

# LATE JURASSIC MAMMALIAN FOSSILS IN THE SEDGWICK MUSEUM, CAMBRIDGE

by WILLIAM A. CLEMENS

**ABSTRACT.** The collection of the Sedgwick Museum contains three mammalian fossils found in the Late Jurassic Purbeck Beds: dentaries of *Trioracodon ferox* and *Spalacotherium tricuspides* and a fragment of a skull of *Peralestes longirostris*. The dentary of *Trioracodon* was discovered in 1933. The other two fossils, part of the Brodie collection, demonstrate that the postcanine dentitions of *Spalacotherium* and *Peralestes* consist of three premolars and seven molars. *Phascolestes dubius* is shown to be a junior synonym of *Peralestes longirostris*.

THE collection of the Sedgwick Museum contains three mammalian fossils from the Purbeck Beds of Durlston Bay, Dorset, that have escaped notice in recent studies of Mesozoic mammals. The whereabouts of two of these fossils, which were discovered in the Mammal bed by W. R. Brodie and first described by Richard Owen (1854), was unknown to Simpson when he prepared his monograph of British Mesozoic mammals and they were listed as lost (Simpson 1928, pp. 100 and 143). Dr. F. R. Parrington began a report on these fossils, but the pressure of other commitments has prevented him from completing it. In the course of my study of British Mesozoic mammals, I had the opportunity to see these fossils, and Dr. Parrington graciously suggested that I should publish this note communicating their whereabouts and describing certain aspects of their morphology pertinent to other research problems.

Fossils identified by catalogue numbers prefixed with the letter 'J' are part of the collection of the Sedgwick Museum, Cambridge. Catalogue numbers lacking this prefix pertain to fossils in the collection of the Palaeontology Department, British Museum (Natural History).

Order TRICONODONTA Osborn 1888  
Family TRICONODONTIDAE Marsh 1887  
Subfamily TRICONODONTINAE Hay 1902  
Genus TRIORACODON Simpson 1928  
*Trioracodon ferox* (Owen 1871)

*Description.* Sedgwick Museum No. J13141 is a fragment of a right dentary containing the canine and all the postcanine dentition. Most of the dentary anterior to P<sub>1</sub> has been broken away and the bulk of the large, curved canine root is exposed. The root extends beneath P<sub>1</sub>, and there is a shallow, longitudinal groove along its lingual side. Unfortunately the premolars and molars were broken and the fragments displaced during fossilization. In the initial preparation of the fossil the crown of P<sub>3</sub> came free. It was replaced in a reversed position, thus exposing the labial surface of the crown, which has a narrow basal cingulum. Specimens of *Trioracodon* in the collection of the British Museum (Natural History), in which the labial side of the lower dentition is exposed, demonstrate that small but distinct labial cingula are present on at least the P<sub>3</sub> and P<sub>4</sub>; these cingula have been overlooked by some students of the triconodonts. The teeth preserved in J13141 resemble those found in other mandibles of *Trioracodon ferox* and do not warrant

[Palaeontology, Vol. 6, Part 2, 1963, pp. 373-7.]

additional comment. Ventral to  $M_3$  and the anterior end of the coronoid process there is a short, internal groove. Although of approximately the same length, the groove is more dorsal and posterior in position than the internal groove on the dentary of the type specimen of *Trioracodon ferox*, No. 4775.

*Comments.* This fossil was found in 1933 by D. A. Curry. The following locality data were obtained from him by Dr. C. L. Forbes. The fossil was discovered in Purbeck beds cropping out in Durlston Bay approximately half-way between Peveril Point and Durlston Head. It came from a band of blue-grey marl between 3 and 6 inches thick, and softer than the adjacent strata.

Order SYMMETRODONTA Simpson 1925  
 Family SPALACOTHERIIDAE Marsh 1887  
 Genus SPALACOTHERIUM Owen 1854  
*Spalacotherium tricuspidens* Owen 1854

*Description.* Sedgwick Museum No. J11378 is a fragment of a right dentary containing an incisor, the alveoli of the ultimate incisor and the canine, and the postcanine dentition.



