As during recent years ever increasing at ten to one is being given to the utilisation of pastures by pigs, it seems worth while to examine the intrinsic worth of some of the methods of grazing which are being practised or advocated.

The observations herein relate essentially to farms which consist dominantly of grassland and which engage in pig keeping as a side line designed usually to bring about better returns from dairy by-products. Hence farms on which pig-keeping is the main venture or on which arable cropping is extensive are definitely excluded from consideration.

On the farms which are to be considered the current utilisation of grassland by pigs is of four principal types.

Type 1: Pigs have access to practically no grassland. This practice, though it is dwindling in popularity and has few if any advocates, is still practised by a considerable number.

Type 2: Pigs have continuous access to one relatively large paddock, say 1 to 3 or 4 acres generally according to the number of pigs. This type of utilisation has few advocates, but many practitioners. It is distinctly preferable to Type 1.

Its principal advantages are (1) in a whole year the pigs consume a considerable amount of leafy nutritious grass. (2) It is relatively inexpensive. (3) Given proper fencing the pigs are confined and the danger of damage by wandering pigs is eliminated.

Its main disadvantages are (1) there is comparatively little grass available when it is most needed, i.e., when the supply of dairy products is at a minimum. (2) There is surplus feed available in summer when there is also a plentiful supply of dairy by-products. (3) Eventually the feed available from the pastures usually deteriorates in quality - clovers decrease; grass tends to dominate and to increase in grossness or coarseness.

Type 3: Pigs graze in a series of small paddocks in a manner which has been termed rotational grazing. A published description of the small paddock system written by Mr. H. M. Peirson, an officer of the Waikato Pig-recording Club, indicates that to accommodate a pig-keeping outfit based on 5 to 6 sows two acres of grassland would be subdivided into 10 small paddocks beyond which the pigs would not be allowed to graze. Such a lay-out involves over half a mile of fences and gates together with piping, etc., for the distribution of water and of dairy by-products. This calls for considerable expenditure which, it is claimed, is justified because it enables the pigs to have "as far as possible a fairly continuous supply of grass in the leafy stage."

It seems to be agreed that the small paddock system when operated with suitable equipment facilitates the convenient and systematic feeding of pigs. But the advocates of the small paddock system attribute to it much more important advantages; they claim that in addition it provides markedly wholesome and profitable conditions of pig keeping. On the other hand farmers who are quite
experienced an & relatively successful in pig keeping contend that, they would not employ the small paddock system even if they were offered free of cost the fencing, etc., as entailed in its layout -- a layout which costs the greater part of £100 in providing paddock accommodation to cope with the skim milk from an average herd of 35 to 45 cows.

Such farmers attach much weight to certain disadvantages of the small paddock system.

In the first place over a wide range of conditions in Winter and early Spring when usually leafy feed is particularly needed, the small paddocks are poached or productive of comparatively little feed.

Eventually, and indeed fairly soon, the feed from the small paddocks deteriorates substantially, it becomes less wholesome and less attractive. This is held to be due to unavoidable changes in the composition of the herbage in the small paddocks, changes which are a necessary accompaniment of the enrichment of the soil resulting from the concentrated feeding of milk by-products, etc., to the pigs. How great this enrichment is may be gauged from the fact that for each sow kept in an efficient pig keeping unit of the sort under consideration from 14 to 16 tons of skim milk is fed annually. After allowance is made for fertilising material removed in pig-flesh sold, there remains from the skim milk material of fertilising value equivalent to at least 2 tons of sulphate of ammonia, 17 cwt. of superphosphate and 12 cwt. of 30% potash on 2 acres annually. This is irrespective of any fertilising material introduced by the feeding of meals, grains, etc.

Critics of the small paddock system assert that it would be much better to have such fertilising material distributed as evenly as possible over twelve or twenty acres instead of on 2 acres; distributed over the larger area it would lead to Improvement, whereas concentrated on the smaller area it leads to deterioration. The protagonist of the small paddock system counters by saying "it may be advisable to shift the layout from time to time." It may, be taken that in practice the labour entailed in such a shifting will lead often to its not being done even when advisable.

The change in the composition of the pastures in the small paddocks consequent upon the enrichment of the soil is considered to be of basic importance. The change normally consists of the suppression of clovers and the dominance of grasses, often, ryegrass. Considerable field experience shows that the resultant herbage is not attractive and even, if kept in a short, leafy stage of growth it may be expected to be relatively poor in mineral matter which is of much moment in pig raising. Hence there seems good ground for questioning the claim of advocates of the small paddock system that it brings about the provision of markedly wholesome herbage. The small paddock system is also criticised on the score of cost. Even if it were characterised by all the important advantages claimed for it, which is not admitted by many, it is held that its cost would often make it impracticable.

