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NOTES ON THE EXTERNALS OF THE POTOROO, POTOROUS TRIDACTYLUS (KERR).

By

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(With 1 plate and 9 figures.)

ABSTRACT

This paper is the sixth describing features of the biology of the potoroo. The externals and the body proportions of the species are described and the ratio of pes-shank is compared with that of two other Tasmanian macropods. The ratio in each species is closely similar. The length of the hand in relation to the length of forelimb of *Potorous tridactylus* is slightly greater than in either *Wallabia rufogrisea* or *Thylogale billardieri*. The population can be divided by weight into the adult and subadult groups from the histograms given.

The Potoroo, *Potorous tridactylus* (Kerr) is common in many parts of Tasmania, but it is still a comparatively little known marsupial. The species was once plentiful on the mainland of Australia but has since become very rare, Marlow (1958) recording that the last two specimens of this species known to have been caught in New South Wales were taken in 1913 and 1958 respectivly. *Potorous tridactylus* once inhabited coastal South Australia but Jones (1924) noted that the species was to be considered extinct in that State. Beyond casting doubts as to whether the species ever existed in Central Australia, Finlayson (1958) had little to say about *Potorous*.

This species was selected some years ago as one suitable for investigation and three papers have already appeared on the general biology of the species (Guiler, 1957, 1958 and 1960).

Potorous trdactylus inhabits the coastal scrub region in Australia and it is distributed in Tasmania from sea level to 3,500 feet, living in regions of thick scrub or forest, usually with some water, but is absent from plains and open forest.

Jones (1924) briefly described the externals of *Potorous* but it is not clear from his description whether he was using Australian or Tasmanian material. He was using a small number of specimens and gave measurements of two specimens of which one was Tasmanian in origin. It is certain that he did not use South Australian animals.

There are few detailed descriptions of the externals of any Tasmanian marsupials and in view of the rarity of this species on the mainland of Australia it is appropriate that such a description be on record. A total of 122 animals has been used in the preparation of this paper.

Potorous tridactylus is generally assigned to the subfamily Potoroinae of the family Macropodidae, the other two subfamilies being the Hypsiprymnodontinae and the Macropodinae.

COLOUR

Potoroos are usually brown in colour ranging from a lightish shade to a dark chestnut. The most frequent variety is a rich dark brown. The colour of each individual hair is dark in the proximal portion but with a light fawn coloured distal region. This gives a flecked appearance to the animal when it is viewed closely.

The suborbital regions are a lighter shade than the general colour of the body and the hairs near the rhinarium are dark. Some individuals have a very thin dark line running up the snout from the rhinarium to the ears. There is a lighter coloured area situated on the face above the vibrissae and below the darker dorsal surface of the snout.

The edges of the ears are darker in colour than the remainder of general body surface. The ears are hairy on the outer surface but are only sparsely covered by hair on the inner surface.

The central surface is a grey to light fawn colour and this grades into the general body colour on the flanks. The pouch entrance in the female is stained yellow, but this may not be observed when the sphincter is tightly closed.

The proximal quarter of the tail is of the general body colour but this grades into a dark brown or, in some individuals, black. The end of the tail frequently has white hairs usually associated with a non-pigmented tip. This is a very variable feature and will be discussed more fully below.

Albinos and melanics are not known in *Potorous tridactylus* though dark coloured animals are common in the more humid parts of Tasmania.

Pouch young are very dark brown in colour and juvenile individuals are always darker than the adults. The animal gradually becomes a lighter shade during its early post pouch life and animals of up to two years of age can be identified by their colour. Old animals of greater age than 4 years have a large number of grey brown hairs, especially the males, and some six year old animals have been caught which are a grizzled grey colour.

The feet are hairy on the upper surface and are the same colour as the general body surface.

TAIL

The tail exhibits considerable variation in the colouring of the tip, the end of which usually bears white hairs and these are usually underlain proximally by darkly pigmented skin. The distal portion

is often non-pigmented and appears as a pinkish region. In only one animal in 89 examined on Mt. Nelson, near Hobart, did the non-pigmented area reach as far as the proximal end of the white hairs. I have not found an animal in which the non-pigmented region is longer than the white hair covered portion. One animal had a ring of dark pigment in the non-pigment portion.

Some animals do not have either a white tip or non-pigmented region to the tail. The presence or absence of a white tip has little apparent significance. Some populations may have a high percentage of all black tails whereas others have no black tailed individuals. The examination of 147 animals showed that there was no sexual difference in the possession of this character and that the proportion of individuals possessing the feature varied from time to time in the one population.

The length of the white tip plotted against the length of the non-pigmented area (Fig. 1) shows that there is, in general, a relationship between the length of the tip and the length of the non-pigmented area i.e. those animals with long white tips tend to have a long part without pigment, but there is no sexual difference in the proportion. There are some strong deviations from the normal relationship, particularly in females having a white tip about 45 mm. in length. The largest tips were possessed by females and the smallest by males but this may be fortuituous due to the composition of the sample.