TEXT-FIG. 1. *Spalacotherium tricuspidens* Owen, reconstruction of part of the lower dentition based on a fragment of a right dentary containing the penultimate incisor, alveolus of the ultimate incisor, alveoli and part of the anterior root of the canine, and the postcanine dentition; J11378:  $\times 6.2$ . Lingual view, broken surfaces blackened.

Since 1854, when this fossil was described and illustrated by Owen (1854, fig. 10), it has suffered considerable damage especially to its molars. The preserved incisor is a small, single-rooted tooth. The posterolingual side of its crown is concave. The penultimate incisor,  $P_1$ , and  $P_2$ , as well as the alveoli for the ultimate incisor and the two-rooted canine, are preserved in a fragment of the dentary that does not appear to be distorted. Posterior to  $P_2$  the dentary has been broken and the adjacent part displaced. The crown of  $P_3$  was also broken and rotated out of position. In the reconstruction (text-fig. 1),  $P_3$  has been returned to its proper orientation, but gaps have been left between  $P_2$ ,  $P_3$ , and  $M_1$  to indicate that the fossil is broken and distorted in this region. Other fossils show that in their natural position these teeth were more closely approximated. The dental arcade of J11378 also may have been distorted by a fracture of the dentary beneath  $M_6$ . The morphology of the postcanine dentition of *Spalacotherium tricuspidens* has been fully described by Simpson (1928, pp. 100-1).

*Dimensions.* Measurements in millimetres of the teeth preserved in No. J11378.

	$P_1$	$P_2$	$P_3$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	$M_6$	$M_7$
Length	1.5	1.7	1.7*	1.6	1.7	1.8	1.8	1.7	1.6*	1.4*
Width	0.6	0.8	0.9*	1.0	1.3*	1.4*	1.5*	1.5*	1.5	1.2

\* Estimated minimal value

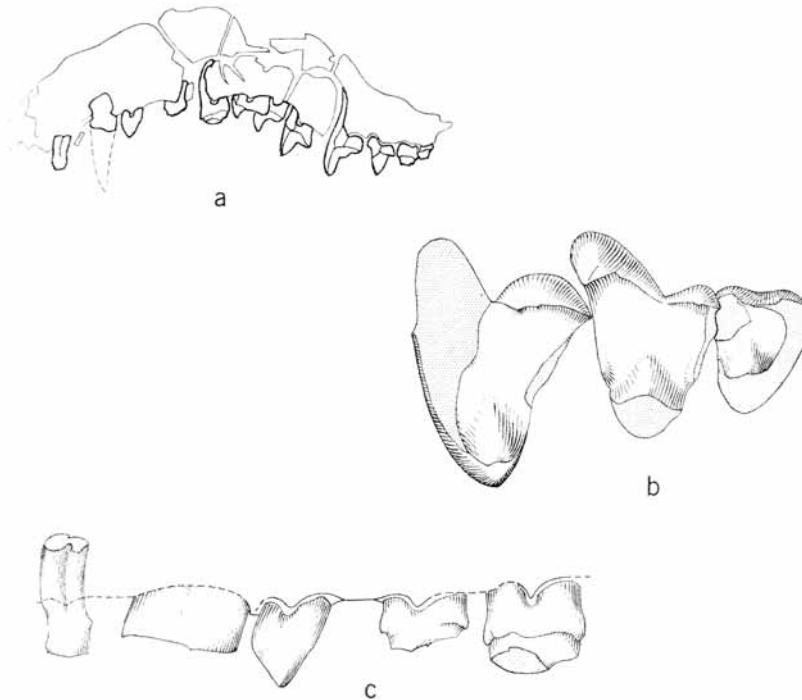
*Comments.* This fossil is the only specimen of *Spalacotherium tricuspides* containing a complete incisor and the entire, albeit fragmentary, postcanine dentition. With the exception of the number of incisors, it gives final confirmation to the dental formula adopted by Simpson (1928, p. 100),  $I_{3+}-C_1-P_3-M_7$ .

