

THE WILD (FERAL) PIGS OF AUSTRALIA : THEIR ORIGIN, DISTRIBUTION AND ECONOMIC IMPORTANCE

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Figs. 1, 7; Plates I-III (Figs. 2-6)

INTRODUCTION

Man in the process of colonizing the various land masses of the world has been responsible for deliberately or accidentally introducing many exotic animals into new environments. When these free living or wild animals originate from domestic stock they are frequently referred to as 'feral', although the word 'maroon', of French origin, is occasionally used.

Zoologists seldom give these feral animals the same attention as native fauna, although they may become of considerable importance either as vermin, as a source of economic wealth or through the destruction of native wild life.

Over a period of several years data relating to the Australian feral pigs has been collected primarily to assess their actual or potential role in the spread of infectious disease. Some information of general interest acquired in the course of that investigation is presented in this paper. The subject of the role of feral pigs in the spread of infection is discussed elsewhere.

SOURCES OF INFORMATION

A request for information was made through the press, scientific and farming journals, government departments and to many individuals. Approximately 700 copies of a circular letter (Pullar 1947) were distributed and about the same number of replies received. The number of reports dealing with the various States were:—Queensland 369, New South Wales 99, Victoria 76, Tasmania 5, South Australia 67, Western Australia 43 and Northern Territory 40.

ORIGIN

In many cases local residents were able to give details regarding the origin of the colonies. These were many and varied and included:—(a) the escape of unrestrained domestic stock, (b) accidental escape of domestic stock when farm buildings were wrecked in storms, trucks damaged or overturned in transit or stock travelling on foot were stampeded, (c) deliberate release of farm stock to found a colony or to improve the conformation of existing feral pigs, (d) deliberate introduction of feral pigs to start a colony. All these factors are still operating, and many new colonies have been established in the last 10-15 years by

the accidental or deliberate release of domestic stock. On Kangaroo Island a few farmers drove their pigs into the bush about 50 years ago, after a religious revivalist persuaded them that they were unclean animals. These pigs appear to have joined the existing feral colony.

In the case of infested areas near the coast, some local residents were of the opinion that they escaped from wrecked vessels. None could supply other than vague information as to the identity of the craft or the approximate year it went ashore. In every case it was possible to obtain a more probable and well authenticated explanation.

Some of the older existing colonies, viz., the greater part of Queensland and the Northern Territory, Upper Darling and Lachlan-Murrumbidgee Junction (N.S.W.), Flinders Island (Tas.), Kangaroo Island (S.A.) and Darling Ranges (W.A.) originated prior to the memory of the oldest residents (*i.e.* before about 1870). In an attempt to discover their origin a search was made of the available published works of naturalists and travellers. The earliest records of feral pigs which we traced were Finch-Hatton (1885) in Queensland on the Dawson River and Dahl (1926) on the Adelaide River (N.T.) and near Broome (W.A.) in 1894-6.

The existence of feral pigs in Australia was not generally recognized by naturalists until comparatively recently as the following specifically stated that they did not exist in this country, Afalo (1896), Semon (1899) and Stead (1937).

To ascertain whether feral pigs existed outside the occupied area in the early colonial days the journals of a number of explorers and navigators were studied in detail, selecting those who in the period immediately prior to the expansion of the pastoral industry (1830 to 1865), passed through country now known to be pig infested. The list of journals studied and the routes followed are given in Fig. 1. Although the writers of these journals usually listed the game observed and shot each day and noted the existence of feral cattle, buffalo, dogs, cats, deer and stray horses, only two references to feral pigs were found. Stokes (1837-43) in the *Beagle* saw a few pigs which had been liberated on an island in Bass Strait, and Jukes (1847) in the *Fly* liberated a boar and a sow on an island near the Queensland coast but shot both them and their progeny a year later.

The true explanation of the origin of these colonies appears to lie in the evolution of pig farming in the early days. Some swine were introduced with the first fleet (1788) and others were brought in on many subsequent occasions. At first they were