The length of the white tip and unpigmented region shows no relationship to the length of the tail (Fig. 2). This is true of both sexes.

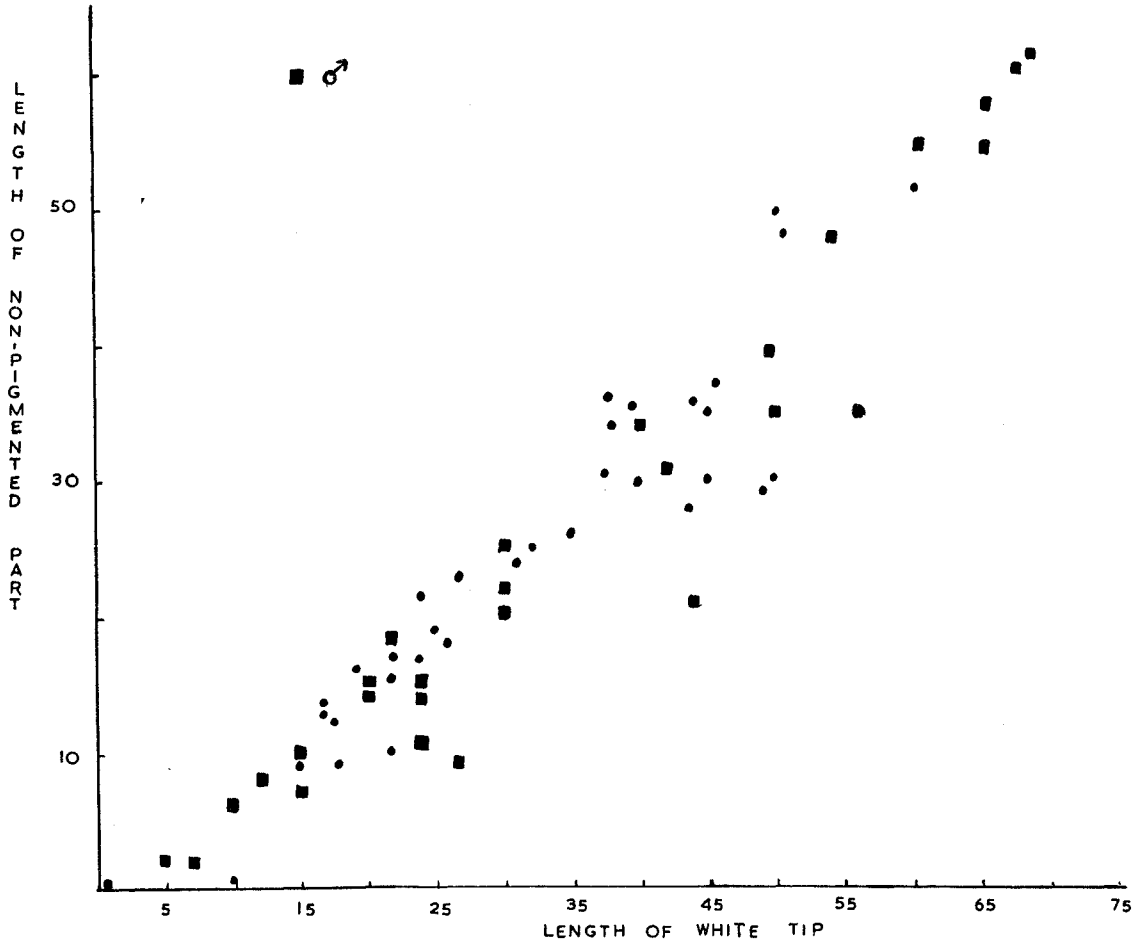

FIG 1.—The length of the white tip on the tail of male and female *Potorous tridactylus* in relation to the length of the non-pigmented area of the tail (in cms.).

