

Docodont nature of *Cyrtlatherium*, an upper Bathonian mammal from England

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The upper Bathonian Kirtlington mammal bed of England is one of the rare Middle Jurassic sites in the world to have yielded mammalian remains and undoubtedly the richest. A few taxa have so far been described, among which the genus *Cyrtlatherium* Freeman, 1979, assigned by its author to the Kuehneotheriidae and subsequently included in the Symmetrodonta. In this note I argue that *Cyrtlatherium* represents a docodont of which it is possibly a milk premolar.

In 1979, Freeman created the genus *Cyrtlatherium* on one complete right lower cheek tooth and two fragmentary ones from the Kirtlington mammal bed in Oxfordshire. His brief description was entirely done with reference to the lower molar of *Kuehneotherium*, without further justification of its systematic placement. His accompanying comments concern only the situation of *Kuehneotherium* among the Theria. The genus has since been regarded as a member of Symmetrodonta and was classified as such in McKenna & Bell (1997).

Reexamination of the holotype led to the conclusion that the tooth pertains in fact to the Docodonta, of which it presents all the main characteristics. Given the contradictions in the literature concerning the homologies of docodont molar cusps (see Butler 1997 and Sigogneau-Russell & Godefroit 1997 for the most recent proposals), and pending a further study, I follow Kermack *et al.* (1987: p. 4) in naming 'the cusps... strictly according to their position in the teeth'. In accordance with this method, however, and differently from Kermack *et al.* (1987), I distinguish the main cusp (which they synonymized with 'disto-buccal') from the disto-labial cusp, which they did not label.

The holotype tooth BMNH M 36511 (Figs. 1, 3B) is very flat transversally, with a central labial dominant cusp (main). Mesially and labially a crest leads to a small cusp (mesio-labial). From the tip of the main cusp but more lingually another crest descends before curving labially to join again the

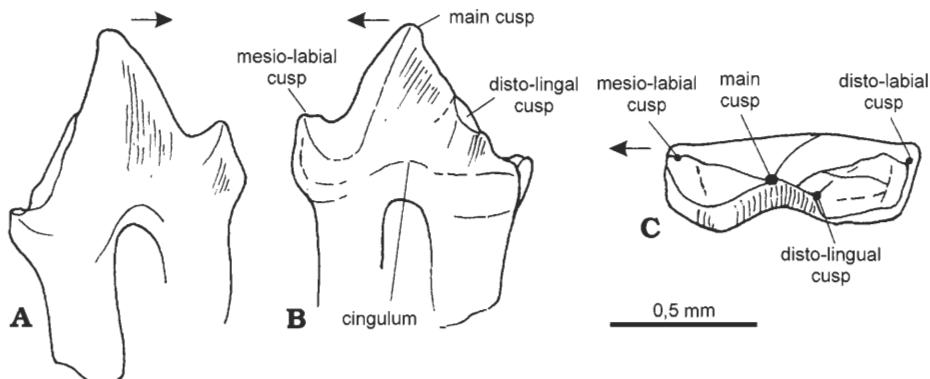


Fig. 1. A–C. *Cyrtlatherium canei*, holotype BMNH M.36511, right lower cheek tooth. In labial (A), lingual (B), and occlusal (C) views. Arrows point towards the front.

