

THE ARIZPE MAMMOTH, PLEISTOCENE OF SONORA, MEXICO— TAXONOMIC RE-EVALUATION

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ABSTRACT

Archidiskodon sonoriensis Osborn, 1929, the Arizpe mammoth, is a junior subjective synonym of *Mammuthus imperator* (Leidy, 1858). The Arizpe mammoth was a complete skeleton found in 1929 from a locality about 1.6 km east of the town of Arizpe, Sonora, in Rancho El Basimachi. It was uncovered from terraces of poorly consolidated, fine-pebble conglomerates and coarse-grained sandstone that form the younger and distal deposits of a presently dissected alluvial fan that flowed southwestward away from Cerro Picacho Arizpe. The age of these alluvial deposits is not better constrained than Pleistocene based on the presence of *Mammuthus imperator*.

Key words: Vertebrate paleontology, Pleistocene, Sonora, Mexico.

RESUMEN

El mamut de Arizpe, *Archidiskodon sonoriensis* Osborn, 1929, es un sinónimo subjetivo junior de *Mammuthus imperator* (Leidy, 1858). El mamut de Arizpe consiste en un esqueleto completo encontrado en 1929 en una localidad ubicada 1.6 km al oriente del poblado de Arizpe, Sonora, en el rancho El Basimachi. El esqueleto fue desenterrado en terrazas constituidas por conglomerados de guijarros finos poco consolidados y areniscas de grano grueso que forman los depósitos más jóvenes y distales de un abanico aluvial actualmente disecado, que fluyó hacia el suroeste del cerro Picacho Arizpe. La edad de estos depósitos aluviales no se constriñe más que al Pleistoceno, con base en la presencia del *Mammuthus imperator*.

Palabras Clave: Paleontología de vertebrados, Pleistoceno, Sonora, México.

INTRODUCTION

Mammoths emigrated to North America from Asia about 1.8-1.6 Ma (Agenbroad, 1984). They spread throughout the continent rapidly, and invaded Central America and northern South America as far south as French Guyana (Osborn, 1942). In Mexico, mammoths are known from a variety of localities, especially in Nuevo León and central Mexico (Ferrusquía-Villafranca, 1978; Kurten and Anderson, 1980). The present authors are aware of several mammoth localities in Sonora, but the only record in the scientific literature is that of Osborn (1929), who named a new species of mammoth, *Archidiskodon sonoriensis*, from near the town of Arizpe, Sonora (Figure 1). Here, the taxonomic status of *A. sonoriensis* is re-evaluated, which the authors refer to as the Arizpe mammoth, and discuss its age. In this article, AMNH refers to the Department of Vertebrate Paleontology, American Museum of Natural History, New York. Measurements of mammoth molars follow the protocol of Maglio (1973, fig. 3). Upper case (M) refers to an upper molar, whereas lower case (m) is used for a lower molar.

SYSTEMATIC PALEONTOLOGY

Class Mammalia Linnaeus, 1758
Order Proboscidea Illiger, 1811
Family Elephantidae Gray, 1821
Genus *Mammuthus* Burnett, 1830

Mammuthus imperator (Leidy, 1858)

(Figure 2)

Synonymy—*Archidiskodon sonoriensis* Osborn, 1929, p. 18, fig. 18. *Archidiskodon sonoriensis*: Osborn, 1942, p. 1033, fig. 923. *Archidiskodon sonoriensis*: Carranza-Castañeda, p. 440, fig. 179, b.

Referred specimen—AMNH 22637, palate with left and right M3 and incomplete lower jaw with right m3, the holotype of *A. sonoriensis* Osborn, 1929 (Figure 2).

Horizon and locality—The American Museum purchased AMNH 22637 for \$50 from Señor Alfredo Serrano in 1929, who collected it from near the locality of Rancho El Basimachi in the northern margin of the Río Sonora, about 1 mile (1.6 km) north-east of Arizpe, in central Sonora (Figure 1). The AMNH specimen is all that remains of a supposedly complete skeleton.

Redescription—The authors redescribe here the holotype of *A. sonoriensis*. The palate is highly vaulted with a median ridge where the palatines are sutured to each other. There are two, cup-like depressions anterior to the M3s, the fossae developed in the maxillaries ventrally to the tusks. Both M3s are moderately worn and have 8+ plates in occlusion. Measurements of M3 are: 205+ mm long, maximum width = 97 mm, plate count = 5 plates per 100 mm, plate thickness = 11.8-12.8 mm, and enamel thickness = 3.5-4.9 mm.

