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AN ANTIACODONT FROM THE GREEN RIVER EOCENE OF UTAH

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ABSTRACT

Report is made of a new occurrence of the dichobunid artiodactyl genus *Antiacodon* following its discovery in the Green River Formation in northeastern Utah by a Cleveland Museum of Natural History field party in 1967. A right ramus of the lower jaw with P_4, M_{1-3} is described and identified as *Antiacodon pygmaeus* (Cope).

In August, 1967, a field party from the Cleveland Museum of Natural History made a search for vertebrate fossils in various Eocene formations of the Uinta Basin, Utah. During a brief visit to the Powder Wash collecting site in the Green River Formation in Uintah County, Utah, near the Utah-Colorado state line, Mr. William Hlavin of the Museum party found part of a lower jaw of the dichobunid artiodactyl *Antiacodon,* hitherto unreported from the Utah Green River beds.

The specimen is described in the present paper. Originally a more extensive study of *Antiacodon* was projected and was already under way before I learned that Carnegie Museum also has some *Antiacodon* material from the Powder Wash locality. Dr. Craig Black of that institution is presently engaged in a study of various Eocene artiodactyles of this type. Inasmuch as there is no point to my duplicating Dr. Black's work, I am limiting the present paper to description of the specimen at hand.

The illustrations accompanying this paper are from superb pencil drawings of the specimen prepared by Mr. Lawrence B. Isham.

SYSTEMATIC PALEONTOLOGY

Family DICHOBUNIDAE Gill, 1872
Subfamily ANTIACODONTINAE Gazin, 1958
Genus **ANTIACODON** Marsh, 1872
ANTIACODON PYGMAEUS (Cope), 1872

Fig. 1

The specimen, C.M.N.H. no. 10930, consists of most of the right ramus of the mandible with P_4, M_{1-3}. It was contained in a block of sandstone taken from the Powder Wash locality, designated by Dawson (1968) as "two miles southeast of Powder Springs (sec. 8,