*Peralestes longirostris* Owen

1871 *Peralestes longirostris*; Owen, p. 33.

1871 *Phascolestes dubius*; Owen, legend plate I, fig. 40.

*Description.* Sedgwick Museum No. J11379 is a heavily damaged fragment of a skull containing an incisor, the canine, and the postcanine dentition. Most of the alveolar



TEXT-FIG. 2. *Peralestes longirostris* Owen, fragment of the left side of a skull containing an incisor, the canine and the postcanine dentition; J11379. *a*, Outline of the skull fragment,  $\times 3.3$ . *b*, Occlusal view of  $M^5-M^7$ ,  $\times 20$ . *c*, Labial view of the incisor, canine, and  $P^1-P^5$ , reconstruction of alveolar margin shown by a dashed line,  $\times 10$ . In figs. 2*b* and 2*c* the broken surfaces of the teeth are stippled.

region of the maxilla and probably part of the premaxilla are preserved. The bone (text-fig. 2*a*) has been severely crushed and distorted and the suture delimiting the premaxilla and maxilla obliterated. The preserved incisor, now lacking the apex of its crown, has small anterior and posterior accessory cusps. Its root is long and has a longitudinal

groove near the middle of the labial surface. Because of damage to the specimen it cannot be determined if a diastema separated the canine and the ultimate incisor. Most of the canine has been lost, but an indistinct impression in the matrix and Owen's illustrations show that the canine was long and lanceolate. P<sup>1</sup> (text-fig. 2c), which is directly behind the canine, is separated from P<sup>2</sup> by a diastema approximately 1 millimetre long. The alveolar edge of the maxilla between these premolars does not appear to be distorted. A smaller gap now separates P<sup>2</sup> and P<sup>3</sup>, but the intervening bone is broken and these premolars have been displaced. Probably they were more closely approximated prior to the fragmentation of the specimen. P<sup>1</sup> has a simple, trenchant crown and lacks accessory cusps and a labial cingulum. The larger P<sup>2</sup> has small anterior and posterior accessory cusps and a short labial, basal cingulum on the posterior end of the crown. P<sup>3</sup> has a large posterior accessory cusp and a distinct, crenulated labial cingulum. The lengths of the premolars are as follows: P<sup>1</sup> = 1.0 mm., P<sup>2</sup> = 1.4 mm., and P<sup>3</sup> = 1.6 mm.

The molars are heavily damaged. Not only were they broken and distorted during fossilization, but many fragments were lost, apparently in the first attempts to prepare the fossil. The crowns of the molars are dominated by the large paracone (nomenclature following Patterson 1956). Ridges along the margins of the crown connect the paracone with the stylar region. Cusps were present on these ridges, but have been damaged or destroyed on most of the teeth. Enough remains to indicate that at least one cusp was present on the anterior, and another on the posterior, side of the crown of most molars. These cusps appear to have been as distinct as, but possibly smaller than, those found on the type of *Peralestes longirostris*. The ridges along the anterior and labial edges of the crown terminate at a large stylar cusp. Although of different sizes and somewhat variable in position the other stylar cusps are smaller than the anterior cusp. A small but prominent posterior stylar cusp is present on the labial ridge of most molars. As far as can be determined, the molars preserved in J11379 are of approximately the same size and closely resemble the molars preserved in the type specimen of *P. longirostris*, no. 47740. Recently the type specimen was more fully prepared and cleaned, revealing the alveoli of M<sup>7</sup> containing fragments of the tooth. Thus the only emendation to Simpson's (1928, pp. 105-6) description of the molars of *Peralestes* required by J11379 is the addition of a description of the seventh molar. M<sup>7</sup> (text-fig. 2b), like the preceding molars, is heavily damaged. Its crown appears to have resembled that of M<sup>6</sup>, differing in its smaller size, the shallower medial notch on the labial edge of the crown, and, possibly, in the relatively smaller size or absence of cusps along the anterior and posterior edges of the crown.

