regarding this policy may be secured from the District Fieldmen of the Production Service, Canada Department of Agriculture.

The Yorkshire sow, Lacombe Duchess 14-141204—A.R. No. 103. This sow qualified for Advanced Registration with a score of 40 for production, 108 maturity index and 81 slaughter test.

## BREEDING METHODS ON THE FARM

### Age of Young Sow

Conditions at the time a gilt is first bred may affect not only the size and thriftiness of her first litter, but also her entire breeding record. If bred too young she will not be able to do justice to both her own development and that of the unborn young, and the resulting pigs are likely to be few in number, and small and weak. Then, too, her growth and development are likely to be seriously stunted; and if there is not a pig to each teat at first farrowing the unused portions of the udder may never develop properly.

For these reasons the Lacombe Station does not breed any gilts until they have attained good growth and development at about eight months of age. Well grown gilts (225 to 275 pounds) bred at this age are sufficiently developed to farrow large litters without injury either to themselves or to future litters.

### Breeding the Sow

Though the sow need not be fat she should be in good health and gaining in condition at the time she is bred. In many cases litters are small and weak, simply as a result of breeding the sow too soon after weaning a large litter or

when in too thin condition. The period of oestrus or "heat" is usually of two or three days' duration. In the great majority of cases a higher conception rate will result from breeding the sow well on toward the end of the period.

**Influences on Size of Litters**

The profit in hog raising comes from raising large litters of thrifty pigs; but large litters cannot be finished if only small ones are farrowed.

There are a number of factors which influence litter size; these include, age, condition, and breeding of the sow, and the condition and virility of the boar.

Since the number of pigs farrowed is limited by the number of ova or eggs produced by the sow during oestrum, which in turn is to some extent governed by the condition of the sow, it pays to feed the sow liberally for a few weeks before breeding to get her in good condition. This practice of having sows gaining rapidly in flesh at time of breeding is known as "flushing", and is particularly valuable in the case of sows that are run down, just after weaning a litter.

It is very unwise to give sows their meals in bed. As over-fat sows will not produce large litters of husky pigs, all the sows at Lacombe are forced to take exercise by feeding at some distance from the cabins. As a further measure to enforce exercise, the feed is scattered over a fairly large area of ground.

Because of the fact that the number of pigs in a litter is limited by the number of ova produced by the sow, it is impossible for the boar to increase the number of pigs in the litter; but if he is not in good breeding condition, or if his sperms are weak and few in number, the litters farrowed may be smaller and the pigs weaker than had a normal boar been used. Also, if he comes from an unprolific strain, his daughters will have a tendency to produce small litters.

In order, then, to secure large litters consistently, it is necessary to select breeding stock that comes from large, uniform litters—to the greatest possible extent from second or subsequent litters—to house the breeding animals comfortably, feed them properly, and force them to exercise.

**Breeding for Two Litters a Year**

Data compiled at Lacombe show that it requires, on the average, approximately one ton of grain to carry a sow raising one litter per year through a twelve-month period. It requires on an average 2,300 pounds to carry a sow raising two litters for the same length of time. This includes feed for the young pigs to weaning time, at eight weeks of age. Taking the average size of litters produced as seven, it can be seen that with the sow raising one litter per year it takes 286 pounds of grain mixture to produce a weanling pig. When two litters are farrowed yearly the amount of grain mixture required is reduced to 164 pounds at weaning. To put it in another way, if the grain mixture fed is worth one cent per pound, the feed cost of the first pig at weaning time will be $2.86 while that of the other pig will be $1.64. This calculation does not take into consideration service fee, the labour cost of caring for the pigs, interest on the investment, and depreciation.

In order to raise two litters of pigs a year successfully it is necessary to so arrange the farrowing dates in the spring and fall that the pigs while young will not be subjected to severe weather conditions. Fall pigs should not be farrowed after September 15. If farrowed at a later date, they will not have sufficient time to become well started before cold weather sets in. To obtain two litters per year, sows should be bred during the months of November and May to obtain late February or March, and August or September litters as the gestation period of the pig is roughly four months, or actually 112 to 114 days.

By keeping a careful service record, the breeder will be able to determine quite accurately when to expect the pigs and to make his arrangements accordingly. (see gestation table, page 54).

A sow that comes under the two-litter-a-year plan must of necessity work harder than the sow raising but one litter during the year and should therefore be particularly well fed after weaning to get her on the up grade again before breeding her. The sow gaining in weight at breeding time is more likely to get with pig at first service and is more likely to produce a large, strong litter.

While some sows will produce two litters a year throughout their lives, others will only successfully produce one litter yearly. At Lacombe, an attempt is made to follow as closely as possible the policy of raising three litters from each sow every two years. This is a good average and will probably meet the requirements of most farmers and show the best net profits in the end.

## CARE OF THE BREEDING BOAR

While constant testing and selection of boars and sows are of inestimable importance in the improvement of the swine herd, the greatest results cannot be attained unless the constant testing and selection are backed up by good feeding and management methods.

### Exercise

Health, vitality and vigour are essential in a satisfactory breeding sire. Moderate exercise and sanitary quarters are conducive to the best breeding efficiency. As the boar's health and condition at time of service may be a factor in determining the number and size of pigs in the litter, it is important that he be allowed moderate exercise and that he be kept always in a thrifty condition, but not fat. In the summer the boar should be kept on pasture and fed just sufficient grain to keep him in good vigorous breeding condition. The green pasture crop not only cuts down the amount of feed required but also provides the boar with succulence and an opportunity of securing some of the protein, minerals and vitamins which may be lacking especially when skim-milk is not available. If pasture is not available, green feed may be supplied to the boar in his pen. In winter the boar should be fed outdoors at some distance from his sleeping quarters, thus compelling him to take exercise.

### Feeding

An important consideration in the care of the boar is the feed. The overfat boar does not make a satisfactory sire as a rule, and a half-starved boar cannot transmit vigour and constitution to his progeny to the same degree that he would if properly maintained. If the boar is not in good breeding condition the litters farrowed may be smaller and the pigs weaker than had a normal boar been used. He should not be fed exclusively on a grain ration but must have some muscle- and bone-building material if he is to transmit the maximum of vigour and constitution to his progeny. This he can obtain from skim-milk, buttermilk or one of the purchased mixed supplements, or legume hay. A mixture of equal parts of oat and barley chop or two parts oats, one part barley and one part wheat, along with a small allowance of skim-milk or buttermilk or an amount of mixed supplement equal to from 5 to 10 per cent of the meal ration should prove satisfactory for the growing or breeding boar. During the winter, bran and any kind of roots are valuable feeds, as they supply bulk, and tone up the system.

FEED MIXTURES FOR THE BREEDING BOAR

| | | |
|---|---|---|
| Ground oats ..... 50 lb. | | Ground oats ..... 50 lb. |
| | or | Ground barley ..... 25 lb. |
| Ground barley ..... 50 lb. | | Ground wheat ..... 25 lb. |

The quantity of meal to feed a boar varies with the circumstances. During the growing period and the breeding season he will require liberal feeding. However, at no time should he be fed more than he will clean up in about 15 minutes.

### Use

As a rule it is unwise to use a boar before he is eight months old and he should be used sparingly until he is well on to a year old. One service to each sow is sufficient. A young boar should not be allowed to serve more than one sow within a 24-hour period. It is best for an aged boar not to serve more than one sow a day with intervals of one or two days a week without being used. He should never be allowed to run with the sows and breed indiscriminately. Do not over-use the boar as this might result in sows coming back to him.

Satisfactory winter quarters for the herd boar.

### Housing

Some farmers follow the practice of running all the pigs on the farm together, including boars, sows with litters of various ages, and fattening pigs. This is not sound practice at any time, and though it may not seriously affect a mature boar, it is distinctly not to be recommended for raising a young one. He should have separate quarters, with a dry bed at all times. Some sort of colony house with a small run for exercise will provide the necessary requirements.

### Safety

It is highly important that the tusks be removed when they are large enough to be harmful as boars with tusks may inflict serious injuries to other pigs or to their caretaker. The removal of the tusks necessitates making the boar secure by passing a noose of stout rope around the upper jaw, back of

the tusks, and tying the rope to a post. The tusks are usually quite exposed, and may readily be removed with a pair of bolt clippers or by the use of a crowbar and cold chisel. By the latter arrangement the crowbar is held against the base of the tusk on one side, while the tusk is broken by a blow to the cold chisel held against the opposite side.

### Trimming the Feet

The boar's feet should be kept trimmed so that he is standing squarely and properly balanced. If the toes have grown very long a sharp wood-chisel and a mall may be used to very good advantage. The toes should be cut back and the horn on the side of the hoof trimmed so that the animal is standing squarely on his feet.

## CARE OF THE BROOD SOW

The result of the year's work with hogs depends more largely on the management and feeding of the sows during pregnancy than during any other period. When the brood sow is not properly nourished and is not forced to take exercise, small and weak litters are likely to be farrowed. The object in feeding is to keep the sow in a thrifty, vigorous condition.

Brood sows on annual pasture of oats and fall rye.

### Summer Care

Forage crops make it possible to carry brood sows over the summer period at a minimum cost, and in a vigorous and thriving condition. The pasture crop has long been recognized as an efficient method of promoting thrift, not only in brood sows, but in stock boars and growing breeding stock as well.

At Lacombe an annual pasture of a mixture of two bushels of oats and one bushel of winter rye, spring seeded, is satisfactory. Sows are turned into this crop when it is about five or six inches high. The oats provide the pasture during the first half of the season, and the winter rye provides the late summer

and fall pasture. Rape is also a suitable crop on which to maintain pigs being kept for breeding purposes. It is as a late fall pasture that rape has its special advantage.

During the summer and fall months, the dry brood sow requires very little care if she is provided with reasonably good pasture, and shade and water. On the other hand, the pregnant sow should not be called upon to rely altogether on pasture for her maintenance. She should not be taken off the pasture but should be given a sufficient amount of grain to maintain her own body, as well as develop the foetus. The value of pasture to the pregnant sow is not only in its succulent nature and nutritious variety, but because it provides a considerable amount of mineral matter which is essential to the development of the unborn young. The amount of grain to feed, with the sow on pasture, will depend on her condition. Young growing sows should be fed more grain in proportion to body weight than mature sows during the pasture season if they are to be given a chance to develop properly.

### Winter Care

Dry, well-ventilated and reasonably warm sleeping quarters, exercise, good wholesome food and plenty of water from which the chill has been removed, are the main essentials in the successful handling of brood sows during the winter months.

Expensive and elaborate piggeries for the winter housing of dry brood sows are unnecessary. All they require is a clean, well-ventilated and reasonably dry sleeping berth as well as an opportunity for exercise. Brood sows do not suffer much from low temperatures provided the shelter is dry, free from draughts and of such a nature as to protect the animals from wind and storm.

Sows are successfully sheltered through the winter on many farms in sheds constructed from poles and straw, and which are draught-proof and well bedded.

At Lacombe the 6 x 8 foot portable colony house has proved a very satisfactory winter shelter for dry brood sows. A number of these are arranged side by side and crated and banked to the eaves with straw, leaving the fronts open and facing the south. A heavy burlap sack hung over the door breaks the wind and provides suitable protection for the doorway. Each of these colony houses will comfortably accommodate from three to four sows, depending upon their age. The colony houses are placed some little distance from the feed trough in order to force the sows to take exercise. Weak pigs are often the result of lack of exercise on the part of the sow.

## FEEDS FOR THE BROOD SOW

Swine, and particularly pregnant brood sows, are apt to suffer from lack of protein and minerals in their feed, more perhaps than any other kind of farm animal. One reason for this is that in producing two litters of pigs per year a great demand is made upon the protein and mineral supply of the mother's body. The cereal grains, which form the basic ration for brood sows, are deficient in both protein and mineral matter. This deficiency can, however, be remedied by supplying supplementary feeds and mixtures rich in the essential elements.

### Feed Mixtures

During the winter months the use of such supplementary feeds as buttermilk, skim-milk, or one of the purchased sow concentrates and simple minerals, together with alfalfa hay (or some form of green roughage), roots when available and potassium iodide, will assist in the production of vigorous, healthy pigs at birth.

Use home-grown grains as far as possible, fed either whole or as a chop mixture scattered on the frozen ground, so that the sows will get additional exercise in picking up the grain. Surprisingly little chop will be wasted by feeding it in this manner. In muddy conditions the grain should be fed in troughs some distance from the sow's sleeping quarters. The following mixtures have been found satisfactory:—

| | | | |
|---|---|---|---|
| Oats | 1 part | Oats | 2 parts |
| | or | Barley | 1 part |
| Barley | 1 part | Wheat | 1 part |

Barley and wheat alone are too fattening for sows. A very fat sow usually farrows a small uneven litter lacking strength and vigour. Bran should be added to the regular ration at least one week before farrowing. It is an excellent addition to the sow ration at the rate of about 5 per cent throughout the full pregnancy period. If roots are available, they may be used in limited quantities instead of bran, thus avoiding the outlay of cash for bran. If milk is available as a source of protein, from ten to fifteen pounds per sow daily will supply the correct balance of protein. If milk is not available from six to eight per cent of a commercial "Sow Concentrate" thoroughly mixed in the chop is perhaps the best single substitute.

Obviously the amount of feed used will vary, the feeder must use judgment, note the condition of the sows and regulate their feed accordingly. As a rule, a daily allowance necessary to bring mature and yearling sows through the winter in good condition is from five to eight pounds of grain. For bred gilts, slightly more feed should be supplied in proportion to body weight; also, the proportion of protein supplement should be increased.