EXPLORERS & NAVIGATORS	REFERENCE
<u>EYRE</u> 1839-41 —————	Verbatim account included in Warburton (1875).
<u>FORREST</u> 1863-74 — — — — —	Forrest, J. (1875).—Explorations in Australia. Sampson Low, Marston Low and Searle London.
<u>GREGORYS</u> 1846-61	Gregory, A.C. and Gregory, F.T. (1884).—Journals of Australian Explorations. J.C. Beal. Brisbane.
<u>JARDINES</u> 1864-5	Byerley, F.J. (1867).—Narrative of the Overland Expedition of the Jardine, etc. J.W. Buxton. Brisbane.
<u>JUKES</u> 1842-5 ✓ J	Jukes, J.B. (1847).—Narrative of the Surveying Voyage of H.M.S. Fly, etc. T. & W. Boone. London.
<u>KENNEDY</u> 1848 xxxxxxxxx	Verbatim accounts included in MacGillivray (1852).
<u>LANDSBOROUGH</u> 1862 	Landsborough, W. (1862).—Journal of Landsborough's Expedition from Carpentaria in search of Burke and Wills. Wilson & MacKinnon. Melbourne.
<u>LEICHHARDT</u> 1844-5 — — — —	Leichhardt, L. (1847).—Journal of an Overland Expedition in Australia from Moreton Bay to Port Essington, etc. T. & W. Boone. London.
<u>MACGILLIVRAY</u> 1846-50 ✓ Mc G	MacGillivray, J. (1852).—Narrative of the Voyage of H.M.S. Rattlesnake, etc. T. & W. Boone. London.
<u>MCKINLAY</u> 1862 — — — — —	McKinlay, J. (cir. 1862).—McKinlay's Journal of Exploration in the Interior of Australia, etc. E.F. Bailliere. Melbourne.
<u>MITCHELL</u> 1831-6 —————	Mitchell, T.L. (1839).—Three Expeditions into the Exterior of Eastern Australia, etc. T. & W. Boone. London.
<u>STOKES</u> 1837-43 ✓ S	Stokes, T.L. (1846).—Discoveries in Australia during the Voyage of H.M.S. Beagle, etc. T. & W. Boone. London.
<u>STURT</u> 1828-31 — — — — —	Sturt, C. (1834).—Two Expeditions into the Interior of Australia, etc. Elder Smith & Co. London.
<u>WARBURTON</u> 1872-4 —*—*—*—*—	Warburton, P.E. (1875).—Journey across the Western Interior of Australia. Sampson Low, Marston Low, & Searle. London.

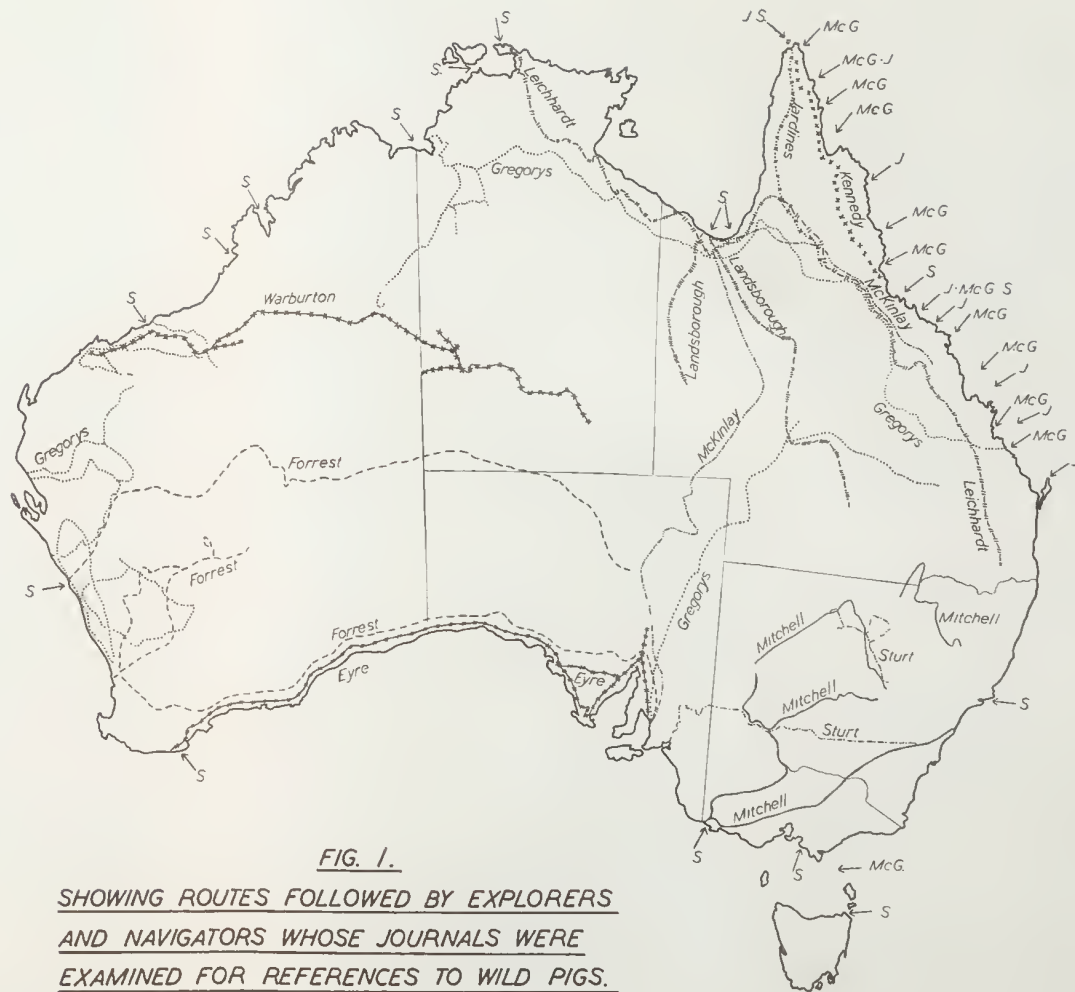


FIG. 1.
SHOWING ROUTES FOLLOWED BY EXPLORERS
AND NAVIGATORS WHOSE JOURNALS WERE
EXAMINED FOR REFERENCES TO WILD PIGS.

