WABULAROO NAUGHTONI GEN. ET SP. NOV., AN ENIGMATICAL KANGAROO (MARSUPIALIA) FROM THE MIDDLE TERTIARY CARL CREEK LIMESTONE OF NORTHWESTERN QUEENSLAND.

RESULTS OF THE RAY E. LEMLEY EXPEDITIONS, PART 4

MICHAEL ARCHER*
Queensland Museum

ABSTRACT

Wabularoo naughtoni gen. et sp. nov. is a middle Miocene kangaroo from the Carl Creek Limestone of Riversleigh Station, northwestern Queensland. The dentary morphology is potoroid-like but the molars are lophodont and therefore macropodid-like; the very large plagiaulacoid premolar shares characters of both groups. Its systematic and phylogenetic position are obscure. Although it may be structurally ancestral to either the potoroids or macropodids it post dates the appearance of both families in the fossil record.

Tedford (1967) summarizes the Riversleigh fauna from the Miocene Carl Creek Limestone noting three diprotodontid genera including *Bematherium angulum* Tedford 1967, and an undetermined genus of kangaroos. In 1976, the author and museum assistants Messrs H. Godthelp and R. Kohout made further collections from the Carl Creek limestone at the locality referred to by Tedford (1967, figs. 1–2) as 'D'. These collections included two additional genera of kangaroos, as well as crocodiles, birds, and diprotodontids.

The new kangaroo described here was found in an isolated block of the very hard Carl Creek Limestone. Using an electric jack-hammer, it was collected as part of a smaller chunk of limestone. Fine preparation was carried out in the laboratory using a compressed-air vibrotool.

Terminology of individual teeth follows Archer (1978a) and that of crown morphology follows Archer (1976a, b) or Bensley (1903). Registration numbers prefixed with *F* in the palaeontological collections of the Queensland Museum.

**SYSTEMATICS**

Superfamily: MACROPODOIDEA
Family: Incertae sedis

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*Present address: School of Zoology, University of New South Wales.*
a kangaroo. The generic name is regarded to be masculine.

**Wabularoo naughtoni** sp. nov.

(Fig. 1; Pls., 1, 2)

**Holo**type: Queensland Museum F9177, broken right dentary with P₃, M₂-₃, and part of M₄.

**Type Locality:** From an isolated boulder of the upper clastic arenaceous limestone member of the Carl Creek Limestone, site 'D' (of Tedford 1967), Riversleigh Station, northwestern Queensland.

**Age:** The absolute age is unknown but, based on faunal comparisons, the Carl Creek Limestone is interpreted to be mid to late Miocene in age (Tedford 1967, Archer and Bartholomai 1978).

**Origin of the Species Name:** In honour of Mr and Mrs E. Naughton, owners of Riversleigh Station, who graciously allowed us to work on the property as well as extended many kindnesses to us during our stay.

**Diagnosis:** That of the genus until additional species are known.

**Description:** The dentary is potoroine-like resembling for example *Bettongia* and *Aepyprymnus* in being short, heavy-bodied, with a marked inflection of the ventral border below the molar row, a prominent swelling of the lateral wall below P₃, and a large and laterally swollen masseteric canal. The point of inflection of the ventral border is below M₄ as in some
The morphology of $M_3$: The morphology of $M_3$ is as in $M_2$ except as follows: The whole tooth is larger; the protolophid is subequal in length to the hypolophid; the protolophid is symmetrically concave anteriorly and occlusally; the crest extending anteriorly from the metaconid to the anterior cingulid does not have an inflection immediately anterior to the metaconid; the anterior cingulid is lower such that its anterior edge is no higher than the midvalley of the tooth; the trigonid is noticeably wider than the talonid and is the widest part of the tooth; the anterior cingular shelf is longer; the swelling anterior to the entoconid is not as well-developed; and there is a poorly-developed but distinct lingual vertical crest on the posterior flank of the metaconid (this may also have been present in $M_2$, but the tooth is very worn in this area).

$M_4$: The hypoconid and posterior face of the hypolophid are missing. The morphology of $M_4$ is as in $M_3$ except as follows: There is a point of inflection between the anterolingual corner and the end of the anterior cingulid and the base of the metaconid; the anterior flank of the entoconid is not extended by a swelling, but rather projects anteriorly.

