

# The oldest *Mammut* (Mammalia: Proboscidea) from New Mexico

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## Abstract

We redescribe and reillustrate the holotype of *Mammut* (= *Mastodon*) *raki* (Frick, 1933), and establish its provenance as the Palomas Formation near the western shore of Elephant Butte Lake in Sierra County, south-central New Mexico. This specimen represents a very primitive *Mammut* of probable Blancan age, the oldest representative of the genus from New Mexico.

## Introduction

The American mastodont, *Mammut americanum*, was extremely rare in New Mexico. Only four occurrences from relatively young Pleistocene (Rancholabrean) sites are known in the state (Lucas and Morgan, 1997). However, a much older and more primitive *Mammut*, originally named *Mastodon raki* by Frick (1933), has long been known from New Mexico. Here, we establish the provenance of *M. raki*, redescribe the holotype, provide the first photographic illustrations of this specimen, establish the current taxonomic status of this species, and discuss its significance. F:AM refers to the Frick Collection of the American Museum of Natural History (AMNH), New York.

## Locality

Frick (1933, p. 630) stated that the type mandible of *Mastodon raki* (F:AM 23335) "was collected by Joseph Rak in the fall of 1927 from beds bearing teeth of Pleistocene *Equus*" and elsewhere (fig. 29A) indicated the locality as "Hot Springs, New Mexico." Archives in the Department of Vertebrate Paleontology of the AMNH indicate that Rak collected F:AM 23335 near Elephant Butte Lake approximately 7 mi (11 km) north of Hot Springs (now known as Truth or Consequences) in November 1927. This places the locality in the vicinity of Rock Canyon in the SE/ T12S R4W, Sierra County, in south-central New Mexico. Lozinsky (1985, Sheet 1) mapped extensive exposures of the axial river facies of the Palomas Formation in this area, and we feel certain that F:AM 23335 was collected from this unit.

## Description

The holotype of *Mammut raki* (F:AM 23335) is an incomplete lower jaw with left m2 and right m2–m3 (Fig. 1). In occlusal view, the jaw is nearly V-shaped with a small spout and two anterolaterally facing alveoli for tusks near the symphyseal tip. The horizontal rami are stout and bear a distinct mental foramen anterior to m2. The total preserved length of the mandible is 600+ mm.

Alveoli for the m1s are present on both rami and are partially resorbed. They indicate the presence of an anteroposteriorly rectangular tooth with at least two transverse sets of roots. The m2 is preserved on both the right and left sides. It has three lophids, each composed of two transversely aligned cuspids separated by a distinct cleft (medial sulcus). The enamel is little plicated, and there are no pillars in the transverse valleys. Length of m2 is 118 mm, maximum width is 76 mm.

Only the right m3 is preserved, and it has five lophids. Like the m2, each lophid is composed of two cuspids separated by a median sulcus. The enamel is barely plicated, and there are no pillars in the transverse valleys, although the first four lophids have distinct pretrite cristids. The length of m3 is 184 mm, maximum width is 80 mm.

## Identification

F:AM 23335 is the holotype of *Mastodon raki* Frick, 1933, a name maintained by Osborn (1936, p. 137). Tedford (1981, p. 1019) referred to this taxon as *Mammut raki* because, as Kurtén and Anderson (1980) noted, *Mammut* Blumenbach, 1799 has priority over *Mastodon* Cuvier, 1817. Lucas (1987, p. 32) argued that *M. raki* was a junior subjective synonym of *M. americanum*. However, as Lucas (1987) noted, the relatively narrow m3 of F:AM 23335 (width/length  $\sim 100 = 43$ ) is unusual for *M. americanum* (e.g., Skeels, 1962, table 1). Furthermore, the type specimen of *M. raki* has well-developed tusks on both the right and left sides, a feature not common in mandibles of *M. americanum*.

Indeed, the mandible of *Mammut raki* most closely resembles specimens termed *Pliomastodon* by Osborn (1936, figs. 101–105, 107). Specimens of *Pliomastodon* are now usually regarded by most workers (e.g., Simpson, 1945; Shoshani and Tassy, 1996) as primitive, early members of the genus *Mammut*. We thus identify F:AM 23335 as *Mammut raki* pending a revision of the genus that may demonstrate this species is not valid.

## Discussion

The mandible of *Mammut raki* almost certainly was derived from the Palomas Formation. Strata of the axial river facies of the Palomas Formation west of Elephant Butte Lake, which probably incorporate the type locality of *M. raki*, have produced a mammalian fauna that includes the horse *Equus simplicidens* and the large camel *Gigantocamelus*. Tedford (1981) regarded this fauna and the nearby Las Palomas Creek fauna from the Palomas Basin near Truth or Consequences to be medial Blancan (Pliocene, about 3 Ma) in age, based on both mammalian biochronology and their close stratigraphic association with a basalt K/Ar dated at 2.9 Ma from Mitchell Point on the west shore of Elephant Butte Lake (Bachman and Mehnert, 1978). Tedford (1981) specifically listed *M. raki* as part of the Blancan mammalian assemblage from the Engle and Palomas Basins. Lucas and Oakes (1986) also assigned a medial Blancan age to the Cuchillo Negro Creek local fauna, including *Borophagus diversidens*, *Equus simplicidens*, and *Stegomastodon rexroadensis*, from the Palomas Formation about 6.2 mi (10 km) west of Elephant Butte Lake. Repenning and May (1986) reported an older, early Blancan mammalian fauna (Blancan II, about 4 Ma, after Repenning, 1987) from the lower part of the Palomas Formation near Truth or Consequences.

