Megabelodon minor (MAMMALIA, PROBOSCIDIA),
A NEW SPECIES OF MASTODONT FROM THE
ESMERALDA FORMATION OF NEVADA

by
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ABSTRACT

A single fossil mandible from the Esmeralda Formation (Late Miocene-Early Pliocene) of Nevada represents a new species of gomphotheriid proboscidean, allied with the "spoon-billed" mastodons of the Tertiary of the Great Plains. Mandibles with long symphysis but no lower tusks were developed in at least three independent lines of Tertiary gomphotheres, represented by the genera Megabelodon, Gnathabelodon, and Eubelodon.

INTRODUCTION

In September, 1961, during a study of the Clarendonian vertebrate faunas and the stratigraphy of the Esmeralda Formation in the area around Cedar Mountain in western Nevada, I collected a mandible of a small gomphotheriid, showing affinities with the "spoon-billed" mastodons of the Miocene and Pliocene of the Great Plains area. The Cedar Mountain discovery is apparently the first record of this specialized group of proboscideans in the Great Basin. Specimen and locality numbers are those of the University of California Museum of Paleontology, Berkeley, California. All measurements are in millimeters.

Order PROBOSCIDEA
Family Gomphotheriidae
Megabelodon minor, n. sp.

Type: UCMP 67101, mandible with right M₃, parts of right M₂, left M₁, left M₃.
Locality: UCMP loc. V-6145, Gomphothere locality. Mineral County, Nevada. On the north flank of the Cedar Mountains, three miles west of Warrior Mine. Latitude 38° 36' 54" N; longitude 117° 52' 18" W.
Age: Late Barstovian or early Clarendonian (Late Miocene or Early Pliocene). Unfortunately, it is not possible to specify the age of this specimen more exactly. The Esmeralda Formation in the area around Cedar Mountain
contains both Barstovian and Clarendonian faunas. The mandible here described was an isolated find, in an area separated by block faulting from localities of known age. The strata at locality V-6145 are geographically close and lithologically similar to a sequence of beds containing a molluscan assemblage similar to those which elsewhere in the Cedar Mountain area are associated with late Barstovian mammals (Firby, 1963, 1966).

**Diagnosis:** Small longirostrine gomphotheriid, lacking lower incisor tusks; symphysis less elongate than in other species of *Megabelodon*, broadened and flattened distally; lower molars relatively narrow, highcrowned; M₃ with four lophids and simple talonid.

**Description:**

M₁: The first molar is represented only by a worn-out remnant from the left side. The right M₁ was lost before burial, and may have been shed before death.

M₂: Enough fragments of the right M₂ were recovered to make possible the reconstruction of most of the base of the tooth and the posterior half of the crown. The tooth was well worn. The crown consisted of three lophids, with simple ectotrofoils on at least the second and third lophids (Fig. 1).

M₃: The right M₃ is preserved in the jaw, where it was just coming into function. There is a very small wear facet on the tip of the first lophid. The posterior part of the left M₃ was also recovered. M₃ has four lophids and a simple talonid. Anterior and posterior spurs on the labial (pretrite) hemilophids would form simple ectotrofoils with wear. The trefoil spurs are bluntly serrate, especially on the first lophid. There are no central conules in the valleys. The lingual (posttrite) hemilophid of the first lophid appears twisted, so that its labial moiety lies nearly anterior to the lingual moiety. The junction of the two hemilophids is therefore near the anterior side of the lophid. There is an anterior spur or accessory column on the lingual hemilophid of the third lophid. The tooth is relatively highcrowned (Fig. 2).

Mandible: The outstanding character of the mandible is the tuskless, scoop-like symphysis. Although the dorsal and lateral surfaces of the symphysis are poorly preserved, the body of the symphysis is nearly complete. There is no
trace of incisor alveoli, and it is clear that no tusks were present. The amount of deflection of the symphysis is obscured by fracturing, but it must have been moderate--probably 15° or less. The deep, asymmetrical lingual groove is bounded by heavy ridges, reaching nearly to the tip of the symphysis. The bone of the extreme tip is too poorly preserved to show clearly whether there was a thickening or rugosity at the tip as in Megabelodon lulli (Osborn, 1936, fig. 666), but this may have been the case. In addition to two mental foramina on the ramus below the anterior end of M₁, there appear to have been at least two foramina along the symphysis, rather than one large foramen as in some advanced longirostrine gomphotheres. The horizontal rami are relatively slender (Fig. 1).

Discussion: Three genera of longirostrine gomphotheriids are characterized in part by the absence of lower incisor tusks: Gnathabelodon Barbour and Sternberg, 1935; Eubelodon Barbour, 1914; and Megabelodon Barbour, 1914.

Gnathabelodon thornei Barbour and Sternberg, from the Pliocene of Kansas, is distinguished by the extreme enlargement of the flaring, shoehorn-like symphysis, and by the short, broad M₃ (Osborn, 1936, pp. 711-714).

Eubelodon morrilli Barbour, from Devil's Gulch, Brown County, Nebraska, is distinguished by its narrow, tapering symphysis, and by the complex, doubly trefoiled molars. (op. cit. pp. 601-611).

