

*PROPLEOPUS CHILLAGOENSIS*, A NEW NORTH QUEENSLAND  
SPECIES OF EXTINCT GIANT RAT-KANGAROO  
(MACROPODIDAE: POTOROINAE)

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**Abstract**

*Propleopus chillagoensis* is described as a second species in the genus. The genus is rediagnosed. The new species differs markedly in details of premolar and molar morphology from the Pleistocene *P. oscillans* (De Vis), but reveals no additional information about intergeneric relationships. In the unique characters which differentiate it from *P. oscillans*, it is less like structurally ancestral forms such as *Hypsiprymnodon* than is *P. oscillans*, and could be a descendent of the lineage leading to *P. oscillans*. A specimen of *Propleopus* from the Pleistocene Wellington Caves is similar to *P. chillagoensis*, and suggests the possibility that the two species, or lineages leading to them, were contemporaneous during part of the Pleistocene, and probably represent end members of a late Tertiary radiation.

**Introduction**

*Propleopus oscillans* was described on the basis of a single dentary fragment by De Vis (1888). Since then a lower incisor and two additional dentary fragments have been reported (Woods, 1960 and Tedford, 1955), as well as a maxillary fragment (Bartholomai, 1972). All of this Pleistocene material has been referred to *P. oscillans* with little hesitation.

Gill (1953, 1957) described a tooth from the Pliocene Grange Burn local fauna which Ride (1964) and Turnbull and Lundelius (1970) regard as similar to but smaller than *P. oscillans*.

The present material, comprising a maxillary fragment and two isolated premolars represents a second very distinct species. The existence of at least two distinct forms of *Propleopus* in the Pleistocene indicates that there was probably a late Tertiary radiation of the genus.

Registration numbers are those of the Queensland Museum (e.g. F6675, fossil collection; e.g. J6824, modern mammal collection), the National Museum of Victoria (e.g. P15917), the American Museum of Natural History (e.g. AMNH 65279) and Museum of Palaeontology, University of California (e.g. UCMP 51697).

Dental terminology follows that used elsewhere by Archer (1974, 1976). An alternative

nomenclature for individual premolar teeth, as used elsewhere (e.g. by Bartholomai, 1972), is not used here, but not because it has been shown to be any less appropriate than the system used by Archer (1974) and some other authors (e.g. Mahoney and Ride, 1975).

**Rediagnosis of *Propleopus* Longman, 1924**

Recognition of a second species broadens the concept of *Propleopus* as follows: Potoroine macropodids differing from other potoroine genera in unique extent of subhorizontal wear facet on I<sub>1</sub>; also differ from *Hypsiprymnodon* in having enamel on I<sub>1</sub> covering only lower half of labial and lingual faces; posterior half of P<sub>4</sub> shorter crowned; M<sub>1</sub> trigonid wide; differing from *Caloprymnus* and *Potorous* in distribution of enamel of I<sub>1</sub>, larger more finely serrated and arcuate plagiulacoid premolars, in having a vestigial tooth immediately posterior to I<sub>1</sub>, and in having lingual cingula (sometimes as rudiments) on upper molars; differing from *Aepyprymnus* in having more arcuate plagiulacoid premolars, poorly-developed lingual cusp or crest development on P<sup>1</sup>, wider molars, poorly-developed transverse lophs on molars; vestigial tooth immediately posterior to I<sub>1</sub>, obliquely set plagiulacoid premolars, and lingual cingula (sometimes rudiments) on upper molars; also differing from *Bettongia* in having more arcu-

ate, mesially swollen plagiolacoid premolars with narrow posterior ends on permanent premolars, and a vestigial tooth immediately posterior to  $I_1$ .

***Propleopus chillagoensis* sp. nov.**

(Plate 11, fig. 1)

*Holotype*: P15917, right maxillary fragment with erupting  $P^4$  and erupting and broken  $M^4$ , fragment of  $M^1$ , and  $M^{2-3}$ , donated by Mr Hugh C. Mainwaring in 1910.