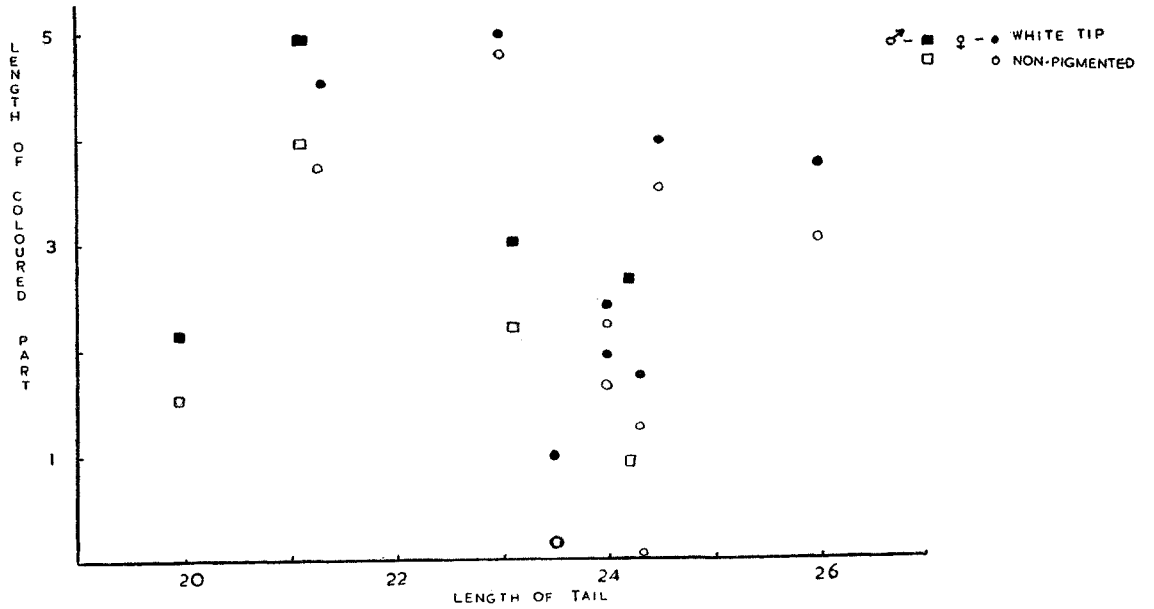

FIG. 2.—The length of the white tip in relation to the length of the tail (in cms.) in male and female *Potorous tridactylus*.

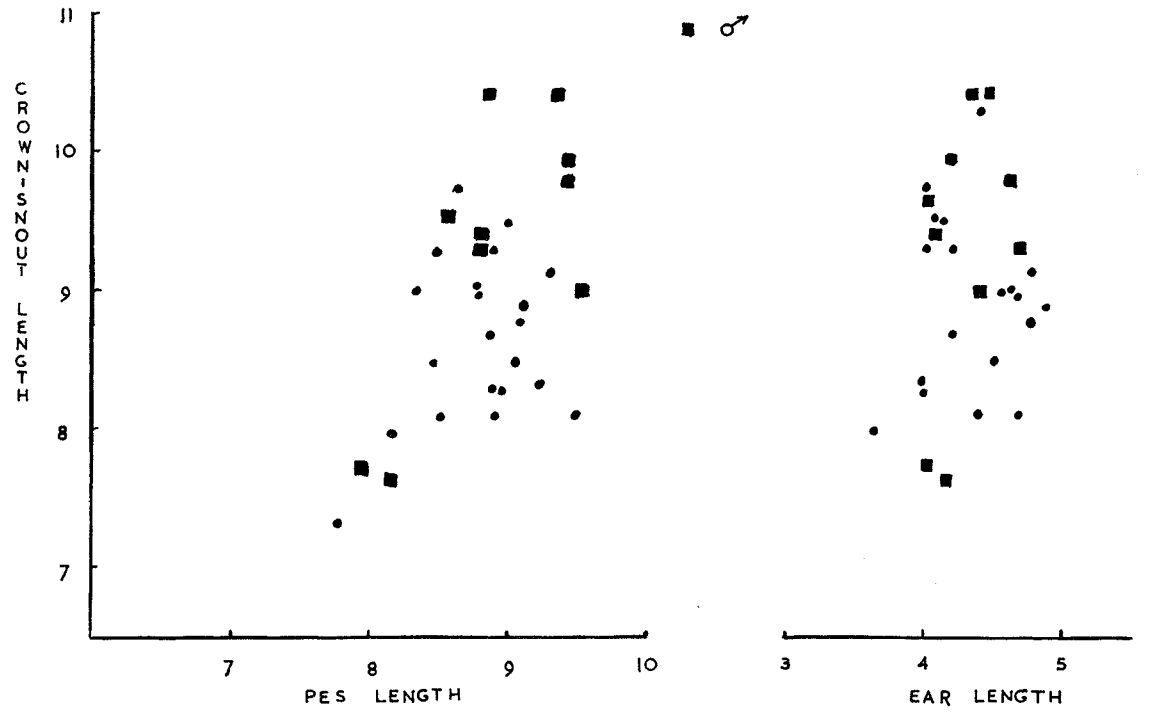

FIG. Length of head (in cms.) in relation to the length of the foot and the length of ear in *Potorous tridactylus*.

