PIG RAISING.

By George F. Gee, H.D.A.

Introduction.

The economic principle underlying pig raising is the production of suitable material which is readily available for consumption, and quickly produced. Allied to this principle are factors which vary according to the country or state in which pig raising is an industry.

In Australia, the primary factor is to supply a market from which the producer attains a monetary gain, whereas in New Guinea the main consideration is local consumption, local sale, and barter. Consumption in the case of plantations and village natives, sale in the case of plantations, and barter in the case of village natives.

Should, however, a pig industry develop beyond the limits of local consumption, sale and barter, then an export trade becomes possible.

The pig occupies an important position in native sociology, being extensively used for consumption and barter, and could become quite a factor in estate economics, providing rations for labour, and material for local sale.

Broadly speaking, the type of pig bred in this Territory could not be regarded as giving satisfactory results where size, early maturity, rapid fattening, &c., are of paramount importance. This paper, therefore, is intended to discuss purely the fundamentals of pig raising and improvement by—

1. Introduction of suitable breed or breeds.
2. Housing.
3. Feeding.

Common diseases of swine also concern the pig raiser, but it is intended to dealt with this aspect in a later article.

It is apparent that points 2 and 3 will have little bearing on native pig raising at the present juncture, it being well known that the introduction of, and adoption by, the native of new ideas must be gradual and extend over a long period of years.

1. Introduction of Suitable Breed or Breeds.

The most suitable breed depends on the types needed and local conditions. In New Guinea the primary requirement is for a breed which will definitely improve the type already in existence, and the following popular breeds may be considered as having the necessary attributes, although the ultimate choice will depend on certain factors correlated with local conditions.

Berkshire.

The Berkshire is one of the oldest breeds in existence and although essentially a pork type is classified in Australia as a dual purpose pig, i.e., suitable for pork or bacon.

The pure strain is black, with a white blaze on the face, four white feet, and a white tip on the tail. The breed is noted for early maturity, hardiness, reliance to thrive under most conditions, high quality of meat produced, and high proportion of popular cuts which it yields. Berkshires are extremely suitable for

cross breeding, transmitting these characteristics such as early maturity, hardiness, &c., for which they are noted, and should produce a most beneficial effect on the New Guinea pig.

The breed are good foragers, tractable, the sows are good mothers and regularly produce good even litters.

Tamworth.

The Tamworth is a direct descendant of the large, wild, red pig of Britain, is said to contain no alien blood, and has been bred pure for 150 years. The pure strain is large, long bodied, long snouted, slab sided, covered with coarse reddish hair on a flesh-coloured skin, free of black spots or hair, essentially a bacon type and proves exceptionally useful in improving the flesh, fining the shoulders, and reducing the jowl of many other breeds.

Tamworths are good foragers, hardy, robust in constitution, particularly free from disease, and prolific breeders; the sows are good suckers, and docile with their litters.

In Australia, this breed is used chiefly for bacon production; especially are the sows crossed with Berkshire boars. The Tamworth is not regarded as such an early maturer as the Berkshire.

Yorkshire.

The Yorkshire, as a breed, is generally divided into two types but is sometimes referred to as Large or Middle White. The breed is claimed to be directly descended from the large white pig of Britain, and improved by the introduction of Chinese blood.

1. *Large Yorkshire.*

The Large Yorkshire is essentially a bacon pig noted for its quality and conformation. Pigs of this breed are sound in conformation, good grazers, prolific breeders, and prepotent. In hot climates, owing to the white skin and hair, they are very susceptible to sunscald, a condition which considerably reduces their value for either pork or bacon.

They give very satisfactory results when used for cross breeding, but the progeny are always white since this is a dominant colour in pigs.

2. *Middle Yorkshire.*

The Middle Yorkshire may be classed as a dual purpose breed, approximating in conformation the Berkshire, and are very good feeders, turning their food to the best advantage. The breed is noted for its prolificacy, the sows being exceptionally good milkers and docile mothers. When used for cross breeding the Middle Yorkshire imparts to the progeny quick growth, good appetite, light offal, and hardy constitution, but like the Large Yorkshire the susceptibility to sunscald is ever present on the light hair and skin.

Any one of the foregoing breeds could be used to successfully improve the New Guinea pig. From the foregoing short descriptions it will be seen that the Tamworth would produce long snouted pigs of bacon conformation, which although larger and infinitely better than the New Guinea pig, would, in the eyes of the native, approximate his own breed, hence the tendency to consider them their own type.

The Yorkshire would produce a progeny, showing a vast improvement in constitution and conformation, but having the predisposition to sunscald on account of the white skin.

The Berkshire, although not so large as the Tamworth, would impart to the native pig desirable qualities such as blocky conformation, shortened snout, and early maturity, without predisposition to sunscald.