**Green Feed**

During the winter gestation period, bright green sun-cured alfalfa or clover hay is an especially important part of the sow's ration. It may be fed on the ground, self-fed long in racks, or ground into meal and mixed with the grain at the rate of from 10 to 15 per cent. While legume hay does add protein and mineral to the ration, its chief contribution is in its content of vitamin A. This important vitamin is rightly referred to as the "anti-infective" vitamin and it is highly important in preventing germ diseases during the first few weeks of the pig's life. Pigs farrowed to sows that have been fed an adequate supply of vitamin A are born with more resistance against common germs than those farrowed to sows suffering from a depletion of this vitamin. In the latter case the little pigs often succumb by being unable to prevent the common germs that are picked up while nursing for instance, from penetrating through the intestine and growing throughout the body to cause a generalized infection. Suckling pigs may also suffer through deficiency of this vitamin in the milk of the sow. Pregnant sows obtaining an adequate amount of vitamin A produce milk that contains sufficient of this vitamin to give a definite degree of protection to their offspring. Vitamin A is abundant in green feeds and in the leafy parts of bright green alfalfa or clover hays. Harvest the hay in as bright green colour as possible.

The first cutting of alfalfa should be made soon after the first flowers appear. Leaves contain about 70 per cent of the total protein of the entire crop. If leaves are lost by delayed haying or in handling operations the value of the feed is greatly reduced.

Where green feed is not available, a feeding oil should be fed at the rate of one tablespoonful per sow daily starting at least one month before farrowing. A dependable brand of fish oil with a guaranteed vitamin A content should be used for this purpose.

Cheap, but comfortable winter shelters for brood sows.

**Minerals**

In formulating rations for winter feeding of the brood sow it is well to remember that at this season of the year she will not have the run of a green pasture and access to minerals in the soil to help balance her ration. Minerals help to make bone in the litter and maintain the proper mineral balance in the sow. Calcium (lime) is likely to be deficient in the sow's ration, and it is often advisable to add about one pound of ground limestone to each 100 pounds of grain feed. Common or iodized salt should be mixed at the rate of one pound per 100 pounds of grain. When a commercial "Sow Concentrate" which contains minerals is being fed, it will not be necessary nor desirable to feed additional calcium and salt.

**Potassium Iodide**

A mineral substance about which the pig breeder should be concerned is iodine. The crops and drinking water in certain sections of Canada are lacking in this element and the shortage causes pigs to be born without hair. Hairless pigs have thick pulpy skin and large necks, no squeal and no vitality. Young pigs affected are either born dead or live but a few hours. Pigs in this condition are more likely to be born from gilts than from old sows. They are also more likely to be born in the spring than in the fall.

During the summer, when pregnant sows can secure plenty of exercise and have access to fresh earth, of which they will consume considerable quantities, the feeding of potassium iodide may not be necessary, but in winter the feeding of this mineral to in-pig sows is essential to the production of normal, healthy pigs at birth.

Hairlessness in new-born pigs can be entirely prevented by supplying small amounts of iodine in the form of potassium iodide to the sow during the

pregnancy period. Potassium iodide may be purchased from any druggist. A convenient method is to dissolve one ounce of potassium iodide crystals in one gallon of water and mix one tablespoonful per sow daily in the feed or drinking water. Another method is to sprinkle two ounces of potassium iodide dissolved in water on 100 pounds of salt which has been dried with heat and then feed this iodized salt at the rate of one pound in 100 pounds of grain. The total cost of feeding potassium iodide at this rate throughout pregnancy is less than 15 cents per sow. The treatment must not be put off long after the sows are settled or it will not be effective. They should be given the dose for at least the last three months of pregnancy to be sure of results.

## CARE AND MANAGEMENT OF THE LITTER

### Farrowing Time

As profit in swine raising is largely governed by the size of litters, and as the possible number of pigs to be raised is limited at farrowing time, every possible precaution should be taken at this critical period. Suitable feeds, clean pens and careful attention are essentials in reducing losses at farrowing time.

The farrowing pen should be thoroughly cleaned in preparation for the sow. A sanitary start is the best and cheapest means of disease control. Often infection sets in, or parasitism begins in the farrowing pen where the young are born. It is, therefore, apparent that one of the essential steps in disease prevention should be the careful and thorough cleaning and scrubbing of the farrowing pen at regular intervals. At Lacombe, before the sows are put into their farrowing house, the house is thoroughly washed first with boiling water and then with a strong lye solution in the proportion of one pound of lye to 30 gallons of lukewarm water. Worm eggs are capable of remaining alive for five years, and even longer and only by heat are they readily killed. The use of boiling water followed by a strong lye solution is the best known means of eradicating worm eggs from buildings. Needless to say, the work must be well done. If cracks and corners are neglected, poor results are almost sure to follow. Just previous to putting the sow into the clean farrowing pen the sow is scrubbed carefuly, especially around the udder, with warm soapsuds and a stiff brush to remove any worm eggs which may be adhering.

If a farrowing pen is carefully gone over with hot water and lye not only will the eggs of every species of worm be destroyed but also all forms of disease-producing bacterial life. This simple practice will save the lives of many pigs and save much time and feed wasted in raising stunted pigs.

Another worth-while measure is to treat the sow for worms, so that after farrowing the pigs will not be so likely to become infested. This may be accomplished by mixing one tablespoonful of oil of chenopodium (wormseed oil) in the feed of each sow five or six weeks before farrowing. Because of the strong odour and bitter taste of the oil it is usually necessary to starve the sows for a few hours before feeding in order to persuade them to eat the treated feed. The capsule and balling-gun method may be used to ensure successful administration. Sodium fluoride is also very effective as a treatment against worms. Care should be taken in using it. (See section on intestinal worms).

About ten days before the sow is expected to farrow she should be put in a clean, dry and reasonably warm farrowing pen so that she may become accustomed to the surroundings. A small amount of bedding, preferably cut straw, should be left in the pen. The heavier and fatter the sow the less the amount of bedding. A guard-rail which may comprise a 2-inch by 4-inch piece or a small pole placed about eight inches above the floor and six inches away from the side walls saves many pigs from being crushed by heavy sows.

About twenty-four hours before the sow farrows there is usually milk in her udder, and she is likely to become extremely nervous and resent any interference. No solid feed should be given at this time. For this period, or even longer before farrowing, it is wise to feed nothing but a warm bran slop to avoid fever and constipation, which are extremely dangerous.

**Sows that Eat Their Pigs**

It is not natural for a sow to eat her pigs. In too many cases sows are over-fed at farrowing time and this causes trouble. The sows get feverish and eat their pigs. The principal reason, however, why sows eat their young is because of a lack of balance in the ration. Sows that winter on a straight grain ration sometimes develop this unnatural habit. Plenty of exercise and feeds such as are described under "Feeds for the Brood Sow", on page 20, will usually prevent this trouble at farrowing. It ought to be said that even with all these precautions there will still be some sows that persist in eating their young, but the losses can be very much cut down. In some cases the only remedy is to dispose of the sow.

**Attention at Farrowing**

The attendant should be on hand while the sow is farrowing. When the sow is irritable or clumsy the pigs should be removed from the pen as soon as born, rubbed dry with a piece of sacking and placed in a box covered with a blanket to ensure warmth. If the building is cold some warm bricks and a couple of blankets will prevent the pigs becoming chilled. As soon as the sow has finished farrowing the whole litter should be placed with her and care given to see that all the pigs receive milk.

**Electric Brooder**

If electricity is available a very effective pig brooder can be constructed which will not only supply heat to the baby pigs but serve to keep the pigs together and out of danger of being trampled or lain on by the sow. In its simplest form it can consist of a light with a reflector hung in a boarded off corner of the pen. A 250 watt heat lamp is best for the first few days.

In very cold weather or in a draughty piggery a box type brooder (after the style of the illustration) is recommended. A heat lamp can be used for the first few days, but thereafter an ordinary 150 watt bulb is quite satisfactory.

Electric Pig Brooder (lid open)

### Removing "Black" Teeth

When the long teeth in the front of the baby pigs mouth disturb the sow when the pigs are nursing or cause damage to the other pigs when they are fighting or playing it is advisable to remove them shortly after birth. These teeth are eight in number, two on either side of both the upper and lower jaws. All that is required to remove their trouble making is to break off the tips with a pair of pliers. Care should be taken that the teeth are not crushed, broken too close to the gum, or the gums cut or bruised with the pliers.

If these teeth are not causing trouble it is not necessary to remove them.

### After Farrowing

It is essential that, after farrowing, the sow should not be over-fed or given anything that will cause digestive disturbances in the young pigs. Sour milk should not be fed at this time. The first feed for the sow after farrowing should consist of a warm slop composed of bran or shorts and water. Do not give cold water for at least twenty-four hours. The ration, including either skim-milk or buttermilk if available, should be increased gradually and heavier feeds such as oats added with the idea of stimulating the milk flow of the sow as rapidly as the litter is strong enough to take it. Usually the sow is on full feed at the end of ten days. When milk is not available, 12 pounds of one of the purchased concentrates to each 100 pounds of a grain mixture of equal parts of oats and barley or oats and wheat is recommended in order to ensure a good flow of milk. Oats, barley or wheat without the addition of any other feed is not a suitable feed for a nursing sow. It is imperative that the protein content of the ration be maintained at a high level in order to support milk flow. Nursing sows require rations of higher protein level than dry stock to meet the needs of lactation. Slop feeds are preferable to dry feeds for the sow in milk.

The feeding of the sow, after she recovers fully from parturition, must of course be more liberal than at any other time in order to ensure a good milk supply, taking it for granted that the brood sows have been selected somewhat from the standpoint of good milking ability. Sows not liberally fed when they are nursing litters lose heavily in body weight and their pigs do not attain the size they should at weaning time. The amount to feed will depend on the size and condition of the sow, and the number of living pigs in the litter. Sows nursing large litters require more feed than those nursing small ones.

### Water

A supply of fresh, clean water should be available to nursing sows and suckling and feeder pigs at all times. In summer, water should be kept in front of all pigs at all times. In winter, it should be supplied regularly with the chill removed. For outside feeding a large water tank with a recessed automatic waterer is highly recommended. The water can be kept above freezing by a tank heater so the pigs may obtain water whenever they need it.

### Feeding of Orphan Pigs

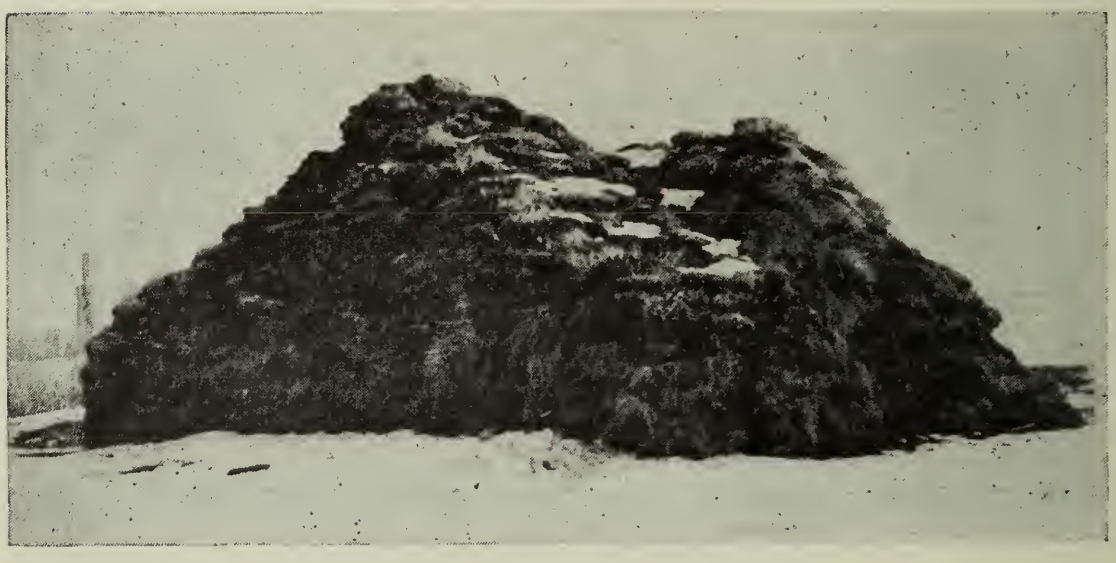
When a sow dies or has insufficient milk to nurse her litter, the pigs can be successfully raised on cow's milk. While cow's milk without addition or adulteration can be used, some feeders add sugar at the rate of two tablespoonfuls per quart of milk. The milk should be given at blood temperature and it is important that the feeding utensils be kept clean. It is best to feed the pigs five or six times daily until they are about two weeks old, when the number of feedings can be reduced to three a day. Care must be taken not to overfeed the pigs, especially during the first week. The milk may be fed with a nipple or in a

shallow dish. By dipping the pig's mouth and nose into the milk it will soon learn to drink out of a dish. Middlings and finely ground sifted oats can be stirred into the milk to form a very thin slop when the pigs are two weeks old, and the pigs continued on this mixture until normal weaning time.

**Exercise**

It is essential that the young pigs have plenty of exercise. If they are confined to a small pen there is the danger of some of them becoming too fat and dying from thumps and other diseases. The practice followed at Lacombe is to turn the sow and litter out for a short time each fine day after the second week. When it is too cold outside, the litters are turned together in the alley of the piggery where they get considerable exercise playing about.

