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A NEW SPECIES OF *THYLOGALE* (MARSUPIALIA: MACROPODIDAE) FROM MAPALA ROCK SHELTER, JAYA (CARSTENSZ) MOUNTAINS, IRIAN JAYA (WESTERN NEW GUINEA), INDONESIA

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ABTRACT

A new species of *Thylogale* (Marsupialia: Macropodidae) has been described on material from an archaeological deposit in Mapala rock shelter, situated at 3996 m in the Jaya Mountains, Irian Jaya, Indonesia. The remains of *Thylogale brunii* and several other mammal species are also present. The faunal material lies above a level dated at 5440 ± 130 BP, but the present status of either species of *Thylogale* in montane western New Guinea is unknown.

INTRODUCTION

From December, 1971 to March, 1972, and in January and February, 1973, the Carstensz Glaciers Expeditions studied the tropical glaciers of the Jaya Mountains, Irian Jaya (western New Guinea), Indonesia. The results of these expeditions have been published by Hope *et al.* (1976). Although the aims of the expeditions were primarily glaciological and geomorphological, a small collection of faunal material was made, including a sample of bones salvaged from the floor of a rock shelter, discovered by an Indonesian mountaineering party. The bones formed part of an archaeological deposit in the rock shelter, and included the remains of a new species of *Thylogale*.

Mapala rock shelter lies at an altitude of 3996 m, close to Lake Larson, about 2 km north of the Northwall of Mt Jaya. It consists of a small overhang beneath a large block of limestone (15 x 15 x 8 m) perched by retreating ice on two small lateral moraine ridges. The site has been described in more detail by Hope, G.S. and Hope J.H. (1976). The archaeological deposit was discovered in February, 1972 when members of the Mapala Club of the University of Indonesia dug away part of the floor to provide more head room in the shelter, which was used as a camp site.

The first Carstensz Glaciers Expedition visited the Mapala camp and collected bulk samples of bone from the excavation spoil, and charcoal and a few bones from the face of the exposed section inside the rock shelter. Three distinct stratigraphic units were recognised in the deposit. The topmost 5 cm consisted of fine red-grey ash with no bone or charcoal. Beneath this was about 27 cm of a very black deposit, rich in bone, charcoal and carbonised twigs. The lowest layer consisted of about 10 cm of grey clayey silts with scattered bones and small fragments of charcoal. This horizon graded into a sterile grey silty clay containing pebbles; probably the basal limestone till. Charcoal fragments from the grey silts gave a C^{14} date of 5440 ± 130 BP (ANU-1015).

The great majority of the bones collected came from the middle layer of the deposit, and apart from the species of *Thylogale* described below included the following: *Zaglossus bruijni, Dasyurus albopunctatus, Peroryctes longicauda, Pseudocheirus cupreus, P. mayeri, Phalanger* sp., *Thylogale brunii, Dendrolagus dorianus, Mallomys rothschildi, Hyomys goliath* and *Canis familiaris*. These remains, as well as collections of modern mammals from the area, have been discussed by Hope (1976). Other archaeological material from the deposit consisted of a fragment of a chert scraper, a piece of granodior-

Records of The Australian Museum, 1981, **Vol. 33 No. 8,** 369-387, Figures 1-7.

ite probably transported to the site by human agency, and several fragments of mollusc shell, including an indeterminate species of the family Geloinidae, which is restricted to brackish coastal waters.

Family Macropodidae
Thylogale christenseni sp. nov.
Figs. 1, 2

HOLOTYPE: AM F54719, left maxillary fragment, with P^4, M^{1-4};
PARATYPES: AM F54718, cranial fragment, with right M^{1-4};
AM F54727, right maxillary fragment, P^3, dP^4, P^4 unerupted (extracted), M^{1-3}, M^4 unerupted;
AM F54728, left maxillary fragment, P^3, dP^4, P^4 unerupted (extracted), M^{1-3}, M^4 unerupted;
AM F54729, left maxillary fragment, P^3, dP^4, P^4 unerupted (extracted), M^{1-3}, M^4 unerupted;
AM F54730, left mandibular ramus, lower incisor, P_4, M_{1-4};
AM F54731, left mandibular ramus, lower incisor, P_4, M_{1-4};
AM F54732, left mandibular ramus, lower incisor, P_4, M_{1-4};
AM F54733, left mandibular ramus, P_4, M_{1-4};
AM F54734, left mandibular ramus, lower incisor, P_4, M_{1-4};
AM F54735, left mandibular ramus, P_4, M_{1-3};
AM F54736, left mandibular ramus, P_4, M_{1-4};
AM F54737, left mandibular ramus, P_4, M_{1-4};
AM F54738, left mandibular ramus, M_{1-4};
AM F54739, left mandibular ramus, M_{2-4};
AM F54740, left mandibular ramus, M_{1-3};
AM F54741, left mandibular ramus, M_{1-4};
AM F54742, left mandibular ramus, lower incisor, P_4, M_{1-4};
AM F54743, left mandibular ramus, dP_4, M_{1-4};
AM F54744, left mandibular ramus, P_3, dP_4, M_{1-2};
AM F54745, left mandibular ramus, P_3, dP_4, M_{1-3};
AM F54746, left mandibular ramus, P_3, dP_4, M_{1-2};
AM F54747, left mandibular ramus, M_{1-2};
AM F54748, left mandibular ramus, M_{1-3};
AM F54749, right mandibular ramus, lower incisor, P_4, M_{1-4};
AM F54750, right mandibular ramus, lower incisor, P_4, M_{1-4};
AM F54751, right mandibular ramus, P_4, M_{1-4};
AM F54752, right mandibular ramus, P_4, M_{1-4};
AM F54753, right mandibular ramus, M_{1-4};
AM F54754, right mandibular ramus, M_{3-4};
AM F54755, right mandibular ramus, M_{1-2};
AM F54756, right mandibular ramus, M_{1-4};
AM F54757, right mandibular ramus, lower incisor, P_3, dP_4, M_{1-2};
AM F54758, right mandibular ramus, M_{1-2};

TYPE LOCALITY: Mapala rock shelter, 4° 3'S, 137° 12'E, 3996 m altitude, 100 m southwest of Lake Larson, 2 km north of Northwall, Jaya Mountains, Sudirman Range, Irian Jaya, Indonesia.

LOCATION OF TYPE MATERIAL: The specimens have been registered in the palaeontological collection of the Australian Museum.

ORIGIN OF SPECIFIC NAME: This species is named for Ole Arne Christensen, a research student in Prehistory at the Australian National University, who studied archaeological rock shelters in the highlands of Papua New Guinea. He died in a road accident on December 16, 1974, shortly before a proposed trip to Irian Jaya to survey archaeological sites in the Mt Jaya region.

GENERIC ASSIGNATION: It is unfortunate that the upper incisors are not preserved in the material here described as *Thylogale christenseni,* since the position of the labial notch at or towards the back of I^3 is the main diagnostic character for the genus *Thylogale*. Apart from this, the teeth of *Thylogale* display fairly generalised macropodine characteristics, and fragmentary material can be assigned to the genus mainly by elimination of other possibilities.