That the Berkshire will transmit characteristics of conformation more desirable than the Tamworth, and colour more desirable than the Yorkshire, shows that this breed is worthy of the utmost consideration for improving the New Guinea pig.

2. Housing and Sanitation.

The site for the piggery should be well drained, the contour of the land being considered to provide natural drainage if possible. An open, porous type of soil is to be preferred; stiff clay or soils with an impervious or heavy sub-soil should, where possible, be avoided as they soon become saturated with foecal and urinary matter, &c., which on decomposition creates unhealthy and objectionable conditions.

The aspect of the piggery is important so that full benefit of sunlight will be obtained, sunlight being the cheapest and best of disinfectants, thereby assisting to a great extent in keeping the surroundings in a sanitary condition.

Rising ground provides an ideal site for the piggery but does not infer that it should be placed on top of a hill, fully exposed to all winds, but on a rise where full benefit of the drainage may be obtained.

The roof of the sty should be of sufficient height to permit air movement and easy cleaning, while the stalls should be smooth, as a precaution against body parasites, and built to minimize draughts. The floor should be impervious to moisture.

The sleeping quarters should, for preference, have a wooden floor, at least six inches above ground level, slabs laid on the ground being little better than the earth itself.

Young pigs are very susceptible to dampness and draughts; these factors induce pneumonia which checks the pig's growth and considerably lengthens the fattening period. Even after recovery the pig may become such a bad doer that it can never satisfactorily be fattened.

The healthiest system of pig raising is to graze the pige in paddocks supplied with an open-fronted shelter shed or a mobile house built on skids which may be easily moved from one paddock to another.

Where it is not convenient to run pigs on large areas, a commonly adopted and suitable method is to have alternate small yards. When one yard becomes fouled from constant use it may be turned over, limed for sweetening purposes, and a green or root crop grown. When the crop is ready it may be soiled or the pigs turned in, the yard then vacant being treated in a similar manner.

The planting of shade trees around the piggery and in the yard is important, particularly in the tropics where other forms of shade apart from the open-fronted shelter shed are necessary.

For the maintenance of cleanliness and sanitation it is advisable to supply a wallow for the pigs, rather than condone the use of a nearby hole, creek or water-course, especially in a climate similar to that experienced in New Guinea.

Unfortunately, the usual type of wallow provided is a puddle hole into which is drained all the filth from the surrounding yards. As the pig is forced to seek relief from the heat, and such a wallow being the only one available, it naturally uses it, thereby creating a foul odorous mixture of mud and water and decaying vegetable matter, which provides an ideal spot for the incubation of diseases and pests. The ideal wallow is one built of concrete, which can be cleaned out regularly and kept in a sanitary condition.

Open drains should always be used so as to facilitate cleaning, but if closed drains cannot be avoided then ample provision should be made for frequent and efficient inspection and cleaning.

Water Supply.

It has been definitely proved that pigs cannot make rapid and economic gains unless a plentiful supply of clean fresh water is always available. Henry and Morrison state that the amount of water required by pigs ranges from 12 lb. daily per 100 lb. of animal at weaning time, down to 4 lb. per 100 lb. live weight during fattening period.

The water troughs should be kept clean and no opportunity allowed for the pigs to drink from stagnant pools. The water, in addition to that stored in tanks as a reserve, could be obtained from a creek or stream running through the property, by sinking a well, or by a spear pump. It is advisable not to allow the pigs access to a stream as a common method of carrying infectious parasites and diseases is by means of running water.

Pigs fed on a dry feeding system require more water than those fed on a swill ration. In addition to the drinking water ample provision should be made for a sufficient supply for the cleaning of all utensils used in feeding, also cleaning the houses when necessary.

3. Feeding.

The economic importance of correct feeding in pig production is indicated by the fact that food represents so large a proportion of the total cost of production.

The pig is well adapted for the disposal of many waste foods, but unless such foods are in a sound and wholesome condition serious trouble will result from their use. Pig feeding is unlike feeding other farm stock because the relatively small capacity of the digestive tract, plus the animal's capacity for rapid growth, prevents the use of bulk or roughage and food containing a high fibre content to best advantage. Therefore, special care must be taken to ensure that the ration is complete in all respects. Generally speaking feeds are divided into two classes—

1. *Concentrates.*

Such as the seeds of all plants, and certain materials produced from the by-products of commercial establishments. Concentrates supply a large amount of nutriment in small bulk.

2. *Roughage.*

The fibrous portion of the ration consists of straw, green feed, pastures, and root crops, which give bulky feed.

The function of bulk in a ration is more than the mere furnishing of nutriment, as the stomach has to be comfortably filled to produce a state of contentment. The pig, however, requires less bulky feed than other animals; nevertheless, bulk or roughage plays an important part in profitable pig production.