These young pigs are being raised under natural conditions in early spring



A pile of stored sods used in the prevention of anaemia.

**Sods for Anaemia**

At Lacombe sods about a foot square and three inches deep are taken up in the fall from areas on which pigs have not been allowed to run. One of these sods is given daily to each sow and litter during the winter. The iron which the

young pigs secure from the soil helps to make good the iron deficiency in the sow's milk, and thus tends to prevent anaemia. Iron cannot be fed to suckling pigs through the dam's milk. It must be stored in advance or else administered direct to the young pigs. Further particulars regarding treatment for anaemia will be found on pages, 48 & 49.

**Creep Feed the Litter**

Experiments have shown that most sows are incapable of supplying through their milk all the food necessary for a big vigorous litter after the pigs reach three to four weeks of age. Additional feed is necessary and results at Lacombe have proved that grain fed to suckling pigs is beneficial. The extra feed produces pigs that are up to five pounds heavier at weaning than those allowed no additional feed. This supplementary feed results in less drain on the system of the sow, greater uniformity within the litter and lessened mortality.

Creep feeding has many advantages.

When about three weeks of age the young pigs will begin to eat solid food. At this time they should be fed easily digested feeds carrying a low percentage of fibrous matter. Unless the hulls have been removed, ordinary oat chop contains too much fibre to be fed to very young pigs. Grinding oats finely does not remove the hulls. The hulls can be removed either (1) by the use of a home-made oat-hull separator, (2) by sifting the chop through an ordinary screen-door wire screen, (3) through the use of a fanning mill by adjusting the sieves and wind.

Shorts, because of its low fibre content, is a valuable feed in the ration of the young pigs. Shorts and sifted or hulless oat chop are very palatable and nourishing feeds for young pigs.

A ration which has been used with good success in the separate feeding of suckling pigs at Lacombe consists of equal parts, of sifted or hulless oat chop and shorts, supplemented with sweet skim-milk or fresh buttermilk.

Commercial "pig starters" make up a complete feed and may be used to good advantage at this stage, particularly if milk is not available.

Clean fresh water should be available to the little pigs at all times.

The separate feeding is accomplished by means of a "creep" or barrier which may be erected in a corner of the pen, leaving an opening of such size that the pigs can run in and out while the sow is excluded. If the sow's pen is not large

enough to permit the erection of a creep, some arrangement should be made whereby the little pigs can be allowed to run out into the alleyway of the pig barn so that they may be fed the meal mixture in a small trough separate from the sow. The milk should be fed in a separate trough in the creep. Care should be taken to see that the feeding utensils and trough are kept sanitary and clean for suckling pigs.

When suckling pigs are allowed access to extra feed before weaning, in a creep or alleyway separate from the mother sow, the usual shock or set-back at this critical time is reduced to a minimum. This is good preparation for the weaning period.

Creep feeding will induce nursing pigs to feed early. This is a very important consideration in connection with the control of anaemia, for as soon as the little pigs begin to eat food from the trough, danger of anaemia is passed.

The plans of a simple home-made oat hull separator and instructions for its operation and use can be obtained upon application to the Extension Service of the Alberta Department of Agriculture, Edmonton, Alta.

**Castration**

At Lacombe all males which are not to be kept for breeding are castrated at six weeks of age before weaning. When this operation is performed while the pigs are still nursing the sow they receive very little set-back and heal up quickly.

A sharp knife is used to make a fairly long cut, extending far enough down the scrotum to permit good drainage. Absolute cleanliness must be observed, and after the testicles have been removed the wound is washed with a good disinfectant.

**Ruptured Pigs**

Pigs ruptured in the scrotum may be easily castrated as follows: Have an assistant hold the pig up by the hind legs. In making the incision, cut only through the skin of the scrotum, being careful not to cut the membrane or sac which envelops the testicle. Then draw out the testicle enclosed in its membrane, and, at the same time, work the intestine back into the body of the pig. With the pig held as described, the intestine will go back to its place with little or no resistance. Having drawn out the testicle far enough, tie a strong string firmly around the cord of the testicle (including the membrane) and then cut away the testicle (enclosed in its membrane) just outside of where the string is tied. Leave the ends of the string three or four inches long, so that they hang outside the wound. If the string does not come away in a couple of weeks, it may be pulled out.

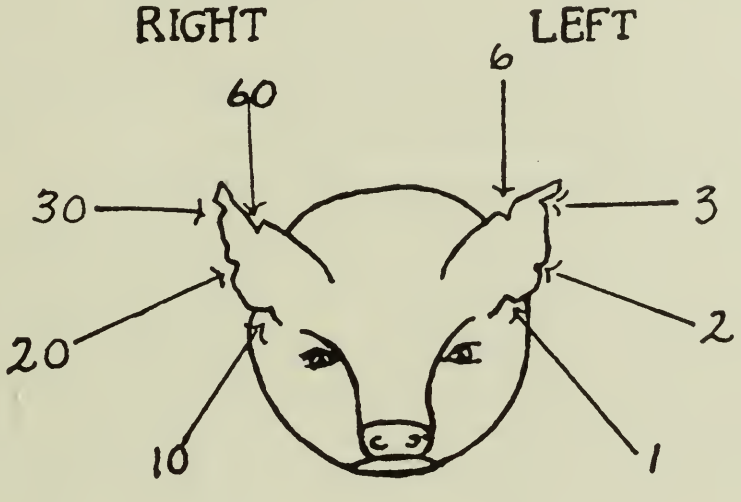
If the rupture is only on one side, the remaining testicle may be removed in the ordinary way. The scrotum should be washed with disinfectant before any incision is made. The hands of the operator and the knife should also be washed with disinfectant before the operation. The incision in the scrotum should extend well downwards to facilitate drainage from the wound. These simple precautions assure success.

**Identification**

In the registration of purebred pigs it is necessary to have them identified under eight weeks of age and before weaning by tattoo marking or ear tag. White breeds such as Yorkshires and Chester Whites must be identified by tattoo marking. This is a regulation of the Canadian Swine Breeders' Association. A breeder shall apply to the Canadian National Live Stock Records, Ottawa, for, and be allotted, letters for his exclusive use with which to identify swine farrowed his property. The herd identification letters are tattooed or tagged in one ear and the number of the animal with designating year letter is placed in the other ear. The tattoo and tag methods of identification are official.

**Method of Earmarking Pigs**

A convenient and accurate system of ear notching for the identification of pigs, which can be adopted for private use is as follows: A "V"-shaped notch is cut out of the edge of the ear with an ear notcher. A notch in the lower margin of the right ear has a numerical value of 10; a notch in the middle margin of the right ear has a numerical value of 20; a notch in the upper margin of the right ear has a numerical value of 30 and a notch over the tip of the right ear has a numerical value of 60. A notch in the lower margin of the left ear has a numerical value of 1; a notch in the middle margin of the left ear has a numerical value of 2; a notch in the upper margin of the left ear has a numerical value of 3 and a notch over the tip of the left ear has a numerical value of 6.




Simple addition is used for these numerical values to determine how to notch a litter. For example take litter No. 12; this is one notch in the lower margin of the right ear (10) and one notch in the middle margin of the left ear (10+2), making a numerical value of 12. Again take litter No. 45; one notch in the lower margin of the right ear (10); one notch in the upper margin of the right ear (30); one notch in the middle margin of the left ear (2) and one notch in the upper margin of the left ear (3) a total of 45. The marks are made best soon after the litter is farrowed when the wounds heal quickly.

## FEEDING AND MANAGEMENT AFTER WEANING

In the production of pork the feed is the largest single item of cost, amounting up to 85 per cent of the total cost. There must be no check in the pig's development from the time it is weaned at eight weeks of age until it is marketed if an acceptable type of pig is to be produced at the lowest possible feed cost and during a feeding period of minimum length. Any additional feed that is required to regain lost weight will increase the cost of production and lower the profit. The gains on young pigs are cheaper than on older ones and it pays to start them well.

Most commercial feed manufacturing firms produce protein-mineral-vitamin supplements known to the trade as mixed supplements or "Hog Concentrates". These supplements are prepared in accordance with experimental findings and when added to home grown grains at the proper levels provide a balance of protein, minerals and vitamins thus making possible the most economical use of coarse grains. In the discussion regarding the feeding of different classes of swine the term "mixed supplement" is used to designate these commercially mixed concentrates.

**Feeding the Weaned Pigs**

If there is any one class of stock which must be more carefully fed than another, it is newly weaned pigs. The critical period in their lives is just after weaning and is truly the dangerous one. Sometimes weaning results in quite a setback for the pigs. The change from sow's milk to a meal ration is an abrupt one, and to prevent any unthriftiness at this stage, great care must be exercised in the selection of the feeds to be used. The use of skim-milk or buttermilk very much simplifies the feeding problem at weaning time and the meal used should contain a minimum of fibre. The young pig has a comparatively small stomach and should therefore be fed frequently with easily digested feeds, carrying a very low percentage of fibrous matter. Oat hulls or coarse feed of any kind is detrimental to small pigs. The pig cannot digest the fibre in oat hulls and is handicapped when forced to fill up on hulls along with his other feed. Middlings or shorts because of their low fibre content are feeds of value in the ration for very young pigs. At this stage special care must be taken to make sure that the ration is properly balanced, as any condition which makes for unthriftiness in the young growing pig may influence his ultimate type as well as the financial return which the raiser will receive.

**Feed Mixtures for Weanling, Growing, and Finishing Pigs**

For uninterrupted growth of the bone and muscle framework on which the body has to be built, the ration for the growing pig must be balanced—that is, it must contain in addition to the carbohydrates a certain amount of protein, mineral matter and vitamins. The ordinary home-grown hog feeds (oats, barley and wheat) which form the basis of practically all swine rations are high in carbohydrates and in fats but relatively low in balanced proteins, in ash or mineral matter, and in vitamins. Protein is required for body growth and is used to produce lean meat, body tissue, hair, hoof, etc. The demand for protein is very heavy in young growing pigs and it is strongly recommended that the percentage in the ration be high for weaning pigs and reduced as the animals approach market weight. Mineral matter is essential for the development of the body framework and must be supplied with the home-grown cereals before maximum development of the growing pig can be attained. Carbohydrates are the starchy portion of the feed. They supply heat and energy and produce fat. The fats are used for the same purpose as the carbohydrates namely, heat and energy and the production of body fat. Without vitamins an animal cannot grow nor remain in good health. Vitamins are also essential to the production of offspring. In other words, these elusive substances have essential parts to play in physiological well-being of animals. Hence if pigs are placed on a ration made up entirely of meals from the cereal grains they tend to become unthrifty and as a result make slow and very often unprofitable gains in weight.

Pig raisers who have skim-milk or buttermilk available are in a fortunate position as with an adequate amount of one of these supplements there is little necessity for the purchase of supplemental protein feeds. Where, however, milk is not available in considerable quantitities it is necessary that this lack should be made up by using a mixed supplement.

Pigs grow much more rapidly than other farm animals, gaining from about two pounds at birth to 200 pounds at six months. As a result they more readily show the effects of mineral deficiency. When pigs do not get dairy by-products, a mixed supplement, fishmeal or green feed, a mineral supplement furnishing lime and salt should be fed. A simple and cheap mineral mixture consists of slack coal 76 pounds, ground limestone or air-slacked lime 3 pounds, salt 20 pounds and sulphur 1 pound. The mixture is fed in boxes (protected from rain and snow) to which the pigs have free access. If one is mixing the mineral supplement with the grain, 2 pounds of a mixture of equal parts of ground limestone, bonemeal and salt should be added to 100 pounds of grain.

*Swine Rations*

The protein content of swine rations should be maintained at the following levels:

(*a*) For newly weaned pigs—18-22 per cent total protein.

(*b*) For pigs weighing 60-110 lb.—14-16 per cent total protein.

(c) For pigs weighing over 110 lb.—12-14 per cent total protein.

N.B.—One pound of mixed supplement has approximately the same protein content as 15 pounds of skim-milk.

The following meal mixtures for the weaning, growing and finishing periods are suggested:

*Feed Mixture*

*For Weaning Pigs*— (Weaning to 60 lb.)

| | |
|---|---|
| Sifted oats | 50 lb. |
| Ground barley | 30 lb. |
| Ground wheat | 20 lb. |
| Skim-milk or buttermilk, feed 3 lb. to each pound of meal | |
| or | |
| Mixed Supplement | 18 lb. |

*For Growing Pigs* (60 lb. to 110 lb.)

| | |
|---|---|
| Ground barley | 50 lb. |
| Ground wheat | 20 lb. |
| Ground oats | 30 lb. |
| Skim-milk or buttermilk feed 2 lb. to each pound of meal | |
| or | |
| Mixed Supplement | 15 lb. |

*For Market Hogs Over 110 Pounds*

| | |
|---|---|
| Ground barley | 60 lb. |
| Ground wheat | 30 lb. |
| Ground oats | 10 lb. |
| Skim-milk or buttermilk feed 1 lb. to each pound of meal | |
| or | |
| Mixed Supplement | 6 lb. |

NOTE:—In mixing feeds for young pigs care should be taken to add supplements in the proportions recommended. Digestive troubles are likely to result when supplements are added greatly in excess of recommendations.

If there is a tendency for the pigs to overfinish when self fed, the addition of 10 per cent alfalfa meal or bran throughout the growing and fattening period will improve the quality of the carcasses produced.

