

**Article XXII.**—A NEW GENUS OF HORSE FROM THE MASCALL BEDS, WITH NOTES ON A SMALL COLLECTION OF EQUINE TEETH IN THE UNIVERSITY OF CALIFORNIA.

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**Archæohippus** gen. nov.

*Generic Characters.*—Skull elongate as compared with *Mesohippus*; metaloph completely united with the ectoloph; protoconule distinct as in *Parahippus*, but the prefossette is open between the metaloph and protoloph, there being no crochet, or anterior median enamel fold in the wall of the metaloph; molars compared with premolars relatively large, their transverse diameters being more nearly equal to those of the premolars than in either *Parahippus* or *Hypohippus*; lachrymal and malar fossæ well developed, the latter forming a deep pit immediately in front of the orbit; anterior border of orbit above anterior half of  $m^3$ ; lower  $p_1$ , as well as upper  $p^1$ , two-rooted<sup>1</sup>; both upper and lower molariform teeth with internal basal cingulum.

**Archæohippus ultimus** (Cope).

*Type.*—An anterior portion of skull (No. 8174 Am. Mus. Coll.) with nearly complete dentition, from the Mascall Beds, Cottonwood Creek, Oregon.

*Paratypes.*—A few teeth, belonging to the University of California collection, from the same beds and locality from which the type specimen came. These specimens comprise a last upper molar,  $m^3$ ; a second upper premolar,  $p^2$ ; a lower premolar, and a fragment of lower jaw containing parts of  $p_3$  and  $p_4$ , and the roots and alveoli of  $p_1$  and  $p_2$ . The numbers accompanying these teeth are respectively Nos. 1689, 1709, 1709a, and 1700.

These specimens, though very incomplete, supply some distinctive characters not shown in the type specimen, and I wish here to acknowledge my indebtedness to Dr. J. C. Merriam, of the University of California, for the privilege of examining and describing them.

The specimen taken as a type of this genus was fully described by Cope<sup>2</sup> under the name *Anchitherium ultimum*,<sup>3</sup> hence it only remains to point out the especial characters which distinguish it from other described genera. It is more advanced in several respects

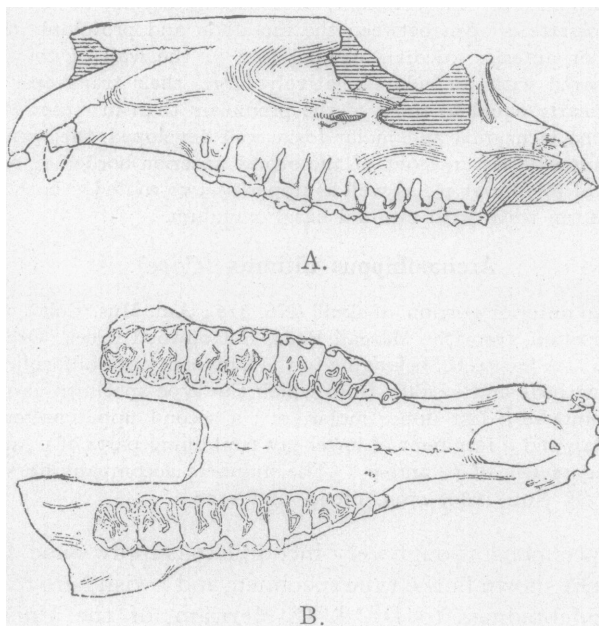
<sup>1</sup>Cope stated in his original description that the upper  $p^1$  had but one root, but an examination of the type shows this to be an error. The greatest diameter of this tooth is 10 mm. instead of 7 mm. as given by Cope.

<sup>2</sup>Proc. Amer. Philos. Soc., Vol. XXIII, 1886, pp. 357, 358.

<sup>3</sup>Cope used this genus name not because of any supposed close affinities to the European genus *Anchitherium*, but because all American species of the *Mesohippus bardi* type were at that time referred to *Anchitherium*. Later writers placed *A. ultimum* with the others in Marsh's genus *Mesohippus*.

than any species of Oligocene horse and compares in degree of progression with the earlier species of *Hypohippus* and *Parahippus*.