permitted to roam at large around the settlement at Sydney Cove and soon became a nuisance, and as early as 17 February 1795 orders were issued that they could be shot if they trespassed on private property (Robertson 1932). Later a pound system was introduced but they continued to cause trouble for another ten years. They were allowed to run in the bush on an island adjacent to Norfolk Island, but later this project was abandoned as the flesh was unpalatable due to the retention of food flavours. On the mainland, as the occupied area extended pigs were carried into the interior and again allowed to roam at large as the following extracts show:—

They (pigs) are allowed to run in the bush during the day, just giving each a cob of maize to bring it home in the evening, if not employing a man to look after them. They feed on grasses, herbs, wild roots and native yams, on the margins of rivers or marshy grounds, and also on frogs, lizzards etc. which come their way. (Cunningham 1827.)

Pigs thrive and breed readily, forming on the whole a valuable stock. They must, however, be allowed to run loose or they will hardly pay. They are, as may be supposed, very troublesome and destructive, and all cultivation must be defended by pig-proof fences Where there is either a marsh or a brush in the neighbourhood of the station they will generally manage to feed themselves, though a little corn night and morning will keep them in better order and prevent their becoming too wild. (Henderson 1851.)

The latter is of particular interest as it is from a book giving general information for the guidance of farmers and other settlers.

Thus until about the middle of the nineteenth century or shortly afterwards pigs were kept under semiferal conditions in the swamps, marshes and other rough country. After about 1865 when the fencing-in of properties became general and the original runs and stations were subdivided, these pigs would lose their identity as the property of particular owners, and would be left untended to become a pest in later years.

EUROPEAN WILD BOARS

European wild pigs were introduced into the Cherokee National Forest, Tennessee, U.S.A., to provide a game animal for hunting (Stegman 1938), and into the Kluitjieskraal plantation in South Africa to control destructive insect larvae (Thomas and Kolbe 1942). We were unable to trace any similar importations into this country.

ASIATIC PIGS

For hundreds of years the so-called 'Malays' from Timor and adjacent islands have collected pearls and beche-de-mer from the northern coast of Australia. Although some would carry pigs as

live cargo, they were seldom on friendly terms with the aborigines and would be unlikely to leave any animals behind at their shore stations.

According to the Historical Records of Australia, Series III, Vol. VI, pp. 711 and 841, twenty pigs were brought from Koepang (Timor) to Melville Island in December 1827. A few months later when that settlement was abandoned, all stock (including the pigs) were transferred to Raffel's Bay on the Coburg Peninsula. When the latter settlement was also abandoned shortly afterwards the fattest stock were slaughtered and salted down for the journey to Sydney. The remainder, including sheep, cattle, pigs, fowls and a pair of horses, were driven into the bush. Thus some of the original Timor pigs may have been included amongst those that were liberated.

During the mass immigration of Chinese in the Gold Rush many could have brought pigs with them. In fact, Dahl (1926) writing in 1894-6 refers to the feral pigs of the Northern Territory as Chinese pigs.

We received one unconfirmed report that some pigs were brought to the Daintree River in Queensland from New Guinea before 1900. In addition, Dr. F. H. S. Roberts, of the Division of Entomology of the Commonwealth Scientific and Industrial Research Organization, advised us that he once found *Gnathostoma hispidum* in a feral pig from the York Peninsular. This parasite is common in pigs in New Guinea but has never been seen in domestic pigs in Australia. Both Roberts and Seddon (1947) have suggested this as indicating the illegal entry of 'knackers' pigs.

It is not possible to solve the problem by examining specimens from feral pigs for features characteristic of Asiatic stock as pigs from Siam or some adjacent country were imported into England between 1750 and 1800 and used to improve the Berkshire, Middle White and possibly other breeds (Lynch 1914, Robinson 1922, and Peirson & Owtran 1945). As both these breeds were very popular in Australia their feral descendants could easily carry these characteristics.

BASS STRAIT SEALERS

Early in the nineteenth century the islands in and near Bass Strait were occupied by a semi-nomadic, polyglot collection of escaped convicts, half-castes and a few free men. These were referred to collectively as 'Sealers' or 'Straitsmen'. They lived by collecting young sea birds, feathers, eggs, fish, seal skins, blubber, etc. They moved from island to island following available

supplies. Jukes (1847) and others noted that they had put pigs, dogs, rabbits and other stock on various islands to breed at will, thus providing a useful addition to the food supply. The existing colonies on French and Kangaroo Islands no doubt originated in this way. The use of old place names such as Hog Bay (Kangaroo Island) is usually taken as an indication that feral pigs have been located there for a considerable time (Hallack 1905 and Martin 1943).