For pigs confined to the piggery and not allowed access to sunlight, add to the feed one teaspoonful per pig per day of a fish oil of commercial grade until the pigs weigh 100 pounds. The addition of fish oil to the ration of young pigs will improve their growth and will assist in guarding against crippling and deficiency conditions.

When commercial supplements which contain fish oil are being fed, it will not be necessary to feed additional oil (see page 37).

## CHARACTERISTICS OF FEEDS

### Oats

Of the common cereals, oats, on account of the high fibre content are probably the least suitable for growing and fattening pigs when fed in large amounts. Oats carry 10 to 15 per cent fibre which is largely indigestible and if fed to

weanling pigs in too large quantities results in scours, curly hair and indigestion. Even following weaning, oats without the hulls sifted out should not constitute more than 50 per cent of the ration. The balance may be made up of barley or (and) wheat. The excessive use of oats is responsible for much unthriftiness in young pigs and, as well, lack of finish at market weight.

The following table shows the result of an experiment at Lacombe when ordinary ground oats were compared with oats from which the hulls had been removed.

Effect of Oats Hulls on the Growth of Pigs

| | Lot 1 | Lot 2 |
|---|---|---|
| | Oats 2<br>Barley 1<br>Tankage | Oats 2 (hulled)<br>Barley 1<br>Tankage |
| Number of pigs | 8 | 8 |
| Average number of days fed | 117 | 117 |
| Average initial weight lb. | 66.4 | 66.5 |
| Average final weight lb. | 180.0 | 181.8 |
| Average daily gain lb. | 0.97 | 0.99 |
| Feed required for 100 pounds gain: | | |
| Grain lb. | 526.2 | 415.0 |
| Tankage lb. | 42.1 | 33.3 |
| Gains made per head during: | | |
| First 30 days feeding lb. | 20.6 | 24.2 |
| Second 30 days feeding lb. | 31.3 | 34.0 |
| Third 30 days feeding lb. | 32.5 | 29.6 |
| Last 27 days feeding lb. | 29.4 | 27.4 |

By briefly reviewing the above table the reader will observe that the lot which was fed oat chop with hulls removed made approximately the same daily gains as the lot eating straight oat chop but they used less feed to produce 100 pounds of gain. These results are similar to results obtained in previous tests of a like nature, in that oat chop with the hulls removed is capable of making more economical gains than straight oat chop.

One point that is worthy of note is the fact that during the first 60 days of the test the lot fed oat chop with the hulls removed made somewhat greater daily gains than the lot fed straight oat chop. After the 60-day feeding period, however, the results show no advantage to be gained in removing the hulls. The results obtained, therefore, would seem to indicate that oat hulls as contained in oat chop are detrimental to young growing pigs but have no harmful effect in a ration supplemented with barley after the pig reaches a weight of approximately 125 pounds.

The amount of labour involved in the sifting of oat chop by hand prohibits the following of this practice where large numbers of hogs are fed unless some mechanical device can be used for this purpose. Hulless oats is the logical feed to use in the growing ration where middlings or shorts are not available, but the difficulty is that this crop cannot always be grown successfully.

Ground oats are an excellent feed for dry sows and can comprise 50 per cent of the grain ration.

## Barley

Barley is the best individual hog feed which is fed in this country. Although it is practically as high in protein as oats, it contains a higher percentage of readily digestible carbohydrates and is therefore fattening in tendency. It is recognized as the feed largely responsible for the quality of bacon most appreciated by Canadian and British consumers. This grain may be profitably used to a far greater extent in the rations of young growing pigs than was formerly thought possible. In this connection an average result of four experiments is submitted. In these experiments the various grain mixtures were fed in conjunction with buttermilk.

Average of Four Experiments Comparing Straight Barley Chop with Various Oat and Barley Chop Combinations for Growing and Fattening Pigs

| — | Lot 1 | Lot 2 | Lot 3 | Lot 4 |
|---|---|---|---|---|
| | Barley chop | Barley chop 3 parts, Oat chop 1 part | Barley chop 2 parts, Oat chop 1 part | Barley chop 1 part, Oat chop 1 part |
| Number of pigs | 34 | 34 | 34 | 34 |
| Average initial weight lb. | 63.1 | 63.1 | 63.3 | 63.2 |
| Average final weight lb. | 207.9 | 209.4 | 201.2 | 200.8 |
| Average daily gain lb. | 1.18 | 1.19 | 1.11 | 1.08 |
| Feed required for 100 lb. gain:— | | | | |
| Grain lb. | 432.6 | 403.0 | 441.6 | 500.8 |
| Buttermilk lb. | 636.8 | 624.6 | 679.7 | 693.2 |
| Live grading of hogs—Select Bacon | 22 | 22 | 20 | 22 |

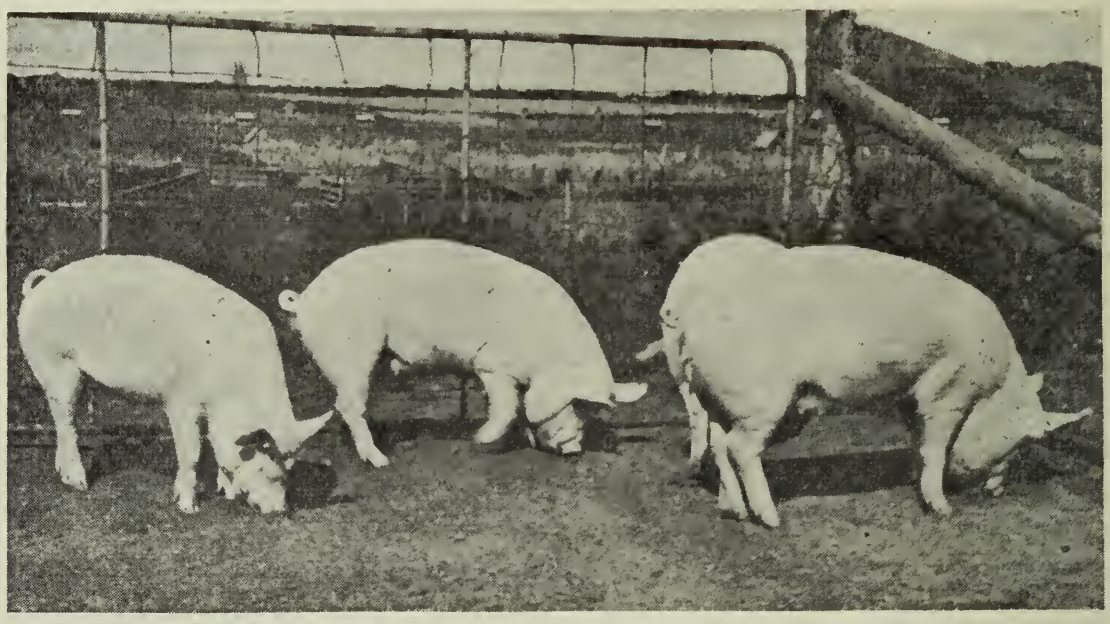
It will be observed from the above table that barley alone or a mixture of three parts of barley and one part of oats supplemented with buttermilk is capable of producing considerably greater gains and also more economical gains than are rations containing a greater amount of oat chop.

Fall pigs fed barley and buttermilk. Note the good market finish.

**Wheat**

Good feed wheat is a valuable feed for fattening purposes and is about equal pound for pound to sound wheat or barley, but low grade, badly shrunken wheat because it is usually richer in protein than plump wheat, has a tendency to produce growth rather than to fatten hogs. For this reason, although it is a particularly good feed for young growing pigs, badly shrunken wheat is not good feed for putting the necessary finish on bacon hogs. Wheat that is badly shrunken is lacking in the starch necessary for producing fat and if barley of reasonably good quality is mixed with it the feeding value of the ration will be increased. Though wheat is somewhat richer than barley in protein, both are low in calcium (lime) and vitamins and therefore require the addition of an efficient protein and mineral supplement to produce rapid and economical gains. Since the kernels of wheat are rather hard and small it should be ground coarsely or rolled for swine. Wheat ground to a fine, floury meal is less palatable and is apt to form a pasty mass in the mouth.

Wheat weighs more for a given volume than either barley or oats. Consequently in mixing a ration the proportions should be determined by weight rather than by measure.



Pigs fed wheat, tankage and pilchard oil from weaning to market.

| | |
|---|---|
| Average daily gain | 1.32 lb. |
| Feed required per 100 lb. gain | 344 lb. |

Almost as important as the low mineral content of wheat is the fact that this cereal grain is lacking in important vitamins, A (for growth) and D (for bone building). The principal need for vitamin supplements comes during the winter and spring months when the pigs are confined for long periods and when fresh green feeds are not available. Fish oils of commercial grade are rich in these vitamins and when added to a grain mixture containing wheat will assist in preventing "crippling" and will as a rule improve the growth. A feeding oil, containing 3000 International Units of vitamin A and 400 units of vitamin D per gram, should be fed at the rate of one teaspoonful per pig daily until the pigs weigh approximately 100 pounds. Lower potency oils would be fed in proportionately larger amounts.

Experiments to determine the value of wheat in hog feeding have indicated that if it is fed too heavily the quality of the carcass may be reduced. A protein supplement, i.e., milk, or a mixed supplement should be fed with all hog rations

containing a considerable percentage of wheat. Failure to take this precaution will result in excessive fat and a lowered rail grade.

Periodically there is a considerable quantity of frozen wheat available for feeding in Western Canada. The damage caused by frost varies and an experiment was conducted at Lacombe in 1951 to assess the value for swine of frozen wheat at different weights per bushel. A standard No. 1 feed barley was compared with frozen wheats weighing 60, 50 and 40 pounds per bushel in four replicated lots. The results are summarized in the following table.

FROZEN WHEAT OF DIFFERENT WEIGHTS PER BUSHEL COMPARED WITH BARLEY FOR MARKET HOGS.

(The rations were self-fed and comprised of 60 barley or frozen wheat, 40 oats along with the recommended levels of the A.R. Protein-mineral supplement).

| —— | Barley | Frozen Wheat 60 lb. per bushel | Frozen Wheat 50 lb. per bushel | Frozen Wheat 40 lb. per bushel |
|---|---|---|---|---|
| No. of pigs | 8 | 8 | 7 | 8 |
| Av. initial weights lb. | 39.0 | 35.4 | 36.4 | 37.4 |
| Av. Final wts. lb. | 203.6 | 203.8 | 205.1 | 206.3 |
| Av. Daily gain lb. | 1.51 | 1.43 | 1.51 | 1.44 |
| Feed per 100 lb. gain lb. | 413 | 419 | 397 | 479 |
| Carcass grades | 4A 4B | 1A 7B | 3A 4B | 3A 4B 1C |

As will be seen above, all lots made very satisfactory gains. In efficiency of feed utilization, as measured by feed per 100 pounds gain, the barley and 60 pound wheat lots were fairly close, the 50 pound wheat lot a little more economical, and the 40 pound wheat lot considerably more expensive of feed. It is quite possible that the low-weight wheat might be bought for considerably less and therefore the actual profits would not vary as much as might be indicated.

The main effect on carcass quality was that the 60 pound wheat over-finished the hogs and consequently lowered the grades. All lots in this experiment were self-fed and as suggested later in this bulletin, the inclusion of some alfalfa meal in the ration would offset this tendency.

In a palatability test conducted at Lacombe in which 34 pigs were allowed a free choice of ground wheat, oats and barley, the pigs showed a preference for wheat. Buttermilk was supplied in this test and a mineral mixture of 76 pounds slack coal, 20 pounds salt, 3 pounds ground limestone and 1 pound sulphur was kept before the pigs. The pigs ate 7,952 pounds wheat, 6,125 pounds barley and 4,253 pounds oats. They made quick and economical gains, averaging 1.18 pounds per day, and consuming 4.43 pounds meal for each pound of gain, which is a good average for fall pigs. These good results were due largely to the fact that the pigs had a variety of cereals in their ration.

Publication 856 "Wheat as a Feed for Livestock and Poultry" can be secured free of charge from the nearest Experimental Station or from the Information Service, Department of Agriculture, Ottawa.

## Rye

Rye is not used to any great extent as pig feed in Canada. Compared with the grains already discussed it is somewhat less palatable and when fed alone it is inefficient in promoting growth and putting on finish. Swine have a pronounced dislike for rye containing any marked amount of ergot, a poisonous substance. Care should be taken not to feed rye containing ergot to breeding swine. Rye should be coarsely ground or rolled for swine and because of its lack of palatability, should be mixed with oats and barley, or either grain alone. In any case, rye should not make up more than one-half of the ration.

### Shorts and Middlings

Shorts and middlings are highly nutritious feeds, containing very little fibre; and are particularly useful in getting weanling pigs away to a good start. For any other purpose they usually cost more than their relative feeding value will warrant paying for them unless they can be purchased at no greater cost per pound than the coarse grains are worth on the farm.

### Bran

Bran is fairly high in protein and phosphorus. This feed is light and bulky and of a laxative nature, and it is particularly valuable for feeding for a few days before and after farrowing to eliminate danger of constipation and fever in brood sows. It can form part of the ration throughout the pregnancy period. It is also valuable in rations self-fed to market hogs.

### Screenings

Screenings are of such variable composition that no definite statements can be made concerning them. However, screenings of the quality of "standard recleaned" screenings (consisting chiefly of wild oats, wild buckwheat and broken or shrunken wheat and free from the small weed seeds) are practically equal to grain in feeding value.