To the pig raiser, a suitable ration is one that promotes and maintains health and growth, therefore, attention is given in the first instance to—

1. The nitrogenous substances generally termed proteins and used chiefly for development of flesh.

2. The starches, sugars, &c., called carbohydrates, which together with the fats and oils, develop and maintain the supply of body heat and energy.

3. Mineral matter and ash, which is valuable for bone forming and the normal functioning of every organ of the body.

The extent to which a substance or substances is incorporated in a food can affect its value, there being an optimum point where the fibre content or the laxative nature of the ingredients decrease the value of the ration. A ration should be properly balanced in respect to the amount of proteins, fats, and carbohydrates it contains. The ratio existing between the digestible crude protein, and the combined digestible carbohydrates plus fats, is known as the nutritive ration. (This may also be expressed as the ratio between the nitrogenous substances (crude protein) and the non-nitrogenous substances (carbohydrates, i.e., sugars and starches plus fat x 2.25 since fat produces 2.25 times as much heat, on being burned in the body, as do the carbohydrates.))

A ration having excess crude protein in proportion to carbohydrates and fat is said to have a narrow nutritive ratio, and if the reverse, it has a wide nutritive ratio.

Nutritive ratios suitable for different classes of pigs are—

Weaners	1 : 4.0
Fattening pigs	1 : 5.0 to 1 : 5.5
Baconers	1 : 6.0
Sows in milk	1 : 5.0
Stud boars	1 : 5.0

If the ration being fed does not have a nutritive ratio approximating these shown, then the ration is not properly balanced. An unbalanced ration can have serious consequences and may be responsible for paralysis and unthriftiness especially in young pigs, and the habit of a sow eating her young.

Suitable Feeds for Pig-feeding.

Maize is rich in carbohydrates and fats, and when fed alone is an efficient ration, especially for growing pigs, but must be supplemented with a food rich in protein. Pigs fatten well on maize, but if it should constitute more than 50 per cent. of the ration, then there is a tendency for the bone to become soft and the fat yellow.

Peas are rich in protein and useful in balancing grains with a high carbohydrate content. Fed alone they produce a very hard, lean flesh and young pigs do not thrive well. Good results will be obtained if fed with other grains but should never form more than 25-30 per cent. of the ration.

Rice, if fed in large quantities, will produce a flesh inclined to be soft. Owing to the large percentage of husk, rice should not exceed 25-30 per cent. of any ration.

Sorghums have a fattening value equal to 80 per cent. of maize. They produce a flesh inclined to be soft and of inferior quality, therefore should not constitute more than 35-50 per cent. of the ration. As the kernels are hard, grinding or soaking may be necessary for young pigs.

Potatoes consist of approximately 75 per cent. moisture and 25 per cent. dry matter which is mostly starch, so 4 lb. of potatoes are generally considered equivalent to 1 lb of maize. This brings into consideration the question of bulk, and while potatoes may be fed to all classes of pigs, best results will be obtained when the digestive tract of the pig is sufficiently developed to cope with the necessary bulk. One-third of the grain ration may be replaced by potatoes, and this amount gradually increased till two-thirds of the grain ration have been replaced. Usually potatoes are too valuable to be used as pig food, but when available they should always be boiled before feeding.

Among the potatoes may be classed sweet potatoes, yams, mamees, cassava, and taro, some of which, at least, are to be found growing throughout the Territory.

Peanuts can be fed to pigs of all ages, but in time produce a soft oily flesh due to their high oil content (approximately 36 per cent.), therefore should be eliminated from the ration at least six weeks before slaughter.

Meat meal, a protein rich food (40-60 per cent.), a product of the abattoir and meat works, is very valuable in balancing grain rations when milk or milk by-products are not available. Owing to its richness in protein, 10 per cent. of meat meal fed with 90 per cent. of corn is sufficient to balance the ration for pigs over 100 lb. in weight, but younger pigs require a little more.

Cocoa meal cannot be recommended as a pig food and has been known to cause abortion in sows.

Grazing and Suitable Crops.

There is nothing which will solve so many of the problems of profitable pig production as an abundance of good forage. All classes of pigs respond to good pasture, and it is especially valuable in the rations of young pigs because of the nature of the proteins, minerals and vitamines provided. Mature sows require little more than good pasture during the greater part of the gestation period. The amount of food saved by pasture depends on the quality of the crop; good pasture can result in a saving of one-half to three-quarters of the protein supplement. The carrying capacity of pasture or forage crops will depend on yield and palatability and the method of feeding to the pigs. One acre of good forage can usually be depended on to carry 11-12 cwt. of pigs for 120-180 days. In the tropics such crops as maize, sorghums, pumpkins, &c., are not rich in protein and for this reason a protein supplement must form portion of the ration if best results are to be obtained.

