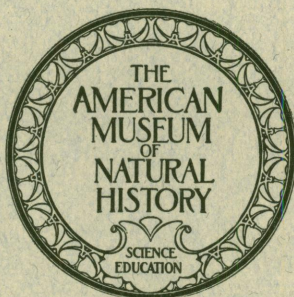


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FIRST APPEARANCE OF THE TRUE MASTODON IN AMERICA

By HENRY FAIRFIELD OSBORN



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FIRST APPEARANCE OF THE TRUE MASTODON
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The geologic history of the *Mastodon* is obscure and the geographic distribution uncertain because of its forest-living habits, but recently great progress has been made in tracing the history of this animal in America, especially through the studies and collections by Matthew and Cook¹ and Sinclair,² through Schlesinger's description of the Miocene proboscideans of Europe,³ and finally through Matsumoto's restudy of the proboscideans of the Oligocene Fayûm deposits of northern Egypt.⁴ From the latter it appears probable that the true *Mastodon* sprang from the genus *Palæomastodon* of northern Africa, while the bunomastodonts (*Trilophodon angustidens* phylum) sprang from the genus *Phiomia* of the same deposits. From the American Museum collections hitherto undescribed, Matsumoto has positively separated these genera and the species associated with them, which have been confused ever since the original descriptions by Andrews of *Palæomastodon*, in 1901, and of *Phiomia*, in 1902.

Matsumoto shows that the name *Palæomastodon* applies only to the lophodont type of *P. beadnelli* on which it was founded. This animal has a much broader skull than its contemporary *Phiomia*. These two animals were profoundly distinct, but, until the remainder of the skull and cutting teeth of *P. beadnelli* is known, we cannot be sure that this animal is directly ancestral to *Mastodon*.

MIocene AND PLIOCENE MASTODONS IN EUROPE

To the *M. tapiroides* of Cuvier, Schlesinger has added a series of forms which are more or less truly lophodont from the Miocene of France and of Austria, the relations of certain of which to *Mastodon* are, in our

¹'A Pliocene Fauna from Western Nebraska.' By W. D. Matthew and Harold J. Cook, 1909, Bull. Amer. Mus. Nat. Hist., XXVI, Art. 27, pp. 361-414.

²'Contributions to the Snake Creek Fauna.' By W. D. Matthew, 1918, Bull. Amer. Mus. Nat. Hist., XXXVIII, Art. 7, pp. 183-229.

³'Additions to the Fauna of the Lower Pliocene Snake Creek Beds (Results of the Princeton University 1914 Expedition to Nebraska).' By William J. Sinclair, 1915, Proc. Amer. Phil. Soc., Phila., LIV, No. 217, May-July, pp. 73-95.

⁴'Die Mastodonten des K. K. Naturhistorischen Hofmuseums.' By Günther Schlesinger, 1917, Denksch. K. K. Naturhist. Hofmuseums, I, Geol.-Paläontol., Reihe 1, pp. 1-230.

⁵In preparation for the American Museum Bulletin by Dr. Hikoshichiro Matsumoto.

opinion, doubtful. There cannot be the least doubt, however, as to the affinity of the grinding teeth found in the Lower Pliocene of Hungary, to which Schlesinger applies the name *M. tapiroides americanus*. These teeth are reproduced herewith (Fig. 1, *D, D1*) from unpublished photographs, kindly forwarded by the author, to the same scale with corresponding grinders (*A, A1, A2, A3*) from the Lower Pliocene, Snake Creek formation, of western Nebraska, also with lower teeth (*B*) from the Middle Pliocene, Thousand Creek, Nevada, and with (*C*) the posterior lower molar of *M. americanus* from the American Pleistocene.

***Mastodon tapiroides americanus* Schlesinger**

The upper and lower grinders from the Lower Pliocene, Tasnád, Usztató Kom., Hungary, embrace a third left superior molar (Fig. 1, *D1*, see Pl. XIII, fig. 5, Schlesinger), also two left inferior molars, m_2 - m_3 (Fig. 1, *D*, see Pl. XIV, fig. 1, Schlesinger). The linear measurement of the crowns agrees closely with that of the Pleistocene *M. americanus*, but the vertical measurement is apparently less, i.e., less hypsodont. This indicates that already in the Lower Pliocene the mastodonts had attained the massive proportions of their Pleistocene descendants. The lophs are similarly composed and show no trace of a trefoil ridge. There is nothing to debar these Lower Pliocene mastodonts of Hungary from the true ancestral line of our Pleistocene *Mastodon*.