The molars of *Thylogale* are rectangular, moderately high crowned, with poor to moderately developed midlinks. They differ on the one hand from the large high crowned molars of *Macropus* (s.l.), which usually have well developed midlinks, and on the other from the square, low crowned molars of the remaining New Guinea genera *Dorcopsulus, Dorcopsis* and *Dendrolagus*. Further, M^1 and M^2 in *Dorcopsulus* and *Dorcopsis* have mesostyles posterolabially to the paracone, a character which is absent in *Thylogale*. The permanent upper premolar in *Thylogale* is large with a well-defined posterior labial cusp and usually a distinct lingual cingulum. It is longer relative to the molars than is the case in most species of *Macropus,* but is distinct from the very long, heavily ridged premolars of *Dorcopsis* and *Dorcopsulus*. A vestigal canine is occasionally present in *Thylogale,* but is never as well-developed as in *Dorcopsis* and *Dendrolagus*. On the basis of these characters the new species has been referred to *Thylogale* rather than to any of the other macropodid genera occurring in New Guinea.

SPECIFIC DIAGNOSIS: p^4 long and narrow, distinct posterior lingual cusp, poorly developed lingual cingulum; molars smaller than in any other species in the genus, weakly developed midlinks.

COMPARISON:

The type material of *Thylogale christenseni* has been compared in detail with specimens of *T. brunii* from Mapala rock shelter (AM F54759-54776; Figs 3, 4, 5); from Mt Giluwe, Papua New Guinea (CM15115-15122) and from the north slopes of Mt Wilhelm, Papua New Guinea (CM 15123); and with *Dorcopsulus vanheurni* from Mt Wilhelm, Papua New Guinea (CM 15124; Figs 6, 7). These latter specimens are in the collection of the CSIRO Division of Wildlife Research, Canberra. The material has also been compared with specimens of *T. thetis, T. stigmatica* and *T. billardierii* from Australia. Nomenclature follows Kirsch and Calaby (1977).

DESCRIPTON:

Cranium: The cranium is best preserved in F54718. It consists of the right premaxilla and maxilla, with the anterior part of the orbit, including the lachrymal, the posterior part of both frontals and part of the right jugal. The masseteric process is large, extending to the crown of the molars. The skull is much smaller than in any comparative specimens of *Thylogale* available, and approaches that of *Dorcopsulus vanheurni*. Although the palate is broken, there is enough bone preserved lingual to the molar row to suggest that posterior palatal vacuities were present, and that large perforations existed behind them, similar to those found in the palate of *T. billardierii*.

Incisors: The upper incisors are not preserved in any specimen. In F54718 the lengths of the alveoli along the lingual margin are: I^1, 2.0 mm; I^2, 2.3 mm; I^3, 3.4 mm. The lower incisors are broad and lanceolate; the curve along the long axis is gentler than in *T. brunii,* and most similar to the situation in *T. billardierii*.

Canine: F54718 possesses a tiny alveolus for a canine just posterior to the premaxilla-maxilla suture. A similar alveolus is occasionally present in *T. billardierii,* although the canine itself is rarely retained.

Upper premolars: Measurements of the upper premolars of *T. christenseni* and *T. brunii* are given in Table 1. In this and later tables all teeth, both left and right have been measured, so it is possible that an individual animal may be represented twice in each set of data.

P^3 is represented by teeth from F54727, F54728, and F54729. It is about two-thirds the size of P^4. There are three cusps present on the sectorial crest, the median one being marginally lower than the posterior and anterior. There is a small posterior lingual cusp and a narrow lingual cingulum. Lateral ridging is much weaker than in *T. brunii,* and the lingual cusp and cingulum are very poorly developed compared with *T. brunii, thetis* and *stigmatica.* In *T. billardierii* the lingual cingulum is also poorly developed, but the posterior lingual cusp is prominent.

P^4 is in position only in F54719, but has been excavated from F54727, F54728, and F54729. It is a long and narrow tooth, almost as long as P^4 in *T. brunii* but considerably narrower. In morphology, it is more like P^4 in *T. billardierii* than in the other speices of *Thylogale.* Three cusps are present along the sectional crest (four in F547290) but they are much less prominent than in *T. brunii.* The anterior and posterior cusps are the most strongly developed, the intervening ones being very small. A sharp labial crest descends from the anterior cusp, but the posterior cusp has no equivalent; ridgelets from the intermediate and posterior cusps are less prominent. A posterior internal cusp, about two-thirds the height of the posterior cusp, extends about one-quarter the way along the tooth.

This cusp is well set-off, separated from the posterior cusp by a V-shaped valley. This is most clearly displayed in the unworn specimens excavated from F54727-54729. In other species of *Thylogale* the posterior internal cusp is connected to the posterior cusp by a lateral spur or ridge. This is most distinct in *T. thetis* and *stigmatica,* where the posterior cusp and its connecting spur form a ridge at right angles to the long axis of the premolar. *Thylogale brunii* and *T. billardierii* are more similar to *T. christenseni,* but in these the lateral spur tends to enclose a small posterior basin. In *T. christenseni* the lingual cingulum is extremely narrow, fading out completely anteriorly. In this respect *T. christenseni* differs considerably from *T. brunii, stigmatica* and *thetis,* all of which have heavy lingual cingula enclosing longitudinal basins, and is similar to *T. billardierii,* which also has a narrow lingual cingulum. In F54719 there is a very small antero-lingual cusp opposite the anterior cusp.

dP^4 is represented in F54727, F54728 and F54729. The tooth tapers anteriorly and bears a strong parastylar cusp. A slight anterior cingulum extends from the parastylar cusp two-thirds of the way across the anterior face of the tooth, so the labial side of the tooth is longer than the lingual side. In contrast, in *T. brunii* dP_4 is square, since this cingulum extends the width of the tooth anteriorly. In *T. christenseni* dP^4 is narrower relative to the molars than is the case in other species of the genus.

Upper molars: Measurements of the upper molars of *T. christenseni* and *T. brunii* are given in Table 2. The molars are rectangular in shape, in contrast to the almost square molars in *T. brunii.* They are smaller than in any other species of *Thylogale;* and are similar in size to the molars of *Dorcopsulus.* The midlink in *T. christenseni* is weak, and similar to the condition found in *T. billardierii,* rather than in *T. brunii, thetis* and *stigmatica,* all of which have well-developed midlinks. There is no sign of a forelink. There is a short

TABLE 1 UPPER PREMOLAR DIMENSIONS OF THYLOGALE CHRISTENSENI AND THYLOGALE BRUNII
(All measurements in millimetres)