The lower jaw has a thick horizontal ramus which is deep and robust. The spout-shaped symphysis is sharply downturned anteriorly. Two mental foramina are present, one below the leading edge of m3, and the other halfway down the

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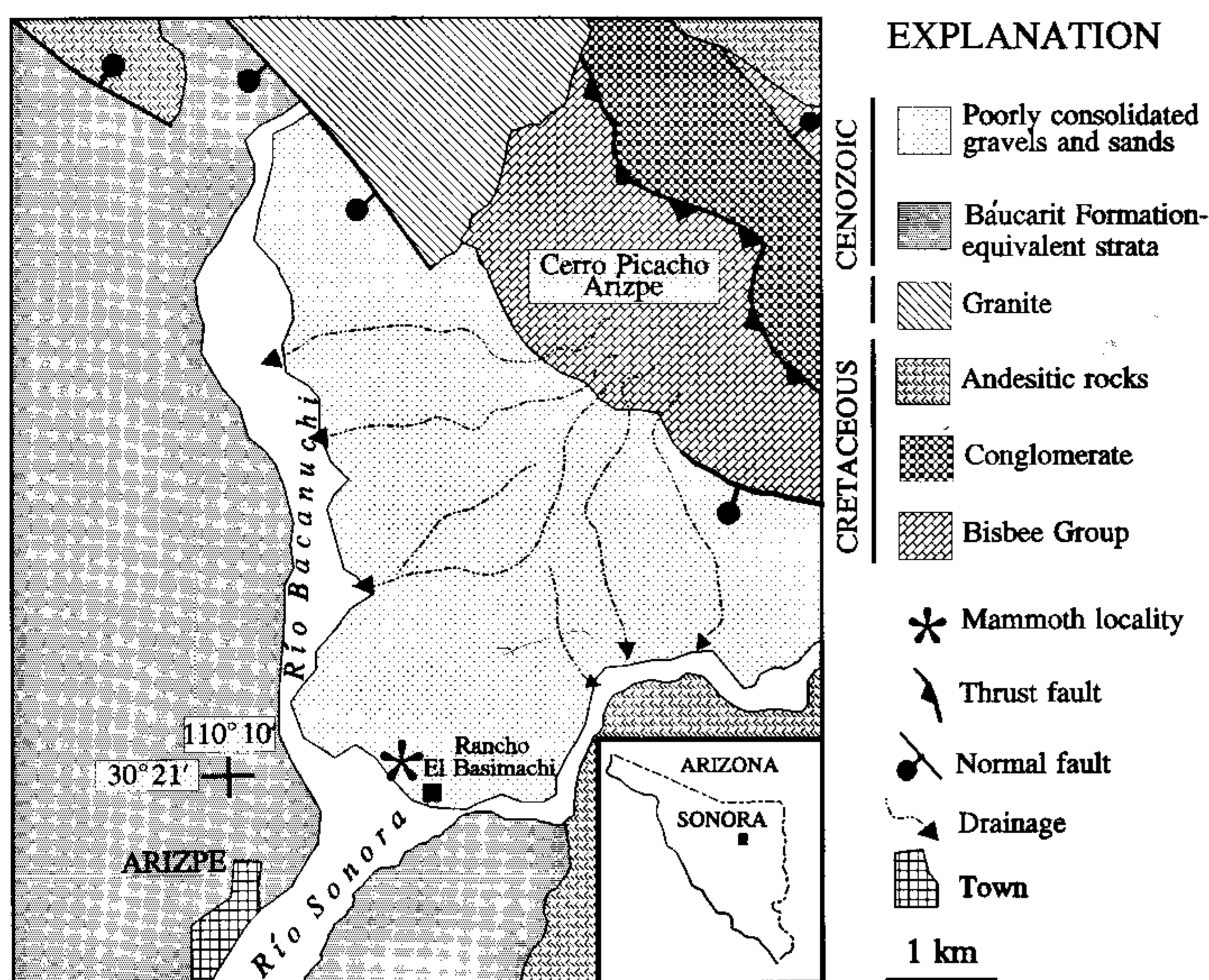


Figure 1. Geologic map of the area showing the Arizpe mammoth locality near Rancho El Basimachi, about 1.6 km northeast from the town of Arizpe. Inset map shows location of the area in north-central Sonora. Geologic map modified from González-León (unpublished work).

symphysis. The ascending ramus is broken, but its base suggests it is vertically oriented. Depth of the horizontal ramus is 240 mm under the anterior part of the m3. The right m3 shows a state of moderate wear with 10+ plates in occlusion. Measurements of the m3 are: length approximately 255 mm, maximum width = 93 mm, crown height approximately = 142 mm, plate count = 5 plates per 100 mm, plate thickness = 13.0-13.5 mm, and enamel thickness = 3.8-4.9 mm.