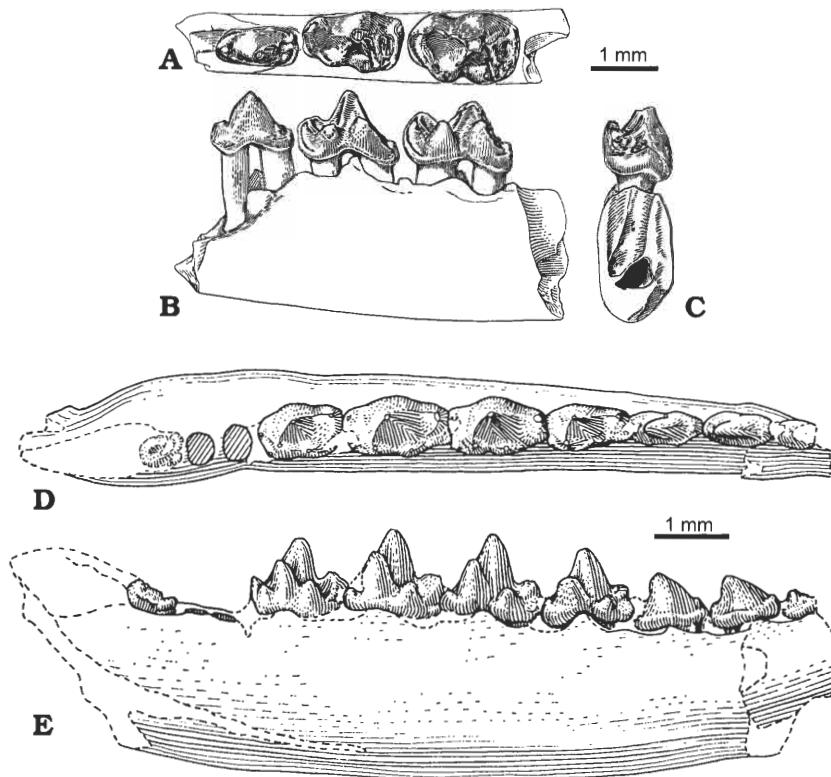


Fig. 2. A–C. *Simpsonodon oxfordensis*, right lower jaw BMNH J.100 in occlusal (A), lingual (B), and posterior (C) views. D, E. *Borealestes serendipitus*, left lower jaw BRSUG 20570 in occlusal (D) and lingual (E) views. (A–C, from Kermack *et al.* 1981; D–E, from Waldman & Savage 1972).

mesio-labial cusp. More mesially and lingually this crest is doubled by the tooth rim; a basin is delimited antero-lingually, the so-called pseudo-talonid of *Simpsonodon* Kermack *et al.* (1987), also present, though smaller, in *Haldanodon* Kühne & Krusat, 1972. Distally a crest descends from the main cusp to another cusp situated completely lingually (disto-lingual), the second in importance on this specimen. From this cusp and distally, descends a crest which turns labially to end in a tiny cusp (disto-labial). The posterior faces of the main and disto-lingual cusps are united in one single transverse surface crossed by vertical ridges, as is typical of docodont lower cheek teeth. Contrary to what can be deduced from the stereophotos by Freeman (1979), no cingulum is visible labially; lingually it is essentially limited to an arch under the main cusp, being very faint distally.

As noted by Freeman (1979), this morphology differs from that of *Kuehneotherium* (Fig. 3A) by the relative position of the 'paraconid' (mesio-labial cusp). Other features mentioned above do not correspond either to the simpler kuehneotheriid morphology: completely lingual situation of the second main cusp (disto-lingual), mesial crest, structure of the posterior trigonid face.

From the same locality Kermack *et al.* (1987) have described the docodont *Simpsonodon* (Figs. 2A–C, 3C). Not only is the holotype tooth of *Cyrtlatherium* considerably smaller than the molars of this genus (see below), but it is also much simpler (Figs. 1, 3B), lacking in particular a mesio-lingual cusp. It is, however, equally specialized in presenting an elongated anterior basin and a protruding mesio-labial cusp. A second genus is known by a lower jaw also from the British Middle Jurassic, *Borealestes* Waldman & Savage, 1972 (Fig. 2D–E), which seems to be closer to the Kimmeridgian *Haldanodon* than to *Simpsonodon*, but the material has not been fully described. A tiny docodont ge-