Megabelodon Barbour was originally described as a subgenus of Tetrabelodon (=Gomphotherium), and later raised to generic rank. The type species is M. lulli (Barbour), from Cherry County, Nebraska. Osborn's treatment of the group varies, but in his "Final Classification" (1936, p. 738), he lists Megabelodon as a distinct genus, in which he includes M. lulli, M. joraki (Frick) and M. cruziensis (Frick), both from the Santa Fe beds of New Mexico, and M. phippsi (Cook) from Ainsworth, Nebraska. Osborn elsewhere suggests (p. 324) that the two Santa Fe species are probably synonymous, that both may be synonyms of M. phippsi, or (p. 326) that M. joraki may be a synonym of M. lulli.

Megabelodon lulli is a large and extremely long-jawed species. Barbour (1914, plates 3-6) originally restored the mandible with a pair of slender tusks. Additional material,
collected later, demonstrated that the symphysis lacked tusks, but had an expanded, rugose tip (Osborn, 1936, pp. 707-709). The molar teeth of the type mandible are too worn for comparison, but Osborn, (ibid.) mentions "very simple and only four crested" molars in a referred mandible.

_Megabelodon phippsi_ seems to be similar to _M. lulli_, but apparently differs in the complexity of the molars. M₃ has four lophids, as in _M. lulli_, but Cook (1928, p. 40) speaks of "small double trefoils on both meta- and trilophids,...[and] on the tetartolophid."

The position of _M. joraki_ and _M. cruziensis_ is uncertain. The molars of the type of _M. joraki_ are too worn for comparison, but the M₃ of _M. cruziensis_ has five lophids. Osborn (1936, p. 324) states that there are "partly closed" incisor alveoli in the mandibles of both _M. cruziensis_ and _M. joraki_. The skull of _M. cruziensis_ also lacks tusks and apparently has partly closed incisor alveoli (Frick, 1933, fig. 10). Osborn suggests that the absence of tusks in these specimens may have been a sexual character. It seems to me more likely to have been a pathologic condition. In either case, it appears unlikely that these forms should be referred to _Megabelodon_.

_Megabelodon minor_ is much smaller than any of the previously described species of _Megabelodon_ (Table 1). In fact, the tooth dimensions of _M. minor_ place it among the smallest of the post-Oligocene proboscideans recorded. A few of the lower third molars of European _Gomphotherium angustidens_ are as short, though wider (Lehmann, 1950, pp. 179, 185) and the teeth from the Burdigalian of Portugal, described as _Trilophodon slisiponense_ by Zbyszewski (1949, p. 57), are smaller (125 x 55, 115 x 55). The symphysis of _M. minor_ is relatively and actually much shorter than those of other _Megabelodon_ specimens. In _M. lulli_ and _M. phippsi_, the symphysis is more sharply down-turned than in _M. minor_. Available information on the molar teeth of _Megabelodon lulli_ and _M. phippsi_ is inadequate for detailed comparisons with _M. minor_. M₃ is four-ridged in all three species. In _M. phippsi_, the pattern of M₃ is evidently more advanced in the development of secondary trefoils. _Megabelodon minor_ is readily distinguishable from all other species of
Figure 1. *Megabelodon minor*, n. sp. Holotype, UCMP 67101. Mandible with right M₃, parts of right M₂, left M₁. Above, occlusal view; below, right side view. Scale equals five centimeters.
Figure 2. *Megabelodon minor*, n. sp. Holotype, UCMP 67101. Occlusal view of nearly unworn right $M_3$. Scale equals one centimeter.
proboscideans by the combination of characters of mandible and teeth and its small size. The character of the symphysis suggests referral to Megabelodon.

The presence of lower tusks is variable in some short-jawed proboscideans, such as Mammut americanum (Kerr). In the long-jawed mastodonts, however, the absence of lower tusks is probably more significant. The great tuskless spoon-bill of Gathabelodon must surely be a part of a specialized feeding mechanism. This is equally true of the long tuskless jaws of Megabelodon lulli and M. phippsi, and, I believe, of the shorter jaw of M. minor. "M." cruziensis and "M." joraki, as already noted, may be pathologic rather than specialized. In Eubelodon, the long but tuskless jaw may indicate another peculiar specialization, or it may be a stage in the transition from a longirostrine to a brevirostroine condition, as implied in Osborn's placement of this genus in the ancestry of Stegomastodon (his Cuvieronius).

The dental differences among the three genera, Megabelodon, Gathabelodon, and Eubelodon, indicate that they independently developed their tuskless, long-jawed condition. Megabelodon minor appears to be related to the Nebraska megabelodonts, but it may possibly represent a fourth independent line of tuskless longirostrine gomphotheres.

The Megabelodon minor mandible was preserved in a marly lacustrine limestone, suggesting that the animal frequented the shores of a lake, feeding on soft near-shore vegetation, as has been proposed for other shovel-tusked and spoon-billed mastodonts.

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<table>
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<tr>
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<th>M. minor (type) (UCMP 67101)</th>
<th>M. lulli (type) (Cook, 1928)</th>
<th>M. phipsi (type) (Cook, 1928)</th>
<th>&quot;M. cruziensis&quot; (type) (Frick, 1933)</th>
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* Estimated dimension of incomplete or inaccessible structure.
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REFERENCES CITED