*Referred Material*: P15918, isolated  $LP_4$ ; P15919, isolated and broken  $RP^4$ ; both from type locality.

*Type Locality*: Fissure deposit in Chillagoe Formation, Chillagoe District, N.E. Queensland. According to a letter (National Museum of Victoria) from Mr Hugh C. Mainwaring to Professor Baldwin Spencer, 21 July 1910, the specimens came from '... a bluff 800 ft. long, 300 ft. wide and 50 ft. above the plain of the surrounding country. This bluff is being worked [1908-11] as a quarry to supply the smelter with flux. In breaking down the stone a number of small caves were found. These were fitted with material resembling silicified clay in which the fossils were imbedded'. Mr William Morrow (pers. comm.) notes that the locality was 'Smelter's Junction, one mile from Chillagoe Railway Station, along the Mungana line, on the left hand side on the way to Mungana.'

*Origin of Name*: Reference to type locality.

*Diagnosis*: Differs from the only other species in the genus, *Propleopus oscillans*, in having a markedly larger  $P^4$  and  $P_4$ , each with nine vertical ribs; anterior ribs on  $P_4$  are rectilinear rather than curved;  $P_4$  crown base more steeply inclined posteriorly; upper molars shorter, with more swollen bases; lingual cingulum around base of protocone on at least  $M^{2-3}$ ; preprotocrista connects directly with preparacrista; posterior half of upper molar crowns markedly narrower than anterior half.

*Description*:  $P^4$ : Two-rooted tooth; occlusal outline oval, widest at anterior one-half; anterior end gently convex, posterior end blunt. Occlusal cutting edge gently convex, ventrally with maximum convexity occurring towards posterior one-half of edge. Anterior edge of tooth has curved, labially convex, vertical crest

confluent with occlusal cutting crest of tooth. Posterior to this anterior crest are eight pairs (lingual and labial) of prominent vertical ridges which reach the occlusal edge of tooth. Ninth pair fails to extend as far as occlusal edge. Longitudinal spacing between ridges decreases posteriorly. Bases of second pair of ridges bifurcated. Bases of eighth and ninth buccal ridges confluent. Ninth ridges more massive than others and form shallow vertical fossettes between themselves and eighth ridges. Relative ridge lengths as follows 3 subequal to 4, 2 subequal to 5, 6, 7, 8, 9. Eighth ridge interrupted by gap on each side. Base of crown lacks cingula. Judging by position of erupting crown,  $P^4$  probably oriented antero-labially, with respect to long axis of molar row.

$P_4$ : Identical to  $P^4$  except as follows: Posterior edge of crown keeled with non-serrated vertical continuation of occlusal cutting crest; widest part of crown closer to middle of tooth; ninth ridges less massive than corresponding ridge in  $P^4$ ; base of second ridge not bifurcated; base of second and third lingual ridges confluent.

$M^1$ : Crown represented by only posterior one-third. Roots indicate anterior one-half of tooth much wider than posterior one-half, and that lingual one-half of tooth longer than labial one-half, result of evidently very large protocone. Remnant of posthypocrista and postmetacrasta linked in arc, middle of which functions as a posterior cingulum. Base of crown very swollen, such that transverse diameter of crown base below hypocene and metacone estimated at three times distance between those cusps.

$M^2$ : Anterior one-half of crown wider than posterior one-half. Lingual and labial sides of crown subequal in length. Protocone, hypocone and paracone subequal in height, and taller than metacone. Preprotocrista and preparacrista connect as an anteriorly convex arc. Postmetacrasta and posthypocrista joined as in  $M^1$ . Prelypocrista and postprotocrista linked in barely obtuse angle. Postparacrista and premetacrasta become irregular towards middle of crown, and are only just linked by low longitudinal crest. Prominent, transverse lingual

ridges descend flanks of paracone and metacone from longitudinal midline of crown. Poorly-defined transverse labial ridge descends flank of hypocone and meets lingual rib of metacone in longitudinal midvalley. Very poorly-defined anterolingually directed labial ridge descends protocone, but intersects the preprotocrista anterior to the protocone. Labial to point of intersection of postparacrista and premetacrista are two small adjacent cusps along labial end of transverse midline. Prominent lingual anterolingually inclined ridge ascends flank of hypocone to base of protocone, adjacent to small basal lingual cuspule, which in turn is adjacent to lingual end of anterolingual basal cingulum which terminates labially at point where  $M^1$  abuts against  $M^2$ . Very small cingular bulge occurs on posterolingual base of hypocone.