Specimen	p_3			dP_4			p_4		
	L	AW	PW	L	AW	PW	L	AW	PW
Thylogale christenseni									
AM F54719(holotype)	—	—	—	—	—	—	6.4	2.2	2.6
AM F54727	4.3	1.9	1.9	4.0	2.8	2.9	6.5	2.3	2.7
AM F54728	4.3	1.9	2.0	4.2	2.7	2.8	6.3	2.0	2.6
AM F54729	4.2	1.8	1.9	3.9	2.6	2.8	6.7	2.2	2.8
Thylogale brunii									
Mapala Rock Shelter:									
AM F54759	—	—	—	—	—	—	6.8	3.0	3.2
AM F54760	5.1	2.3	2.9	5.1	3.8	4.2	6.7	3.1	3.4
AM F54761	—	—	—	4.6	3.6	3.8	6.4	3.1	2.9
Mt Giluwe:									
CM 15115	4.9	2.3	2.7	5.1	3.6	4.1	—	—	—
CM 15116	5.1	2.4	2.9	5.0	3.8	4.3	6.7	2.6	3.1
CM 15117	5.2	2.4	3.0	5.1	3.9	4.2	—	—	—
CM 15118	5.6	2.7	3.1	5.4	4.0	4.4	—	—	—
CM 15119	5.2	2.5	3.1	5.1	3.9	4.2	—	—	—
CM 15120	—	—	—	—	—	—	6.5	2.4	3.2
CM 15121	5.3	2.6	3.1	5.4	3.9	4.5	—	—	—
CM 15122	5.5	2.6	3.0	4.9	3.8	3.0	—	—	—
Mt Wilhelm:									
CM 15123	—	—	—	—	—	—	7.8	3.2	3.8

TABLE 2 UPPER MOLAR DIMENSIONS OF THYLOGALE CHRISTENSENI and THYLOGALE BRUNII
(All measurements in millimetres)

Dimension		*Thylogale christenseni*					*Thylogale brunii*							
							Mapala			Mt Giluwe				Mt Wilhelm
		54718	54719	54727	54728	54729	54759	54760	54761	N	X	S	O.R.	15123
	L	4.0	4.0	4.0	4.4	4.3	5.1	5.3	5.1	8	5.28	0.18	5.0-5.6	5.5
M_1	AW	3.5	3.5	3.2	3.4	3.1		4.8	4.5	8	4.71	0.18	4.4-4.9	5.6
	PW	3.4	3.3	3.3	3.2	2.9		4.9	4.4	8	4.61	0.27	4.0-4.8	5.4
	L	4.5	4.3	4.7	4.7	4.8	5.7	5.8	5.6	8	5.81	0.15	5.7-6.0	6.2
M_2	AW	3.8	3.9	3.7	3.6	3.3	5.2	5.4	4.8	8	5.15	0.12	5.0-5.3	6.0
	PW	3.6	3.5	3.5	3.5	3.3	4.9	5.0	4.7	8	4.78	0.21	4.5-5.1	5.7
	L	5.0	4.7	4.9	5.0	4.9	6.4	6.4	6.2	6	6.17	0.25	5.8-6.5	7.2
M_3	AW	4.0	3.9	3.7	3.8	3.7	6.0	5.9	5.1	6	5.13	0.20	4.9-5.4	6.5
	PW	3.6	3.4	3.6	3.6	3.5	5.1	5.2	4.5	6	4.60	0.09	4.5-4.7	5.2
M_4	L	5.0	4.9				6.2			2			6.2-6.3	6.7
	AW	3.8	3.7				5.7			2			4.7-4.9	6.3
	PW	3.3	2.6				4.6			2			4.1-4.2	4.5
M_{1-2}		8.7	8.4	8.7	9.1	9.0	10.8	11.2	10.9	8	11.16	0.23	10.8-11.5	11.8
M_{1-3}		13.6	13.1	13.3	14.0	13.7	17.3	17.7	17.1	6	17.20	0.32	16.6-17.4	18.9
M_{1-4}		18.6	18.0				23.9			2			23.6-23.7	25.1

anterior cingulum, which extends only three-quarters of the way across the front of the molars. This contrasts with the condition in *T. brunii, thetis* and *stigmatica*, where the anterior cingula extend completely across, or almost so, and is again similar to *T. billardierii*.

Lower premolars: Measurements of the lower premolars of *T. christenseni* and *T. brunii* are given in Table 3. P_3 is a short narrow blade with three very faintly defined ridges on the labial and lingual sides.

dP_4 is similar to that of other species of the genus but the protoconid is greatly reduced.

P_4 is a narrow blade with up to four ridges on the labial and lingual faces. The anterior cusp is strongly defined. In other species of *Thylogale,* a crest descends anteriorly from the anterior cusp so that in lateral view the anterior face of the tooth is convex or angular; the crown length of the tooth being less than the length at the base of the enamel. In *T. christenseni,* however, the anterior face of the tooth is vertical in most cases, with only a few specimens showing an expansion anteriorly at the base of the enamel (e.g. F54732, F54751).

Lower molars: Measurements of the lower molars of *T. christenseni* and *T. brunii* are shown in Table 3. The lower molars are rectangular in shape with weakly developed fore and midlinks. The anterior cingulum does not extend as far across the face of the tooth as it does in other species of the genus. In size the molars are very similar to the lower molars of *Dorcopsulus,* but are higher crowned.

DISCUSSION

This new species is consistent in all respects with the four modern species of *Thylogale,* and is quite distinct from the other macropodid genera represented in New Guinea. It is most similar to *T. billardierii* from Tasmania, so it is particularly regrettable that I^3 is not preserved, since *T. billardierii* is somewhat aberrant, compared to the other species of *Thylogale,* in that the labial notch does not extend as far towards the back of the tooth.

Most of the *Thylogale* specimens recorded from Australian fossil sites are of late Pleistocene or Holocene age and have been referred to one or other of the extant Australian species. However isolated teeth from the Hamilton Fauna recovered from Late Pliocene terrestrial deposits at Grange Burn, western Victoria, have been referred to the genus and are regarded as representing a new taxon (Turnbull and Lundelius 1970). This species is also similar in many respects to *T. billardierii,* but is of comparable size, so is much larger than *T. christenseni*. It is of interest that the Hamilton Fauna also contains material referred to the New Guinean taxa *Phalanger gymnotis* and *Dorcopsis* sp.

Two species of *Thylogale* have been previously recorded from New Guinea, the widespread *T. brunii* and *T. stigmatica,* known only from southwest Papua. Three subspecies of *T. brunii* are recognised; *T. brunii brunii* from Aru Island and southern New Guinea, *T. brunii browni* from the Bismarck Archipelago and the lowlands of northern New Guinea, as far west as Jayapura, and *T. brunii keysseri* from the Huon Mts and the highlands of Papua New Guinea (Tate 1948). By comparison with Tate's measurements, the specimens of *T. brunii* from Mapala rock shelter and Mt. Giluwe belong to the mountain subspecies *keysseri,* the smallest of the three. The measurements of specimen CM 15123, collected from an unknown altitude, possibly close the Ramu River, on the northern slopes of Mt. Wilhelm, agree with those given by Tate for the subspecies *browni*.

