

THE IDENTITY OF THE EXTINCT MARSUPIAL GENUS *NOTOTHERIUM* OWEN

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ABSTRACT

As a basis for the clarification of the taxonomy of the genus *Nototherium* Owen (Marsupialia: Diprotodontidae) a lectotype for the type species *N. inerme* Owen is selected. *N. mitchelli* Owen and *Euowenia robusta* De Vis are treated as junior synonyms of this name.

It has already been pointed out by Stirton (1955) that in the literature of Australian fossil marsupials the generic name *Nototherium* is second only to *Diprotodon* in frequency. Unfortunately both species included by Owen (1845 a, b) in the genus at the time of its description were based on poor material and their subsequent interpretation has been far from satisfactory.

The present paper is a contribution to the discrimination of these taxa, and has resulted from a study over several years of the large collection of Diprotodontidae in the Queensland Museum, including much fragmentary material, as well as specimens in other repositories. This has been carried out through the courtesy of Mr. H. O. Fletcher, Australian Museum, Sydney, Mr. E. D. Gill, National Museum of Victoria, Melbourne, and Dr. A. J. Sutcliffe, British Museum (Natural History), London. It is also desired to acknowledge with gratitude profitable discussion with Mr. Alan Bartholomai, Queensland Museum, Brisbane, and Dr. W. D. L. Ride, Western Australian Museum, Perth. The photographs of the type of *N. mitchelli* were kindly furnished by Dr. Ride.

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THE TYPE SPECIES OF NOTOTHERIUM

Owen (1845a) published the generic name *Nototherium* and the species names *N. inerme* and *N. mitchelli* in the *Report of the Fourteenth Meeting of the British Association*. It is held that in this work *N. mitchelli* has only the status of a *species inquirenda*, since Owen (p. 233) states "The difference in the shape, as well as the size of the jaw, bespeaks at least a specific distinction from the jaw referred to *Nototherium inerme*." The names were also published in the "Descriptive and Illustrated Catalogue of the Fossil Organic Remains of Mammalia and Aves Contained in the Museum of the Royal College of Surgeons of England" (Owen, 1845b), and the doubtful generic position of *N. mitchelli* is again indicated in his discussion on No. 1506, its type, in which he states "The difference of the shape, as well as the size of the jaw, bespeaks at least a specific distinction from No. 1505." The latter is the holotype or a syntype of *N. inerme*, depending on the priority of the respective publications.

However, no matter which publication has priority, it is clear that the genus *Nototherium* was established with one certain nominal species, *N. inerme*; the other, *N. mitchelli*, having been included with some doubt on both occasions. The type species is therefore *N. inerme* by monotypy.

Subsequently Owen (1877) indicated that he considered *N. mitchelli* as the type species. He states (p. 275) "Of *Nototherium inerme* I have the entire molar series of both sides of the upper jaw; with sufficient of that part of the skull to demonstrate its generic accordance with the more complete specimen of the skull of the type-species in the Museum at Sydney." This latter specimen, a cranium, is the holotype of *Zygomaturus trilobus* Macleay, which Owen had regarded (1873) as conspecific with a mandible he had identified as *N. mitchelli*. It will be argued that Owen misinterpreted *N. mitchelli* in this paper, and the confusion in the application of the name stemmed from then. Flower (1884) and Lydekker (1887) treated *N. inerme* as a junior synonym of *N. mitchelli*.

While Longman (1921) did not accept this synonymy, he formally proposed *N. mitchelli* as the type species, apparently unaware of Owen's (1877) statement, and in the belief that he was confirming Lydekker's action in treating it as the type species.

However, in view of the doubtful generic status attributed by Owen (1845a, b) to *N. mitchelli* at the time of its original proposal, neither Owen's nor Longman's subsequent designation of it as the type species invalidates the situation whereby *N. inerme* has been automatically the type species of *Nototherium* from its time of publication.

THE TYPES OF *N. inerme* AND *N. mitchelli**N. INERME*

Owen (1845a) described as the "principal fossil", an incomplete right ramus, with evidence of four molar teeth and portion of the symphysis. He believed the incisors had not been developed. The specimen was not figured.

This is certainly the same specimen listed as No. 1505, and described and figured (Owen 1845b, plate 8, figs 1-5). It is stated to have been derived "From the alluvial or newer tertiary deposits in the bed of the Condamine River, west of Moreton Bay, Australia" and "Presented by Lieut.-Col. Sir T. L. Mitchell, C.B.". A second specimen listed as No. 1507 from the same source, consisting of smaller portion of a right ramus, with remains of the last two molars was attributed to *N. inerme*, but not figured.

Should the "Catalogue" have priority both specimens are to be regarded as syntypes of *N. inerme*. When Owen (1873) subsequently discussed the genus *Nototherium* in some detail it is clear that he regarded No. 1505 as the type of *N. inerme*. However, it may never be possible to ascertain with complete certainty which of the two publications is the earlier and for this reason it is deemed desirable to designate as the lectotype No. 1505, described and figured by Owen (1845b, pp. 314-6, pl. 8, figs 1-5). In the subsequent illustration of Owen (1873, pl. 8, figs 1-4) of this specimen it has been grossly restored. It is listed by Flower (1884) as No. 3844 under *N. mitchelli*.

This specimen is believed to have been destroyed when the Museum of the Royal College of Surgeons was bombed in 1941, but Owen's (1845b) description and figures are sufficient for the discrimination of the species.

N. MITCHELLI

Since the name was based only on one fossil in the original descriptions, this specimen is automatically the holotype. It consists of an incomplete posterior half of a left ramus, with the third and fourth molars imperfectly preserved, and was listed by Owen (1845b) as No. 1506, described, and figured (pl. 9, figs 1-5). Subsequently Flower (1884) listed it as No. 3843 in the collection of the Royal College of Surgeons. It is now preserved as M.16590 in the collections of the British Museum (Natural History).