$M^3$ : Anterior one-half of tooth much wider than posterior one-half. Lingual one-half subequal in length to labial one-half. Protocone subequal in height to hypocone, all other than paracone, and much taller than reduced metacone. Prehypocrista, postprotocrista, preprotocrista and preparacrista linked in  $M^2$ . Posthypocrista does not contact vestigial postmetacrista, being separated by posterolabial depression. Poorly developed premetacrista and postparacrista only just fail to contact in transverse midvalley of tooth. Prominent lingual rib descends paracone in posterolabial direction from longitudinal midline of crown. Much more poorly developed lingual and labial ridges descend flanks of metacone and hypocone but just may not meet each other in longitudinal midvalley. Poorly-developed labial ridge descends protocone in same manner as in  $M^2$ . Prominent lingual rib ascends flank of hypocone to base of protocone. Vertical lingual ridge, also descends from base of protocone to point halfway down its flank. Base of this ridge vaguely contacts oblique lingual hypocone ridge and anterolingual basal cingulum on anterior flank of protocone. Anterolingual cingulum terminates labially just short of point at which  $M_2$  abuts  $M_3$ . Poorly-developed (but better than  $M^2$ ) posterior cingulum descends from posterior

flank of hypocone to posthypocrista near its labial end.  $M^3$  less worn than  $M^2$  and reveals fine crenulations over much of crown surface enclosed by principal cusps. Also evidence of accessory vertical crenulations parallel to labial ridges of protocone and hypocone, and connecting posthypocrista with longitudinal midvalley of crown.

$M^4$ : Only anterior one-half of crown remains. From remnant of base of posterior one-half, evident that anterior one-half wider than posterior one-half. Protocone taller than paracone. Preprotocrista connected to preparacrista as in  $M^3$ . Postparacrista not connected to premetacrista. Lingual ridge of paracone prominent and extends transversely to longitudinal midvalley to meet labial ridge of protocone. Some evidence for lingual protocone ridge as in  $M^3$ . Tooth erupting so anterior cingulum not visible, if present. Edge of enamel near posterior base of protocone suggests lingual hypocone ridge present as in  $M^3$ . Very poorly-developed vertical ridge occurs on anterolabial flank of paracone linking preparacrista with base of crown. As in  $M^3$ , clear indications of accessory crenulations occur in crown valleys and on flanks of cusps.

Meristic changes along tooth row: Posteriorly, teeth become relatively narrower and longer; metacone markedly reduces in size; paracone reduces in size but at a slower rate; crests linking metacone to other crests become smaller; transverse midvalley of crown becomes more open at labial end; bases of protocone and hypocone become less swollen; distance between hypocone and metacone diminishes. Tooth eruption sequence indicated suggests  $P^4$  and  $M^4$  erupt at approximately the same time.

*Discussion:* The type specimen of *Propleopus oscillans* is a dentary while that of *P. chillagoensis* is a maxillary fragment. A possibility therefore exists that both specimens represent *P. oscillans*. We have considered this possibility and discounted it for the following reasons. First, Bartholomai (1972) has described F6675 from the Darling Downs, a maxillary fragment with  $LP^4$ - $M^2$ , and referred it to *P. oscillans*. It is specifically distinct from the