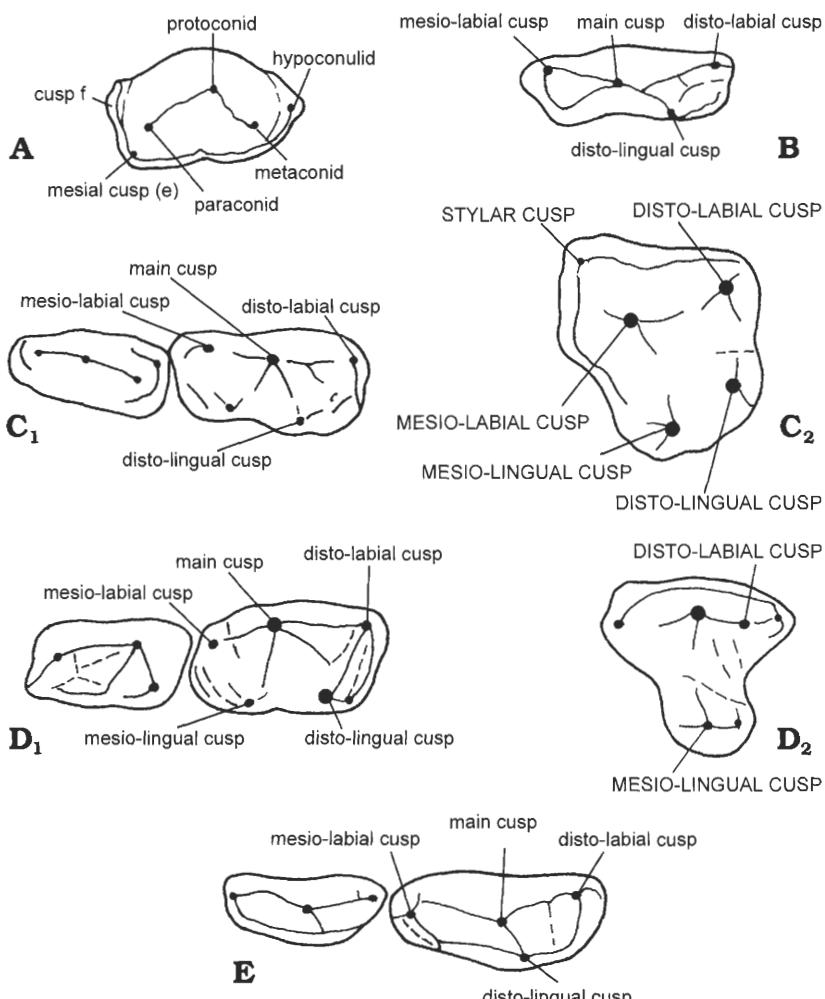


Fig. 3. Schematic occlusal views of *Kuehneotherium* and docodont molars showing cusp nomenclature. Anterior is to the left. **A.** *Kuehneotherium praecursoris*, right lower molar, BMNH M.19155. **B.** *Cyrtlatherium canei*, right lower molar, holotype BMNH M.36511. **C.** *Simpsonodon oxfordensis*, last right lower premolar and first molar, BMNH J.100 (**C₁**); right upper molar, BMNH J.783, reversed (**C₂**). **D.** *Haldanodon exspectatus*, right d3 and first lower molar, SGP VJ.1004 (**D₁**); schematic upper left molar (**D₂**). **E.** *Peraiocynodon inexpectatus*, left ?d3 and ?first lower molar, holotype BMNH M.48248, reversed. Not to scale. (A, modified from Kermack et al. 1968; B, original; C, modified from Kermack et al. 1987; D, modified from Krusat 1980; E, modified from Butler 1939).

nus was identified in the Berriasian Purbeck Limestone Group, *Peraiocynodon* Simpson, 1928, which was later suspected to represent a juvenile of *Docodon* Marsh, 1881 (Butler 1939, Kermack et al. 1987; but see Krusat 1980), which also needs reevaluation from unpublished material. *Cyrtlatherium* resembles most the slightly larger last premolar (d3?) of *Peraiocynodon* (Fig. 3E): on neither tooth is there a mesio-lingual cusp, and on both, the main cusp is relatively high; but the anterior basin is here better defined and the lingual face of the tooth is not obliquely oriented as in *Peraiocynodon*.