Some of those who criticise the small paddock system of pig grazing are not simply destructive critics. They propound and practise an alternative system which constitutes the 4th type of pasture utilisation by pigs which is to be considered.
Important features of the 4th type of utilisation are its simplicity and cheapness. Its essential features briefly are:

1. As far as possible the pigs graze over fields of many acres the feed from which is consumed mainly by dairy cattle.

2. Normally the grazing is arranged in such a way as to assure the pigs receiving highly nutritious feed from the grassland—fresh, leafy and satisfactorily rich in clover.

As far as is known no one has evolved and put into practice what he considers a perfect procedure of this type, and so one must be content herein to outline briefly the methods and results of two farmers.

First of these is Mr. J. Lauridsen, Linton.

Last year Mr. Lauridsen kept 5 sows which were fed wholly on grass except for about 2 weeks before farrowing and for 5 to 6 weeks following farrowing, after which the young pigs were weaned and the sows returned to grass alone. When on grass the sows were in some of the best pastures on the farm, the bulk of the feed of which is consumed by the dairy cows. Between farrowing and weaning the sows and litters occupied a convenient high quality pasture of about 1½ acres. When the grass is very short and in scant supply as it is likely to be in late Winter and early Spring the sows are given a limited amount of chou moellier. Actually during the past Winter the sows received practically nothing but what they obtained from the pastures. As far as possible be tween weaning and slaughtering as porkers, the pigs are penned and fed wholly on skim milk, but should the supply of skim milk at any time not be adequate enough to maintain a satisfactory rate of growth in all the growing as distinct from the breeding pigs then some of the growing ones past the weaning stage are given access to pastures to supplement the skim milk.

The results obtained by Mr. Lauridsen seem significant. His sales, almost wholly in the porker stage are equivalent to 55 lb. of pig flesh for every hundred pounds of butterfat produced. This compares interestingly with returns of 54 lb. of pig flesh for every hundred pounds of butterfat cited by Messrs. Phillips and Hale in evidence submitted to the Dairy Commission. In the latter case, the cost of meal, etc., was approximately 5/4d. for each pig sold, whereas in Mr. Lauridsen’s case it was 3/-. Incidentally Mr. Lauridsen sold a greater total number of pigs in the previous season than last year, but details of weights are not available. For the year Mr. Lauridsen sold 15 pigs for each sow kept which is slightly better than the pigs-sold-to-sow ratio in the results cited by Messrs. Phillips and Hale (123 pigs sold from 9 sows.)

A second farmer who employs methods of pasture utilisation by pigs essentially similar to those employed by Mr. Lauridsen obtained the best results noted and features as Farmer B in the published report of Manawatu Pig Recording and Development Club. This farmer produced 48 lb. of pig flesh per 100 lb. of butterfat. His total meal purchases are unusually low relative to the gross returns.

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a way that they grass leafy, nutritious pastures the growth of which is controlled by the dairy cows.

Certain aspects of the procedure of the farmers mentioned seem to call for some comment. The fact that Mr. Lauridsen's sows maintain themselves for 36 to 38 weeks of each year is interesting in relation to recent work by the School of Agriculture of Cambridge University. As the result of this work, Dr. Woodman states in the March, 1934, Journal of the English, Ministry of Agriculture.

"As regards in-pig sows being permitted unrestricted grazing, the herbage so secured (say 12 to 15 lb.) if young grass, should be looked upon as furnishing the equivalent of no more than about 2 lb. of meal; and if more mature grass about 1½ lb. Indeed, in view of the energy expended by the sows in grazing and moving about, it is probably safer to assume that these figures over-state the case for grass."

It is slightly unfortunate that the weight of the in-pig sows is not indicated definitely. Marshall and Halman, also of the Cambridge School of Agriculture, state on page 348 of "Physiology of Farm Animals" (1932) that the bare maintenance ration of pigs of 250 to 350 lb. live weight is the equivalent of 3.6 to 3.8 lb. meal daily. And in Woodman's article already quoted he writes, without questioning:

"A colleague stated recently ...... it has always been found necessary even when grass is abundant to feed at least 4 lb. of meal per head to maintain the animals in good condition."