THE AMERICAN PLIOCENE MASTODONS

During the summer of 1908 the American Museum party, under Dr. W. D. Matthew, first collected in the Snake Creek of western Nebraska a fauna subsequently determined as of Lower Pliocene age (Matthew and Cook, 1909, p. 361). The first proboscidean found appeared not to be referable to the true *Mastodon* (p. 367) but rather to the bunomastodont group. Subsequently, in 1918, several distinctive specimens were found in the same beds which may now be named as the type and paratypes of a new species of *Mastodon* (*Mastodon matthewi*), in honor of Dr. W. D. Matthew, the author who first described this interesting fauna. In 1918¹ this fauna was divided by Matthew into two life zones, an older zone of Upper Miocene age, in which *Merychippus* was abundant, and a more recent zone containing *Protohippus*, *Hipparion*, and *Pliohippus* (cf. *mirabilis*) of Lower Pliocene age. The latter zone may be known as

¹Osborn, H. F., 1918, 'Equidæ of the Oligocene, Miocene, and Pliocene of North America. Iconographic Type Revision.' Mem. Amer. Mus. Nat. Hist., N.S., II, Pt. I, p. 34, "Preliminary Key to the Geologic Distribution of the Principal Species of Equidæ."

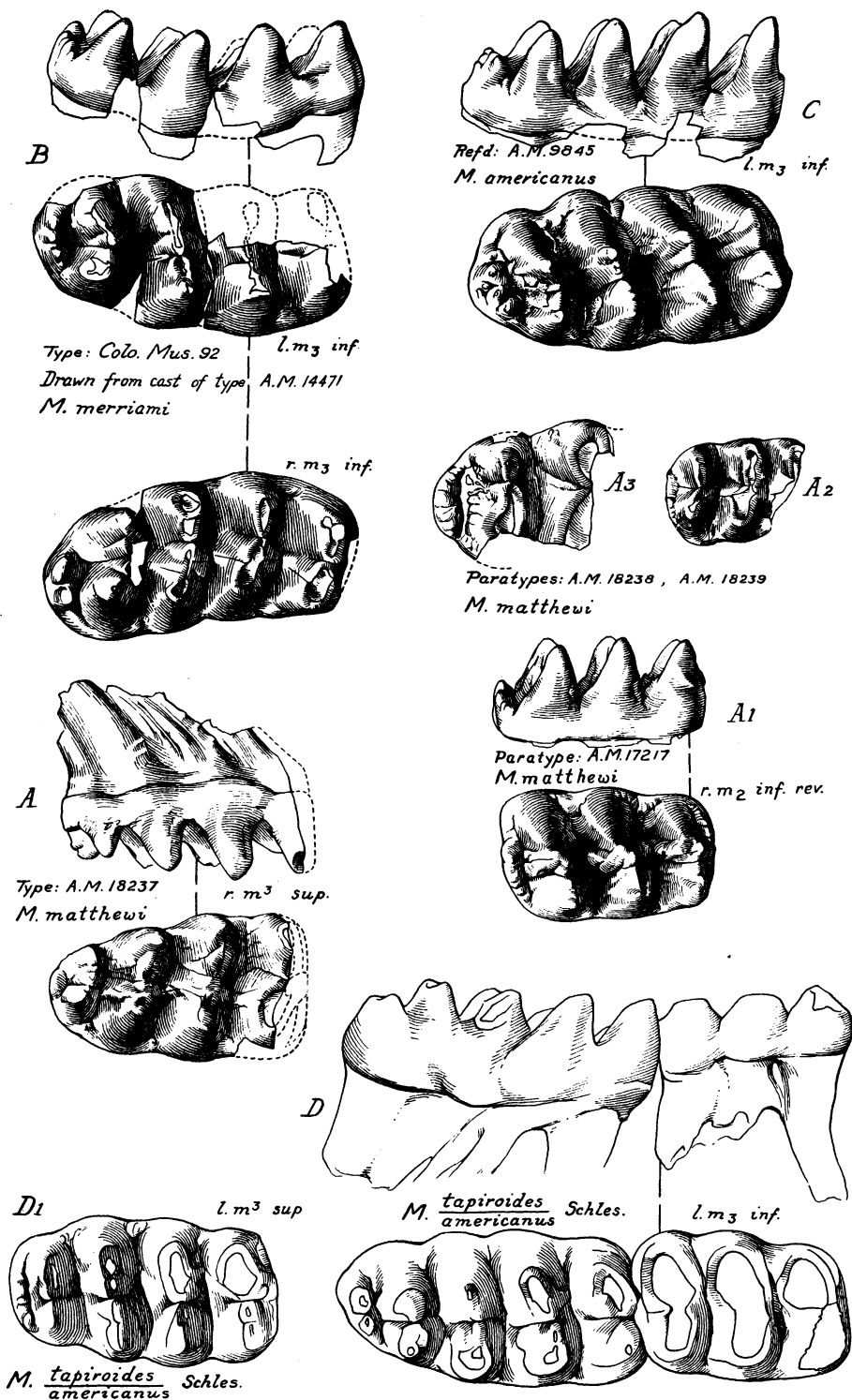


Fig. 1. D and D1. Inferior molars referred to *Mastodon tapiroides americanus*, from the Lower Pliocene of Hungary. Reproduced through the courtesy of Dr. Günther Schlessinger.