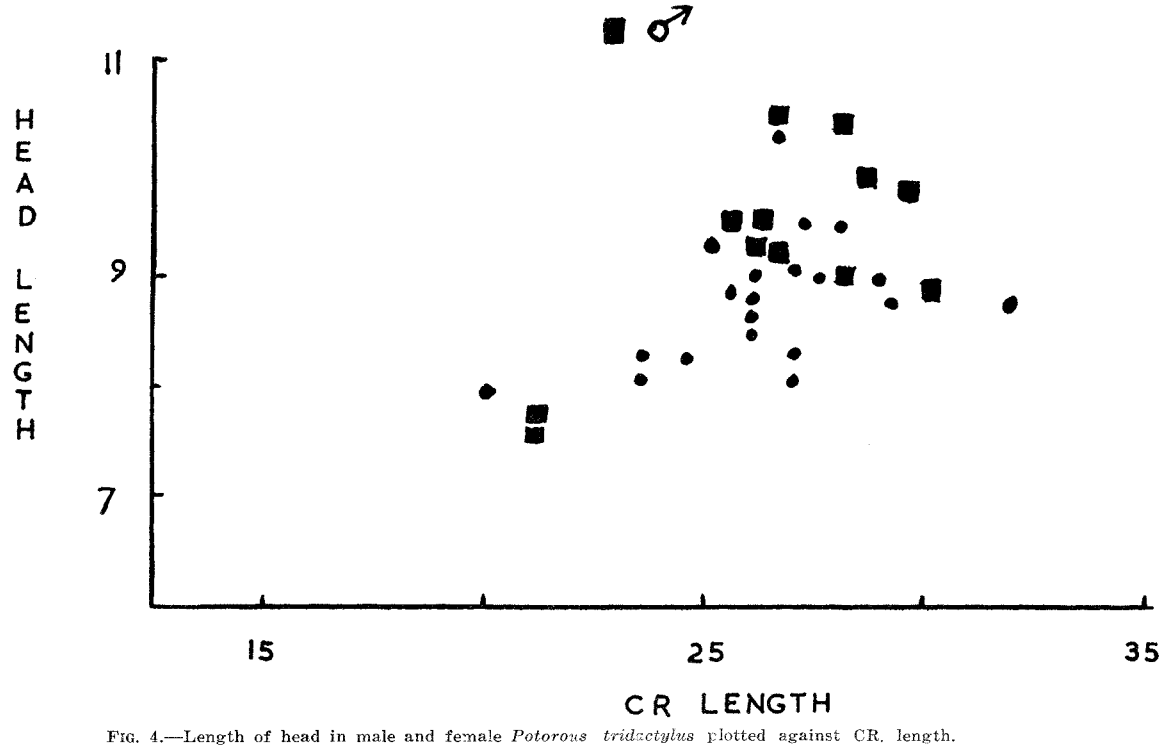

FIG. 4.—Length of head in male and female *Potorous tridactylus* plotted against CR. length.

FOOT

The foot of the Potoroo resembles that of the other macropods and has two syndactyl toes. The sole of the foot is naked and granular. The digital formula is 4>5>2.3.

MANUS

The manus possesses five digits but differs from that of the members of the subfamily Macropodinae in that the digits are of unequal length with the claws of the median digits greatly elongated. These claws are used in digging for roots and other food. The palms are naked and granular. This digital formula is 3>4>2>1>5.

VIBRISSAE

The Potoroo has well developed facial vibrissae. The vibrissae of the Potoroo were described in detail by Lyne (1959), and only general comments are given below. There are three rows of mystacials, the first bearing one vibrissa though two are less commonly encountered. The second row bears four or rarely five vibrassae while the third row shows greater variation and may bear five or six. There usually are two genal vibrissae though one may be encountered. The interramal region has usually one vibrissa though two may rarely be encountered. The ulnar carpals are usually three in number though one, two or four are to be encountered. The only vibrissae which are constant in number are the two suproarbitals. The Potoroos have no anconeal, calconeal or medium antebrachial vibrissae, a feature which is shared with the other macropods.

TEETH

The dental formula of the Potoroo given by Jones is $I\ \frac{1.2.3}{1.0.0}$; $C\ \frac{1}{0}$; $P.M.\ \frac{0.0.3.4}{0.0.3.4}$; $M\ \frac{1.2.3.4}{1.2.3.4}$. However, the small range of five skulls which are available to me shows only one premolar present and it is apparent that there must be some variation in this feature. The upper incisors are weak compared to those of the kangaroos but the lower pair are long and powerful. The first pair of upper incisors are the largest and strongest teeth of the upper jaw but the second and third pairs are very small. The canine teeth are recurved and strong, the premolars are strong and grooved. Bensley (1903) described the New South Wales representatives of the species as having three grooves on the premolars while the Tasmanian animals were said to have three grooves with indications of a fourth. Bensley went on to describe only 3 grooves as occurring on the teeth of "the dwarf *P. rufus*," but this species is now accepted as being a young *P. tridactylus*. In the Tasmanian specimens examined there may be three or four grooves on the premolars, the grooves on the inside of the tooth may be more developed than on the outside. The grooves appear to be better developed on the lower premolars than