THE CAPTAIN COOK HYPOTHESIS

It is commonly held, particularly in Northern Queensland, that Captain Cook introduced pigs into Australia and in consequence feral pigs are sometimes termed 'Captain Cookers'. The liberation is supposed to have been made at the Endeavour River (near Cooktown) where Cook careened his barque for repairs.

We could not find any evidence to support this hypothesis which is probably a confused version of the deliberate liberations in New Zealand.

An examination of the following copies of Cook's Journal and Log: (a) as edited by Synge (1897); (b) transcribed by Bonwick (1886); and reprinted together with those of several other members of the crew of the Endeavour in The Historical Records of N.S.W., Vol. I, Part I, 1893, provided the following facts which indicate that Cook did not liberate pigs on the mainland of Australia.

1. After Cook had completed his observations of the Transit of Venus he reprovisioned at Tahiti and then sailed west discovering and surveying the coasts of New Zealand and Australia. The provisions from Tahiti included a number of live pigs, but the majority died from exposure before reaching New Zealand and very few were still alive when the *Endeavour* was in Australian waters.
2. No pigs were liberated in New Zealand during the First Voyage. The introductions were made during the Second and Third Voyages.
3. Cook careened his ship at the Endeavour River to repair the damage caused by striking a coral reef six days before. Although this was successful it was found that the pumps were almost useless. Cook was therefore caught in the narrow waters between the Barrier Reef and the mainland, with no knowledge of the location of the few passages to the coral sea or of the route to the nearest known settlement (Java), and dependent on his own supplies and the soundness of his ship for an indefinite period. It is considered

highly improbable that he would discard such valuable cargo as live pigs under such circumstances.

4. The aborigines were at first tolerant but later openly hostile to the white visitors, and towards the end of their stay fired the grass around their camp on two occasions. This was in marked contrast to the usually friendly and tolerant attitude of the Maoris.

Describing one of these fires, Cook stated:—

Luckily at this time we had hardly anything ashore besides the forge and a sow with a litter of young pigs, one of which was scorched to death in the fire. (Synge 1897.)

It is considered unlikely that pigs would be deliberately released under these circumstances and that he would have mentioned any accidental escape.

5. Although the presence of pigs on a number of islands of the South Pacific was noted in the account of the First Voyage, the first mention of the intention to release them in New Zealand occurs early in the account of the Second Voyage. This suggests that the decision was made in England between the two Voyages.
6. During the Second Voyage, sheep, pigs and geese were bought at Capetown with the deliberate intention of liberating them in New Zealand. Unfortunately the majority of these died before reaching that country, and the few survivors were showing signs of malnutrition. These and others obtained from Tahiti were liberated at several points in New Zealand. Cook did not revisit Australia during the Second Voyage.
7. On the Third Voyage, Cook obtained further pigs from Capetown. Although these were liberated chiefly in New Zealand, two were set free at Adventure Bay on the Island of Bruni near Tasmania, which Cook thought was part of the mainland of Australia. Cook had difficulty in restraining the aborigines from killing them, and had no doubt as to their ultimate fate.

He does not mention any previous liberations in Australia, and as this was his only contact with this country after his First Voyage there were no other opportunities for introductions.

ASSOCIATION OF PIGS WITH ABORIGINES

Although it is generally agreed that there is no evidence of aborigine-pig association, no great reliance can be placed on negative evidence. More definite information was supplied by J. W. Chapman, of the Edward River Mission, Queensland, who



FIG. 2

A young, sty-reared, 'Recent Type' feral sow, captured near the Lachlan-Murrumbidgee junction, N.S.W. Note the well-developed mane.



FIG. 3

An 'Early Type' feral boar, shot near Albatross Bay, Cape York, Queensland.

Photograph by D. L. Belcher, Weipa Mission, North Queensland.



FIG. 4

A mature feral sow from the Macquarie Marshes, N.S.W.

Photograph by *Sgt. H. P. Orman, Moree, N.S.W.*



FIG. 5

A mature, sty-reared, 'Recent Type' feral sow captured near the Lachlan-Murrumbidgee junction and used for breeding baconers.