A, A1, A2, and A3. Type and paratypes of *Mastodon matthewi* Osborn, from the Lower Pliocene of Nebraska.

B. Type molars of *Mastodon merriami* Osborn, Middle Pliocene of Nevada, Colo. Mus. 92.

C. Referred *Mastodon americanus*, from the phosphate beds of South Carolina, in the American Museum.

All figures one-fourth natural size.

Snake Creek B or *Procamelus-Hipparion* Zone, similar to that of Fort Niobrara Nebraska, of Little White River South Dakota, of Clarendon Texas, and of the Santa Fé Marls B New Mexico. From his collection of 1914, Sinclair also reported (1915, p. 84, Fig. 9) a left last lower molar attributed to ?*Mastodon* species, collecting locality 1000A. It is probably in this true early Pliocene of North America, broadly equivalent to Pikermi-Eppelsheim of Europe, that *M. matthewi*, the first true *Mastodon* to reach America, occurs. In his second paper, Matthew (1918, p. 199) confirms Sinclair's division of the Snake Creek proboscideans into two types and selects for the zygalophodont type, allied presumably to *M. americanus*, the generic name *Zygalophodon* Vacek, 1877, type *M. tapiroides* Cuvier.

Of more recent age, probably Middle Pliocene, is the type of *Mastodon merriami* from Thousand Creek, Humboldt County, Nevada, discovered by Mr. George D. Mathewson in digging one of the excavations along the opal outcrop on a precipitous hill about 500 feet above the level of Thousand Creek and between the main forks of the creek, as described by the geologist, Richard C. Hills.¹ The formation consists of a more or less stratified volcanic ash containing much opalized wood. The type specimens include several bone fragments, portions of the two upper tusks, and parts of the upper molars, in addition to the well-preserved two lower molars here figured as the type. A very important character is the presence of broad enamel bands on the upper tusks (Fig. 2, C, D, E), which are perhaps similar to the enamel bands observed by Schlesinger in the true Miocene and Pliocene mastodons of Hungary. The Thousand Creek fauna of Nevada is regarded by Merriam as of Middle Pliocene age. It is deemed by Osborn as belonging to the *Ilingoceras-Pliohippus* Zone, to which is assigned the temporary number 16 (Osborn, 1918, p. 34).

***Mastodon matthewi*, new species**

TYPE: the right third superior molar, Amer. Mus. 18237. PARATYPES: the right second inferior molar (unworn), Amer. Mus. 17217; the posterior portion of a right third inferior molar (more worn), Amer. Mus. 18238, also of a right second inferior molar, Amer. Mus. 18239. The type and paratypes probably belong to four different individuals. Collected by the American Museum expeditions of 1916 and 1918 under

¹The writer is indebted to Dr. Richard C. Hills for a letter, March 9, 1921, which contains a full account of his discovery of this interesting type.

