FIRST FOSSIL BANDICOOT FROM THE PLIOCENE CHINCHILLA LOCAL FAUNA

B.S. MACKNESS, S. WROE, J. MUIRHEAD, C. WILKINSON AND D. WILKINSON

FOUR fossil peramelemorphians are currently recognised – *Yarala burchfieldi* from Miocene deposits of Riversleigh (Muirhead and Filan 1995; Muirhead in press), *Ischnodon australis* from the Early to Middle Pliocene Palankarinna Fauna (Stirton 1955), *Perameles allinghamseni* from the Early Pliocene Bluff Downs Local Fauna (Archer 1976) and *P. bowensis* from the Early Pliocene Bow Local Fauna (Muirhead et al. 1997). Three of these fossil taxa are referable to modern families. *Ischnodon australis* represents the Thylacomyidae, while *Perameles allinghamseni* and *P. bowensis* represent the Peramelidae. *Yarala burchfieldi*, in contrast, represents the superfamily Yaraloidea (Muirhead in press).

Two other fossil permelemorphians have been formally described but subsequently referred to modern taxa. *Perameles tenairostris*, described by Owen (1877) from cave deposits presumed to be in the Wellington area of New South Wales (NSW) (Mahoney and Ride 1975), was considered by Lydekker (1887) to be indistinguishable from the modern *P. nasuta*. Fossils from Broom Cave near Taralga, New South Wales described as *P. wombeyensis* by Broom (1896) were subsequently identified by Wakefield (1972) as representing *P. nasuta* and *Isodon macrourus*.

This note describes material from the late Early Pliocene Chinchilla Local Fauna referable to *P. bowensis* including previously unknown elements. It also discusses the biocorrelative value of this new discovery. Dental nomenclature follows Flower (1869) and Luckett (1993) where the adult, unreduced tooth formula of marsupials is P1-3 and M1-4. Dental terminology follows Muirhead (1994). Classification follows Aplin and Archer (1987). Institutional abbreviations: AM F Australian Museum Fossil Collection; QM F, Queensland Museum Fossil Collection.

**Stratigraphy**

The Chinchilla Sand was named by Woods (1960) for a sequence of weakly consolidated grey to yellowish and light brown sands, ferruginised heterogeneous conglomerates, grits, sandy clay and clays. These outcrops range from shallow beds to sections several metres deep. Wilkinson’s Quarry, at Chinchilla, Queensland, has been continuously worked by two of us (CW, DW) for over ten years. The specimens described come from a fossil-bearing unit within the quarry that lies unconformably on top a layer of fine sand. The sediments are primarily fluviatile in nature and represent a number of depositional events. Most fossils in these units occur as isolated pieces. Tedford et al. (1992) conclude that the Chinchilla Local Fauna biocorrelates with the Kanunka Local Fauna of the Tirari Desert, South Australia. On the basis of magnetostratigraphy, they conclude that the latter is approximately 3.4 million years old, or late Early Pliocene in age.

**Description**

The type of *P. bowensis*, from the Pliocene Bow Local Fauna of north-eastern NSW, is a right M3 (AM F98809). The paratypes, from the same local fauna, comprise a right M2 (AM F98810), a right P3 (AM F98811), a right M1 (AM F98812) and a left M1 (AM F98813) (Muirhead et al. 1997). Additional specimens from two Wellington Cave deposits, the Big Sink Unit and Graded-Bedded Units, have also been tentatively referred to the species (Muirhead et al. 1997). The Wellington Cave specimens include a broken M1 (AM F69804) and two broken right M3’s (AM F69887, F69899) from the Big Sink Local Fauna and a broken M1 (AM F69897) and M2 (AM F69896) from the Graded-Bedded Unit.
The material from the Chinchilla Local Fauna (Fig. 1) comprises an isolated left $M_1$ (QM F30580) and a partial left dentary preserving an incomplete $M_2$, $M_3-4$ (QM F30581). It is referred to *Perameles bowensis* on the basis of overall similarity in morphology of the $M_1$ and $M_3$ to paratypes AM F98813 and AM F98812 respectively. The dentary is broken anteriorly, preserving the posterior part of the $M_2$ alveolus. In lateral view, it is slightly convex along the ventral margin and is deepest below the $M_4$, tapering anteriorly and posteriorly from this point. The coronoid crest is largely missing, but what remains ascends from the body of the dentary at an angle of approximately 35°. The condyle is not preserved.

$M_1$. Morphology follows that of the paratype (AM F98813) from the Bow Local Fauna. 

$M_2$. Only the talonid is preserved. Wear is minimal to moderate. The entoconid is the tallest cusp, large and conical. The hypoconulid is much lower and the hypoconid lower-crowned still. A weak pre-entocristid is present. The crescent-shaped cristid obliqua (as judged in occlusal view) terminates against the remnant posterior face of the trigonid at a point, slightly buccal to the midline of the tooth. A well-defined buccal cingula is present. The posthypocristid is very well-developed. Talonid morphology of this $M_2$ clearly differs from that of the paratype $M_1$ and $M_3$ in that it is wider with a larger entoconid and longer posthypocristid.

$M_3$. This tooth differs in no significant way from that of the paratype (AM F98812) from the Bow Local Fauna.

$M_4$. The trigonid is entirely preserved, but the talonid is broken away above the posterior root of the tooth. Both the metaconid and paraconid exhibit heavy wear. Of the two principle shearing crests preserved, the paracristid is slightly longer than the metacristid. The trigonid is narrower in its transverse dimension, relative to the paratype $M_3$. The paracone and metacone are more closely appressed with respect to the long-axis of the tooth row.

**DISCUSSION**

There are only two Pliocene vertebrate-bearing faunas in Australia with radiometric dates – the Hamilton Local Fauna in Victoria (Turnbull et al. 1965) and the Bluff Downs Local Fauna in northeastern Queensland (Archer and Wade 1976, Mackness et al. 2000). Although palaeomagnetic
studies have provided a further framework for assigning ages to some faunas (Tedford et al. 1992), the use of biocorrelation and stage-of-evolution interpretation still remain very important tools in the understanding of biochronological relationships of Australian Tertiary faunas.

The Chinchilla Local Fauna is the third Pliocene locality where *Perameles bowensis* has been recorded. Muirhead et al. (1997) suggest that *P. bowensis* is phylogenetically closer to recent species than to *P. allinghamensis* Archer (1976) from the Early Pliocene Bluff Downs Local Fauna. It is also more derived, adding weight to the interpretation that the Big Sink, Bow and Chinchilla Local Faunas are younger than Bluff Downs even though the radiometric age for Bluff Downs may be as young as 3.6 million years (Mackness et al. 2000). A record of *P. allinghamensis* from the Bow Local Fauna in the table of Dawson et al. (1999:287) is an error with only *P. bowensis* being recorded from that site.

A number of more derived taxa than those found in the Bluff Downs Local Fauna are present and/or shared between the Chinchilla and the Bow, Big Sink and Spring Park Local Faunas (Table 1). These include species of *Palorchestes* (Mackness 1995), *Dasyurus* (Wroe and Mackness 1998), *Thylacooleo* (Dawson et al. 1999), *Koobor* (Archer 1976), *Thylacoleo* (Dawson et al. 1999) and a new marsupial family (Mackness et al. 1994). Present data suggests a close bracketing of these medial Pliocene sites. Continued examination of the differences and similarities between their respective faunas has potential to provide further clarification of their relative biocorrelative relationships.

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