Photograph by *F. J. Thompson, Manangatang, Vic.*

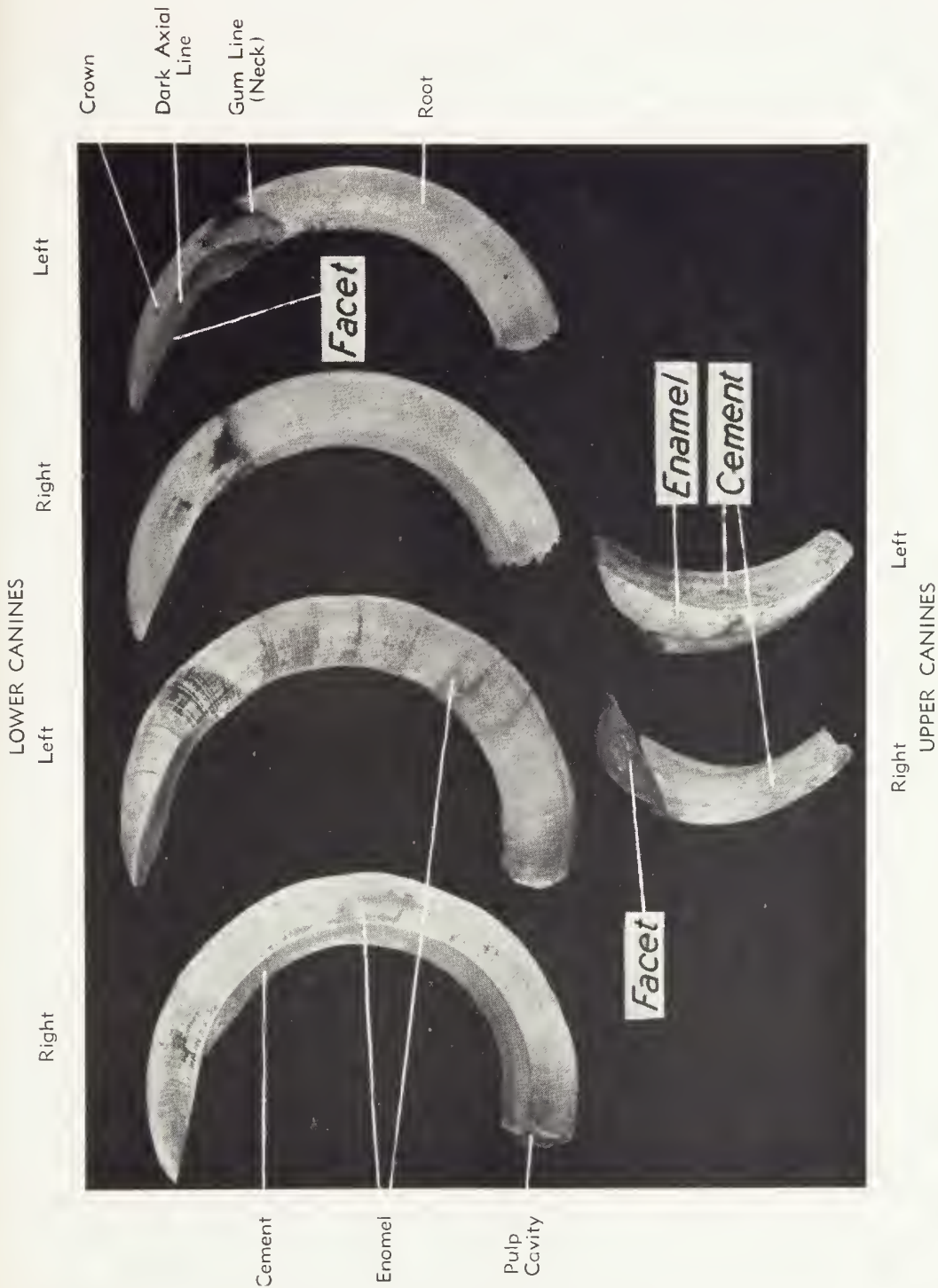


FIG. 6
Tusks from feral boars.

informed us that there is no aboriginal word for pig, and that the natives use the English term 'pig' or some modification such as 'piggy-pig'. This fact was investigated by the staff of the National Museum, Melbourne, who reported that no aboriginal word for pig is listed in any of the vocabularies in their possession.

APPEARANCE

The feral pigs are extremely variable in their appearance although in some areas local types are recognized by the presence of some characteristic colour, marking or other feature.

In general the feral pigs (Figs. 2 to 5) resemble poor type domestic pigs but are lean and muscular with narrow backs, usually referred to as 'slab-sided' or 'razor-backed'. The predominant colour is described as black or black and white, but this includes rusty or reddish blacks and blue-blacks. Other colours are reds, fawns, duns, roans, white and mixed colours. Occasionally agouti coloured animals are seen but they are comparatively rare. White saddles, spots and tiger markings have been noted in a few districts. In some localities whole colonies of white pigs have been observed.

The majority of pigs have large heads with long snouts although short snouted animals are sometimes seen.

The shoulders and neck, particularly in the boars, are well developed. This appears chiefly to be due to the exercise of rooting, as the shoulders and necks of sty-reared feral pigs are not very large.

In some animals there is a mane of long erect bristles extending along the mid-dorsal line for a variable distance from the head (Fig. 2).

Old boars usually have well developed keratinous plaques or shields on their shoulders. The horny layer in this region may be $\frac{3}{4}$ in. (2 cm. thick).