The total age range of the Palomas Formation, on the basis of vertebrate fossils, paleomagnetic stratigraphy, and its relationship to dated basalts, is from about 4 Ma to as young as 400 ka (Tedford, 1981; Lozinsky and Hawley, 1986; Lucas and Oakes, 1986; Repenning and May, 1986; Mack et al., 1994). Without knowing the exact locality and horizon where the type of *Mammut raki* was collected, we can only estimate its age based on morphology and on the biochronology of mammalian faunas collected from the Palomas Formation in the general vicinity of Elephant Butte Lake and Truth or Consequences. The morphology of the type mandible suggests that *M. raki* is Blancan, or possibly late Hemphillian, whereas most mammalian faunas from the Palomas Formation are medial Blancan.

*Mammut* was rare during the Blancan. Specimens referred to as *M. americanum* are known from three northwestern Blancan faunas, including Grand View and Hagerman in Idaho and White

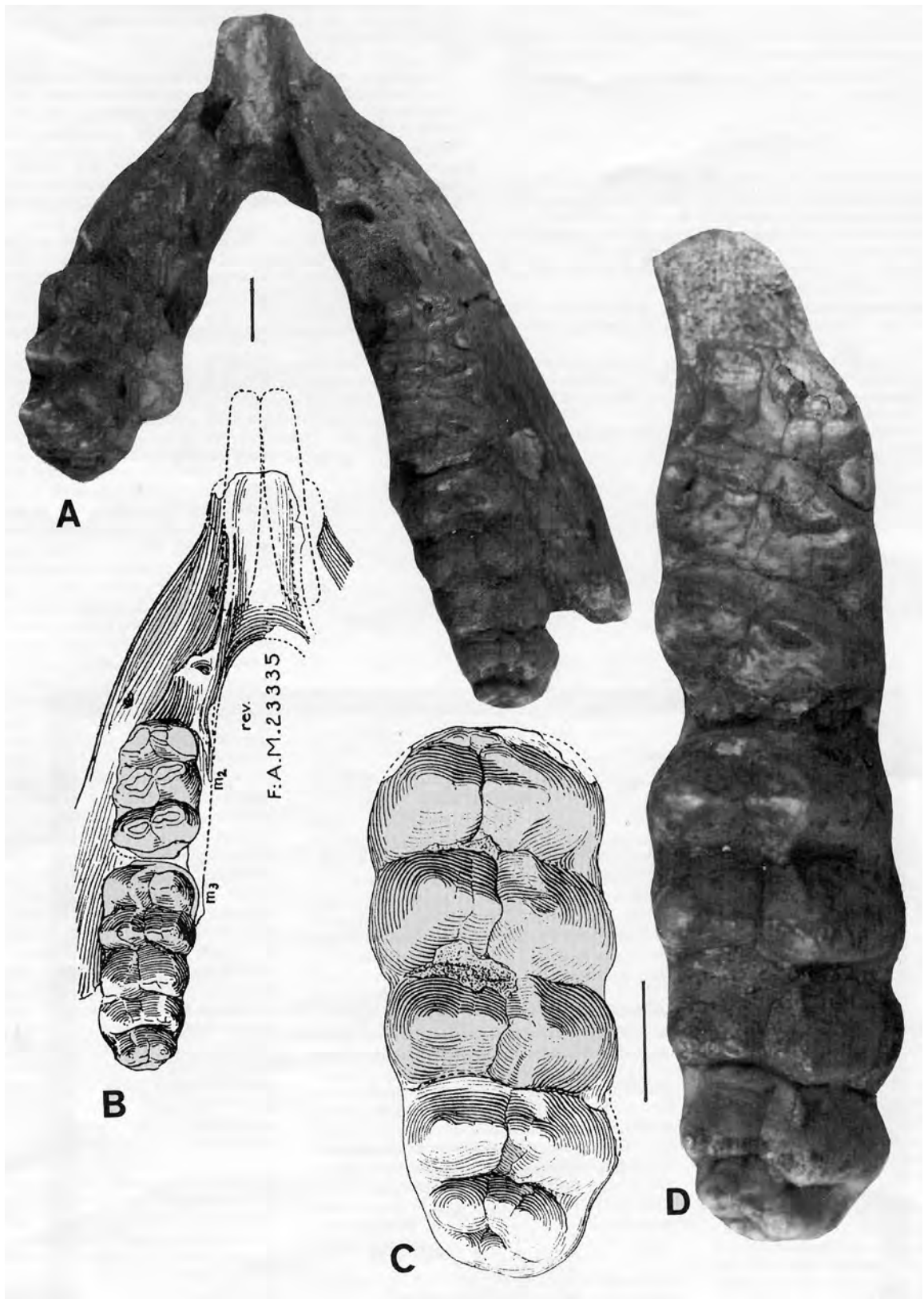


FIGURE 1—Holotype mandible (F:AM 23335) of *Mammut raki* (Frick) from the Palomas Formation near Truth or Consequences, New Mexico. A–B, Occlusal view of lower jaw. B is from Frick (1933, fig. 29A) and was drawn reversed to facilitate comparison. C, Occlusal view of right m3 (from Frick, 1933, fig 25A). D, Occlusal view of right m2–m3. Scale bar for A–B is 5 cm long; for C–D it is 2 cm long.

Bluffs in Washington (Kurtén and Anderson, 1980). *M. raki* is certainly the oldest *Mammut* from New Mexico. All other well documented records of this genus in the state are Pleistocene (Lucas and Morgan, 1997).

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