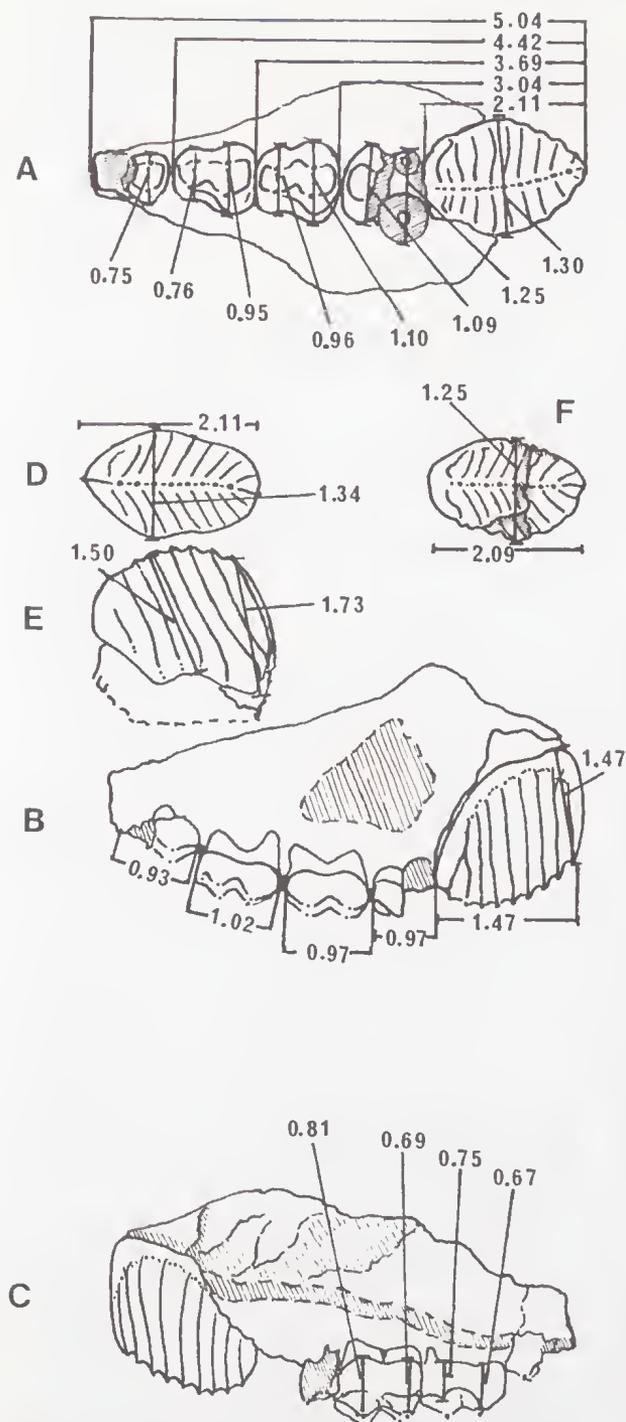


Figure 1—Measurements of specimens of *Propleopus chillagoensis* sp. nov. A-C, P15917, holotype. D-E, P15918, LP<sub>4</sub>. F, P15919, RP<sub>4</sub>. Measurements are in centimetres.

Chillagoc maxillary fragment, for reasons noted in the diagnosis. In addition, although P<sup>4</sup> of the type of *P. chillagoensis* is larger than P<sup>4</sup> of F6675, its molars are proportionately smaller. For this reason, the size differences in the two maxilla cannot be the result of allometry.

Additional evidence for reference of F6675 to *Propleopus oscillans* comes from the number of ridges on upper and lower adult premolars of living potoroines. In modern *Aepyprymnus rufescens*, of twenty-three specimens examined with relatively unworn premolars, nine have the same number of ridges (seven or eight) on the upper and lower premolars, while the remainder differ by only one ridge. Variation in ridge number is as follows: P<sup>1</sup>: one has seven ridges; thirteen have eight; and eight have nine; P<sub>4</sub>: three have seven ridges; thirteen have eight; and three have nine. In *Hypsiprinodon moschatus*, of all ten specimens with relatively unworn adult premolars, P<sup>1</sup> has six and P<sup>4</sup> seven ridges. Both upper and the single lower premolars of *P. chillagoensis* have nine ridges, while the P<sub>4</sub> of the holotype of *P. oscillans* and P<sup>4</sup> of the referred specimen both appear to have seven ridges. The constancy of ridge number in *Hypsiprinodon*, the consistently different ridge number in *P. chillagoensis* from the holotype of *P. oscillans*, and the apparently close relationship of *Propleopus* to *Hypsiprinodon* (see below) which has a species constant number of ridges, convince us of the correctness of Bartholomai's (1972) reference of F6675 to *P. oscillans*. Added to the other morphological characters noted in the diagnosis, it also convinces us of the distinction between the two species of *Propleopus*.