There are two extreme types of feral pigs which may conveniently be designated the 'Early Type' and the 'Recent Type'. There is, however, a large and varied range of intermediate forms. The early type pigs appear to be becoming increasingly scarce, and the recent type the predominant animal.

The early type pig is described as small, black or dark red in colour, with a large head and shoulders, narrow back and very small hind legs. The sows would not weigh more than about 70 lb. and the boars about double that weight (Fig. 3).

The recent type pig resembles a poorly developed modern domestic pig. These are relatively larger, the sows being up to

about 150 lb. and the boars up to 300 lb. or even more. They are commonly black or dark red, but a high proportion are of lighter or mixed colours. White pigs are sometimes observed. The head and shoulders are large and well developed, the back is broader and the disproportion between the fore and hind legs less marked (Figs. 4 and 5.)

It is considered that the pigs of the early type are the direct descendants of those which escaped or were liberated early in the settlement of the continent (70 to 120 years ago), while the recent type pigs are the progeny of recent additions.

Juvenile Striping.

Dorsal longitudinal stripes in shades of brown and fawn are sometimes seen in the suckers, but they disappear as they grow older.

Unfortunately this subject was not specifically included in the list of questions asked, although it is now realized that it might provide information regarding the possible introduction of Pacific Island pigs into this country. Dorsal stripes in the young are rarely seen in the domestic breeds in this country, although it is the normal colour in New Guinea and the adjacent islands.

Some observers volunteered the information that they had noted stripes in the young local pigs. All but two of these reports referred to the area between Cooktown and Cairns (North Queensland). The two exceptions were of a general nature and did not apply to any particular district.

Tusks (Fig. 6)

The canine teeth or tusks of the male are large, well developed, and project out of the mouth and act as formidable weapons of offence.

The lower canines are 150-300 mm. (5-12 inches) long, triangular in cross-section with sides 16-25 mm. ($\frac{5}{8}$ -1 inch) wide. They are curved upward, outward and backward, forming an arc of a circle slightly less than 60 mm. (2 $\frac{3}{8}$ inches) in diameter. The lesser curvature is covered with yellowish cement and the other two with creamy-white enamel. All surfaces are marked by longitudinal and transverse ridges. Approximately four-fifths of the tooth is embedded in the lower jaw. The canine teeth grow continuously during life as they have permanent pulp cavities.

The upper canines are considerably shorter, being about 90 mm. (3 $\frac{1}{2}$ inches) long and 25 mm. (1 inch) wide. They are approximately oblong in cross section, and curve outward and backward

in a horizontal plane. The greater curvature is covered with enamel, and the remaining surfaces with cement.

The function of the upper canines is to act as whetstones to the lower teeth, keeping them sharp and worn down to the correct length. By this means the lower tusks are provided with pointed, razor-sharp facets 35-70 mm. ($1\frac{1}{2}$ - $2\frac{3}{4}$ inches long).

If an upper canine is accidentally or deliberately removed, the corresponding lower one will continue to grow in a complete circle, ultimately re-entering the mandible. According to Troughton (1943) the natives of New Guinea sometimes deliberately remove the upper canines to produce these overdeveloped teeth for bangles. On the mainland, tusks are frequently collected and polished for ornamental purposes.

During the course of this investigation a number of polished and natural tusks were made available for detailed examination. These consisted of 23 pairs of lower canines and a pair of upper canines. Seventeen lower pairs and the single upper pair were collected in Queensland by Mr. E. J. Shelton, of the Queensland Department of Agriculture and Stock. One pair of lower canines was collected from Southern New South Wales by Mr. A. Murdoch of Melbourne, and the remaining four by Mr. K. C. Edwards from Kangaroo Island.

The only reasonably constant dimension was the radius of the greater curvature of the lower tusks. In the series of 23 pairs examined the range was 48 to 64 mm., the mean 57.5 mm. and the standard error ± 1.2 . There was so little variation in this measurement that it may be of value in the classification of the genus *Sus*. Unfortunately this possibility cannot be explored as very little suitable material is available in Australia.

GEOGRAPHICAL DISTRIBUTION

(Fig. 7)

The position is far from static, as the pigs continually infiltrate into new suitable areas, and at the same time are slowly being eliminated by the advance of closer settlement. For this reason, the present distribution can only be described in general terms.

The pigs are not evenly scattered throughout the infested areas, but are located in colonies on water courses, in swamps, and in rough and heavily timbered country. In the north-eastern part of the continent, the colonies are regarded as contiguous, as they lie mainly within the normal wandering range (10-20 miles) or along natural lines for expansion, such as permanent or occasional water-courses, coastal swamps, etc.



FIG. 7.
GEOGRAPHICAL DISTRIBUTION OF WILD FERAL PIGS IN
AUSTRALIA

INFESTED AREAS

Curtis Is.

* Small numbers from adjacent areas have been seen in favourable seasons.

Some difficulty was experienced in collating the reports as a number of observers referred to former colonies as though they still existed, although they admitted that they had not seen them for years.