THE INTERPRETATION OF THE SPECIES AND SYNONYMY

With such imperfect type material it becomes necessary to interpret the species to which they belong, essentially on the basis of referred specimens, which as individuals can be compared directly with the types only in a small number of characters, or sometimes only indirectly.

In the type of *N. inerme* (plate 13, figs 1, 2) the available characters are (1) the size of the ramus; (2) the size of the teeth; (3) the shape of the ramus particularly the degree of curvature of the ventral margin as seen in lateral view and the rather steep ascent of this margin behind the diagastric process; (4) the height of the dental foramen relative to the postalveolar shelf; (5) the development of the diagastric process; and (6) the depth of the alveolus for the incisor.

In the type of *N. mitchelli* (plate 13, figs 3–5) the available characters are (1), (2), (3), (4), (5) as above, and (7) the configuration of the molar crowns.

The depth of implantation of the fourth molar in the type of *N. inerme* shows that the fossil was derived from an immature individual with this tooth incompletely erupted. Because of immaturity the molar row had not progressed forward and the postalveolar shelf is short. In contrast, while the molars of the type of *N. mitchelli* are broken and very incomplete, sufficient of their surface is retained to indicate that wear on the posterior molars was at an advanced stage and the individual was mature. Similarly the length of the postalveolar shelf points to considerable progression of the molar row. The interpretation of Owen (1845a, p. 233; 1845b, p. 317) that both were mature specimens is therefore disputed.

Taking the difference in maturity into account, it is immediately apparent that there is close agreement in characters (1)–(5) in both jaws. This agreement is reinforced by individual comparison with material of *Euowenia robusta* De Vis (plate 14, figs 1–3), including the type, in the collections of the Queensland Museum. The three taxa are regarded as conspecific, with *Nototherium mitchelli* Owen and *Euowenia robusta* De Vis, 1891 as junior synonyms of *Nototherium inerme* Owen.

While the presentation of revised diagnoses for the genus *Nototherium* Owen and its type species are beyond the scope of this preliminary paper, it may be said that that for the species includes the following characters of the mandible pertinent to the preceding discussion. The ramus and molar teeth are those of a medium-sized diprotodontid; in lateral view the ventral margin of the body of the ramus is gracefully curved and, beyond the diagastric process which is relatively weak even in aged individuals, it ascends steeply; the dental foramen is markedly elevated above the plane of the postalveolar fossa; the lophids of the molars are obliquely crescentic and the median valley is closed at the base by a weak but persistent midlink descending from the middle of the protolophid, to meet the stronger link from the hypoconid. The presence of the part of the midlink descending from the protolophid may be observed in the type of *N. mitchelli*.

Owen (1845a, b) supposed that the incisor teeth in *N. inerme* were lacking altogether and in fact it appears that the symphyseal region of the type is broken in the vicinity of the base of the incisor alveolus. In this species the lower incisors are

subconical, anteriorly divergent and the base of the alveolus for each incisor extends to beneath the premolar; but the depth of implantation is somewhat variable as in all diprotodontids and this last character is of no great significance.

The only diprotodontid names published before 1845 are *Diprotodon optatus* Owen, 1838 and *Dinotherium australe* Owen, 1843. The holotype of *D. optatus* is the anterior portion of a right mandibular ramus with a broken incisor preserved as number M. 10796 in the collections of the British Museum (Natural History). The form of the incisor is such that the fossil cannot be conspecific or even congeneric with *N. inerme* as interpreted above. The holotype of *Dinotherium australe* has large molars with transverse lophids (Owen, 1843, figs 1–2) and again there is clear generic distinction from *N. inerme*.

Nototherium Owen is therefore considered to be a valid generic name and *N. inerme* Owen a valid and viable species name. The relegation of *N. mitchelli* to synonymy should have the result of preventing further confusion of its application, which stemmed from Owen's misidentification of material when he revised the genus *Nototherium* (1873). The extent of this may be gauged by reference to the specimens figured in the plates of this work:

- (1) The cranium illustrated on Plates 2 and 3 as *N. mitchelli* relates to *Zygomaturus trilobus* Macleay.
- (2) The mandible illustrated on Plate 4 as *N. mitchelli* relates to *Z. trilobus*.
- (3) The mandible illustrated on Plate 5 as *N. mitchelli* relates to *N. inerme*.
- (4) The mandible illustrated on Plate 6 as *N. mitchelli* relates to *Z. trilobus*.
- (5) The mandible illustrated on Plate 7 as *N. victoriae* may be attributed to *Zygomaturus*.
- (6) The mandible illustrated on Plate 8 is the holotype of *N. inerme* grossly restored.
- (7) The upper cheek teeth illustrated on Plate 9, figs 3–4, as *N. mitchelli* relate to *Z. trilobus*.
- (8) The upper cheek teeth illustrated on Plate 9, fig. 5, as *N. inerme* are correctly identified.
- (9) The lower cheek teeth illustrated on Plate 10 as *N. mitchelli* and *N. victoriae* relate to species of *Zygomaturus*.
- (10) The incomplete ramus illustrated on Plate 11 as *N. mitchelli* relates to *Euryzygoma dunense* (De Vis).

There has been very little usage of the name *Euowenia robusta* De Vis since the time of its original description (De Vis, 1891) so the present synonymy cannot be said to upset stability in that regard. The type species of the genus is *E. grata* De Vis, and on this basis the relation of *Euowenia* to *Nototherium* becomes a matter for further consideration.

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