

A P P E N D I X .

ART. XXIV.—*Miocene Artiodactyles from the Eastern Miohippus Beds*; by O. C. MARSH.

IN recent numbers of this Journal, the writer has described various ungulate mammals from the upper Miocene of South Dakota and adjoining regions.* These were artiodactyles mainly, and of them the larger forms were related more or less closely to the genus *Anthracotherium*, established by Cuvier in 1822. These forms prove, on further study, to be more numerous and important in the horizon where *Protoceras* was found, or in the eastern Miohippus beds, than was at first suspected, and some additional specimens are described briefly and figured in the present article.

Heptacodon gibbiceps, sp. nov.

The type specimen of the present species is a skull in good preservation, except the posterior part, which is lost. The portion preserved fortunately affords a number of characters sufficient to separate the genus from allied forms of the same horizon, which will be discussed later.

The facial portion of this skull is strongly rounded above, especially in the frontal region, and this has suggested the specific name. The orbits are large, and not closed behind, although limited posteriorly by strong processes above and below. There is no antorbital depression, and the lachrymal foramen is inside the orbit. The nasals are elongate, narrow in front, and widely expanded behind where they join the frontals. They touch the lachrymals, thus separating the maxillaries from the frontals.

* This Journal, vol. xlvii, p. 409, May, 1894; and vol. xlviii, p. 91, July, 1894. See also, vol. xli, p. 81, January, 1891; vol. xlvi, p. 407, plate vii, November, 1893; and vol. xxxix, p. 524, June, 1890.

There were in all forty-four teeth. Three incisors were present on each side above, and there is a diastema behind the last one. The upper canine was large, and directed well forward and outward. There is no diastema behind the canine, and the four premolars form with the true molars a continuous series. The first and second premolars are secant, the third is subtriangular in outline, while the fourth has its crown composed of one external cusp and one internal cone. The upper molars conform strictly to the pattern of the type specimen on which the genus was based. A figure of this tooth and one of the corresponding molar of the present specimen are given below, natural size, in cuts 1 and 2.

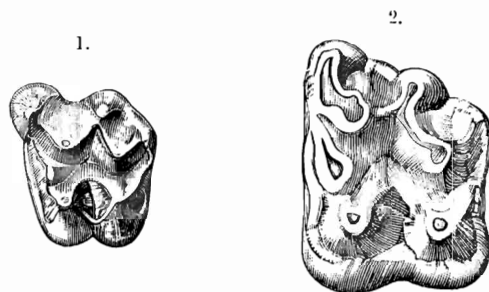


FIGURE 1.—Last upper molar of *Heptacodon curtus*, Marsh; left side; seen from below.

FIGURE 2.—The same tooth of *Heptacodon gibbiceps*, Marsh.
Both figures are natural size.

The posterior nares open opposite the middle of the last upper molars. The anterior palatine foramina appear to be confluent, forming together a heart-shaped aperture, which may in part be due to injury.

This type specimen indicates an animal about the size of a wild boar.

Elomeryx armatus, gen. nov.

The specimen described in the last number of this Journal as *Heptacodon armatus* proves on examination to belong to a distinct genus, which may be called *Elomeryx*. Of this genus, two species are now known. Some of the main characters are as follows:—

The skull is elongate, with the facial part quite narrow. The frontal region between the orbits is flat or even concave. The orbits are very small, and not closed behind. There is no lachrymal fossa. The anterior narial opening is large, and the snout broad.

There are the usual forty-four teeth. The upper incisors diverge, and have short, compressed crowns. The upper canine is very large and dependent. It is oval in outline near its base, but compressed below, with a serrated posterior edge; a feature not before observed in ungulate mammals.

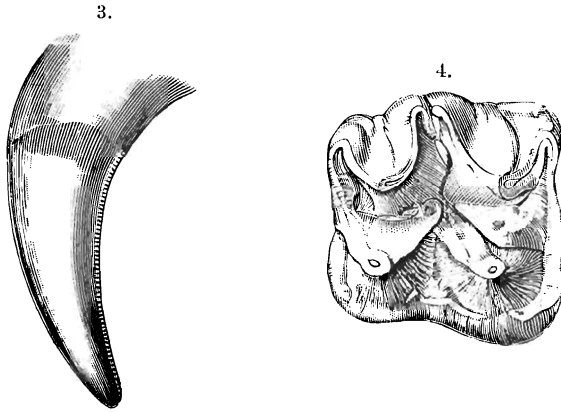


FIGURE 3.—Left upper canine of *Elomeryx armatus*, Marsh; outer view.

FIGURE 4.—Last upper molar of same species; right side; seen from below.

Both figures are natural size.

There is a long diastema behind the canine. The premolars and molars form a close series. An upper canine and last molar of the type species are shown above, natural size, in figures 3 and 4, and the upper molars of a new smaller species, in figure 5 below.

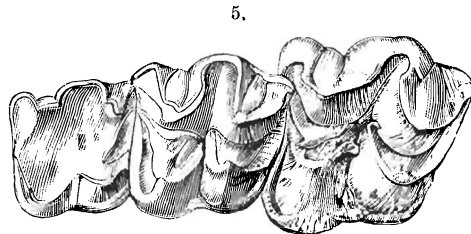


FIGURE 5.—Upper molars of *Elomeryx mitis*, Marsh; left side; seen from below.

Natural size.

The posterior nares are placed well behind the molar series, much as in existing swine. There is a postglenoid process, and a long paroccipital. The type species has a small auditorial bulla, and the other, a larger one. The zygomatic arch is slender, and curved well outward. The temporal fossæ are large, and separated above by a narrow sagittal crest. The brain was well developed. The type specimen of *E. armatus* indicates an animal about the size of a large deer.

Octacodon valens.

In addition to the two genera above described, there is a third, closely allied to them apparently, which is now known from various remains found in the same horizon. These remains may for the present be provisionally placed in the genus *Octacodon*, a typical upper molar of which is shown below, figure 6. One character seen in the teeth of this genus is the short crowns of the premolars and molars and the low cusps and cones of which they are composed. This feature will at once distinguish the teeth from those known as *Hyopotamus*,* found in the same region. In the latter forms, the elevations of the crowns are especially prominent and pointed, as shown in the molar represented in figure 7.

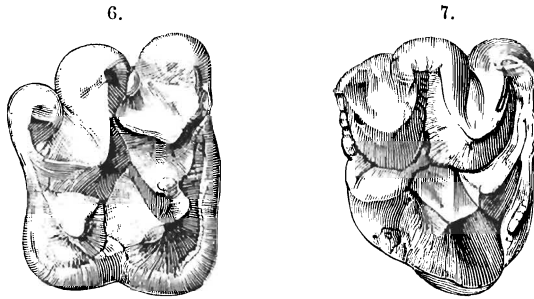


FIGURE 6.—Last right upper molar of *Octacodon valens*, Marsh; seen from below.
FIGURE 7.—The same tooth of *Ancodus (Hyopotamus) deflectus*, Marsh.

Both figures are natural size.

The position of the first premolar is another character of importance. In *Heptacodon* and *Elomeryx*, this tooth is situated close to the second premolar, but in the specimens here referred to the present genus, it is separated from both the canine and the second premolar by a well-marked diastema. None of these genera have the dependent process on the lower jaw which is characteristic of *Anthracotherium*. The nearer relations of these various allied forms will be discussed by the writer in a later communication.

Yale University Museum, New Haven, Conn., July 19, 1894.

* The generic name *Ancodus*, Pomel, has priority over *Hyopotamus*, Owen, and the latter must be regarded as a synonym. The name of the family therefore should be *Ancodontidae*.