In general, the present distribution is:—

Queensland

The pig infested area covers the greater part of the State except the low rainfall region to the south-west, the closely settled portion in the south-east and the relatively treeless Mitchell grass plains on the western slopes of the coastal ranges. Isolated colonies occur near the coast on the Burrum River, Mary River, Wide Bay area and Brisbane River (near Yabba). Colonies are also found on the following islands: Prince of Wales, Hammond, Curtis, Facing and Moreton.

New South Wales

The pig infested area extends from Queensland into New South Wales. This includes the Darling River to as far south as Tilpa and its tributaries from the Warrego to the Bogan. In favourable seasons pigs may be found on the Paroo, having followed the flood water down from Queensland.

In addition, isolated colonies are located in the swamps around the Lachlan-Murrumbidgee junction, the Nandewar Ranges, Campbell's Island (on the Murray River near Barham), Morisset (near Newcastle) and Bago (in the State Forest near Tumbarumba).

Victoria

There has been a number of colonies of feral pigs in Victoria, but the last one, which was located on the headwaters of the Gellibrand River in the Otway Forest, was destroyed by the bush fires of 1938-39.

In favourable seasons a few wandering pigs, probably from the colony near Barham, have been seen as far south as Macorna.

Tasmania

There is a colony on Flinders Island, but feral pigs do not appear to have become established on the main island.

South Australia

The only existing colony is located on the western end of Kangaroo Island.

Western Australia

There is a number of isolated colonies which are located around the mouth of the Forrest River and the coastal marshes to the north, the mouth of the Isdel River, the upper reaches of the Fitzroy River, the DeGrey River and its tributary the Shaw River, the coast near Northampton, the mouth of the Hill River, the Wooroloo Brook (near the Avon River), the Darling Ranges in the south-west, and part of the adjacent coastal swamps.

Northern Territory

The records are incomplete, as large areas are uninhabited or set aside as Aboriginal Reserves. Known existing colonies are located on the coast and rivers of Eastern Arnhem Land and the Coburg Peninsula from the King River to the Daly River, and the swamps near Maranboy.

DAMAGE AND ECONOMIC LOSS DUE TO PIGS

Feral pigs are responsible for considerable economic loss by destroying stacks of fodder, vegetable, cereal and sugar cane crops, breaching vermin-proof fences, fouling water holes and rooting up tracks, embankments of tanks and drains.

They destroy enormous numbers of small terrestrial animals and by eating the eggs have almost exterminated ground nesting birds in some areas.

It is generally held that pigs kill large numbers of new-born domestic animals, particularly lambs, and that they will attack weak stock trapped in mud-holes during dry spells. The position is not absolutely clear as reliable observers expressed some doubt regarding pigs killing such large animals.

It is well established that they eat carrion, but it has been noted both here and in New Zealand (Mackintosh 1941) that they frequently leave carcasses until they have ripened for a few days. They have been seen eating foetal membranes from lambing ewes. On the other hand, none of our informants stated that they had ever seen a pig kill a live lamb or other domestic animal.

Alternative explanations which should be considered are: (1) the pigs eat the lambs and other new-born animals immediately they are dropped and before they begin making active movements, or (2) as with the Norwegian rat (*Rattus norvegicus*) which is supposed to kill chickens and ducklings, only a small number of the older and larger individuals become predatory, and the whole species is blamed for their depredations. One report supported

this view by stating that if the older boars and sows are killed off there is very little trouble with lambing ewes.

VALUE AND EXPLOITATION

Feral pigs have a definite economic value. They are highly regarded as an alternative source of meat in sheep and cattle country. In fact, many station owners allow a few to remain on their properties for that purpose. Others deliberately release well-bred boars to improve the feral stock.

In and near pig country a number of farmers depend on the feral pigs for replenishing their stock for fattening. Some even cross them with well-bred boars (Fig. 5).

Pigs kill and eat large numbers of small and medium sized snakes, and in some districts have been responsible for their virtual extinction. Pigs are not naturally immune to snake-bite, but depend on a tough, resistant skin, a thick layer of subcutaneous fat and, like the mongoose, on relatively quicker muscular movements (Henry 1934).

Feral pigs by destroying carrion also play an important role in blowfly control. In fact some farmers encourage their presence for that reason.

BIONOMICS

Habits

Feral pigs are mainly nocturnal, hiding under cover, preferably near water, during the day and appearing in the open late in the afternoon.

They appear to be gregarious, as the colonies include both sexes and all ages, although they usually forage singly or in small groups.

They generally avoid human contact, but old males become very savage and have been known to attack dismounted men without provocation and have run under horses and disembowelled them with a slash of their tusks.

Diet

Pigs are omnivorous and their diet is extremely varied, in fact they consume anything edible that is within their reach. Under natural conditions the diet includes leaves, fruits and roots of edible plants, grubs, beetles, shellfish and other small animals.