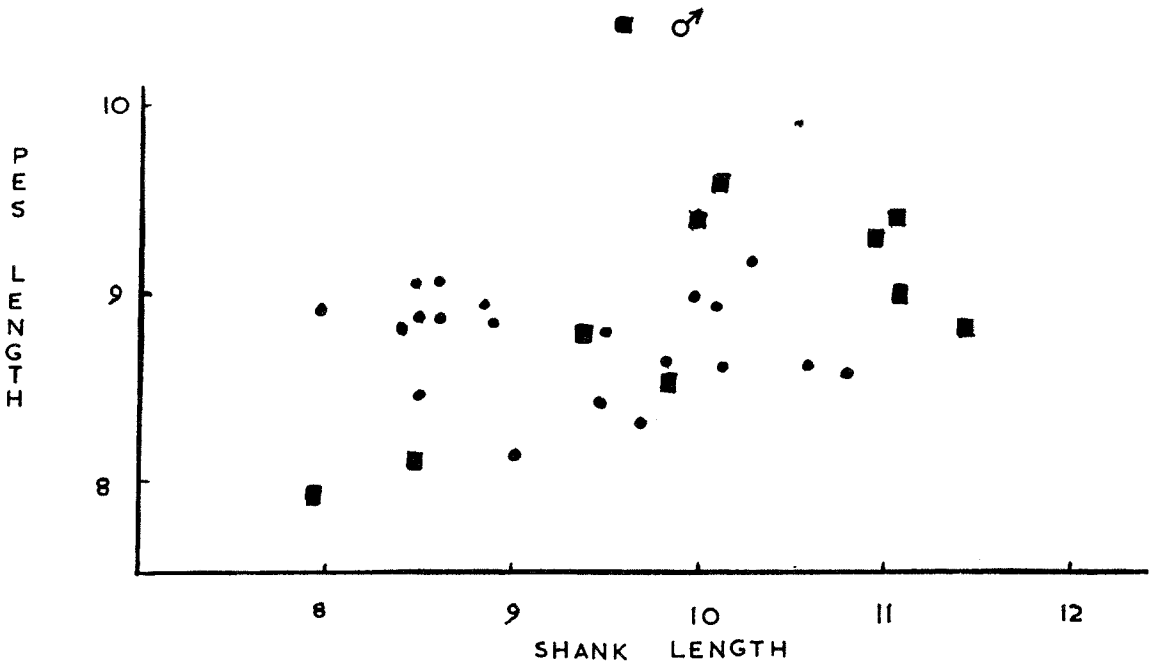

FIG. 5.—Length of shank (in cms.) in relaiton to the length of the foot in 33 *Potorous tridactylus*..

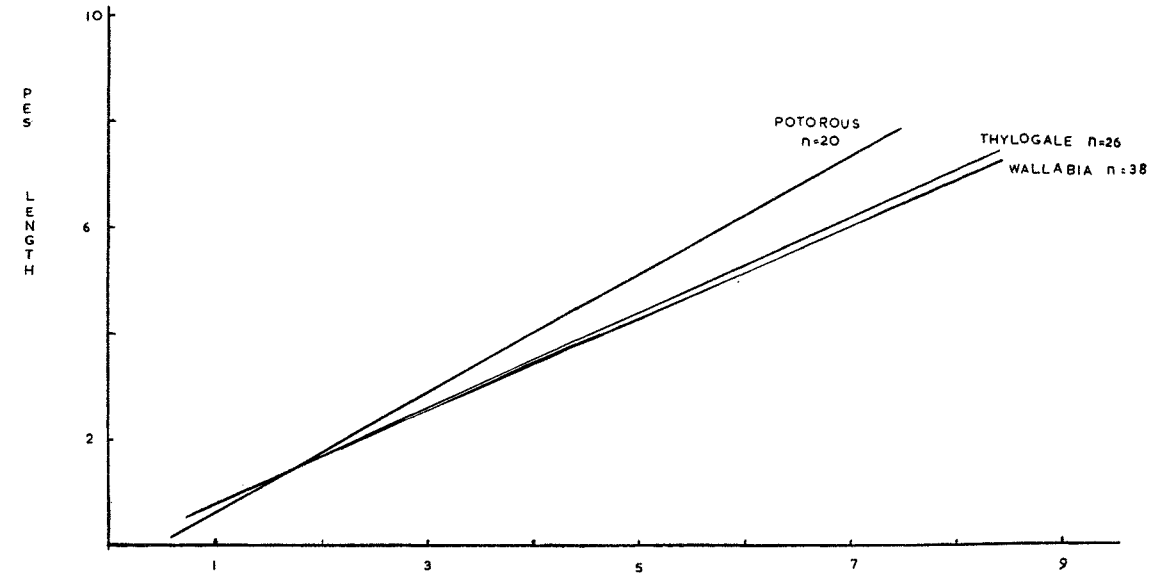

FIG. 6.—Length of shank (in cms.) to length of foot in *Potorous tridactylus*. *Thylogale billardierii* and *Wallabia rufogrisea*.