### Skim-milk and Buttermilk

Skim-milk and buttermilk as they come from the separator and churn, are very similar insofar as their value in the hog ration is concerned and either can be regarded as superior to any other single protein supplement, being rich in protein of the highest quality and also high in calcium and phosphorus. Protein is required for body growth and calcium and phosphorus are needed for bone development and other vital processes. Rations for growing pigs when made up entirely of meals from the cereal grains are unbalanced because of the insufficient and incomplete supply of protein and mineral matter.

Milk by-products have possibly their greatest value in getting the weanling pigs off to a good start. Care must be taken, however, not to feed them in too large quantities as overfeeding the growing pig on milk tends to make his middle heavy and the best value is not realized from the milk. For pigs up to 80 pounds in weight it is recommended that 3 pounds of milk be fed for each pound of meal eaten. Between 80 and 125 pounds, the ration is 2 pounds per pound of meal and between 125 and 200 pounds, 1 pound of milk should be fed for each pound of meal eaten.

The following table will show the relative performance of two groups of pigs in dry lot, one self-fed grain supplemented with buttermilk and the other self-fed the same grain mixture with water only. Results are based on an average of three experiments.

FEEDING BUTTERMILK

| | Group 1 | Group 2 |
|---|---|---|
| | Meal and Buttermilk | Meal only |
| Number of pigs | 26 | 26 |
| Average initial weight lb. | 50.9 | 50.5 |
| Average final weight lb. | 202.8 | 148.1 |
| Average daily gain lb. | 1.23 | 0.66 |
| Feed required for 100 lb. gain:— | | |
| Grain lb. | 465.3 | 800 |
| Buttermilk lb. | 700.0 | ..... |

Based on the three-year average, the results of this test in terms of dollars and cents, valuing oats at 43 cents a bushel and barley at 53 cents a bushel show that while buttermilk cost 1.7 cents a gallon it had an actual value 4.9 cents per gallon on the basis of grain saved.

In taking the average of two other tests with hogs on brome grass and oat-and-rye pasture the results show the margin of profit in feeding buttermilk to be decreased. On the basis of grain saved buttermilk costing 2 cents a gallon had an actual value of 3.3 cents a gallon. Apparently good pasture crops assist in supplying the growth-promoting food constituents.

**Tankage.**

Tankage, a packing-house by-product, consisting mainly of thoroughly cooked and sterilized powdered meat and bone scraps was until recent years the most widely used combined protein and mineral supplement for hog feeding except in those districts where dairy by-products were available in abundance. It is not normally used by itself now since it is the basic ingredient of most of the commercial mixed supplements being placed on the market instead of tankage. However, if obtainable, it is a valuable supplement.

Tankage may be fed in either of two ways: one is to expose the tankage in a a small self feeder in the pen and allow the pigs to help themselves while receiving at the same time a satisfying ration of grain. The other system is to feed the tankage mixed with the chop feed in the proportion of 10 per cent by weight of the total grain ration to weanling pigs, and smaller amounts to older pigs depending on the other ingredients in the rations.

**Fishmeal**

Fishmeal of good quality contains a well balanced protein and is an excellent source of readily available calcium and phosphorus, as well as a number of minor elements such as iodine. A good fishmeal should not contain more than 4 or 5 per cent of fat. Its general use in inland areas is dependent on its cost relative to other protein supplements. It may be used to advantage in a mixture with tankage and other supplements.

**Linseed Oilmeal**

Linseed oilmeal is a by-product in the manufacture of linseed oil, being the ground up residue after the oil has been extracted from flaxseed. It may be fed to advantage in small quantities to brood sows before farrowing and while nursing litters but as a single protein supplement for growing pigs it is less efficient than those of animal origin. It is useful to combine with animal proteins in adding variety to a mixed supplement.

**A.P.F. Antibiotic Feed Supplements**

In hog feeding the protein feeds of animal or marine origin such as tankage, skim-milk, fishmeal, etc., generally supplement the coarse grains better than do the feeds of vegetable origin although the component parts of the two types are not widely different. The difference in results has been attributed, until recently, to an unidentified factor generally known as the animal protein factor. In 1948 a new vitamin called $B_{12}$ was isolated and this vitamin is now believed to be the most active ingredient of the animal protein factor.

In the past few years many experiments have been conducted with A. P. F. in the form of pure Vitamin $B_2$ and while some results indicated its usefulness in this form, it was not until this material was combined with some of the antibiotics such as penicillin, aureomycin, terramycin, streptomycin, etc., that some very spectacular results have been obtained with feeder hogs.

The pure substance should not be confused with the combined. The former is generally called Vitamin $B_{12}$ or A.P.F. feed supplement and the latter vitamin $B_{12}$ antibiotic feed supplement or A. P. F. antibiotic feed supplement.

At the present time there is some difference of opinion as to which antibiotic gives the best results with hogs. In general, however, the A.P.F. antibiotic feed supplements improve rate of gain and feed efficiency with feeder hogs. This seems particularly so with runty or unthrifty pigs. It is indicated that these feeds will have a special place in creep feeding and until the pigs reach 60 to 75 pounds. If fed after this stage experiments in progress at the University of Alberta suggest that bacon carcasses are adversely affected.

Very small quantities of this material produce the desired results. They are being included in most commercial feeds and if available alone should be thoroughly mixed with the feed and fed according to the manufacturers recommendations.

**Mixed Protein-Mineral Supplements**

A mixture of the protein feeds is generally better than a single feed. Most commercial supplements contain a proper balance of the essential feeds and are thoroughly mixed. However, if the individual protein feeds can be obtained the following mixed supplement which can be mixed at home has proved very satisfactory:

| | | | |
|---|---|---|---|
| Tankage (50% protein) | 50 lb. | Iodized Salt | 5 lb. |
| Fishmeal (60% protein) | 15 lb. | Bonemeal (or ground limestone) | 5 lb. |
| Linseed Oilmeal (35% protein) | 25 lb. | | |

This is the standard protein-mineral supplement fed at the Advanced Registry test stations and is included in the ration at the rate of 15 per cent until the pigs reach 115 to 125 pounds and 8 per cent from then to market weight. Pigs fed inside should have feeding oil during the growing period.

**Alfalfa**

Alfalfa, either as hay fed from a rack or as meal added to the ration is a valuable feed for pregnant sows. It contains vitamins, ash or mineral matter, especially lime, and protein. Although alfalfa will provide roughage which is beneficial to brood sows, it is not rated highly in comparison with dairy by-products or tankage as a sole supplement to the grain ration for growing and fattening pigs. Its high fibre content tends to cut down the rate of growth. The particular value of this feed for growing pigs appears to lie in its being fed in small proportions in a mixed protein supplement. It has a special place in the self-fed ration.

In an experiment comparing the value of tankage and alfalfa meal as protein supplements for growing swine it was found that the total gain, the average daily gain, the meal required per hundred pounds gain and the returns over cost of feed were all in favour of the tankage-fed lot.

**Roots and Potatoes**

A small amount of turnips or mangels will improve the brood sow's ration. Roots provide bulk and succulence and furnish ingredients lacking in grain. One or more turnips or mangels per day per sow will add variety to the ration as well as help the milk flow. Roots should be chopped before being fed to swine. For young growing pigs turnips or mangels are not suitable as they tend to utilize too much space in the digestive tract.

Potatoes give very good results when used as a partial substitute for grain in the hog ration, provided that they are thoroughly cooked before feeding. The water in which potatoes are cooked should be discarded. Raw potatoes generally produce poor results when fed to swine. For the best results the proportion of potatoes should not be greater than 4 pounds of potatoes to each pound of grain. It requires about 450 pounds of potatoes to equal 100 pounds of grain. Potatoes should be supplemented with a suitable protein and mineral supplement such as the dairy by-products or tankage if best results are to be secured.

**Mineral Supplements**

The part which minerals play in raising good hogs is important since they are necessary for bone building as well as for proper muscle and heart action. The proper combination of minerals and vitamins makes for satisfactory growth and development of the bacon hog.

Of the various mineral elements required by the pig, calcium, phosphorus, sodium, chlorine, iodine and iron are the ones most likely to be lacking in the feeds commonly supplied. Of these, calcium and phosphorus are required in the greatest amounts, the reason being that approximately 85 per cent of the bone of growing animals is made up of calcium and phosphorus. A lack of calcium and phosphorus will cause unthriftiness and perhaps stiffness and rickets.

The major portion of a pig's ration consists of cereal grains and their by-products. These are relatively rich in phosphorus and low in calcium (lime), hence the big need in pig rations is for lime or calcium supplements. Skim-milk, buttermilk and mixed supplements are well supplied with calcium. Therefore, if pigs are receiving an adequate supply of skim-milk or buttermilk or if they are fed a commercial mixed supplement in the' amounts recommended by the manufacturer and have access to good pasture as well, the necessity for special mineral feeds is practically negligible.

The matter of mineral supplements is, however, of great importance in view of the fact that on many farms no skim-milk or buttermilk is available and the use of mixed supplements as a milk substitute is not a general practice. This is especially true where fall pigs are being raised. In the absence of milk or mixed supplements the addition of one pound of the best grade of ground limestone and one pound of salt to each 100 pounds of grain or two pounds of a simple mineral mixture will provide for the mineral needs of growing pigs.

It is more economical to supplement the grain ration with either protein or minerals, preferably both, than to feed grain alone.

**Salt**

All animals require a certain amount of salt, yet there is a tendency to leave it out of the pig ration. A pig requires a moderate amount of salt as any other animal does for the proper functioning of the body. Common salt contains one of the elements for making hydrochloric acid in the stomach of the animal, and this is absolutely essential for proper digestion. A deficiency of salt results in poor growth and inefficient utilization of food. The cereal grains which form the basic ration for hogs do not contain sufficient amounts of the mineral elements chlorine and sodium, which are both supplied through the medium of common salt.

Another beneficial effect of salt is that it makes feed more palatable, and when feed tastes better, animals eat more of it in a given time and thus make more rapid gains.

Experimental results at Lacombe indicate that the addition of common salt alone to a grain ration of oats and barley is effective in increasing gains and reducing the amount of feed required to make gains. In tests conducted, the use of 2½ pounds of salt in every 100 pounds of meal mixture with pigs in dry lot, self-fed a grain ration of oats and barley resulted, on the average, in a 36 per cent increase in daily gains and a 22 per cent decrease in cost of gains.

Sometimes hogs are poisoned by eating too much salt and frequently through drinking salty brine, of which the animals are fond. Salt should always be fed to swine with great caution and in small amounts. The recommendation is that the dry meal, with 1 pound of salt thoroughly mixed in each 100 pounds of chop, be spread out in the trough and the water or milk poured over it. The

practice of soaking chop which contains salt should be discouraged as a poisonous brine solution is likely to form before feeding. When slop containing salt has been allowed to stand unstirred for 24 hours or more before use the salt settles to the bottom of the barrel, making that part of the mixture so strongly impregnated with salt that it may poison the hogs. If meal containing salt is fed as slop it should always be thoroughly stirred immediately before feeding.

Practically all commercial hog concentrates now being placed on the market instead of tankage contain sufficient salt to meet the pig's requirements for this mineral. Hence, if a commercial concentrate is being fed no salt should be added to the pig's ration.

**Iodine**

Iodine is vital to the normal functioning of the thyroid gland and insufficient amounts in the ration of pregnant sows, especially during the winter months, may result in hairlessness in new-born pigs. Particulars regarding this treatment have been discussed under the heading Potassium Iodide, page 22.

**Iron**

A supplementary supply of iron for suckling pigs is discussed under Nutritional Deficiency Diseases and Parasites. See page 48.

**Pasture Crops**

Although experimental results at Lacombe indicate that growing pigs on a ration of grain alone do much better when they also have access to pasture, other results at the same Station show that with a complete ration (grain and protein supplement) market hogs were raised more quickly and economically without pasture. Pasture is recommended for growing gilts and boars for breeding purposes and for maintaining boars and brood sows. Pasture serves several important purposes; it supplies proteins, minerals and vitamins which may be lacking, especially when skim-milk or other substitutes are not available, lessens the probability of disease infection or worm infestation, and supplies succulence as well as allowing for exercise.

Pasture lots should not exceed from half an acre to one acre in size. It is a good plan to have two pastures for each lot of hogs. By alternating them the pastures may be grazed fairly closely and still provide good succulent feed. When fences are not available for pig pastures, the alternative is to feed freshly cut forage to the pigs in their pen as required.

Sows pasturing on alfalfa.

There is a tendency, especially with the white breeds, for pigs to blister or sunscald on pasture and to reduce this condition to a minimum, suitable shelter in the form of brush, open sheds or colony houses should be provided. Sunscald causes a severe setback in young pigs. It is well to place the self-feeder or trough in the shade. Healing of sunscald can be hastened by a liberal application of used crankcase oil to the affected parts. Much sunscalding can be avoided if the pasture is not allowed to grow too high. It is the moisture off the tall plants along with the sun which causes a lot of the blistering.

It should be borne in mind that if pasture is used for market hogs it must be supplemented with full feeding of grain, preferably by the use of a properly constructed self-feeder, if an acceptable type of pig is to be produced. There should be no check in the pig's development from the time it is weaned until it is marketed. Pigs allowed to run on pasture without grain grow too big a frame and an objectionable depth of chest before they are finished. If sold within the proper weights, their carcasses, because of lack of finish, dress out thin and flabby. In order to produce proper finish it is necessary to feed them until they become overweight and are graded "heavy."

At Lacombe, such pasture crops as oats, rye, rape, alfalfa, sweet clover, barley, wheat, peas and various mixtures have been under test for a number of years.