TABLE 3 LOWER TEETH DIMENSIONS OF THYLOGALE CHRISTENSENI and THYLOGALE BRUNII
(All measurements in millimetres)

Dimensions		*Thylogale christenseni*				*Thylogale brunii*								
						Mapala				Mt Giluwe				Mt Wilhelm
		N	X	S	O.R.	N	X	S	O.R.	N	X	S	O.R.	15123
	L	4	3.73	0.13	3.6-3.9	7	4.46	0.08	4.3-4.5	6	4.57	0.20	4.4-4.8	
P_3	AW	4	1.45	0.10	1.3-1.5	7	1.69	0.11	1.6-1.9	6	1.82	0.10	1.7-1.9	
	PW	4	1.63	0.15	1.5-1.8	7	2.01	0.09	1.9-2.1	6	2.13	0.12	2.0-2.3	
	L	4	3.45	0.06	3.4-4.5	9	4.39	0.09	4.3-3.5	6	4.65	0.15	4.4-4.8	
dP_4	AW	4	1.75	0.13	1.6-1.9	8	2.28	0.05	2.2-2.3	6	2.47	0.08	2.4-2.6	
	PW	4	2.03	0.05	2.0-2.1	9	2.84	0.09	2.7-2.9	6	2.97	0.19	2.7-3.2	
	L	9	5.44	0.27	5.1-5.9	4	6.18	0.21	6.0-6.4	2			5.8-6.3	7.4
P_4	AW	9	1.70	0.09	1.6-1.8	4	2.28	0.31	2.0-2.7	2			1.9	2.3
	PW	9	1.70	0.09	1.6-1.8	4	2.38	0.43	1.9-2.9	2			1.9-2.1	2.4
	L	26	3.77	0.13	3.6-4.0	13	4.65	0.19	4.3-5.0	8	4.83	0.17	4.6-5.1	5.3
M_1	AW	23	2.50	0.13	2.3-2.8	12	3.06	0.10	2.8-3.2	7	3.26	0.11	3.1-3.4	3.6
	PW	24	2.68	0.16	2.4-2.9	13	3.32	0.18	2.8-3.5	8	3.56	0.15	3.3-3.8	3.7
	L	28	4.14	0.18	3.8-4.4	14	5.34	0.20	4.9-5.7	8	5.33	0.12	5.2-5.5	6.1
M_2	AW	26	2.99	0.15	2.8-3.5	13	3.79	0.13	3.6-4.0	8	3.79	0.29	3.1-4.0	4.3
	PW	27	3.10	0.15	2.9-3.4	14	3.94	0.17	3.6-4.2	8	4.09	0.19	3.8-4.3	4.3
	L	22	4.56	0.14	4.3-4.8	8	5.96	0.32	5.4-6.3	6	5.78	0.24	5.5-6.1	6.8
M_3	AW	21	3.44	0.19	3.2-3.8	8	4.35	0.27	4.0-4.7	6	4.40	0.11	4.3-4.6	5.0
	PW	21	3.42	0.20	3.1-3.8	8	4.44	0.30	4.0-4.8	6	4.35	0.10	4.2-4.5	5.0
	L	17	4.66	0.23	4.3-5.0	5	6.38	0.33	5.9-6.7	2			6.3-6.6	7.5
M_4	AW	16	3.44	0.20	3.2-3.8	5	4.76	0.23	4.4-5.0	2			4.5-4.6	5.2
	PW	17	3.14	0.21	2.7-3.6	5	4.32	0.32	3.9-4.7	2			4.1-4.3	4.6
M_{1-2}		26	8.08	0.23	7.6-8.5	13	10.02	0.25	9.6-10.5	8	10.36	0.22	10.1-10.8	11.0
M_{1-3}		19	12.67	0.35	12.0-13.2	7	15.99	0.45	15.5-16.7	6	16.27	0.12	16.1-16.4	17.6
M_{1-4}		15	17.53	0.41	16.8-18.1	4	22.48	0.48	21.8-22.9	2			23.0-23.8	24.3

The presence of *T. christenseni* in the Mapala rock shelter together with the widespread species *T. brunii* is surprising. In archaeological sites in montane areas of eastern New Guinea, *T. brunii* has been found together with *Dorcopsulus vanheurni* (White 1972). *Dorcopsulus vanheurni* is not represented in the Mapala site, and its closest known occurrence is at Mt Trikora (Wilhelmina), 150 km to the east. In 1939 the Third Archbold Expedition collected a series of 19 specimens at altitudes ranging from 850-2700 m in the region between Mt Trikora and the Tariku (Idenberg) River (Tate 1948); these remain the only specimens of *D. vanheurni* recorded from Irian Jaya. Faunal records for this region are in fact extremely poor, and the series of *Thylogale brunii* from Mapala represent the only record of the mountain subspecies *keysseri* in western New Guinea.

The Archbold Expedition to Mt Trikora neither saw nor collected any wallabies in the grasslands above 3000 m and remarked on the paucity of animals there (Archbold *et al.* 1942; Brass 1941). The experience of the Carstensz Glaciers Expeditions was similar. Mammals were rarely seen in the Mt Jaya region and the only species recorded living in the area were *Zaglossus bruijni, Peroryctes longicauda, Mallomys rothschildi, Rattus* spp., and wild dogs. No trace of wallabies was noted, and the local Damal people gave conflicting statements as to whether wallabies still live in the area.

The Mapala rock shelter lies towards the south of the Kemabu Plateau, an expanse of gently rolling country extending north from the sheer cliffs of the Northwall, the northern boundary of the rugged Jaya Mts. The Plateau extends about 500 km east-west and 25 km north-south, at altitudes between 3,400 and 4,200 m. The valleys on the plateau are covered with tussock grassland, while subalpine forest and shrublands grow on the ridge tops and extensive groves of tree ferns clothe the intervening slopes. There is some evidence that the present extent of the grasslands is due to human activity (mainly burning) over the last 10,000 years. Grasslands were much more extensive during cold phases of the late Pleistocene, when the maximum extent of the Mt Jaya ice cap was about 800 sq km. It is estimated that at the height of the last glaciation, mountain grassland covered about 16,000 sq km in the Sudirman Range (Mt Jaya and Mt Trikora areas) compared with about 4000 sq km at present (Hope, J. H. and Hope, G.S. 1976). There is no evidence about the nature of these grasslands from the Mt Jaya area itself, but if they resembled those of Papua New Guinea at that time, much of the area would have supported scattered shrublands, providing a varied, mosaic environment.

Relatively little is known about the ecology of the various species of *Thylogale*. Ziegler (1977:134) describes *T. brunii* as inhabiting 'man-made and alpine grasslands and areas of secondary growth, seldom straying far into thick forest'. The series of *T. brunii* from Mt Giluwe, in the western highlands of Papua New Guinea, was collected at an altitude of about 3,700 m, close to the summit. Mt Giluwe, a large strato-volcano, is mostly open grassland above about 3100 m. The wallabies came from very small forest patches not more than about 40 acres in extent (Newsome 1971). Wallaby dung was seen only in the grass close to these patches, and not elsewhere in the vast expanses of grassland or close to other forest patches. Newsome suggested that although the wallabies were not present in all forest patches, these patches were responsible for the survival of the species in the area.

In contrast, the other small wallaby of montane New Guinea, *Dorcopsulus vanheurni*, seems to be more characteristic of dense forest areas (Zeigler 1977). Specimens caught on Mt Wilhelm, PNG, came from relatively undisturbed areas of montane forest at about 2,700 m, well away from both the higher grasslands and the cultivated areas.