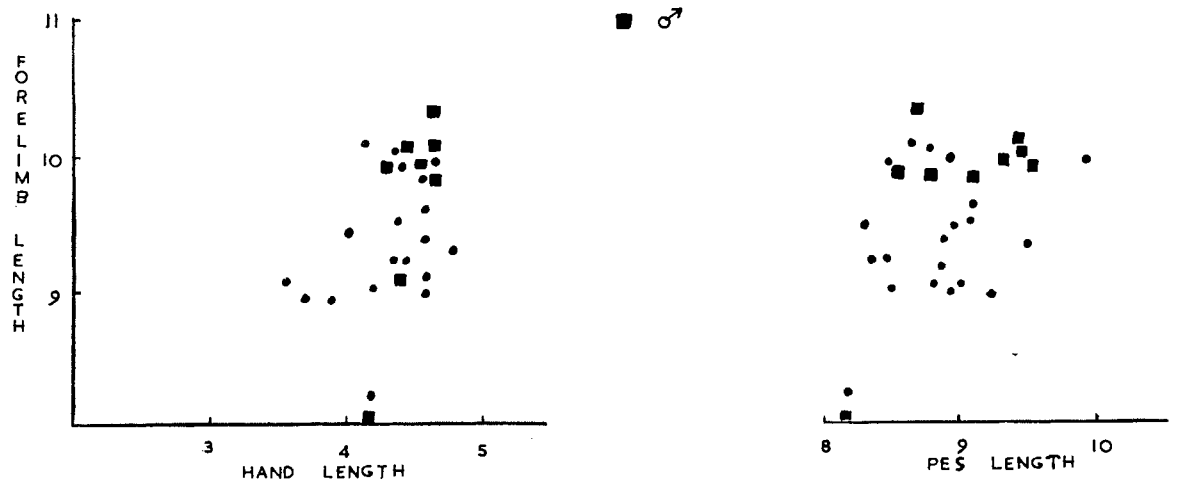

FIG. 7.—The length of forelimb (in cms.) in relation to the length of hand and length of foot in 27 *Potorous tridactylus*.

on those of the upper jaw. It is doubtful if the possession of four grooves is associated with old age since two male skulls of breadth 48.0 and 46.2 mms. show 3 or 4 grooves respectively. The premolar grooves are not as strongly developed as in *Bettongia*.

The molars are four in number, are robust and the three anterior teeth of the upper jaw are subequal in size to their companions in the same jaw as well as to those of the lower ramus. The 4th molar in the upper jaw is smaller than 1-3 but is subequal to its fellow of the dentary.

Examination of 20 live specimens showed that all individuals possessed two premolars and no sexual differentiation could be observed in the distribution of grooves on the teeth.

The teeth of *Potorous* are not as specialized as those of the Macropodinae in that they retain more of their insectivorous form, especially in the premolars and molars.

POUCH

The pouch of the female is well developed and opens forward. The aperture, which is situated about one third of the length of the belly from the posterior end, can be detected by a brownish stain on the fur. The pouch can be identified at the birth of the animal (Guiler, 1960). It contains four nipples arranged in an anterior and posterior pair, each situated to the left and right of the midline. Multiparous females have one or more nipples larger than the others due to the feeding activities of the young.

BODY FORM AND PROPORTIONS

The body (Plate 1) is squat and ungainly. The hindquarters are large but the legs are not greatly elongated as in many members of the Macropodidae. The forequarters are lightly built and the forelegs are much smaller than the hind, giving an unbalanced appearance to the animal when it is on four feet. The head is disproportionately large in relation to the forequarters. The ears, eyes and tail, together with the vibrissae, have been described above.

Male Potoroos have a slightly longer head than females of similar size. This feature can be seen taking either pes length or ear as an index of size (Fig. 3), or the crown-rump length (Fig. 4). The same feature is shown when the length of the head is plotted against the size of the ear. It has been shown earlier (Guiler, 1960) that the ear grows rapidly in the pouch young to 3.75 cm. length at 280 days of age and thereafter it grows slowly to an average adult length of 4.35 cms. and it can be taken as a structure against which the growth of other organs can be plotted. It is difficult to distinguish the sexes of Potoroos by the measurement of proportions of the body, but with experience in the field it is possible to guess the sex of a Potoroo with reasonable, though not infallible, accuracy, the males being more heavily built than females.