Discussion—In naming *Archidiskodon sonoriensis*, Osborn (1929, p. 20; reprinted by Osborn, 1942, p. 1033) gave the following diagnosis ("specific characters" in his terminology):

"Mandibular rostrum prolonged obliquely downwards, with downturned beak, as seen both in front and side views; length from symphyseal groove to tip of rostrum 230 mm, exposed length of M3 246 mm, of m3 346 mm; depth from third unbroken plate to bottom of jaw 244 mm. A total of 11 + 2 (?) exposed ridge-plates in M3, of 2 (?) + 11 + 3 in m3".

The features listed by Osborn are either characteristic of *Mammuthus* (shape of the mandibular rostrum) or metrics characteristic of *Mammuthus imperator* (see below). Also, note that: (1) Osborn's report of an m3 length of "346 mm" probably is a typographical error for "246"; (2) the plate counts reported by Osborn are reasonable extrapolations of the total number of plates of the unworn M3 and m3, but the present authors' plate counts make no such extrapolations; and (3) the authors follow Maglio (1973), who presented strong arguments based on morphology that *Archidiskodon* is not a distinct genus, so the authors regard *Archidiskodon* Pohling to be a junior subjective synonym of *Mammuthus* Burnett.

The taxonomy advocated by various authors that only recognizes three species of mammoths in the New World south of Alaska is used. These are the cranio-dental grades *M.*

meridionalis, *M. imperator* and *M. columbi* (Maglio, 1973; Agenbroad and Mead 1989; Lucas and Effinger, 1991). In this taxonomy, the Arizpe mammoth is too primitive to belong to *M. columbi* (see Dutrow, 1980; Madden, 1981). It has a low plate ratio (5), low number of plates in occlusion (8-10+) and very thick enamel. These are primitive features of *Mammuthus* species not seen in *M. columbi*. In all measurements it falls within the range established by Madden (1981, table 12) for *M. imperator*. Only its enamel is unusually thick, slightly above that range, but the present authors do not feel this is a sufficient basis for excluding the specimen from *M. imperator*. Measurements of the Arizpe mammoth also overlap to a great degree those reported for *M. meridionalis* (= *M. hayi*) by Madden (1981, tables 5, 7). However, the deep, robust and apparently vertical ascending ramus and sharply downturned symphyseal spout of the Arizpe mammoth exclude it from that species (Lucas and Effinger, 1991; Lucas *et al.*, 1993). The Arizpe mammoth shows great similarity in morphology and size to specimens from New Mexico referred to *M. imperator* by Lucas and Effinger (1991, fig. 3). The present authors thus feel confident in synonymizing *A. sonoriensis* with *M. imperator*.

GEOLOGY AND AGE

The Arizpe mammoth described here was discovered in 1929 by the owner of Rancho El Basimachi, Mr. Alfredo Serrano (according to the historian of the town of Arizpe, Mrs. Carmelita Pellat, personal communication, 1995). The site is located about 1.6 km northeast of the town of Arizpe in central Sonora. The mammoth remains were recovered from poorly consolidated deposits of fine-pebble conglomerate and coarse-grained sandstone (Figures 3 and 4) that form the distal facies of a presently dissected, large alluvial fan (Figure 1) that flows southwestward from the uplift forming the Cerro Picacho Arizpe. These alluvial rocks have a dip of less than 10 degrees toward the southwest and unconformably overlie well-consolidated conglomerates that constitute basin-fill deposits of depocenters formed during the Basin and Range extensional event and which are equivalent to the Báucarit Formation (King, 1939) of Sonora. An isotopic K-Ar age of 21.7 ± 0.41 Ma (Roldán-Quintana, 1979) [21.8 ± 0.5 Ma according to Bartolini *et al.*, 1994] is known from basaltic andesite flows at the base of these older rocks from an area located near San Felipe, about 60 km southward of Arizpe.

