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MULTITUBERCULATES IN THE WASATCH FORMATION

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Multituberculates had long been known from the Triassic and Jurassic when Lemoine (in 1880) made the sensational discovery that they occur in the Thanetian Paleocene fauna of Cernay-les-Reims in France. Cope soon found them also in the American Paleocene, and it has since been established that they are as characteristic of the Paleocene as of the Mesozoic. Their presence along with varied archaic placentals came to be considered as diagnostic of the Paleocene, and their final extinction was supposed to coincide with the close of this epoch and immediately to precede the incursion into North America and Europe of true Eocene mammalian faunas. It was, then, surprising and important to find that multituberculates occur also in Eocene beds in Wyoming, as first briefly announced in 1914¹. The present paper is devoted to the description of these last stragglers of the oldest order of mammals.

The first specimen was found by Granger in 1912, three miles southeast of the mouth of Pat O'Hara Creek in the Clark Fork Basin. It is stated in field notes to have been in definite association with *Eohippus* and *Pelycodus*, and there is no doubt that it is from the horizon later named Sand Coulee. The Sand Coulee beds overlie the Clark Fork beds and are marked by the first appearance of true Eocene mammals, including for the first time perissodactyls, artiodactyls, rodents, and adapids. The Clark Fork horizon, following Matthew, is generally considered as representing the close of the Paleocene, and in any event the Sand Coulee is certainly post-Paleocene and represents the lowest levels of the classical Wasatch Formation, as refined by recent faunal studies.

In the following year, 1913, three additional specimens were found by William Stein at the head of Big Sand Coulee in the same region. These are associated under field numbers with typical Wasatch mammals, including *Eohippus*, *Diacodexus*, and *Pelycodus*. This fact and the other field data indicate that these also are from the Sand Coulee beds. This series of four finds, made at different localities in different years and by different collectors, in each case with similar, surely Eocene, associated mammals, seems to remove all possibility of error or accident and to make

¹Granger, W. 1914. On the names of lower Eocene faunal horizons of Wyoming and New Mexico. Bull. Amer. Mus. Nat. Hist., XXXIII, p. 205.

it certain that multituberculates do occur here in post-Paleocene strata.

The remains all belong to the specialized ptilodontid *Eucosmodon*. This genus appears to range from the Puerco into the Sand Coulee—a span including four very distinct successive mammalian faunas through which no other genus is known to range. It may, therefore, eventually be found that two or more related genera are included, but the present specimens, while obviously belonging to new species, afford no clear generic distinctions from the Puerco *Eucosmodon americanus*. Two species appear to be present, but only one is now definable.

***Eucosmodon ultimus*, new species**

TYPE.—Amer. Mus. No. 16103, part of left ramus with P_4 and M_1 and associated right P_4 . Collected by W. Granger, 1912.

HORIZON AND LOCALITY.—Sand Coulee Beds, Wasatch Formation, Clark Fork Basin, Wyoming.

DIAGNOSIS.—Length P_4 , 11.4 mm.; fourteen serrations on margin; relatively long and low. Length M_1 , 7.3 mm.; maximum width, 3.7 mm.; six external and four internal cusps.

Eucosmodon, as defined by Matthew and Granger, is a ptilodontid genus characterized by the absence of P_3 and by the large, compressed, scalpriform lower incisors. The present type does not include any part of the incisor, and its alveolus, while present in large part, is too badly crushed for accurate measurement. Two multituberculate incisors from the Sand Coulee beds are included in the collection, however, and both are of the sort characteristic of *Eucosmodon*. One, A. M. No. 16782, has a maximum height (*i.e.*, maximum diameter of transverse section) of 6.1 mm. and maximum width of 2.6 mm. This incisor has nearly the same dimensions as that of *E. americanus* but the enamel band is markedly wider, especially on the median surface.

The other incisor, A. M. No. 16783, probably belonged to a different species from the first, although we prefer not to attempt its definition on this material, especially as it is not quite certain which kind of incisor belonged with the cheek teeth named *E. ultimus*. This second incisor has a maximum transverse diameter of 7.3 mm., and a maximum width of 2.6 mm., being larger but more compressed than No. 16782. It is the largest *Eucosmodon* incisor known.

P_4 has a contour long and low relative to that of P_4 in *Ptilodus*, a character shared by all but one of the several known species of *Eucosmodon*, described and undescribed. It is slightly larger than the homologous tooth of *E. americanus*, and much smaller than that of *E. molestus*,

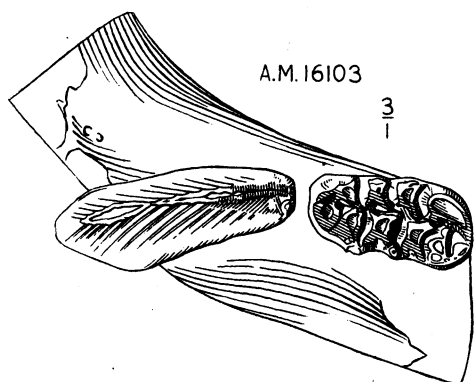


Fig. 1. *Eucosmodon ultimus*
Granger and Simpson. Crown and
external views of type specimen.
Three times natural size.

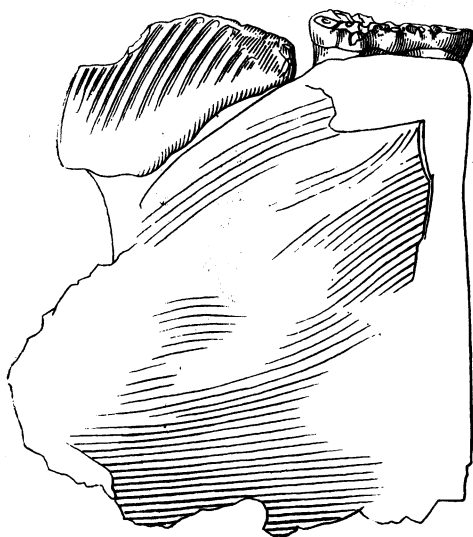


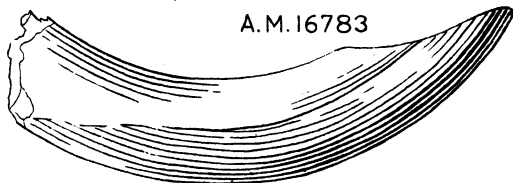
Fig. 2. *Eucosmodon*. External views
and transverse sec-
tions of two incisors
from the Sand Coulee
beds. Twice natural
size.



A.M. 16782

2
1

A.M. 16783



although the incisor of the latter is slightly smaller than the smaller of the two from the Sand Coulee.

M₁ is larger and has more cusps than in *E. americanus*, distinguishing the two species even more sharply than does the premolar. The most posterior of the six external cusps is the smallest on the tooth, while the first and last of the four internal cusps are elongate and enlarged. All of the cusps have the rather complex, plicated pattern characteristic of ptilodontids generally. There is a small conical accessory cupule externally, between the third and fourth main outer cusps, and there are indications of other still smaller tubercles on this side of the tooth.

The jaw is deeper and more robust than that of *E. americanus*.

The fourth specimen, A. M. No. 16098, includes only the posterior part of a right M₁, which agrees closely with that of the type.

The drawings in this paper are by John Germann.