In Australia, *Thylogale thetis* and *T. stigmatica* occur in rainforest in coastal Queensland and northern New South Wales. Calaby (1966) recorded the species in the Clarence and Upper Richmond River areas of northern NSW. Here both species occurred in rain forest, in large patches of lantana on areas formerly covered with rain forest, and sometimes in wet gullies with a dense shrubby ground stratum, close to larger rain forest patches. The two species were not found together, the smaller rain forest patches being occupied by one species only, and where both occurred in a large patch, they occupied discrete areas. The ecological factors governing the distribution of the two species were not determined. Both species, however, came out of the rain forest and fed close to the edge in the evening.

The Tasmanian species, *Thylogale billardierii,* occurs in damp, densely vegetated areas such as fern gullies, the edges of rain forest and in drainage areas of heathland where the scrub is tall and dense (Green 1974). It emerges at dusk to feed on shrubs, native grasses and introduced pasture if this lies near its territory.

Given the similarity of habitat for the various species of *Thylogale,* that is, a dependence on forest or shrub patches, but with movement into more open vegetation on the edges of these patches for feeding, it is probably reasonable to assume that *T. christenseni* had similar habits. The presence of both *T. christenseni* and *T. brunii* together in a rock shelter on the Kemabu Plateau is an interesting parallel to the sympatric distribution of *T. thetis* and *T. stigmatica* in eastern Australia. In New Guinea, the shrub-rich grasslands with their patches of forest would seem to have provided a suitable habitat for species of *Thylogale,* both now and in the past. During the late Pleistocene, shrub-rich montane grasslands were more extensive on all the high mountain areas of New Guinea. The major reduction in grassland area that occurred after 14,000 BP would have put pressure on all species living in these areas. Mt Jaya, however, possesses the most extensive area of high plateau and would have been least affected, so most important as a refuge for high altitude populations. It is possible to speculate that *T. christenseni* may have once been more widespread in montane New Guinea, but after the expansion of forest between 14,000 and 10,000 years most islands of shrub-rich grassland were able to support only one species (*T. brunii*), while the larger expanse of the Kemabu Plateau (and possibly equivalent areas around Mt Trikora) were able to support two species, both *T. brunii* and *T. christenseni.*

Both *T. brunii* and *T. christenseni* certainly survived in the Mt Jaya area until less than 5000 years ago, but the question of whether either or both persist there today can only be answered by further field work. However, the lack of sightings of wallabies or their dung by the recent expeditions suggests that they must be fairly rare. While faunal records for the area are extremely sparse, the contrast between the extensive faunal list from the Mapala rock shelter and the few modern records does suggest that there has been some decrease in the mammal fauna within the last 5000 years. Pollen records for the Mt Jaya region suggest that clearance and burning by man within the last 10,000 years have partly reversed the development of high forest, and increased the extent of shrub-rich grassland and forest patches. Burning was probably at a peak between 2-3000 years BP (Hope, G.S. and Hope, J.H. 1976). The first effect of this may have been neutral or even favourable for the fauna, but burning would have been accompanied by hunting, and this, together with the advent of the dog, both feral and as a hunting aid, is the likeliest cause for the apparently rare (or possibly extinct) present status of the two thylogales. However, it should be noted that the small populations of *T. brunii* on Mt Giluwe have managed to survive in spite of a high density of feral dogs and native hunters. Dogs have probably been in New Guinea for only about 3000 years (Hope 1977), and the presence of the remains of one in the small sample from the Mapala rock shelter may be significant;

dog remains are relatively rare in eastern New Guinea archaeological sites, and have only been found in the very youngest levels (White 1972).

CONCLUSION

Thylogale christenseni is recorded only from a single late Holocene deposit in Irian Jaya. It is not known whether the species still survives, either in Irian Jaya or Papua New Guinea. Consideration of its probable ecology and the past extent of suitable habitat suggests the possibility that it may once have been widely distributed in montane New Guinea. The parallelism with *T. billardierii* in many characteristics is interesting, in the light of Tasmanian-montane New Guinea relationships in general, which seem to reflect a similar ancestral fauna and flora related to that of the middle and late Tertiary of mainland Australia.

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I am grateful to the members of the Carstensz Glaciers Expedition, who collected the faunal material from Mapala rock shelter, and to Dr A. Newsome, for use of his specimens of *Thylogale brunii* from Mt Giluwe.

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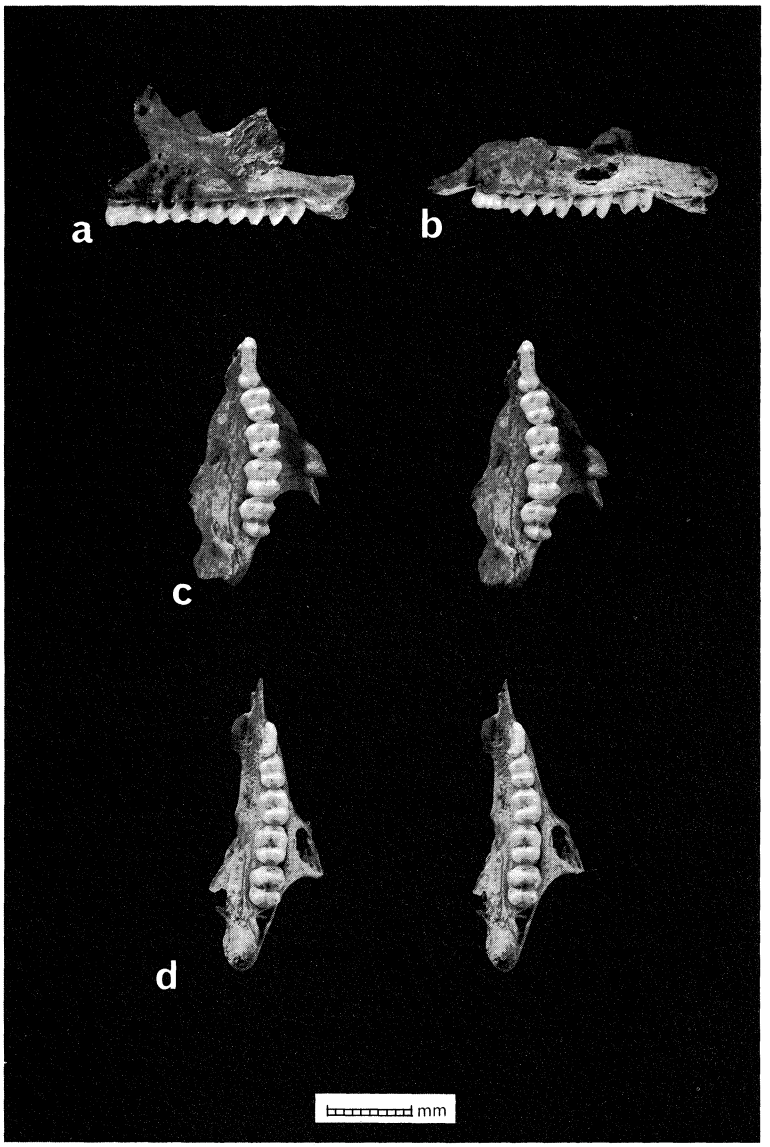

Fig. 1
Thylogale christenseni sp. nov.