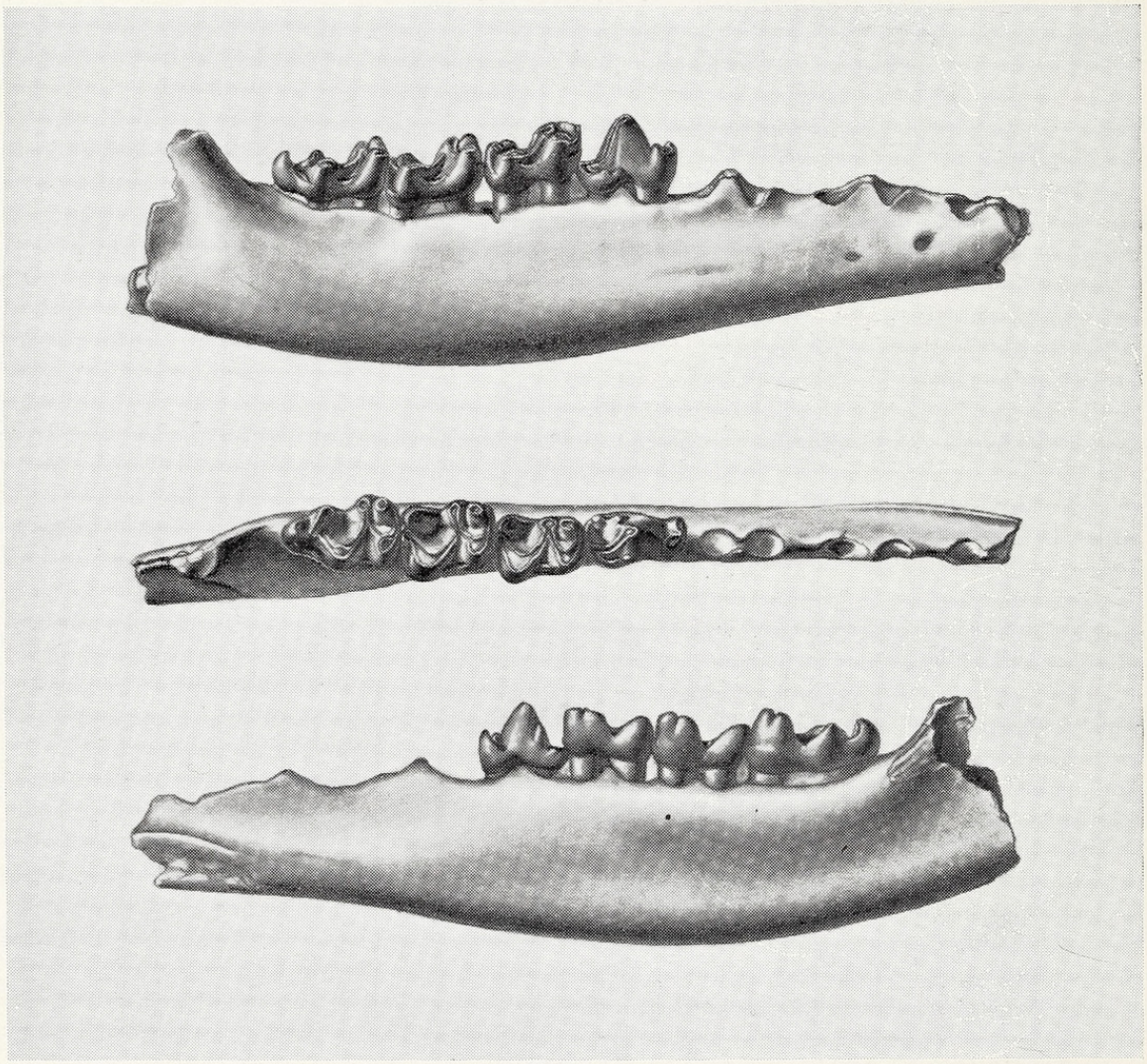

Fig. 1

Antiacodon pygmaeus (Cope). Right ramus of mandible (C.M.N.H. no. 10930), lateral, occlusal and lingual views. Twice natural size. Douglas Creek Member, Green River Formation, Middle Eocene, Powder Wash quarry, Uinta Basin, Utah.

T. 7 S., R 25 E., S.L.M.), Uintah County, Utah, on the basin side of Raven Ridge in the eastern part of the Uinta Basin." Dawson also states that the United States Geological Survey has determined that the mammal quarry is in the lower part (Douglas Creek Member) of the Green River Formation. Although I indicated the assignment with question (Burke, 1935), my attributing the sandstone of the mammal quarry to the upper part of the Green River Formation remains a regrettable error.

Posteriorly, the lower jaw preserves part of the ascending ramus and the anterior portion of the masseteric fossa. Anteriorly it extends slightly in advance of the anterior border of the alveolus of the canine. About 2 mm of the ventral border is missing beneath M_1; the thin enamel walls of the hypoconids of M_2 and M_3 have been chipped, and most of the entoconid cusp of M_1 has been lost. All of these features have been restored in the illustrations (fig. 1).

The masseteric fossa is fairly well excavated, although its inferior border is not well defined. The anterior border of the ascending ramus rises at an angle of about 65 degrees. The ventral border of the ramus is slightly convex, and the anterior half curves gently upward. There are three mental foramina, a slight slitlike one beneath the posterior alveolus of P_3, another beneath the posterior alveolus of P_2, and the third and most prominent beneath the diastema between P_1 and P_2.

The alveoli for the premolars anterior to P_4 indicate two diastemata, one between P_2 and P_3 and a second, slightly shorter, between P_1 and P_2. The single alveolus for P_1 is separated from the alveolus for the canine by about 1 mm of bone and the root of P_1 appears to have been slightly larger than that of the canine.

The anterior portion of the ramus is slender because of the upcurving of the ventral border and the progressive downbending of the alveolar border. The symphysis is extensive and quite rough; it narrows posteriorly, and extends back beneath the alveoli for P_2.

The protoconid of P_4 is a strong cusp, attenuated anteriorly to meet with a prominent paraconid. Internal to, and extending in advance of the paraconid is a relatively large parastylid. The metaconid, which arises on the posterointernal flank of the protoconid, is a distinct cusp, but definitely smaller than is usual in *Antiacodon*. The talonid is defined by the cingulum externally

and is joined posteriorly by the strong posterior crest from the protoconid. On the internal side of the talonid there is a small but definite entoconid, from which a short crest extends to the metaconid.

All of the molars bear anterior and posterior cingula, although the anterior cingulum of M_3 is barely distinguishable. Low cingula also block the exits of the external valleys of the molars.

The trigonids of the molars are characteristic of *Antiacodon*. The metaconids and paraconids are closely appressed, with the paraconid the higher and larger cusp. The metaconid extends further lingually than the paraconid. The protoconid is the lowest trigonid cusp and might be termed subcrescentic. An anterior crest from the protoconid joins the paraconid. A less elevated crest extends from the protoconid to the metaconid.

The molar talonids show large crescentic hypoconids and broad central valleys, the exits of which are closed by the metaconid and the entoconid walls, which form a broad V and meet low on the lingual side. The valley slopes of the entoconids are decidedly flat surfaces. From the hypoconid the crista obliqua extends to the protoconid-metaconid crest in M_2 and M_3; in M_1 the crista obliqua extends well up on the slope of the metaconid. The posterior crest from the hypoconid connects with the hypoconulid, but not with the entoconid, in M_1 and M_2. In M_3 this crest connects with the posterior blade of the entoconid. The crestlike entoconid blade then descends posteroexternally toward the base of the hypoconulid. The posterior cingulum originates along the posterior walls of the hypoconid and entoconid and expands posteriorly to form the prominent hypoconulid. An incipient crest extends forward and downward along the anterior face of the hypoconulid to meet with the descending blade of the entoconid. The posterior crest from the hypoconid very definitely does not extend to the hypoconulid.