Mammuthus imperator has been reported from Mexico before, from the Santa Isabel Iztapan locality in the State of Mexico (Agenbroad, 1984). The species tended to have a southerly distribution in North America throughout the Pleistocene. The youngest isotopically dated *M. imperator* is about 10,600 BP, so the Arizpe mammoth by itself only indicates an age no more precise than Pleistocene. Its presence in poorly consolidated rocks that unconformably overlie Báucarit Formation-equivalent limits the youngest age of these rocks to the Pleistocene.

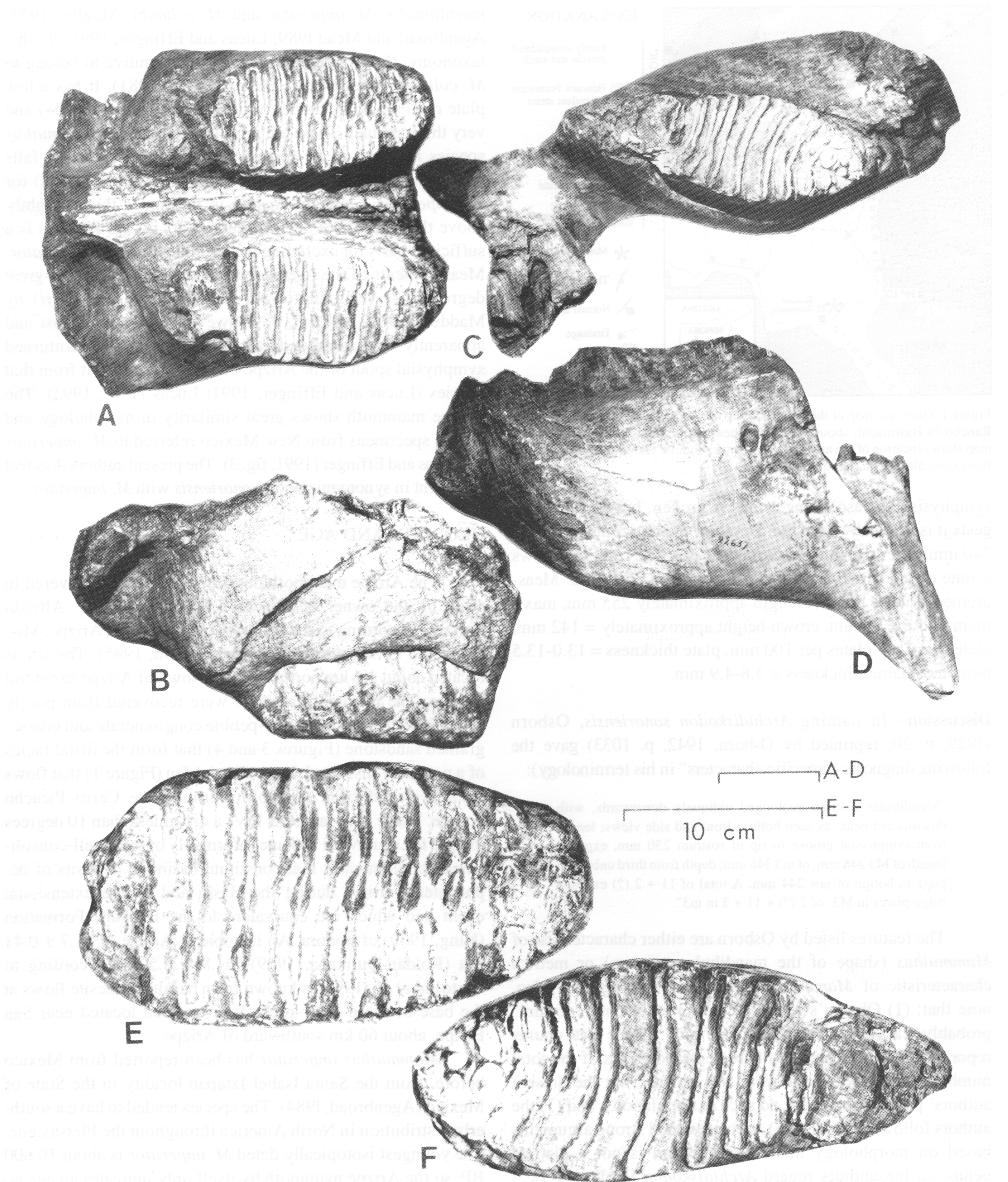


Figure 2. AMNH 22637, the Arizpe mammoth. A-B, Palate with left and right M3s, occlusal (A) and left lateral (B) views. C-D, incomplete lower jaw with right m3, occlusal (C) and right lateral (D) views. E, Occlusal view of left M3 and F, Occlusal view of right m3.