For central Alberta, two bushels of oats mixed with one bushel of winter rye offers a forage crop which can be seeded early in the spring and will produce pasture until after the freeze-up in November. The oats provide the pasture during the first half of the season and the winter rye provides the late summer and fall pasture. Rye without oats is practically as good, but takes longer to get a start. At Lacombe, eight acres of oat and rye pasture seeded early in May carried 30 mature sows from the first of July to the freeze-up in November.

Rape makes an excellent fall pasture for hogs.

Rape also makes a very satisfactory pasture for the summer and fall. About seven weeks are usually required from the time rape is seeded until it is ready for pasturing. Pasturing should commence when the plants are about

six inches high; otherwise it becomes rank and unpalatable. Four to five pounds is sufficient for seeding in drills 30 inches apart, while eight to ten pounds is necessary if the seed is drilled or broadcasted the same as an ordinary grain crop. A good stand of rape is capable of carrying from 20 to 25 pigs per acre.

Alfalfa makes a good pasture for hogs. Unfortunately it is sometimes difficult to establish and also if too closely cropped is likely to be killed out. Sweet clover, on the other hand, is not very palatable and soon gets too tough and woody to make good feed.

The coarse grains such as oats, barley and wheat when sown alone or in combination are commonly used for hog pastures. These crops mature quickly and if a continuous pasture is to be provided a succession of seedings must be made. One month of heavy pasturing will finish all the succulent green growth.

Another good pasture mixture for hogs is oats and peas, but the peas are expensive, and if the season is dry give very poor returns.

## ECONOMY OF INDOOR PIG PRODUCTION

Experimental results at Lacombe indicate that pigs confined to sanitary feeding pens inside and fed on a grain ration properly supplemented with feeds high in proteins, minerals substances and vitamins make faster and more economical gains than pigs fed similar feeds under outside conditions in a pasture lot. In a test conducted with spring farrowed Yorkshire pigs housed indoors and fed on a grain ration supplemented with salt, tankage and cod liver oil, gains were seven per cent more rapid and fifteen per cent more economical than with pigs fed outside with access to an annual pasture mixture of oats and rye on the same ration less the cod liver oil. The results of this test would indicate that where sanitary feeding pens are available and rations are properly balanced, there is no need for pasture accommodation for growing and finishing pigs of good bacon type. However, for growing young pigs, gilts and boars for breeding purposes, or for carrying breeding stock, boars and sows, pasture and exercise are very valuable.

## PREPARATION OF FEEDS

### Grinding

A question which is frequently asked is whether or not it pays to grind grain for hogs. The question is of special interest in times of low prices for grain or hogs. In experiments conducted at Lacombe to compare the values of ground and whole grains it was found that ground grain produced considerably better results. The chop-fed pigs made 31 per cent higher daily gains than the lot fed whole grain. In addition to this, the whole grain would not produce the finish required for select bacon hogs and the whole-grain-fed pigs had to be fed chop to finish them. These results would indicate that there is enough saving through grinding the farm-grown grains to make such preparation decidedly profitable. It is considered best to grind wheat to a coarse state, barley medium and oats fine. If wheat is ground too finely it tends to form a sticky mass when swine are chewing it and consequently is not relished by the pigs. The hulls of oats or barley when coarsely ground are not readily eaten by the pigs if they can manage to sort them out.

### Cooking

In the earlier days it was generally regarded that practically all feeds for hogs would be improved by cooking, but experimental work and private experience has shown that the common grains are more economically fed without cooking. There are some feeds such as potatoes that are made more available and are better relished by pigs if cooked. The potatoes should be cooked thoroughly, and the water in which they are cooked should be discarded, as it contains poisonous properties.

### Soaking

The practice of soaking ground grains for growing and fattening pigs is of doubtful value. Generally just as satisfactory results are secured and much labour is saved when the same feeds are given dry or mixed before feeding. There is a little stimulus to milk production in the feeding of slop to brood sows. Wetting the feed may be advisable when a mixture of finely ground grains is fed outside in a windy location, to prevent feed from being blown from the trough and wasted. Also, in very cold weather it may be advisable to feed a warm slop so the hogs will get sufficient water for maximum growth and development.

## THE SELF-FEEDER FOR HOGS

The practice of self-feeding farm animals is coming into more and more general use. Under this system a continuous supply of feed is kept before the animals, enabling them to eat when they want to, and in whatever quantity they desire, thus giving the smaller, weaker pigs a better chance. It is not so well adapted for feeding brood sows or any kind of breeding stock that should be kept on less than a full ration.

Self-feeder for hogs. Note the uniformity in the size of the pigs.

Self feeding hogs saves labour and although it cannot be said to save feed it will produce good pigs, if certain precautionary steps are taken with the type of hogs put on the self feeder and the kinds of feeds used.

Experiments have shown that if short, thick pigs are self-fed they will generally finish shorter and fatter than if they had been hand fed. Other experiments have indicated that if good type bacon pigs, pigs with good length and from bacon type parents, are put on a self-feeder with a balanced ration their resulting carcasses are not adversely affected. If both methods of feeding are possible therefore, the pigs should be sorted as to their adaptability to self feeding. The long, bacon-type pigs which will not be much affected, can be put on the self feeder and the poorer-type pigs which need closer attention, hand fed. On the other hand, if all pigs have to be self-fed recent experiments have indicated that certain changes in the ration should be made.

An experiment conducted at several Universities and Experimental Farms has shown that diluting the self-fed ration with 20 per cent bran after the pigs reach

110 to 120 pounds resulted in less fat and better grades. A more recent experiment at the Dominion Experimental Station, Lacombe, has indicated that when the self-fed ration was diluted with either 10 per cent bran or 10 per cent alfalfa meal all the way, that is, from weaning to market weight, the pigs gained just as rapidly and made better grades than when the same ration undiluted was self-fed or hand fed. The basic grain ration in both experiments was made up of 50 parts of barley 30 of oats and 20 of wheat. To this mixture 15 per cent of a protein-mineral supplement was added for young pigs until they reached from 110 to 120 lb. weight and 8 per cent from this weight until marketed.

Diluting or adding fibre to the self-fed ration for bacon pigs generally results in the pigs eating a little more and taking a little longer to go to market. This, however, is not always the case as in some experiments the pigs receiving the diluted rations gained just as rapidly and as efficiently as any of the other lots. At Lacombe the 20 per cent dilution in the finishing period resulted in a somewhat lower dressing percentage whereas the 10 per cent dilution fed throughout the entire feeding period gave the same dressing percentage as when the pigs were hand fed or self-fed an undiluted ration.

The economics of diluting the self-fed ration will depend, therefore, on the availability and price of bran or alfalfa meal and the reaction of particular pigs to it. In almost all cases it has resulted in leaner, higher grading pigs.

A self-feeder to be entirely satisfactory must be so arranged that the contents will feed into the troughs without any stoppage caused by the blocking of the meal in the hopper. The type of self-feeder used with success for a number of years at Lacombe is provided with a movable board secured with thumb screws which enables the flow of feed to be accurately regulated. It is necessary to regulate this board according to the character of the feed used and to make frequent inspections to see if the feed supply is sufficient and the feeder properly adjusted.

A circular giving detailed plans and specifications for the construction of a self-feeder can be secured free of charge from the nearest Experimental Station or from the Information Service, Department of Agriculture, Ottawa, Ontario.

## FALL PIG PRODUCTION

The ability to raise fall pigs is the final test of the successful hog-feeder. Too late farrowing in the fall, over-crowding and over-feeding, damp quarters, lack of exercise, and the feeding of unbalanced rations are the usual causes of failure with fall litters. Litters farrowed not later than September 15 so as to have the pigs well developed and able to stand cold weather by November, dry, draught-free quarters and suitable supplementary feeds along with the grain, seem to be the keynotes to success in fall pig raising.

### Shelter

The prospect of having to carry fall pigs through a long and severe winter prevents many farmers from breeding their sows for fall litters. While it must be admitted that in Canada there is the possibility of long and severe winters which may cause the fall pigs to make slow and comparatively expensive gains; nevertheless the fact remains that unsatisfactory housing conditions on many farms are to a large extent responsible for the poor gains. The fall pigs must have dry, well bedded quarters which are free from draughts, and well ventilated if they are to make the maximum use of feed consumed.

Inexpensive but very satisfactory equipment for housing and feeding fall litters.

Expensive and elaborate shelters for housing fall pigs are unnecesary. Straw shelters have proved satisfactory on many farms as a temporary measure. Colony houses have made satisfactory shelters for fall pigs at Lacombe. The gable type portable colony house, 6 by 8 feet and 4 feet to the eaves, can be used to advantage, provided the pigs in the colony house are kept dry and well bedded and that the feed trough, or self-feeder is sheltered to some extent from severe winds.

The plan followed at Lacombe is to place the cabins side by side and crate and bank them to the eaves with straw, leaving the fronts open and facing the south. A sheet of sacking or similar material hung over the door breaks the wind and provides suitable protection for the doorway. The feeding lot which adjoins each cabin is large enough to provide space for limited exercise and the feed trough or self-feeder. The 6 by 8 foot colony house will accommodate from eight to ten fall pigs comfortably. If more than eight or ten pigs are together they often pile up during cold weather and those underneath become too warm and damp with steam; then when coming out to feed they suffer from the cold.

A circular giving detailed plans and specifications for the construction of a cheap portable colony house can be secured free of charge from the nearest Experimental Station or from the Information Service, Department of Agriculture, Ottawa, Ontario.

If a permanent piggery is available it will render good service, not only for fall and winter farrowing but for housing fall pigs during the growing and finishing stages. If the walls and ceilings of the building become covered with frost during the cold spells of winter it is advisable to install a small stove that will give off sufficient heat to prevent frost accumulation and dampness.

**Suitable Rations**

When considering the ration to be fed it must be remembered that fall pigs require a plentiful supply of protein and mineral matter in their feed if they are to make satisfactory gains and make the best use of the feed consumed. When skim-milk or buttermilk is scarce the results in fall pig raising may prove disappointing unless a substitute is provided. Tankage or a mixed supplement fed at the rate mentioned on page 37 will keep fall pigs making satisfactory and economical gains. The fall pig can also make use of small amounts of cull potatoes, roots, alfalfa hay and similar feeds which will to some extent offset the lack of a green forage crop.

**Mineral Matter for Fall Pigs**

If properly fed, a young pig will increase its weight almost one hundred times in six months. To produce this very rapid growth all the necessary elements, including minerals must be provided. If minerals are lacking in the ration, the pigs become unthrifty, and growth is much slower. Spring pigs secure the necessary minerals largely from pastures and from eating the freshly rooted soil. Minerals from these sources are not available for fall litters fed mainly in dry lots and pens and consequently an adequate mineral ration should be provided. The mineral deficiencies in a ration can be remedied, however, by feeding supplementary minerals as dealt with under the heading "Mineral Supplements." See page 39.

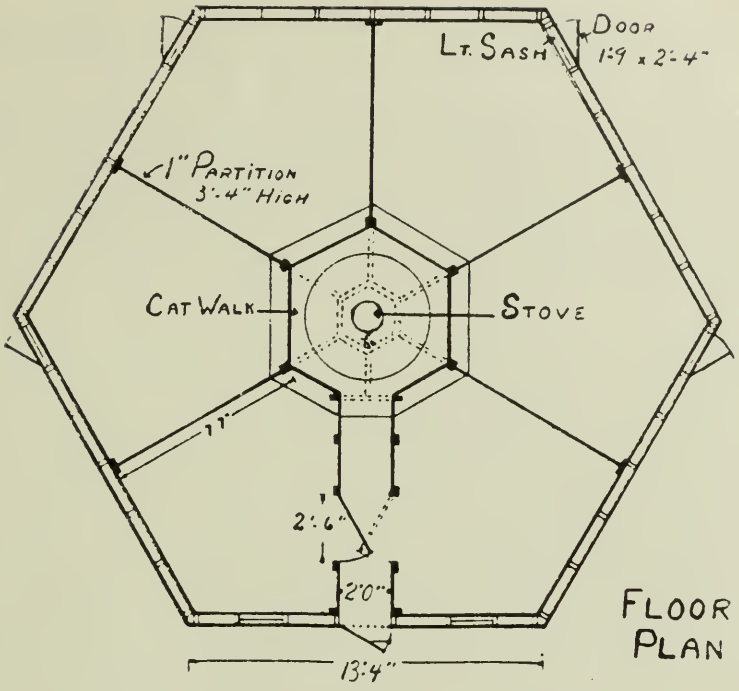
**Fish Oils**

The general unthriftiness which is associated with mineral deficiency, particularly when fall pigs are being fed in confinement during the winter, may not always be due to an actual lack of calcium in the ration. Calcium may be present in an adequate supply but cannot be properly utilized by the animals in the absence of vitamin D, which assists the body to make use of it. This very important vitamin is most easily introduced either through the medium of cod liver oil, pilchard oil or direct sunlight. The importance of direct sunlight in making available to a hog the calcium present in the ration cannot be overestimated. It should be borne in mind, however, that since it is the ultra-violet rays from the sun which, acting on the animal's skin, produce vitamin D, and since these ultra-violet rays are unable to pass through common glass, the sunlight that filters through ordinary windows has lost very largely those properties that make it so effective in preventing troubles like rickets, etc., which are associated with calcium deficiency. The feeding of some form of fish oil at the rate of one teaspoonful per pig daily until they weigh approximately 100 pounds will improve the growth and will assist in preventing crippling in pigs closely confined after weaning. The above rates of feeding are for a standard oil rated at 3,000 units of vitamin A and 400 units of vitamin D per gram. With lower potency oils more would be required. If commercial supplements which contain fish oil are being fed do not feed additional oil.