Fig. 1a Lateral view of holotype, left adult maxilla, AM F54719.

Fig. 1b Lateral view of juvenile maxilla, AM F54728.

Fig. 1c Stereopair of occlusal view of holotype, AM F54719.

Fig. 1d Stereopair of occlusal view of AM F54728.

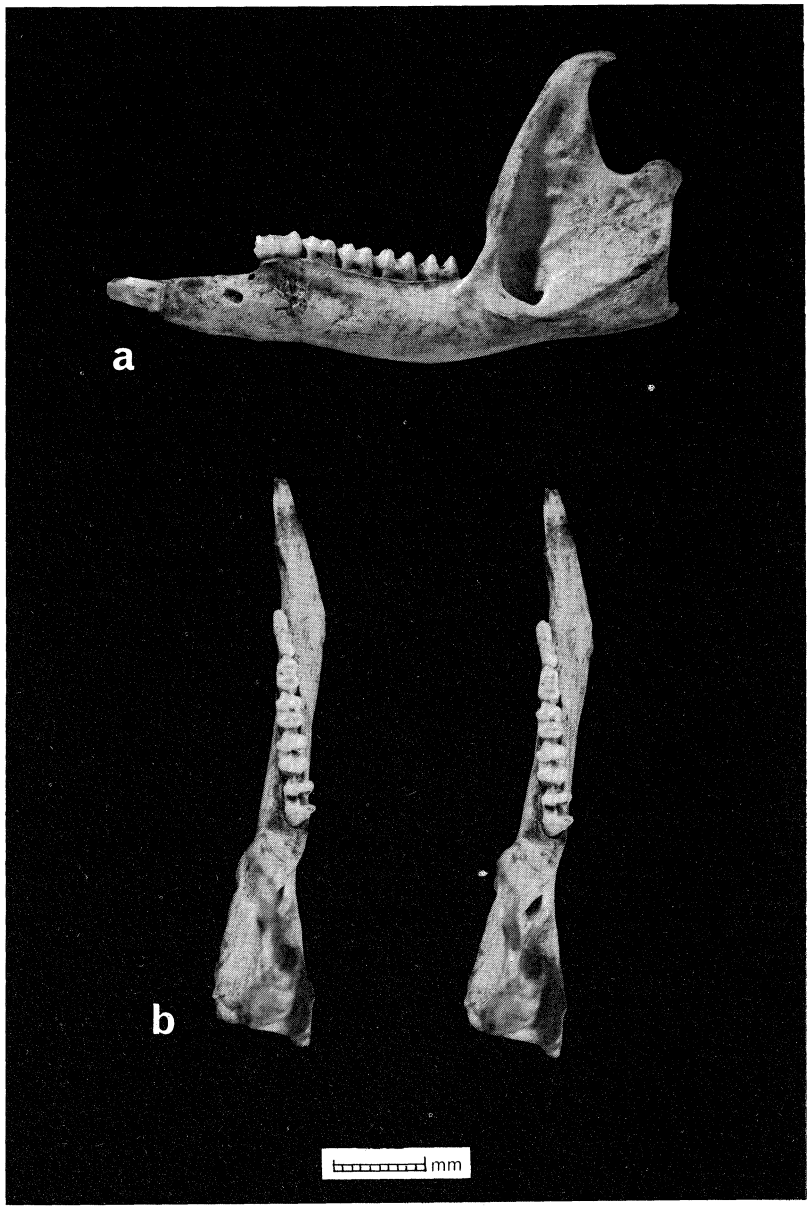

Fig. 2

Thylogale christenseni sp. nov.

Fig. 2a Lateral view of left adult mandibular ramus, AM F54730.

Fig. 2b Stereopair of occlusal view of AM F54730.

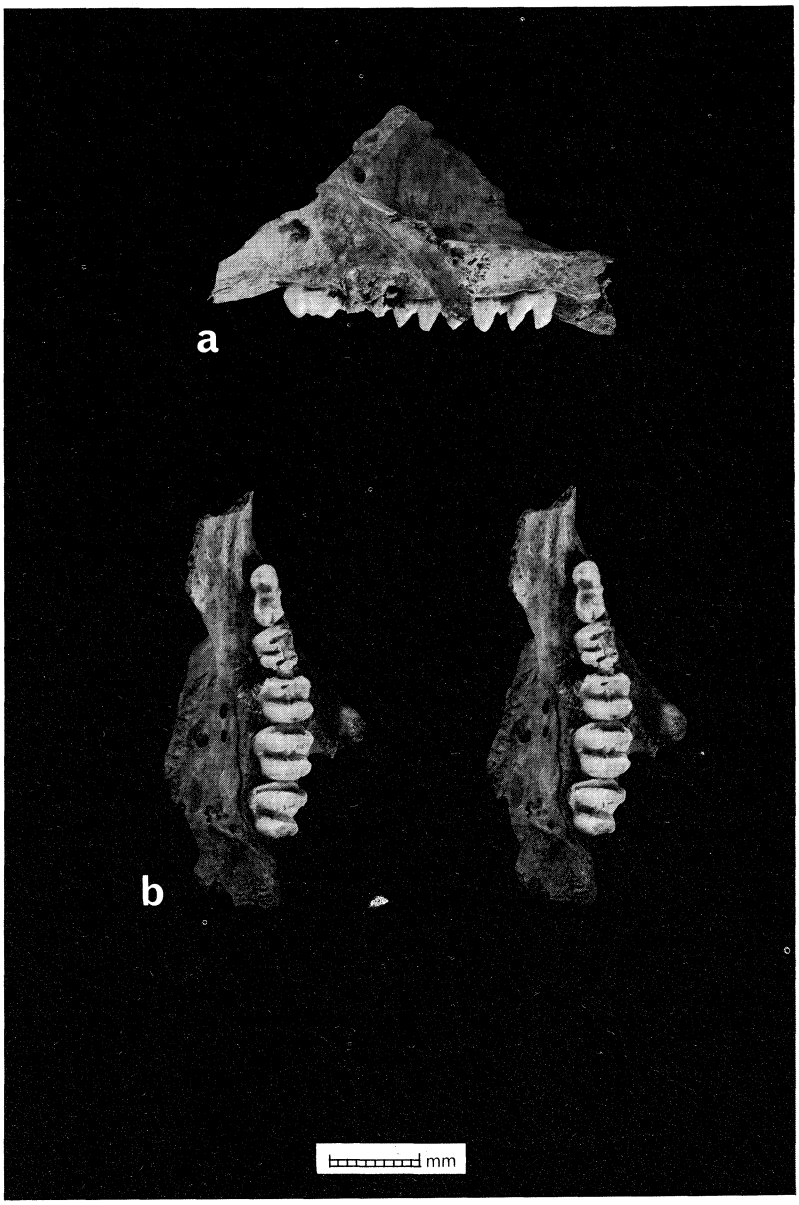

Fig. 3

Thylogale brunii (Schreber, 1778)

Fig. 3a Lateral view of left adult maxilla, AM F54759.