The following crops are suitable for growing in New Guinea, and two or more of these could be planted to ensure a continuance of good forage throughout the year: Cowpeas (a particularly valuable legume, rich in nitrogen), pumpkins, maize, millet, sorghum, sweet potatoes and other crops used for native foods.

Preparation of Feeds.

Most feeds require little preparation for pigs. Maize may be fed either shelled, on the cob, or the pigs may be turned into a field and the maize "hogged down". It is not materially improved by grinding; coarsely grinding or cracking small grains may result in a saving of food but the extent of the saving depends on the hardness of the grain and the method of feeding. When hand fed in groups, the pig eats rapidly and a large number of small grains escape being broken by the teeth, thus passing directly through the body. On the other hand, pigs accustomed to eating from a self feeder eat more slowly and masticate their food more completely, so that greater use is made of the food eaten than when hand feeding is practised. Tests indicate a saving of 15-20 per cent. of small grains by grinding, but later observations suggest that with self feeding, grinding saves little, if any, feed.

Soaking is a poor substitute for grinding small grains, and it does not improve the feeding value of maize and cracked grains.

Cooking reduces, rather than increases, the value of most feeds for pigs; hotel and slaughterhouse refuse, soy beans, potatoes and other similar foods being the exceptions. "Swill" feeding is an old practice, but tests have failed to justify its use for growing pigs and there is little evidence to indicate it is necessary even with breed sows.

Creep feeding is a method by which the suckers are fed separately to the sow, and is best carried out by placing across one corner of the pen, a hurdle with vertical openings of sufficient width to admit the suckers, while the sow is excluded. Young pigs commence to eat when three to four weeks old, and a little swill at this stage appears most palatable, while later grain may be added to the ration. This system relieves the sow of a large amount of unnecessary strain, the suckers will be healthier, and an increase of up to 10 lb. per pig may be obtained at weaning time.

Self feeding is a method of feeding in which the grain ration is always available to the pig. The grain is placed in a hopper, so constructed that as the pig eats the grain from the trough, more falls down and a certain amount is always in the trough. This method creates a considerable saving in labour where grains are being fed, and is intended more especially during the growing and fattening stages of pork and bacon production. It is not, however, recommended for breed sows, as they usually only require a limited amount of grain. Once charged with grain, a self feeder cannot be neglected, for the feeder may become blocked by mud carried on the pigs' feet, &c., thus the feed in the trough becomes spoiled, making it unpalatable.

It is essential that all feeding utensils and troughs be kept perfectly clean. Often the feeding trough is a hollow log which is difficult to clean, the food soaking into the crevices, putrifies, and becomes a suitable medium for the growth of germs, which, if taken into the digestive tract, may cause disease or gastro-intestinal derangements, especially in young pigs. Scours may often be traced to incorrect or filthy feeding.

Uneaten food should always be removed from the troughs, which should be cleansed before another feed is given.

Troughs may be of iron, concrete, or wood. Iron troughs are preferable as they may be kept clean with a minimum of trouble, but are fairly expensive. Concrete is good if well made and properly finished off. Acid in the food may attack the concrete causing it to disintegrate, thus the pig will eat lime and sand with his food. Concrete troughs should be given a rendering coat of a thin layer of one part of cement to two parts of fine sand and steeled to give a smooth surface.

A very good and inexpensive trough can be made from sawn timber, provided it is well joined and tarred thoroughly before use, to prevent food soaking in. If built at a slight slope, with a bung at one end, they are easily kept clean. All troughs should be heavy enough to prevent them being overturned, and so constructed to prevent, as far as possible, pigs standing in them.

Infection, and most parasitic diseases, occur through ingestion and if the pig, after tramping or lying in the dung or urine, stands or lies in the trough, the eggs of intestinal worms are conveyed to the food, to set up further infection.

There is no apparent reason why the apple and water, from coco-nuts being cut for copra drying, could not be successfully used in the Territory in pigs' rations as a protein supplement to the grain being fed. Chemical analysis, of both the meat and water, as shown in the following table, confirms this theory, which makes both these products of the coco-nut palm appear to have great possibilities in the founding of a definite pig raising industry in New Guinea. Unfortunately, no record is available of any feeding tests with these products having been carried out in other parts, but the writer hopes that in the near future the Department of Agriculture will have the opportunity of conducting feeding tests with both these products and also other foods.

ANALYSIS OF THE MEAT AND WATER OF COCO-NUTS.

From Sampson on "The Coco-nut Palm".

	In Dry Matter.					
	Moisture.	Nitrogen.	Phosphoric Acid.	Potash.	Lime.	Magnesia.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Water ..	95.04	0.50	0.56	6.60	0.69	0.51
Meat ..	43.46	3.05	0.46	0.80	Trace	0.16