Discussion: Gazin (1952, 1955, 1958, 1962) has dealt rather extensively with *Antiacodon* in relation to other Eocene artiodactyl genera. Based on his studies, I think there can be little doubt that the present specimen represents *Antiacodon pygmaeus* (Cope).

Although the small metaconid of P_4 of C.M.N.H. no. 10930 is not typical of *Antiacodon pygmaeus,* it appears to me that this may be simply a matter of individual variation, and Dr. Gazin, who has

had an opportunity to see the specimen, accords with me in this conclusion (written communication, Feb. 1, 1968).

Also to be considered are variations in the length of diastemata in specimens that have been referred to *Antiacodon pygmaeus*. Gazin (1958, p. 3) has noted that the diastema between P_2 and P_3 in A.M.N.H. no. 12697 is about 2.5 mm and in U.S.N.M. no. 1800 it is 3.9 mm. He also states (ibid., p. 4) that the jaw of A.M.N.H. no. 12697 is preserved to about 1.7 mm in advance of the roots of P_2, but doubtless he found no trace of an alveolus, otherwise he would have noted it. The diastema between P_2 and P_3 in C.M.N.H. no. 10930 is 1.9 mm, definitely shorter than in either of the above specimens, and the diastema between P_1 and P_2 is 1.7 mm, so this diastema also is apparently shorter than in A.M.N.H. no. 12697. However, I am inclined to attach little weight to these variations; they may, as a matter of fact, be related to age—the teeth of U.S.N.M. no. 1800, for example, are considerably worn in comparison with those of C.M.N.H. no. 10930, and my specimen quite obviously represents a much younger individual.

Because C.M.N.H. no. 10930 preserves more of the anterior portion of the jaw than previously described specimens of *Antiacodon*, it is of particular interest. It demonstrates, for instance, that by Middle Eocene time the P_1 of *Antiacodon* had attained the same size as the canine or was perhaps a little larger. But it also shows that along with the enlarged P_1 the anterior portion of the jaw remained, as Gazin (1958, p. 4) characterized it, "relatively slender" and the downbending of the alveolar border anteriorly contributes to this slenderness to about the same extent as the upcurving of the inferior border.

Starting with these characteristics, I would expect an Upper Eocene descendant of *Antiacodon* to show much the same construction of the lower jaw, and along with it no pronounced increase in size of P_1—in effect, the type of jaw usually found in Upper Eocene homacodonts.

Gazin's (1958) *Auxontodon* combines a lower jaw with a strongly convex inferior border and a much enlarged, perhaps caniniform, P_1. The cusp-crest construction of the cheek teeth appears to conform in all respects with what one would expect of an Upper Eocene antiacodont. Nevertheless, for the reasons cited

above, I cannot visualize *Auxontodon* as a direct derivative of *Antiacodon,* although there seems no doubt that the two forms had common ancestry.

Possibly, as has been suggested in regard to other elements of the North American Middle Eocene fauna, *Antiacodon* may have been in some way too specialized for a particular environment to survive its passing. Study of the skeleton might throw some light on the matter, but despite years of collecting, skeletal material of these Middle Eocene artiodactyles is still unknown. To judge from teeth at least, *Antiacodon pygmaeus* appears to be the only artiodactyl represented in the Powder Wash fauna. Almost any artiodactyl skeletal material taken from that quarry might prove to belong to *Antiacodon pygmaeus* and would be worthy of study on this account.

Measurements of C.M.N.H. no. 10930, in millimeters, are given below:

Depth of lower jaw at posterior margin of alveolus of P_1	5.0
Depth of lower jaw at anterior margin of first alveolus of P_3	6.0
Depth of lower jaw beneath M_2, lingually	7.5
Length of cheek tooth series from anterior margin of alveolus of C to posterior margin of M_3	35.5
Length of cheek tooth series from anterior margin of alveolus of P_1 to posterior margin of M_3	33.9
Length of diastema between P_1 and P_2	1.7
Length of diastema between P_2 and P_3	1.9
Length of lower premolar series from anterior margin of alveolus for P_1 to posterior margin of P_4	18.9
Length of lower molar series, M_1-M_3 inclusive	15.0
P_4, length : greatest width	4.6 : 2.5
M_1, length : greatest width	4.5 : 2.9*
M_2, length : greatest width	4.4 : 3.4*
M_3, length : greatest width	5.8 : 3.3

*Approximate

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