From *Mesohippus* and *Miohippus* this genus is clearly distinguished by (1) the complete union of the metaloph with the ectoloph in the upper molariform teeth; (2) the proportionally larger size of the protoconule; (3) the greater lengthening of the anterior portion of the skull, as shown in the comparatively longer muzzle; (4) the more backward position of the orbit, and (5) the great development of the lachrymal and malar fossæ. It differs from *Parahippus* in (1) the absence or but slight development of a crochet on the metaloph;



*Archaeohippus ultimus* (Cope). No. 8174 Am. Mus. Coll. A, side view;  
B, palatal view.

(2) the deeper notching of the external wall of the protoloph between the protocone and protoconule with a correspondingly less notching of the internal protoloph wall; (3) the comparatively more equal proportions of the molars to the premolars, and (4) the presence of a well developed internal basal cingulum. In the type, an old individual, the dentition is much worn by use and in some of the teeth the cingulum is nearly obliterated.

Compared with *Hypohippus* (1) the protoconule is much larger

than in that genus; (2) the molars in relation to the premolars are comparatively larger; (3) the muzzle is relatively longer; (4) the orbit is placed the width of a molar farther backward, and (5) the malar fossa, which is wanting in *Hypohippus*, is well developed, as is also the lachrymal fossa, with which it is nearly confluent, being separated only by a low rounded transverse ridge.

The lower teeth in the University of California collection show the additional characters of (1) a relatively strong two-rooted  $p_1$ , and (2) a well developed internal basal cingulum on the molariform teeth. The development of an internal basal cingulum in the lower teeth has not been observed in any other horse and is analogous to that seen in the *Palæotherium* of Europe.

This genus has advanced in development in many respects beyond any of the Oligocene horses and in its degree of progression ranks with *Hypohippus* and *Parahippus* while differing from both these genera. Thus in *Archæohippus* we have a third phylum of Miocene horses retaining brachyodont teeth, while more advanced in other respects than the Oligocene forms of the *Mesohippus* type. If, therefore, *Hypohippus* and *Parahippus* are to be retained as full genera, *Archæohippus* is likewise entitled to generic value.

#### **Archæohippus sp.**

In the California University collection from the Mascall beds there are two upper milk teeth ( $dp^1$  and  $dp^2$ ) and the anterior half of a third ( $dp^3$ ), all apparently belonging to a single individual, which probably represents a second and larger species of *Archæohippus*. But since the specimen is so incomplete and moreover represents only the milk dentition, I prefer not to propose a new name and thus add to the already too long list of species founded on inadequate material.

These teeth are much too large to be referred to *Archæohippus ultimus*, but they show the characteristics of the genus.  $Dp^1$  is relatively very large, the basal cingulum, especially along the anterior borders of the teeth, is well developed, there is a deep exterior notch between the protocone and protoconule, the protoconule is semi-crescentic and there is no spur or crochet on the metaloph. A peculiarity of these teeth is the regular continuity of the inner wall of the protoloph. The constriction between the protocone and protoconule is confined entirely to the outer or anterior wall, making the protoconule, which is greatly enlarged, assume a semi-crescentic form. This arrangement of the protoloph is, in a less pronounced

degree, also characteristic of the type (milk) teeth of *Parahippus cognatus*. In *P. cognatus* the protoconule is more conic in outline and there is a slight infolding of the inner enamel wall of the protoloph.

In the development of the protoloph and especially in the relative proportions of the protocone and protoconule these teeth are intermediate in development between those of the *Mesohippus* and *Anchitherium* forms and the *Merychippus* and *Protohippus* type of molars. In *Mesohippus* the walls of the protoloph are infolded about equally, the protoconule compared with the protocone is very small and more or less conic in form. In the hypsodont forms of the *Merychippus* and *Protohippus* types the protoconule is larger than the protocone and entirely crescentic in form, having joined the metaloph by means of the fully developed crochet and antecrochet. In *Hypohippus* the protoconule is nearly or quite lost in the continuous protoloph. *Archæohippus*, in the more crescentic form of the protoconule, represents more nearly than does *Parahippus* a direct intermediate form between *Mesohippus* and the hypsodont forms, but in some other important respects it is less directly intermediate.

Two other specimens in the University of California collection remain to be mentioned, a single upper molar,  $m^1$  or  $m^2$ , referable to *Parahippus brevidens* (Marsh), and the anterior half of a lower milk tooth, referable to some species of *Merychippus*.

All the teeth of this interesting little collection show characters of advanced development beyond any of the Oligocene forms, but are less specialized than the known Upper Miocene forms, thus tending to confirm the placing of the Mascall beds, from which these specimens were taken, in the Middle or Lower Middle Miocene.