Front elevation of the pig brooder house.

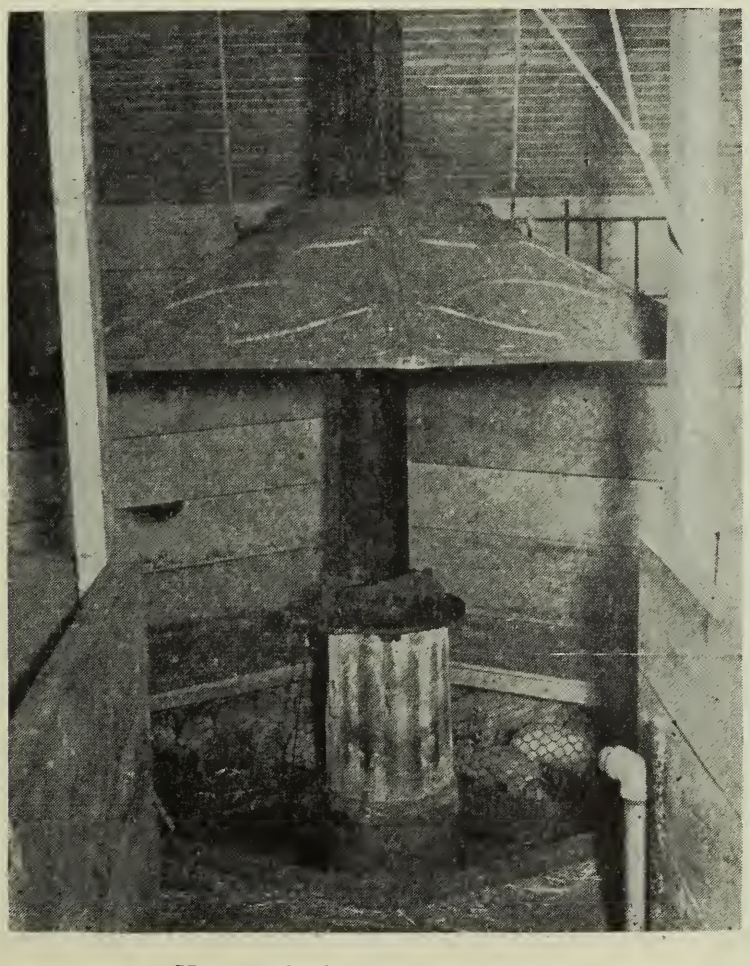
## PIG BROODER HOUSE

The greatest problem before the swine industry in Canada is to level off production throughout the year in order to secure a more equitable distribution




Floor plan for the pig brooder house.

Where farrowing accommodation is inadequate for winter farrowing or where electricity is not available for brooders the pig brooder house may have a place in the equipment necessary for year-round pig raising.



**Hover raised. Note young pigs.**

of marketings. Canadian farmers are marketing the smallest number of hogs when prices are highest, and the largest number when prices are lowest.

Winter farrowing of pigs is virtually a necessity to the uniformity of supply. The four months of low marketing volume in hogs—June, July, August and September—appear to result from lack of farrowing in the four months December to March and the solution appears to lie in a larger number of hog producers aiming to farrow sows during these winter months. Early farrowing requires better than average farrowing quarters for the sows.

The pig brooder is a hexagonal or six-sided building allowing for six farrowing pens approximately 7 feet long, 13 feet 6 inches wide at the outside wall, corner to corner, and 4 feet wide at the central end. In the centre of the house, like the hub of a wheel, is a five-hundred-chick, coal-burning brooder stove with the metal umbrella resting on a platform or cat-walk. Heavy poultry netting is stretched from the inside of the cat-walk down to the floor below the stove to prevent the little pigs getting too close to the stove. The metal umbrella reflects the heat down and under the cat-walk which is the favourite spot for the baby pigs. The stove sits up on a cement block about eight inches off the floor. The principle involved in the success of the brooder house is the small differential in temperature under the hover which attracts the pigs away from the sow to safety. Farmers are invited to visit the Station and inspect this building, and appraise its advantages and disadvantages for themselves.

## NUTRITIONAL DEFICIENCY DISEASES AND PARASITES

Under this heading no attempt will be made to deal with contagious diseases to which hogs are subject. However, an endeavour is made to describe methods of prevention and treatment for the troubles common to swine which, if not combated in time, may eliminate the profit from pig feeding. Most of these troubles may be avoided by taking proper preventive measures.

### Anaemia

One of the common causes of death among suckling pigs, and particularly those that are raised under more or less artificial conditions, is nutritional anaemia. Pigs farrowed in winter and early spring, closely confined to comparatively small pens with a board or concrete floor, and receiving no minerals apart from those contained in the mother's milk, become anaemic and the mortality among them is high. This condition is not seen to any extent in pigs which are born during the late spring and summer months, when they are out in the sunshine and have free access to suitable soil and vegetation.

Some pigs die suddenly while still fat but usually there are symptoms which indicate the presence of anaemia such as lack of vigour and thrift, diarrhoea, paleness of colour, laboured, jerky breathing, wrinkled skin and loss in weight. There is more fat in the region of the jowl than there should be. It will be noticed that anaemic pigs do not run and play as they should, but prefer to lie in the straw most of the time. The age at which this condition is most critical in young pigs that are housed continuously is when they are two to five weeks old and it often affects the fattest and sleekest pigs in a litter. As soon as the little pigs begin to eat food from the trough the danger of anaemia is passed, as they will secure sufficient iron from the grains consumed. However, pigs that have had anaemia and recover do not generally make good gains for a considerable period.

Anaemia in pigs is due to a lack of red corpuscles in the blood which is traceable to a deficiency of iron in the milk supplied by the nursing sow. Feeding iron to the nursing mother will not help, for this does not increase the iron in her milk. The treatment lies in prevention. At Lacombe a practice which has been followed for a number of years with satisfactory results as a means of prevention of loss in early farrowed litters is to place sods approximately one foot square in size in the pens with the sow and pigs each day. Soil contains considerable quantities of iron and the young pigs, in rooting around in the dirt, eat sufficient quantities to make good the shortage of iron. Extremely sandy soil that is very low in iron should not be used. At Lacombe the sods are stored in a suitable place for winter use from areas on which pigs have not been allowed to run, so as to guard against infestation of parasites in the young nursing pigs.

For pigs already affected, or as an additional insurance, the sods may be treated with a solution of ferrous sulphate. This is made by dissolving one teaspoonful of ferrous sulphate in one quart of water, and sprinkling this amount of the solution on each sod with a sprinkling can. One-tenth of a pound of ferrous sulphate dissolved in 100 pounds of skim-milk, which is placed in troughs readily accessible to the young pigs, will offer a practical substitute for sods if the latter are not available.

Another plan is to treat the young pigs on the third, seventh, fourteenth and twenty-first day after birth, giving each pig approximately one third the amount of reduced iron that will cover a ten cent piece. This quantity should be placed well back in the mouth. The iron sticks to the inside of the mouth and is slowly swallowed. If anaemia already exists in a litter the above treatment should be repeated every other day until improvement is apparent. Reduced iron can be purchased at almost any drug store.

Much may also be accomplished in preventing the disease by providing means whereby the young pigs may exercise in sunlight in outside yards and procure needed minerals from the earth whenever the weather permits.

**Rickets**

Especially among the fall pigs, there is a great deal of trouble with what is usually believed to be rheumatism. The symptoms are lameness, and very

Pig suffering from rickets.

obvious soreness at the knee joints and a bowing outward of the thighs. In a great many cases the actual cause of the trouble is rickets, a bone deficiency disease. This disease is caused by either a shortage of, or a lack of the proper proportions of the minerals, calcium (lime) and phosphorus, or by lack of the vitamin D necessary for the assimilation of these minerals. Too close confinement in dark, dreary pens and a diet lacking in the necessary amount of calcium, phosphorus or vitamin D will bring on this disease in pigs. When a normal deposition of calcium and phosphorus does not occur, the growing bones become weak and are readily broken or fractured. Finally, there is a loss of weight and the pigs affected become runts of the worst type.

Rickets may be avoided by feeding a balanced ration and seeing that the pigs receive a fair quota of vitamin D, either from its cheapest source, the sun, or from a substitute such as a standard feeding oil. See page 46.

If this disease has secured a foothold through a lack of mineral matter in the ration, the addition of a simple mineral mixture of two parts bonemeal and one part each of ground limestone and salt at the rate of four per cent of the ration will assist in bringing about a quick recovery. The use of a good grade of white fishmeal and of first-class alfalfa hay will protect pregnant brood sows against vitamin deficiencies and will help to prevent rickets in fall- or winter-born pigs.

**Scours in Small Pigs**

Common scours is an ailment of suckling pigs that gives hog producers considerable trouble and may cause heavy losses in small pigs unless precautions are taken to prevent it. This ailment is most likely to affect winter and early spring-farrowed litters that are closely confined in dark, damp, and chilly buildings. When nursing pigs become chilled, an attack of scours is likely to result. In some instances the udder of the sow becomes affected with mastitis or garget, resulting in milk being secreted that is poisonous for pigs. It usually causes fatal scouring. Infection from germs which are commonly associated with filth is also responsible for digestive disturbances resulting in diarrhoea.

Scouring may also occur as a symptom of some diseases, such as anaemia, enteritis, and parasitism in young growing pigs, in which cases special treatments should be given.

However, over-feeding or sudden changes in the feed of the sow are probably the most important causes of pig scours. At the first sign of scours the sow's feed should be reduced one-half at least, and if she is receiving barley it should immediately be removed from her ration. A light, thin slop of shorts and lime-water makes the most satisfactory diet for the sow until the little pigs are better. It may be necessary to keep the sow on restricted rations for three or four days. Lime-water can be conveniently made by putting a half pound of quicklime into a pail of good water, stirring it thoroughly while slaking is in progress and then allowing the lime to settle. Use the water off the top of the pail without disturbing the lime at the bottom.

It is a good practice to hasten the removal of the irritating substances from the bowels by the use of castor oil. Pigs that are less than one week old should be given a teaspoonful of castor oil. Pigs that are over a week old should receive one tablespoonful. If the diarrhoea persists, small quantities of lime-water may be used to advantage. A tablespoonful administered to each little pig daily should be sufficient to alleviate the inflammation in the intestines.

To prevent scouring, copper sulphate should be used as follows:—add one ounce of copper sulphate (bluestone) to one gallon of water, then feed one part of this solution to eight parts of slop.

The best treatment will be of little value unless the pigs are immediately removed to clean, dry quarters. The entire litter will eventually become infected and may die, if clean straw is not supplied and the pens are not cleaned and disinfected daily. Proper feeding and sanitary measures will be found to be of considerable value in combating this serious menace to the swine industry.

The new Antibiotic A.P.F. (Animal Protein Factor) supplements show considerable promise in controlling scours in young pigs.

**Intestinal Worms**

All classes of domesticated animals harbour numerous kinds of parasites and swine in particular are subject to infestation with very large numbers of these pests. The chief and most harmful parasite affecting swine is the intestinal round worm. The eggs of the worms pass out of infested pigs in the dung and after about three weeks on a moist and relatively warm floor or in soil they are ready to infect young pigs whenever swallowed. The newly hatched worms pass from intestines to the liver and lungs where considerable irritation may occur in *susceptible* pigs. Then they go back again to the intestines where they may interfere materially with the absorption of food. This causes many pigs to have a cough, develop lung congestions and finally pneumonia, and those which survive are apt to be stunted and prove unprofitable feeders. Pigs heavily infested with worms become paunchy, have rough coats, may snuffle and run at the nose and eyes, and show signs of general unthriftiness. Some days pigs do not feed well; other days they cannot get enough. Diarrhoea alternates with constipation in cases where the infestation is heavy. Many cases of thumps in young pigs are caused by the migration of round worms through the lungs. The losses from worms are great enough to make it advisable for the pig raiser to spend considerable time and effort in avoiding them. Fortunately worms only cause these symptoms in pigs that have been rendered susceptible by other conditions. If young pigs are protected against lack of sow's milk, lack of iodine, anaemia and rickets, and if runts are destroyed at birth, the average litter will be highly resistant to the effects of worms. Most of the preceding parts of this bulletin, incidentally, describe good management practices which are the best means of worm control.

Small pigs get the worm eggs from the udder of the sow or from the floor or walls of the pen, probably within a few days after birth. Preventive measures will go a long way in eliminating the trouble, and cleanliness cannot be too strongly recommended. This should start at the time the sow is prepared for farrowing. See page 23 "Farrowing Time."

Keep in mind that successful treatment for worms consists in prevention rather than cure and that the main feature in prevention is sanitation. The conditions under which pigs are commonly kept in many parts of Canada are highly favourable to the spread of parasites which render the pig an easy prey to disease-producing organisms. During the summer season pigs in innumerable instances have the run of wallows and yards fouled from many years use, deep in dust, and dependent for water on drainage pools. It is a common custom to run together pigs of all sizes from scattered sources. The maintenance of sanitary surroundings would go a long way towards reducing pig losses. The pig should be given access at weaning time to a clean lot or pasture which is known to be free from contamination.

At Lacombe every yard and lot in which pigs run to any considerable extent is ploughed and seeded to a temporary pasture crop at least once every year.