Fig. 3b Stereopair of occlusal view of AM F54759.

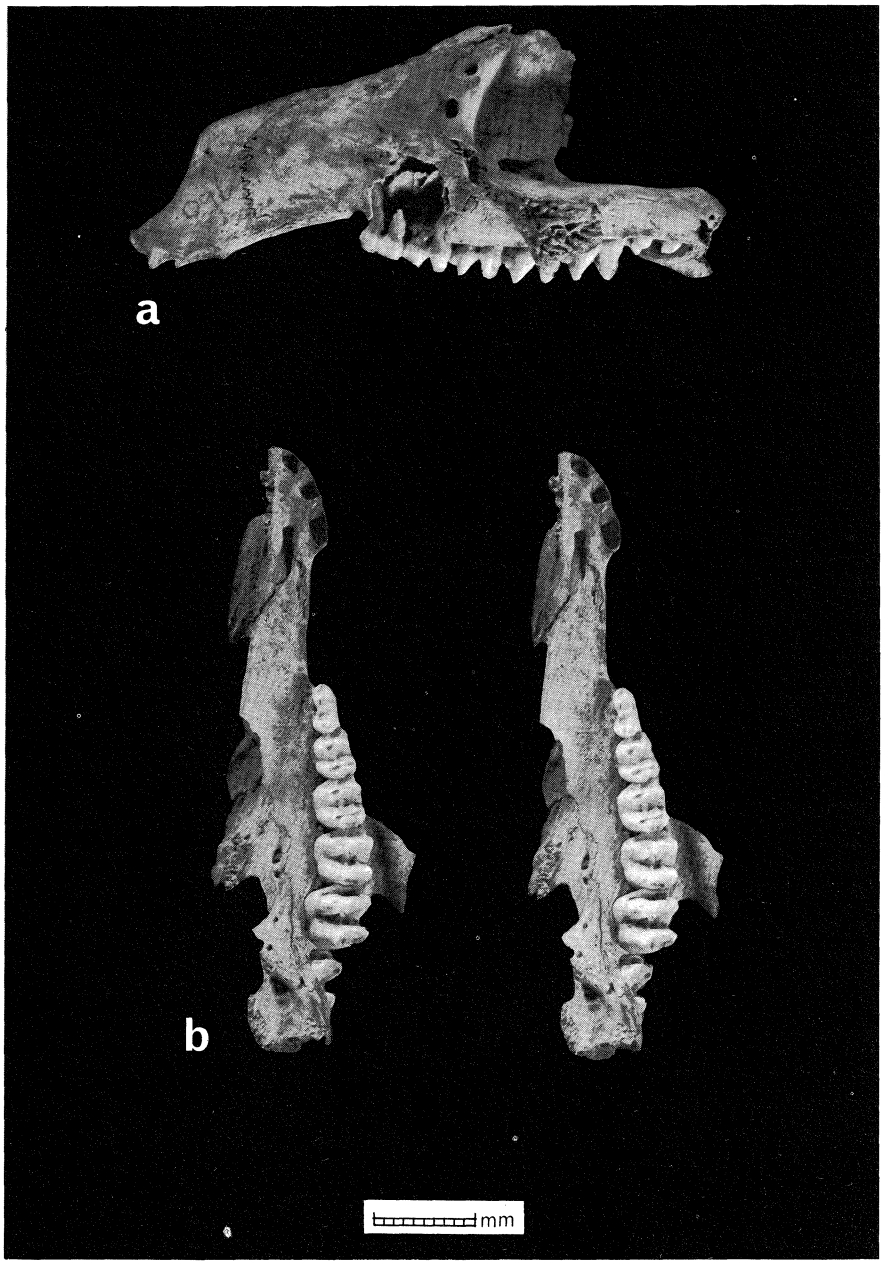

Fig. 4

Thylogale brunii (Schreber, 1778)

Fig. 4a Lateral view of left juvenile premaxilla and maxilla, AM F54760.

Fig. 4b Stereopair of occlusal view of AM F54760.

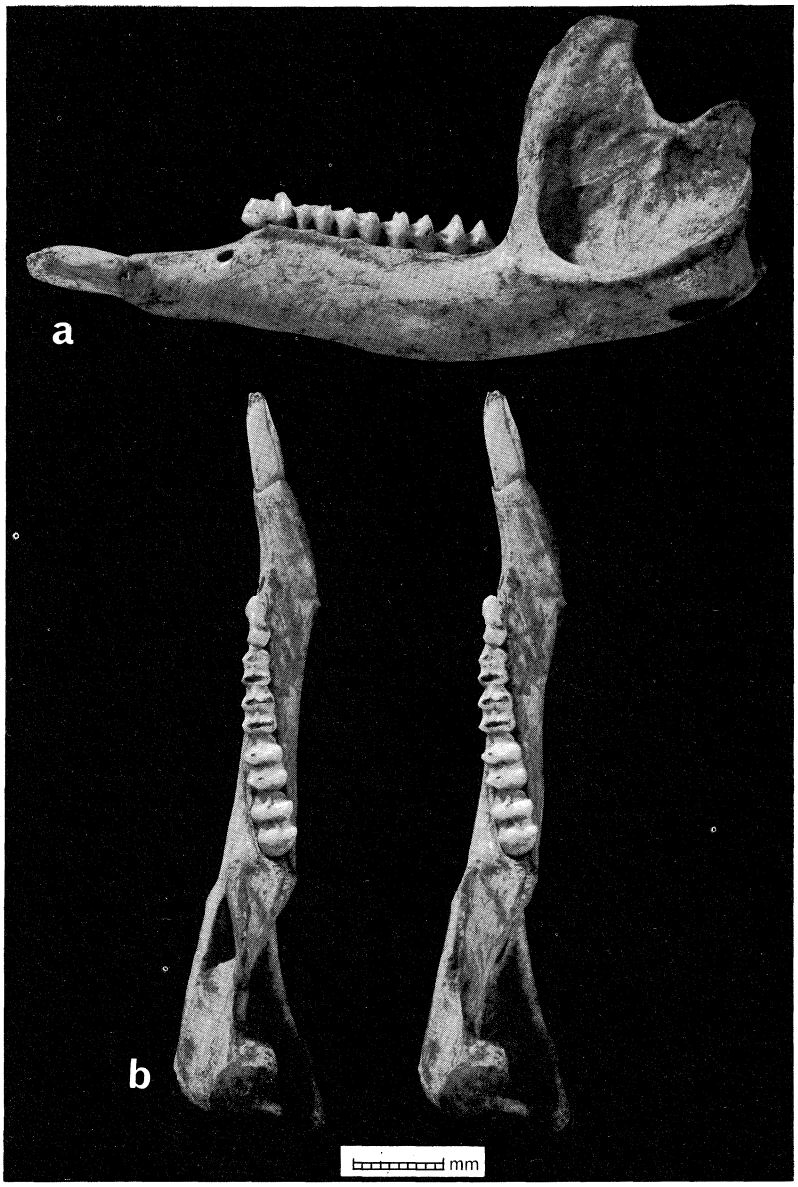

Fig. 5

Thylogale brunii (Schreber, 1778)

Fig. 5a Lateral view of left adult mandibular ramus, AM F54762.