Carrion appears to form a large part of their diet, and decaying carcasses are soon demolished in pig infested country. After a fire the pigs move in to devour the dead birds and animals. Where trapping operations are in progress the pigs follow up the lines, eating the skinned carcasses and even taking the game from the traps.

Habitat

Feral pigs are found in all types of country including coastal sand dunes, marshes and mangrove swamps, open and dense forest, scrub and savannah lands, inland swamps, rivers and occasional water-courses, rough mountains and open plains. In all localities the animals have three requirements—water, an assured food supply, and cover in which to hide during the day.

Movement

Although they tend to remain near their usual habitat, their daily foraging range is up to 5 or 10 miles. Odd animals (usually mature boars) have been noted up to 20 miles from the nearest known colony.

There is some evidence of seasonal movement, particularly in those localities where they are restricted to the vicinity of permanent waterholes during the dry season. The advent of the wet season or periodical floods enable them to range over a much larger area.

They also tend to concentrate in areas where food is plentiful, following the ripening of natural crops of tubers and fruits and the chance accumulation of carrion during droughts or after bush fires.

Nests

Information on this subject is very scanty. It appears that under certain conditions they build large, well-camouflaged nests up to six or eight feet in diameter. These structures consist of interlaced branches, fern fronds and grass. It has been suggested that they are mainly constructed by sows to hide and protect their litters. Reports of nest building were received from western and southern Queensland, northern New South Wales, Kangaroo Island, and the Darling Ranges (in Western Australia).

Nest building by *Sus scrofa* and other pigs has been noted in other parts of the world.

CONTROL

Natural Enemies

The most important natural enemy of the feral pig is white man, and several isolated colonies have been wiped out entirely by human agency.

According to a number of reports the aborigines did not kill many pigs until about 1900, but they now eat large numbers and in some districts have also exterminated them.

There are few predatory animals in Australia which can kill an adult pig. The only native marsupials large enough to attack small or medium sized animals are the Tasmanian Wolf (*Thylacinus cynocephalus*) and the Tasmanian Devil (*Sarcophilus harrisii*), neither of which is found in pig infested country.

In the tropics the crocodile (*Crocodylus porosus*) and the python (*Python amethystinus*) are important natural enemies, but their geographical distribution is restricted.

The wedge-tailed eagle (*Uroaëtus audax*), dingo (*Canis dingo*), fox (*Vulpes vulpes*) and the feral dog kill numbers of suckers, but are too small to successfully attack adult pigs.

Other Means

Apart from accidental or natural phenomena such as bush fires or floods, control has largely been by hunting and poisoning. In the past it was left to individual effort, at times stimulated by the payment of bonuses or 'scalp money' by property owners, public companies (such as sugar mills) and municipalities. Records of the payment of bonuses go back at least as far as 1870.

Recently in Queensland the payment of a standard bonus of two shillings has been organized over a large area, including almost all that part west of the coastal range. Since pigs were gazetted as 'vermin' under "The Stock Routes and Rural Lands Protection Acts" on the 7th July 1945 the annual number destroyed has varied between 23,496 and 34,512, which is equal to approximately twenty *per cent* of the total number of domestic pigs slaughtered in the whole State.

The results so far appear to be very satisfactory, but it is too soon to assess them accurately.

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SUMMARY

1. The wild pigs of Australia originated from escaped domestic stock and should therefore be termed feral pigs.
2. There is no evidence that pigs existed in Australia prior to its occupation by white men.
3. In the early colonial days pigs were kept under semi-feral conditions in swamps, marshes, etc., or were liberated on coastal islands.
4. There is no evidence of the deliberate introduction of European Wild Boars.
5. Some Asiatic pigs may have been introduced prior to and during the Gold Rush, and there is some evidence of the importation of pigs from New Guinea into North Queensland.
6. From the available information it appears highly improbable that Captain Cook liberated pigs in Australia.
7. The appearance of the feral pigs varies considerably, but in general they are small, narrow-bodied and rough with big heads and shoulders and small hindquarters. A large proportion of the pigs are black, although other colours are seen.
8. The radius of the greater curvature of the lower canines is remarkably constant (mean 57.5 ± 1.2 mm.) and may be of some value for the classification of the genus *Sus*.
9. A large part of Queensland and northern New South Wales is infested with pigs. Isolated colonies are also present in Queensland, New South Wales and Western Australia, and on a number of coastal islands including Kangaroo and Flinders Islands.
10. Feral pigs do considerable damage to crops, fencing, water-works and drains, stacked fodder, native fauna, etc. They also kill large numbers of lambs.
11. Feral pigs have some economic value in that they provide a useful alternative source of meat in sheep and cattle country, and are used as a source of store stock by some farmers. They are important scavengers of carrion, and thus indirectly reduce the blowfly population.
12. Habits, diet, habitat and range of movement are briefly described.
13. Control has been attempted by hunting, poisoning and the payment of bonuses for their destruction.

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