*Comments.* Simpson (1928, pp. 102-4) has reviewed the evidence for the allocation of *Peralestes* to the Spalacotheriidae. He seconded the suggestion that the genus *Peralestes* might be based on the upper dentition of *Spalacotherium tricuspidentis*. But Simpson commented (*ibid.*, pp. 103-4): 'It is not to be definitely considered as a synonym of *Spalacotherium*, however, until their association can be considered proven beyond any question.' Since publication of Simpson's monograph the upper and lower molars of an Albian symmetrodont, *Spalacotheroides bridwelli*, have been described by Patterson (1955, 1956). Information obtained from these fossils supports the allocation of *Peralestes* to the Spalacotheriidae, but does not bear directly on the problem of the synonymy of the Purbeck genera. Now it can be demonstrated that the postcanine dental formulae

of *Peralestes* and *Spalacotherium* are equivalent and that the posterior molars of both,  $M_7^2$ , are distinctly smaller than the penultimate molars. This adds support to the suggestion that *Peralestes longirostris* is a junior synonym of *Spalacotherium tricuspides*, but it does not prove their association beyond any question.

Recognition of the whereabouts of J11379 requires one minor change in the currently accepted classification. This fossil appears to be the specimen originally identified by Owen (1854, p. 430) as a fragment of the right dentary of *Spalacotherium tricuspides*. The illustration of the specimen (ibid., fig. 12) is not detailed, but the identification can be based on the gross similarities between J11379 and the illustration. Also, of the fossils listed by Owen (ibid., p. 431) as associated with the mammalian fossil, only the '... jaw with a few teeth...' and '... the impression of the dentary bone...' of *Macellogodus* are missing from the block in which J11379 is preserved. In the text of his monograph on Mesozoic mammals Owen (1871, pp. 36–37) identified the mammalian fossil as '*Incertae sedis*, *Peralestes* sp.?', but in the legend of Plate I he allocated it to a new species of *Phascolestes*, *P. dubius*. Because Owen's description and illustrations were inadequate, the whereabouts of the type specimen was unknown, and the referred specimen was indeterminate. Simpson (1928, p. 143) deemed the species *Phascolestes dubius* to be a *nomen nudum*. Now that the type specimen has been found, *P. dubius* can be demonstrated to be a junior synonym of *Peralestes longirostris*.

*Acknowledgements.* I am indebted to Mr. A. G. Brighton and Dr. F. R. Parrington, who made it possible for me to study these Mesozoic mammalian fossils. Thanks are due to Drs. E. I. White and A. Sutcliffe, who gave me access to the collection of Mesozoic mammals in the British Museum (Natural History) and extensive assistance with many phases of my research. I am indebted also to Drs. C. L. Forbes, K. A. Joysey, and K. A. Kermack, and Mrs. Frances Mussett for the help they gave me. It is a pleasure to cite the craftsmanship of Mr. A. Rixon, who skilfully prepared the type specimen of *Peralestes longirostris*. This research was carried out while I was a National Science Foundation Post-doctoral Fellow at University College, London, and the report was completed at The University of Kansas.

#### REFERENCES

- OWEN, RICHARD. 1854. On some fossil reptilian and mammalian remains from the Purbecks. *Quart. J. geol. Soc. London*, **10**, 420–33.  
 — 1871. Monograph of the fossil mammalia of the Mesozoic formations. *Paleontogr. Soc.* **24**, 1–115, pl. I–IV.  
 PATTERSON, B. 1955. A symmetrodont from the Early Cretaceous of northern Texas. *Fieldiana: Zool.* **37**, 689–93.  
 — 1956. Early Cretaceous mammals and the evolution of mammalian molar teeth. *Fieldiana: Geol.* **13**, 1–105.  
 SIMPSON, G. G. 1928. *A catalogue of the Mesozoic Mammalia in the Geological Department of the British Museum*. London, British Museum (Nat. Hist.), x+215, pl. I–XII.

WILLIAM A. CLEMENS  
 Museum of Natural History  
 and Department of Zoology,  
 The University of Kansas,  
 Lawrence, Kansas

Manuscript received 27 September 1962