Fig. 5b Stereopair of occlusal view of AM F54762.

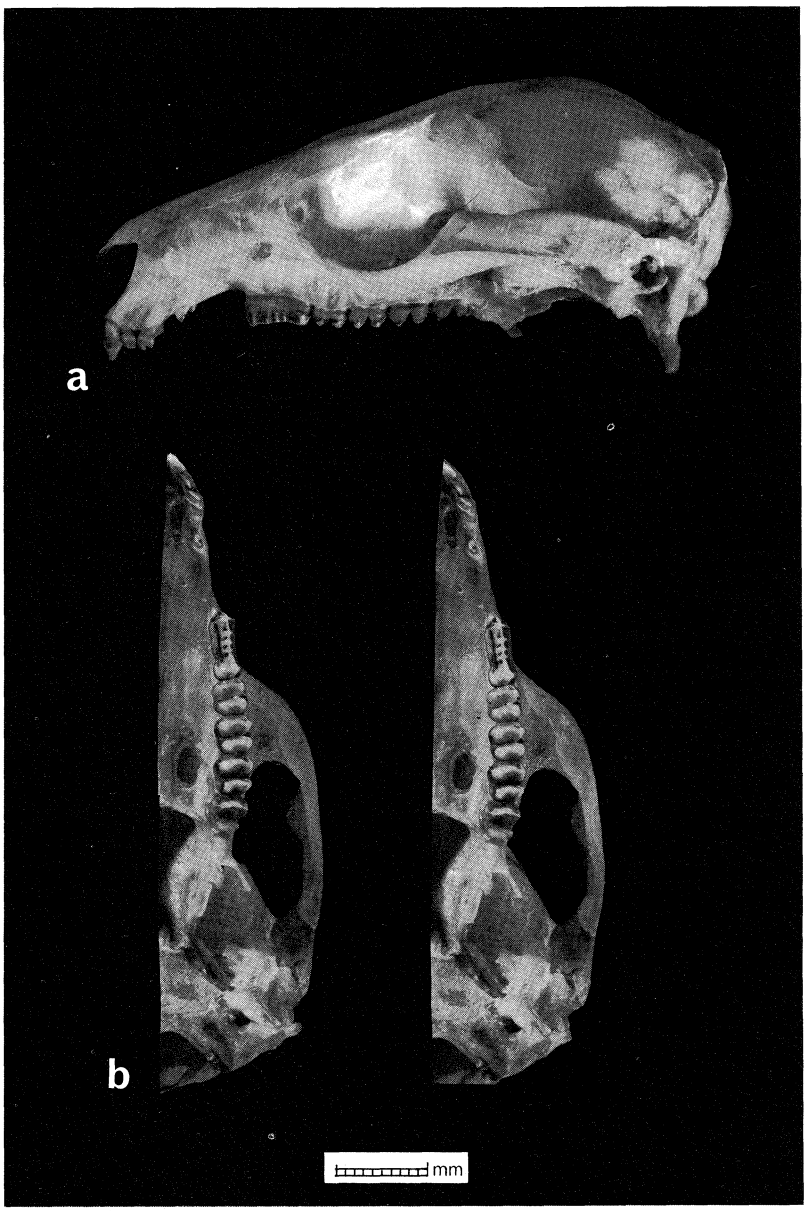

Fig. 6

Dorcopsulus vanheurni Thomas, 1922

Fig. 6a Lateral view of adult skull, CM 15124.

Fig. 6b Stereopair of occlusal view of left side of skull, CM 15124.

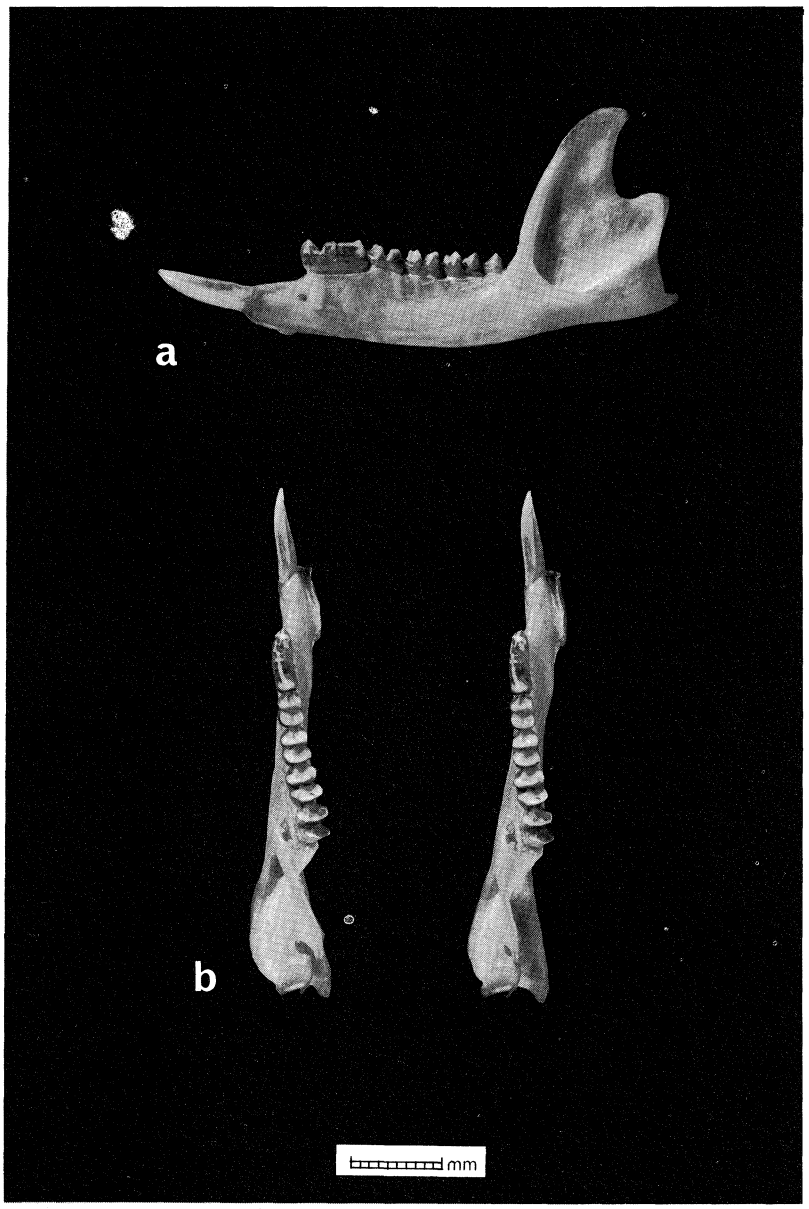

Fig. 7

Dorcopsulus vanheurni Thomas, 1922

Fig. 7a Lateral view of left adult mandibular ramus, CM 15124.

Fig. 7b Stereopair of occlusal view of CM 15124.