Figure 3. Panoramic view of Pliocene alluvial terraces near Rancho El Basimachi, northeast of Arizpe, Sonora. View is toward the southeast with Cerro Pelones in the background.

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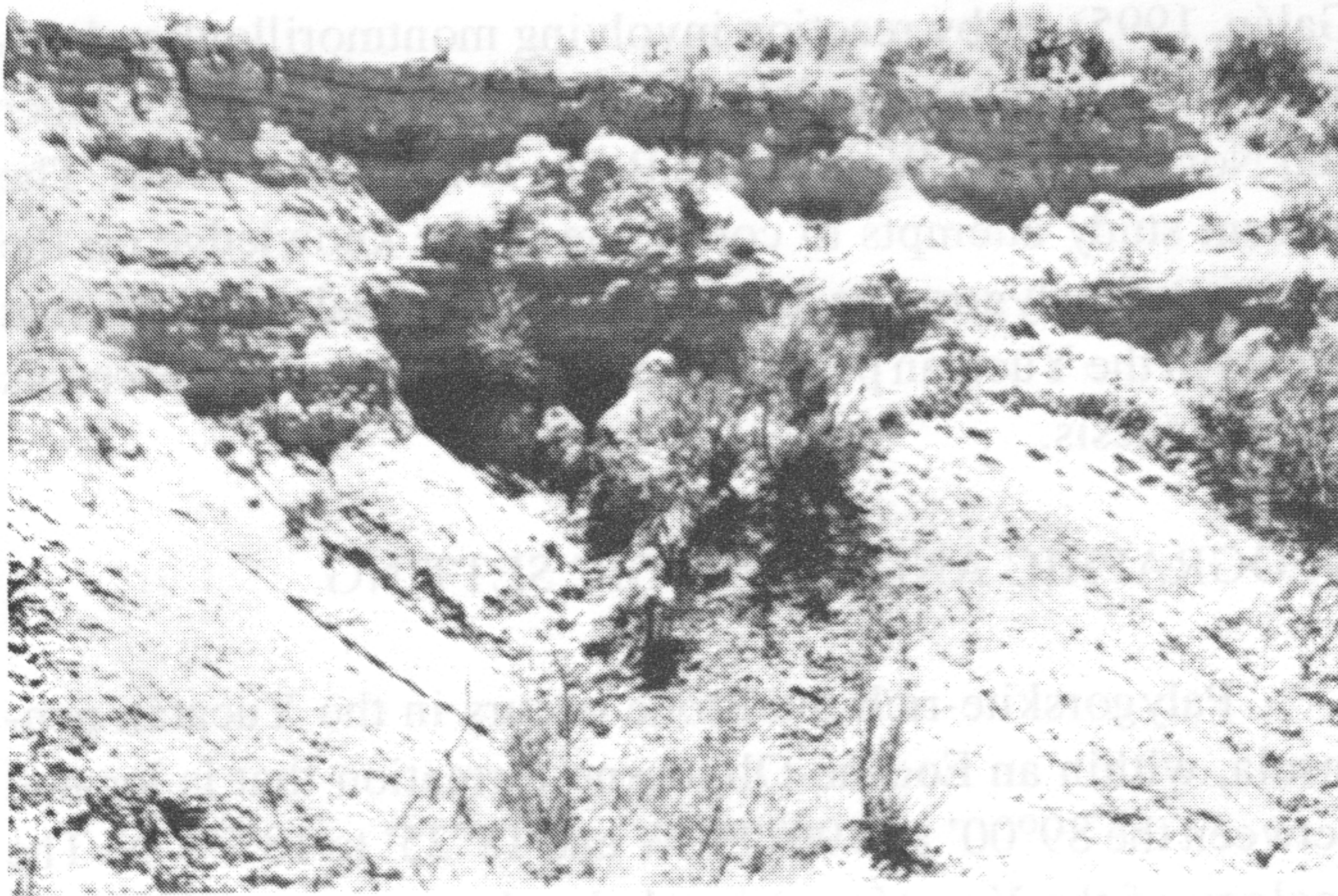


Figure 4. Outcrop of poorly consolidated alluvial deposits (parallel laminated pebble sandstone and siltstone) at which the Arizpe mammoth remains were collected in 1929.

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