The length of the hind foot plotted against the crown-snout length shows that these two lengths are directly proportional to each other, and that the foot is sub-equal to the crown-snout length. The foot in adult animals apparently does not keep on growing throughout the life of the individual since there is no evidence of larger animals having big feet. In fact, the maximum foot length of a Potoroo appears to be about 9.5 cms.

The foot is slightly shorter than the shank though some animals have the shank almost the same length as the foot (Fig. 5) and a few have the foot shorter than the shank. The small sample measured (33 animals) shows that the males have

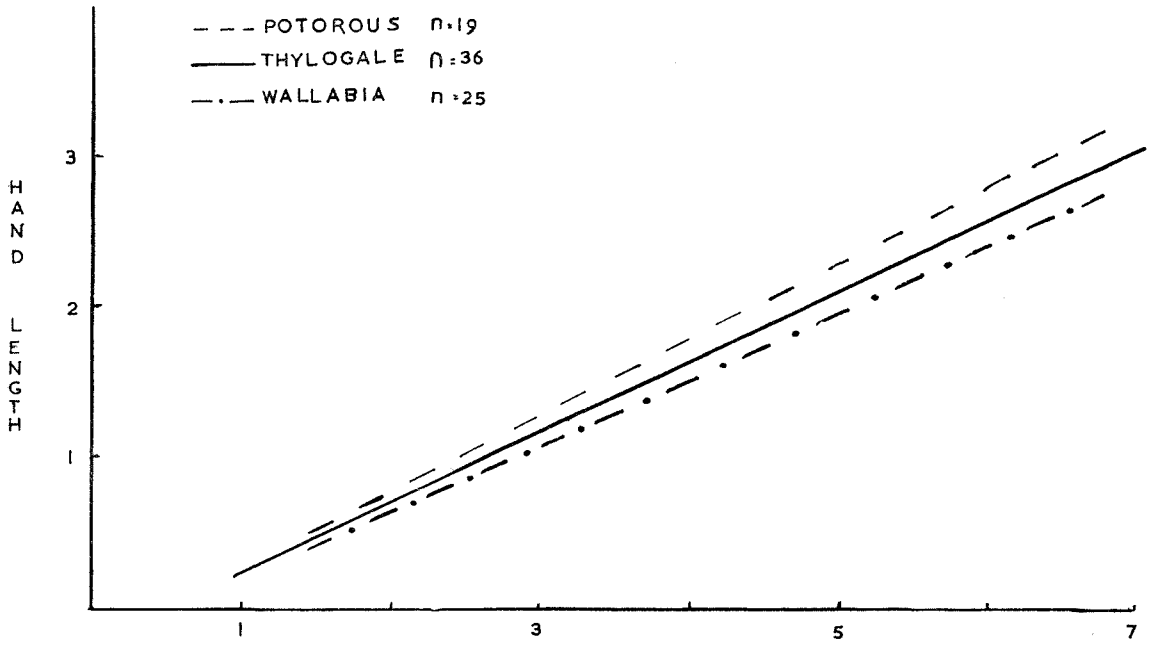

FIG. 8.—The length of the hand plotted against the length of forelimb in *Potorous tridactylus*, *Wallabia rufogrisea* and *Thylogale billardierii*.