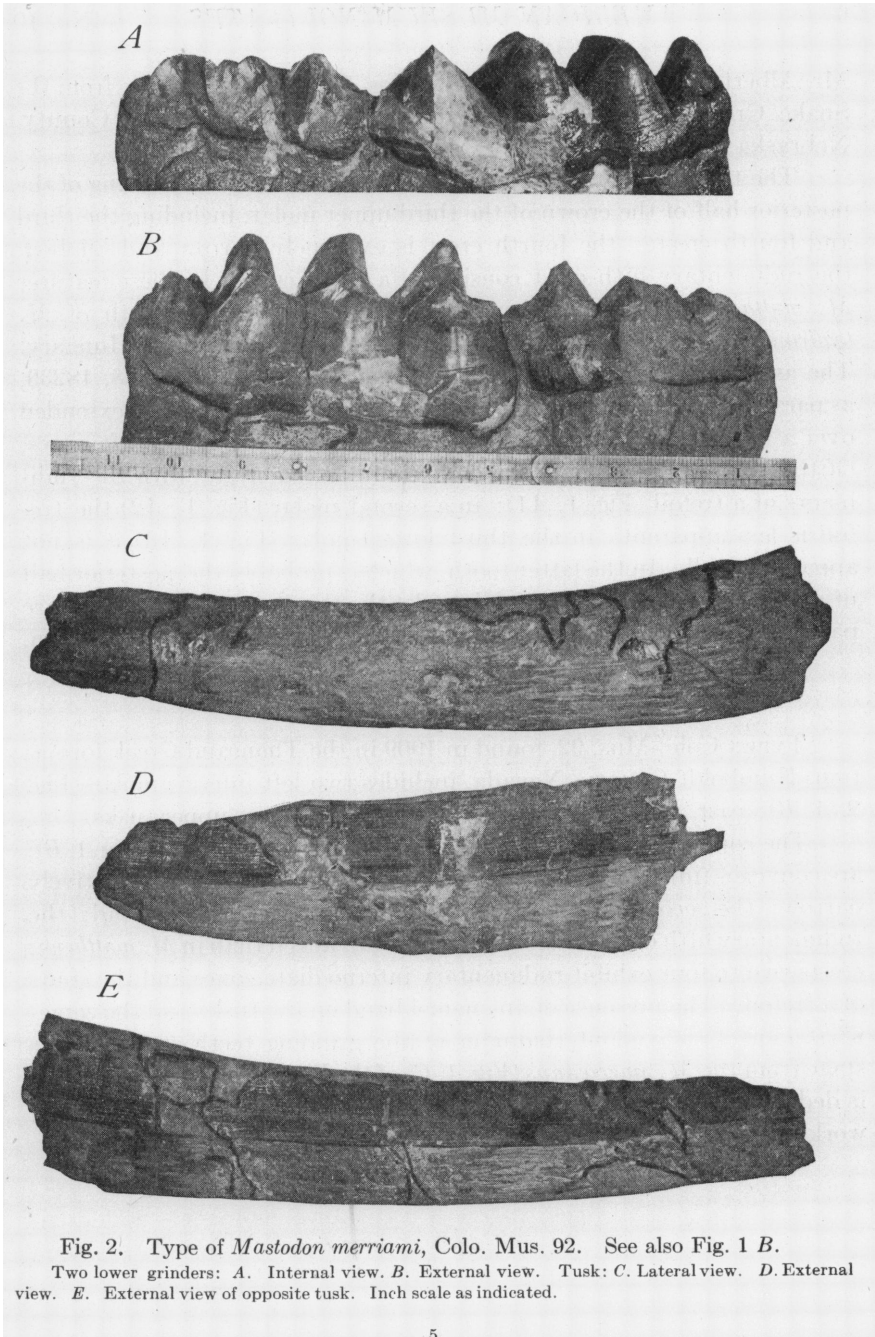


Fig. 2. Type of *Mastodon merriami*, Colo. Mus. 92. See also Fig. 1 B.
 Two lower grinders: A. Internal view. B. External view. Tusk: C. Lateral view. D. External view. E. External view of opposite tusk. Inch scale as indicated.

Mr. Albert Thomson. The type and Nos. 18238 and 18239 are from the Snake Creek B level (*Procamelus-Hipparion* Zone) of Sioux County, Nebraska; the level of No. 17217 is not recorded.

The type (Fig. 1, A) is distinguished by the rapid narrowing of the posterior half of the crown of the third upper molar, including the third and fourth crests; the fourth crest is extremely narrow and bilobed; the rudimentary fifth crest consists of a single cusp. In these features *M. matthewi* is more primitive than the corresponding tooth of *M. tapiroides americanus* (Fig. 1, D1) of the Lower Pliocene of Hungary. The association of the lower molars, Amer. Mus. 17217, 18238, 18239, as paratypes is provisional, because the Snake Creek deposition extended over a long period of time and may represent more than two life zones. Of these teeth, m_2 presents three unworn pointed crests with the rudiments of a trefoil (Fig. 1, A1); in a second molar (Fig. 1, A2) the trefoil is less apparent; in the third lower molar (Fig. 1, A3) it is not apparent at all. In the latter tooth, which is probably the posterior half of a third lower molar of the right side, the third and fourth crests are partly preserved; crest five is represented by a broad tuberculate talon.

***Mastodon merriami*, new species**

TYPE: Colo. Mus. 92, found in 1909 in the Thousand Creek formation, Humboldt County, Nevada, includes two left inferior molars (Fig. 2, A, B); cast, Amer. Mus. 14471, also portions of two upper tusks.

The contours of these grinding teeth, as seen from above (Fig. 1, B), are convexo- (inner side) concave (outer side); the first crest is relatively narrow; the second, third, and fourth crests are relatively broad; the rudimentary fifth crest is little if any more advanced than in *M. matthewi*; crests two to four exhibit rudimentary intermediate cones and the spurs of a trefoil. The presence of an enamel band on the tusks and the somewhat more brachyodont character of the grinding teeth separate this stage from the *M. americanus* (Fig. 1, C) of the Pleistocene. This species is dedicated to Professor John C. Merriam, in recognition of his pioneer work in describing the fauna of Thousand Creek.

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FRANK E. LUTZ, Editor

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