*Treatment.*—Worm-seed oil (oil of chenopodium) is recommended as one of the best worm expellants. A recommended method of administration is to mix

the oil of chenopodium with castor oil. Treat pigs at about 80 to 90 days of age. using 20 to 30 drops of oil of chenopodium in two to four ounces of castor oil. The oil should be given with a dose syringe or a tablespoon to pigs individually. Pigs should be fasted for 18 to 24 hours prior to treatment and should not be fed or watered for 3 hours after treatment except for a handful of dry oats given directly after dosing in order to prevent vomiting.

A simple and inexpensive worm treatment which has been found effective at Lacombe is to starve the pigs for 18 to 24 hours, giving water for the first 12 hours but not after that. The following materials are mixed:—

1 teaspoonful turpentine,
1 teaspoonful white gasoline or any gasoline which is free from any lead content,
4 tablespoonfuls raw linseed oil,

per 100 pounds weight of pig. This mixture is stirred into skim-milk and left before the pigs until they drink it. They are starved another three hours; then fed as usual. Pigs which do not improve are dosed again in six days.

A satisfactory treatment for the removal of round worms from the intestines of swine consists in the administration of phenothiazine as powder in the feed. One pound is sufficient to treat 38 growing pigs weighing between 50 and 100 pounds. The cost per pig is approximately six cents.

Dosage— 9 grams per pig weighing 25-50 lb.
12 grams per pig weighing 50-100 lb.
20 grams per pig weighing 100-200 lb.

Dosage in ounces—
1 ounce phenothiazine will treat 4 pigs weighing 25-50 lb.
2 ounces phenothiazine will treat 5 pigs weighing 50-100 lb.
2 ounces phenothiazine will treat 3 pigs weighing 100-200 lb.

Phenothiazine should be thoroughly mixed in a thick grain slop and no starving or physic is necessary. Do not treat many pigs from one trough to make sure that each one will consume the proper amount of the drug. See that the medicated feed is evenly distributed in the feed trough before the pigs are admitted. The weight of the pig should be known and the dose accurately measured and administered as overdosing may lead to loss. Pigs should not be exposed to the sun for 24 hours following treatment with phenothiazine. It can be purchased at or through any drug store.

**Sodium Fluoride Treatment**

One of the most efficient and least expensive methods of treating hogs for worms is the use of sodium fluoride. During the late summer and fall of 1948 the Experimental Station at Lacombe, Alberta, undertook to test the use of this compound. The methods followed in the administration of sodium fluoride were similar to those suggested by the United States Department of Agriculture following extensive experimentation with the compound.

The results obtained were highly satisfactory and demonstrated that this method of treatment is very simple, efficient and safe if used in accordance with the recommendations. It must be recognized that sodium fluoride is a poison and accordingly its use should be carefully controlled.

(1) The recommended amount is one part of sodium fluoride mixed thoroughly with 99 parts by weight of *dry* ground feed (1 lb. per 100 lb.) Feed the affected pigs for one day on this mixture. Calculate the amount of feed the pigs will consume in the day and place that before them in one feed and leave it before the pigs until it is all consumed since the

amount of sodium fluoride contained in that amount of feed constitutes the required dosage. Example, if only ten pounds of feed are needed, use only one tenth (1/10) of a pound of sodium fluoride; if 50 pounds of feed, use ½ lb. sodium fluoride, etc.

| Daily Feed Requirements for Pigs of Different Weights | |
|---|---|
| Wt. of Pigs | Daily Feed Required (grain) per pig. |
| 50 lb. | 2.5 lb. |
| 100 lb. | 4.5 lb. |
| 150 lb. | 6.0 lb. |
| 200 lb. | 7.0 lb. |
| 250 lb. | 7.0 lb. |

(2) Sodium fluoride must not be mixed with feed and left around the premises.

(3) *Do not feed sodium fluoride in slop feed. It dissolves readily in water and pigs could get an overdose by drinking the water from the slop. This overdose could cause death.*

(4) Do not supply water for a few hours after treatment.

(5) Separate the pigs into lots of uniformly sized animals and do not feed too many pigs in the same pen. Otherwise some animals may get too much, others not enough.

(6) It may be advisable to withhold the evening feed on the day preceding treatment in order that the pigs will eat this medicated feed. Slop-fed pigs particularly do not take too readily to the dry feeding which is necessary in this treatment.

The sodium fluoride treatment does an efficient job of ridding affected pigs of worms and it may be used on all feeder pigs and all breeding stock although the treatment of sows later than the third month of gestation or pigs under three months of age is not recommended.

Frequently the first warning a farmer has of round worm infestation in his pigs is the appearance of worms in the faeces. This occurs either because a high resistance has been developed to the worms or because the animal has a high temperature. Since high temperatures accompany several common swine diseases, and since sodium fluoride treatment is exceptionally dangerous in cases of intestinal diseases the necessity of correct diagnosis cannot be overstressed. Sodium fluoride *should not be administered* to obviously sick animals.

Keep in mind that any de-worming process is hard on the pigs and to be avoided if possible; it is important but only as a part of the year-round swine sanitation program. There are no substitutes for rigid swine sanitation and balanced nutrition in the control of roundworms. Rotation of lots, thorough disinfecting of the piggery, washing of the sow before placing her in the disinfected farrowing pen, together with prevention of vitamin, mineral and protein deficiencies are musts if round worms are to be controlled.

## Calendar Showing Dates of Breeding and Farrowing for Sows, Based on 112-Day Gestation Period

| Date bred | Date due | Date bred | Date due | Date bred | Date due | Date bred | Date due | Date bred | Date due | Date bred | Date due | Date bred | Date due | Date bred | Date due | Date bred | Date due | Date bred | Date due | Date bred | Date due | Date bred | Date due |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Jan. | April | Feb. | May | Mar. | June | April | July | May | Aug. | June | Sept. | July | Oct. | Aug. | Nov. | Sept. | Dec. | Oct. | Jan. | Nov. | Feb. | Dec. | Mar. |
| 1 | 23 | 1 | 24 | 1 | 21 | 1 | 22 | 1 | 21 | 1 | 21 | 1 | 21 | 1 | 21 | 1 | 22 | 1 | 21 | 1 | 21 | 1 | 23 |
| 2 | 24 | 2 | 25 | 2 | 22 | 2 | 23 | 2 | 22 | 2 | 22 | 2 | 22 | 2 | 22 | 2 | 23 | 2 | 22 | 2 | 22 | 2 | 24 |
| 3 | 25 | 3 | 26 | 3 | 23 | 3 | 24 | 3 | 23 | 3 | 23 | 3 | 23 | 3 | 23 | 3 | 24 | 3 | 23 | 3 | 23 | 3 | 25 |
| 4 | 26 | 4 | 27 | 4 | 24 | 4 | 25 | 4 | 24 | 4 | 24 | 4 | 24 | 4 | 24 | 4 | 25 | 4 | 24 | 4 | 24 | 4 | 26 |
| 5 | 27 | 5 | 28 | 5 | 25 | 5 | 26 | 5 | 25 | 5 | 25 | 5 | 25 | 5 | 25 | 5 | 26 | 5 | 25 | 5 | 25 | 5 | 27 |
| 6 | 28 | 6 | 29 | 6 | 26 | 6 | 27 | 6 | 26 | 6 | 26 | 6 | 26 | 6 | 26 | 6 | 27 | 6 | 26 | 6 | 26 | 6 | 28 |
| 7 | 29 | 7 | 30 | 7 | 27 | 7 | 28 | 7 | 27 | 7 | 27 | 7 | 27 | 7 | 27 | 7 | 28 | 7 | 27 | 7 | 27 | 7 | 29 |
| 8 | 30 | 8 | 31 | 8 | 28 | 8 | 29 | 8 | 28 | 8 | 28 | 8 | 28 | 8 | 28 | 8 | 29 | 8 | 28 | 8 | 28 | 8 | 30 |
| | | | | 9 | 29 | 9 | 30 | 9 | 29 | 9 | 29 | 9 | 29 | 9 | 29 | 9 | 30 | 9 | 29 | | | 9 | 31 |
| | May | | June | 10 | 30 | 10 | 31 | 10 | 30 | 10 | 30 | 10 | 30 | 10 | 30 | 10 | 31 | 10 | 30 | | Mar. | | |
| 9 | 1 | 9 | 1 | | | | | 11 | 31 | | | 11 | 31 | | | | | 11 | 31 | 9 | 1 | | April |
| 10 | 2 | 10 | 2 | | July | | Aug. | | | | Oct. | | | | Dec. | | Jan. | | | 10 | 2 | 10 | 1 |
| 11 | 3 | 11 | 3 | 11 | 1 | 11 | 1 | | Sept. | 11 | 1 | | Nov. | 11 | 1 | 11 | 1 | | Feb. | 11 | 3 | 11 | 2 |
| 12 | 4 | 12 | 4 | 12 | 2 | 12 | 2 | 12 | 1 | 12 | 2 | 12 | 1 | 12 | 2 | 12 | 2 | 12 | 1 | 12 | 4 | 12 | 3 |
| 13 | 5 | 13 | 5 | 13 | 3 | 13 | 3 | 13 | 2 | 13 | 3 | 13 | 2 | 13 | 3 | 13 | 3 | 13 | 2 | 13 | 5 | 13 | 4 |
| 14 | 6 | 14 | 6 | 14 | 4 | 14 | 4 | 14 | 3 | 14 | 4 | 14 | 3 | 14 | 4 | 14 | 4 | 14 | 3 | 14 | 6 | 14 | 5 |
| 15 | 7 | 15 | 7 | 15 | 5 | 15 | 5 | 15 | 4 | 15 | 5 | 15 | 4 | 15 | 5 | 15 | 5 | 15 | 4 | 15 | 7 | 15 | 6 |
| 16 | 8 | 16 | 8 | 16 | 6 | 16 | 6 | 16 | 5 | 16 | 6 | 16 | 5 | 16 | 6 | 16 | 6 | 16 | 5 | 16 | 8 | 16 | 7 |
| 17 | 9 | 17 | 9 | 17 | 7 | 17 | 7 | 17 | 6 | 17 | 7 | 17 | 6 | 17 | 7 | 17 | 7 | 17 | 6 | 17 | 9 | 17 | 8 |
| 18 | 10 | 18 | 10 | 18 | 8 | 18 | 8 | 18 | 7 | 18 | 8 | 18 | 7 | 18 | 8 | 18 | 8 | 18 | 7 | 18 | 10 | 18 | 9 |
| 19 | 11 | 19 | 11 | 19 | 9 | 19 | 9 | 19 | 8 | 19 | 9 | 19 | 8 | 19 | 9 | 19 | 9 | 19 | 8 | 19 | 11 | 19 | 10 |
| 20 | 12 | 20 | 12 | 20 | 10 | 20 | 10 | 20 | 9 | 20 | 10 | 20 | 9 | 20 | 10 | 20 | 10 | 20 | 9 | 20 | 12 | 20 | 11 |
| 21 | 13 | 21 | 13 | 21 | 11 | 21 | 11 | 21 | 10 | 21 | 11 | 21 | 10 | 21 | 11 | 21 | 11 | 21 | 10 | 21 | 13 | 21 | 12 |
| 22 | 14 | 22 | 14 | 22 | 12 | 22 | 12 | 22 | 11 | 22 | 12 | 22 | 11 | 22 | 12 | 22 | 12 | 22 | 11 | 22 | 14 | 22 | 13 |
| 23 | 15 | 23 | 15 | 23 | 13 | 23 | 13 | 23 | 12 | 23 | 13 | 23 | 12 | 23 | 13 | 23 | 13 | 23 | 12 | 23 | 15 | 23 | 14 |
| 24 | 16 | 24 | 16 | 24 | 14 | 24 | 14 | 24 | 13 | 24 | 14 | 24 | 13 | 24 | 14 | 24 | 14 | 24 | 13 | 24 | 16 | 24 | 15 |
| 25 | 17 | 25 | 17 | 25 | 15 | 25 | 15 | 25 | 14 | 25 | 15 | 25 | 14 | 25 | 15 | 25 | 15 | 25 | 14 | 25 | 17 | 25 | 16 |
| 26 | 18 | 26 | 18 | 26 | 16 | 26 | 16 | 26 | 15 | 26 | 16 | 26 | 15 | 26 | 16 | 26 | 16 | 26 | 15 | 26 | 18 | 26 | 17 |
| 27 | 19 | 27 | 19 | 27 | 17 | 27 | 17 | 27 | 16 | 27 | 17 | 27 | 16 | 27 | 17 | 27 | 17 | 27 | 16 | 27 | 19 | 27 | 18 |
| 28 | 20 | 28 | 20 | 28 | 18 | 28 | 18 | 28 | 17 | 28 | 18 | 28 | 17 | 28 | 18 | 28 | 18 | 28 | 17 | 28 | 20 | 28 | 19 |
| 29 | 21 | | | 29 | 19 | 29 | 19 | 29 | 18 | 29 | 19 | 29 | 18 | 29 | 19 | 29 | 19 | 29 | 18 | 29 | 21 | 29 | 20 |
| 30 | 22 | | | 30 | 20 | 30 | 20 | 30 | 19 | 30 | 20 | 30 | 19 | 30 | 20 | 30 | 20 | 30 | 19 | 30 | 22 | 30 | 21 |
| 31 | 23 | | | 31 | 21 | | | 31 | 20 | | | 31 | 20 | 31 | 21 | | | 31 | 20 | | | 31 | 22 |

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