It seems that the Cambridge workers have satisfied themselves that pigs cannot maintain themselves on pastures alone. Yet, Mr. Lauridsen has demonstrated in practice that they can do so. And Mr. Lauridsen's performance in this regard is not at all unique; other farmers in the Manawatu District and doubtless in other districts have managed sows in a similar way and obtained similarly good results.

The feeding of sows on grass alone between each weaning and farrowing is of great practical moment because it increases the proportion of skim milk available as a diluted concentrate for use in rapid flesh production by the pigs for slaughter.

It has been urged against the feeding of sows on grass alone that while sows so fed might seem satisfactory in condition their litters would be unsatisfactory - weaklings; and pigs dead at birth would be unduly numerous. This has, not been so in several instances which have been investigated. It is conceivable that the use of pastures badly balanced in botanical composition would provide a diet deficient in mineral matter and result in poor litters, but the pastures in the instances under observation were not badly balanced - the proportion of clover ranged from good to very good - and as the pastures were grazed in a distinctly leafy stage, their content of mineral matter would be relatively high.

It may be as well at this stage to distinguish between a practical possibility and sound farm practice; it is held merely that feeding sows on pastures alone has
been shown to be a practical possibility; it by no means follows necessarily that economically it is sound practice to keep cows on pastures alone, but it is not necessarily sound economically to do so.

Mr. Lauridsen's practice of weaning at 5 to 6 weeks is valued by him for assuring a second litter at a timely stage relative to feed supplies. It is interesting to note that H. P. Jacques in Modern Pig Keeping, published in 1930 by Cassell, states: "In Denmark pigs are weaned at four weeks."

One of the purposes behind Mr. Lauridsen's method of weaning, i.e., the adjustment of feed requirements to feed supplies is reflected in his sales. This is illustrated in those of last season which were as follows:

<table>
<thead>
<tr>
<th>Period</th>
<th>Eggs Sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>July-August</td>
<td>2</td>
</tr>
<tr>
<td>Sep-Oct</td>
<td>11</td>
</tr>
<tr>
<td>Nov-Dec</td>
<td>18</td>
</tr>
<tr>
<td>Jan-Feb</td>
<td>21</td>
</tr>
<tr>
<td>Mar-Apr</td>
<td>11</td>
</tr>
<tr>
<td>May-Jun</td>
<td>12</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>75</strong></td>
</tr>
</tbody>
</table>

Underlying such sales is a planned adjustment of feed requirements to feed production on the farm - a type of adjustment about which there seems to be considerable neglect.

Disadvantages Attributed to Extensive Grazing of Pigs.

Three objections commonly are raised to the grazing of pigs on wide range.

1. Damage to pastures is held to result from the "rooting" habit of the pigs. This danger can be obviated by suitable "ringing" of the pigs.

2. It is held that ordinary fencing would be insufficient to keep pigs from roaming widely even on to other farms with consequent damage to crops, etc.

Several farmers whose pigs are kept on wide range affirm definitely that the pigs as a rule do not pass through a reasonably well made and maintained seven-wire fence and observation seems certainly to confirm this view.

3. It is held that pigs on wide range would be subject to tubercular infection from grazing herbage contaminated by tubercular infected cows. On this point the opinion of the Director of the Livestock Division is that there would be some danger of infection in the manner specified, that in practice the danger would not be great; that it would probably be offset by the greater vitality with consequent greater general resistance to disease which would result from the free consumption of leafy herbage of high digestibility and mineral content and that in short the incidence of disease in pigs on wide range would probably be less than in pigs confined to small paddocks.
So far only accepted facts and the experience and opinions of practising farmers have been cited. From these it is considered that the following are the more important conclusions that may be deduced:

(1) The small paddock system of grazing of pigs has specific advantages, but that the merits claimed for it cannot be fully substantiated.

(2) That the small paddock system necessarily leads to unsatisfactory from the nutritional viewpoint.

(3) That the small paddock system in relation to any advantages attaching to it is usually costly and that even were its merits from the grassland viewpoint greater its cost would often make it impracticable.

(4) That excellent results have been obtained in an inexpensive manner by pigs grazing on wide range.

(5) That in pig grazing dry breeding animals have been maintained wholly on the feed gathered in wide grazing with consequent good results.

(6) That wide range grazing avoids to a considerable extent the disadvantages of the small paddock system.

None of the methods of pasture utilisation by pigs which has been observed or alluded to herein is advanced as an ideal one - so far enough comparative study has not been carried to warrant the formation of definite conclusions.