Further, but less convincing evidence for the association suggested by Bartholomai (1972), is the fact that both the holotype of *P. oscillans* and F6675 come from the Darling Downs of southeastern Queensland, while the specimens of *P. chillagoensis* come from far northeastern Queensland.

These data, as well as the close approximation of upper and lower molar sizes, support Bartholomai's (1972) reference of F6675 to *Propleopus oscillans* and convince us that the

Chillagoe material with its nine vertical ridges, and relatively short and wide premolars cannot be referred to *P. oscillans*.

Most authors who have considered the affinities of *Propleopus oscillans* regard it to be closely related to *Hypsiprymnodon*, a conclusion with which we generally agree, although some characters more closely resemble *Bettongia* than *Hypsiprymnodon*. *P. chillagoensis* reveals no characters that more closely ally it with *Hypsiprymnodon* or *Bettongia* than with *P. oscillans*. The characters which differentiate it from *P. oscillans* are unique derived characters and are of neutral value in assessing intergeneric relationships. Because *P. oscillans* retains more structurally primitive character states (i.e. fewer ridges on P<sup>1</sup>, relatively unswollen molars, poorly-developed lingual ezingula, and unreduced metacones on the upper molars), and has no derived characters of its own which are not also present in *P. chillagoensis* and hence diagnostic of the genus as a whole, it can be regarded as structurally, if not actually ancestral to *P. chillagoensis*.

The precise age of the eastern Darling Downs specimens within the Pleistocene is in doubt. Similarly, the age of the Chillagoe specimens is in doubt but the presence of *Sarcophilus*, suggests that the Chillagoe deposit is no older than Pleistocene (Bartholomai and Marshall, 1973). Tedford (1967) mentions that the material described here as *P. chillagoensis* is associated with *Sarcophilus* and small macropodines apparently related to living species.

The *Propleopus* specimen (UCMP 45171) figured by Tedford (1967, fig. 5b) as *P. oscillans* from Pleistocene deposits in Wellington Caves, New South Wales, although only a fragmentary dentary lacking P<sub>4</sub>, shows in some respects, the kinds of characters which might be expected in lower molars of *P. chillagoensis*. Compared with *P. oscillans*, the anterior half of M<sub>1</sub> is relatively wider, the molars are somewhat shorter, and most importantly, the talonid of M<sub>4</sub> is narrower as noted by Tedford (1967) and its entoconid is more reduced. The entoconid is the occlusal counterpart of the metacone in the upper molars. Reduction

of one is likely to be reflected by reduction of the other. Its taxonomic position is considered as doubtful until better material becomes available.

Tedford (1967) concludes that the late Pleistocene, Lake Menindee, New South Wales specimen (UCMP51697) of *Propleopus* is referable to *P. oscillans*, a conclusion with which we agree. A second tooth fragment from Menindee (UCMP51698) was compared by Tedford (1967) with the Chillagoe material. It is likely that this specimen is also referable to *P. oscillans*.

These occurrences suggest the possibility that the lineages resulting in *Propleopus oscillans* and *P. chillagoensis* may have been contemporaneous during the Pleistocene and represent parts of a late Tertiary radiation of the genus.

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### Explanation of Plate

#### PLATE 11

*Propleopus chillagoensis* sp. nov. A, stereopair, occlusal view, P15917, holotype, RP<sup>4</sup>-M<sup>4</sup>. B, labial view, P15917, holotype. C, stereopair, occlusal view, P15918, LP<sub>4</sub>. D, labial view, P15918, E, stereopair, occlusal view, P15919, RP<sup>4</sup>. F, labial view, P15919. White line is one cm in length.