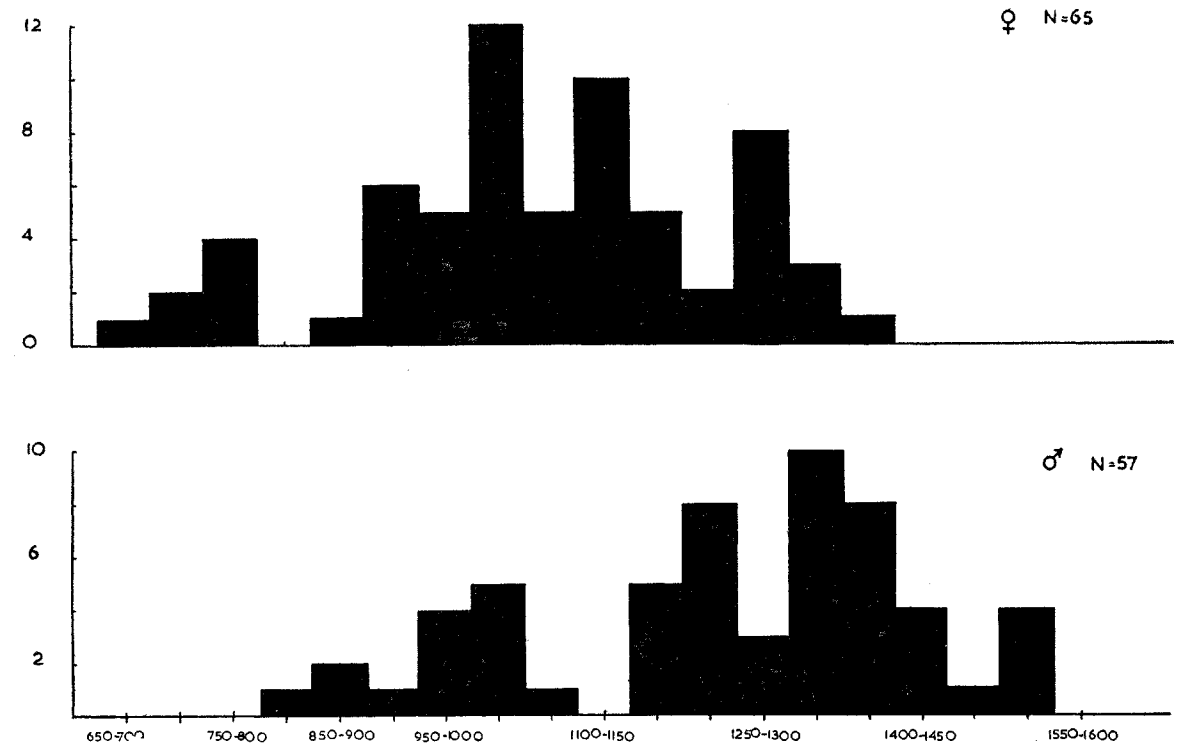

FIG. 9.—The body weight (in grams) of 122 living *Potorous tridactylus*. The lower and upper histograms show the weights of females and males respectively. The weights were classified respectively into 50 gram groups.

a greater mean foot than the females, being 8.2 cms. to 7.95 cms. respectively and the shank also is longer in the male measuring 10.07 cms. to 9.9 cms. The shorter leg of the female may in part account for the lighter build of the female.

Comparison of the length of the foot plotted against length of shank in the Potoroo, the pademelon *Thylogale billardierii* (Desmarest) and the wallaby, *Wallabia rufogrisea* (Desmarest) shows that the relation of these two parts of the hind limb to each other is the same in both *Thylogale* and *Wallabia,* but in the Potoroo the foot is relatively slightly longer than in the other two species (Fig. 6).

The males have a slightly shorter forelimb than the females, though there is little difference in the length of the manus in either sex (Fig. 7). Similarly, the length of the forelimb in the male relative to the length of the foot is greater than in the female.

The length of the hand in relation to the length of forelimb in *Potorous* is slightly greater than the measurement in both *Wallabia rufogrisea* and *Thylogale billardierii* (Fig. 8). In the latter two species the relationship is the same.

SEXUAL DIMORPHISM

Apart from the presence or absence of a pouch or testes, the difference between the sexes is very slight. The head of the male is slightly longer and broader than that of the female and the body is more heavily built and larger in size and is of greater weight.

BODY WEIGHT

The live weight of adult *Potorous* was measured when the animals were first captured and these weights are graphed in Fig 9. In this figure the weights of female animals which were less than 650 grs. have been ignored since these are obviously juvenile individuals which had recently left the mother. In the case of males, the comparable weight selected was 800 grs. The histograms show that the males are heavier than females and that probably two weight groups can be identified in the population, namely a sub-adult and an adult. The weights of these groups are below 800 grs. in the femae and below 1050 grs. in the male. These weight groups do not give an accurate age for individuals in the population beyond the broad outline mentioned above since it is known from earlier work that Potoroos live to 5 years in a natural state (Guiler, 1957).

The higher weights for males shown in the histogram end abruptly, thus indicating that the larger males had not been captured. This may be due to a sampling error or to the animals being too large for the type of trap used in the field work.

REFERENCES

BENSLEY, B. A., 1903.—On the evolution of the Australian Marsupialia with remarks on the relationship of the marsupials in general. *Trans. Linn. Soc. Lond.* (2), 9, 83.

FINLAYSON, H. H., 1958.—On Central Australian Mammals Part III The Potoroinae. *Rec. S. Aust. Mus.* 13: 235.

GUILER, E. R., 1957.—Longevity in the wold Potoroo, *Potorous tridactylus* (Kerr). *Aust. J. Sci.* 20: 26.

————, 1958.—Observations on a population of small marsupials in Tasmania. *J. Mamm.* 39: 44.

————, 1960.—The pouch young of *Potorous tridactylus* (Kerr.) *J. Mamm.* 41: 441.

JONES, F. W., 1924.—The mammals of South Australia. Pt. 2. Government Printer, Adelaide.

LYNE, A. G., 1959.—The systematic and adaptive significance of the vibrissae in the Marsupialia. *Pro. zool. Soc. Lond.* 133: 79.

MARLOW, B. J., 1958.—A survey of the marsupials of New South Wales. C.S.I.R.O. Wildl. Res. 3: 71.

PLATE 1.—Adult female *Potorous tridactylus*, with young.