Meristic gradients along the tooth row: The protolophid and trigonid increase in width from $M_2$ to $M_4$; the hypolophid and talonid also increase in width at least from $M_2$ to $M_3$; the preprotocristid increases in length from $M_2$ to $M_4$; the anterior cingulid decreases in height from $M_2$ to $M_4$; and the protoconid increases in mass from $M_2$ to $M_3$, but is subequal in $M_3$ and $M_4$.

**DISCUSSION**

*Wabularoo naughtoni* is in most characters except molar morphology, a decidedly potoroid-like kangaroo. Its lophodont molars which also lack posterior cingula are however decidedly non-potoroid-like characters. Its systematic and phylogenetic position within the Macropodoidea are therefore very much in doubt.

*Wabularoo naughtoni* could theoretically represent any one of at least five evolutionary stages: (1) a potoroid developing into a macropodid; (2) a macropodid developing into a potoroid; (3) a specialized macropodid paralleling potoroids; (4) a specialized potoroid paralleling macropodids; (5) a representative of an as yet unrecognized group equivalent in rank to known kangaroo subfamilies but a derivative or ancestor of none of the other known groups. However, at least one undoubted potoroid occurs in the mid-Miocene Etadunna Formation (M. O. Woodburne, pers. comm.) and at least one high-crowned macropodid tooth is known from the mid-Miocene Nambang formation from the Frome Embayment of South Australia (Archer and Rich, in preparation). These probably older occurrences discount the first two of the above possibilities. There is at present insufficient information to decide between the remaining three.

Speculations about kangaroo evolution and classification have been going on continuously since Bensley’s (1903) comparative study of the teeth of marsupials. More recent speculation concerning the relative primitiveness of the known subfamilies (e.g. Pearson 1950, Ride 1971, Bartholomai 1972) has highlighted the fact that there is still no agreement about whether potoroids were ancestral to macropodids, macropodids were ancestral to potoroids, or both groups were derived independently from a common ancestor referable to neither group. There has even been renewed interest and uncertainty about the composition of the subfamilial groups (e.g. Woodburne 1967, Kirsch 1968, Archer 1978b). Elsewhere (Archer 1978b) I have proposed a speculative rearrangement of all kangaroo genera into two families: The Potoroidae containing the Hypsiprinodontinae (Hypsiprinodon and Propleopus) and the Potoroinae (all other potoroid genera); and the Macropodidae containing the Sthenurinae (possibly including the genera Sthenurus, Procoptodon, Setonix, Dorcopsoidea, Dorcorhus, Dendrolagus and Hadronomas) and the Macropodinae (containing all other previously described genera). The Sthenurinae, in the expanded form used by Archer (1978b), is essentially a plesiomorphic group and probably not monophyletic.

There are other different and as yet unnamed middle Miocene Kangaroos, from central South Australia (M. O. Woodburne, pers. comm.) that cannot be referred to any of the previously described subfamilies without significantly altering the current concepts of these subfamilies. There is a possibility that *Wabularoo naughtoni* and these other aberrant taxa are referable to a fifth subfamily of kangaroos. I have not proposed a new subfamily for *W. naughtoni* because of the limited information provided by the single dentary. It would be desirable to consider incisor and cranial structure as well, aspects of which are preserved in the Miocene material under study by M. O. Woodburne.

The diprotodontids of the Riversleigh local fauna were concluded by Tedford (1967) to be contemporaneous with or slightly younger than
the Ngapakaldi diprotodontids from the Etadunna Formation. Pollens from the Etadunna Formation are regarded to be Batesfordian to Balcombian in age (pers. comm. from W. K. Harris in Callen and Tedford 1976). Therefore it can be suggested that the Riversleigh local fauna is probably middle to late Miocene in age.

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LITERATURE CITED


PLATE 1

_Wabularoo naughtoni_ gen. et sp. nov., holotype F9177 × 2

**FIG. A:** Stereophotograph postero-occlusal view, showing P$_3$–M$_4$. The hopolophid of M$_4$ is broken.

**FIG. B:** Stereophotograph, occlusal view.

**FIG. C:** Stereophotograph, lingual-occlusal view.
PLATE 2

Wabularoo naughtoni gen. et sp. nov., holotype F9177 x 2.

FIG. A: Stereophotograph, antero-occlusal view.
FIG. B: Stereophotograph, buccal-occlusal view.
FIG. C: Buccal view.
FIG. D: Lingual view.