It is thus possible that the holotype tooth of *Cyrtlatherium* represents a milk premolar, perhaps of *Simpsonodon*: it shows the same ratio of length with the lower molar BMNH J.761 of this genus

(0.83 mm *versus* 1.4 mm) than that found between the d3 and m2 of *Haldanodon* VJ 1004-155 (1.3 mm *versus* 2.3 mm); but it is relatively narrower (0.37 mm *versus* 0.9 mm for BMNH J.761; against 0.8 mm *versus* 1.30 mm for d3 and m2 of *Haldanodon*). BMNH M 36511 is also relatively longer and narrower with respect to p3 of *Simpsonodon* than is d3 with respect to p3 of *Haldanodon*. Study of unpublished material of *Cyrtlatherium* (some 15 isolated teeth), also from the Kirtlington mammal bed, should help solve its relationships among docodonts; but its inclusion in this order needs no further delay.

Abbreviations used. — BMNH M or J refer to mammalian specimens in the Natural History Museum, London; BRSUG, Department of Earth Sciences, Bristol University, Bristol, UK; SGP, Serviços Geológicos de Portugal, Lisboa.

Systematics

Order Docodonta Kretzoi, 1946

Family Docodontidae Simpson, 1929

Genus *Cyrtlatherium* Freeman, 1979

Type species: *Cyrtlatherium canei* Freeman, 1979, from the Kirtlington mammal bed, in Forest Marble, upper Bathonian, England.

References

- Butler, P.M. 1939. The teeth of the Jurassic mammals. — *Proceedings of the Zoological Society of London, Series B* **109**, 329–336.
- Butler, P.M. 1997. An alternative hypothesis on the origin of docodont molar teeth. — *Journal of Vertebrate Paleontology* **17**, 435–439.
- Freeman, E.F. 1979. A middle Jurassic mammal bed from Oxfordshire. — *Palaeontology* **22**, 135–166.
- Kermack, D.M., Kermack, K.A., & Mussett, F. 1968. The Welsh pantothere *Kuehneotherium praecursoris*. — *Journal of the Linnean Society (Zoology)* **47**, 407–423.
- Kermack, K.A., Lee, A.J., Lees, P.M., & Mussett, F. 1987. A new docodont from the Forest Marble. — *Zoological Journal of the Linnean Society* **89**, 1–39.
- Kretzoi, M. 1946. On Docodata, a new order of Jurassic Mammalia. — *Annales Historico-Naturales Musei Nationalis Hungarici* **39**, 108–111.
- Krusat, G. 1980. Contribuição para o conhecimento da fauna do Kimeridgiano da Mina de Lignito Guimara (Leiria, Portugal). IV Parte: *Haldanodon exspectatus* Kühne & Krusat, 1972 (Mammalia, Docodontata). — *Serviços Geológicos de Portugal* **27**, 1–73.
- Kühne, W. G. & Krusat, G. 1972. Legalisierung der taxon *Haldanodon* (Mammalia, Docodonta). — *Neues Jahrbuch für Geologie und Paläontologie Mitteilungen* **5**, 300–302.
- Marsh, O.C. 1881. New Jurassic mammals. — *American Journal of Science* **21**, 511–513.
- McKenna, M.C. & Bell, S.K. 1997. *Classification of Mammals Above the Species Level*. xii + 631 pp. Columbia University Press, New York.
- Sigogneau-Russell, D. & Godefroit, P. 1997. A primitive docodont (Mammalia) from the Upper Triassic of France and the possible Therian affinities of the order. — *Comptes-Rendus de l'Académie des Sciences* **324** (ser. IIa), 135–140.
- Simpson, G.G. 1928. *A Catalogue of the Mesozoic Mammalia in the Geological Department of the British Museum*. x + 215 pp. British Museum, London.
- Simpson, G.G. 1929. American Mesozoic Mammalia. — *Memoirs of the Peabody Museum, Yale University* **3**, xv + 225 pp.
- Waldman, M. & Savage, R. J.G. 1972. The first Jurassic mammal from Scotland. — *Journal of the Geological Society of London* **128**, 119–125.

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