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LATE PLEISTOCENE MAMMALS FROM PLACITAS, SANDOVAL COUNTY, NORTH–CENTRAL NEW MEXICO

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Abstract—A mammoth tooth and other proboscidean fossils from the vicinity of Placitas, Sandoval County, New Mexico, collected in 1874 by E.D. Cope, represent one of the earliest documented records of Pleistocene mammals in the state. Subsequent collections by Robert Ariss in 1940 and Arthur Harris in 1961 added to the Placitas Local Fauna (LF) that now consists of three species: the camel *Camelops hesternus*, *Bison* sp., and the Columbian mammoth *Mammuthus columbi*. Previously reported occurrences of the horse *Equus* and the mastodon *Mammut americanum* from Placitas cannot be confirmed from available fossils in museum collections. The presence of camel, bison, and mammoth indicate a grassland ecosystem dominated by large grazing mammals. *Bison* and *Mammuthus columbi* establish a late Pleistocene (Rancholabrean) age for the Placitas LF, which shares taxonomic similarities with other regional Rancholabrean assemblages, including the White Mesa Mine and Albuquerque Gravel Pits. Although limited in diversity, the Placitas LF provides an important historical and regional context for late Pleistocene mammalian faunas in north–central New Mexico.

INTRODUCTION

Vertebrate fossils of Pleistocene age have been known from near Placitas, New Mexico for more than 150 years. Well-known 19th-century paleontologist E.D. Cope studied the geology and collected fossils in the vicinity of Placitas in October 1874 as a member of the Wheeler Expedition (Cope, 1875, 1877). Cope (1877, p. 25) reported: "teeth and other bones" of the Columbian mammoth "*Elephas primigenius* subspecies *columbi*" (now known as *Mammuthus columbi*) from "Placita" (now known as Placitas), New Mexico. We do not know the exact locality in the Placitas area where Cope found the mammoth fossils he reported. Cope (1877, plate 70) illustrated a partial tooth of *M. columbi*, reproduced here as Figure 1I and briefly described below. Cope's record of *M. columbi* from Placitas was later repeated by Hay (1924, p. 257), who stated, "A tooth of the same species [*Elephas*= *Mammuthus columbi*] was found by Professor Cope near the town of Placita [=Placitas] in Sandoval County. Along Placita Creek he found deposits which he named the Placita marls and in these the tooth was obtained." Hibben (1941) noted that a student from the University of New Mexico, Robert Ariss, collected vertebrate fossils from the vicinity of Placitas, including horse (*Equus*) and mastodon (*Mammut*). Harris (1993) added the camel *Camelops* and the bison *Bison* to the fauna based on fossils he collected on the "Western edge of Placitas" in 1961. The following is a brief review of the geology and paleontology of the late Pleistocene Placitas LF.

LOCALITIES

The village of Placitas is located at the northern end of the Sandia Mountains in Sandoval County, north–central New Mexico (N35.32°, W106.45°, WGS84, Placitas 7.5-minute quadrangle) at an elevation of approximately 1,815 m (5,955 ft). In addition to the report of mammoth by Cope (1877), there are two other Pleistocene vertebrate fossil sites known from the vicinity of Placitas (Hibben, 1941; Harris, 1993). These three sites were combined as the Placitas Local Fauna–LF (Harris, 1993; Morgan and Lucas, 2005; Morgan and Harris, 2015; Harris, 2025). As with Cope's 1874 site, we do not know the exact locality of these two additional Placitas sites, only that they all occur in the general vicinity of Placitas.

In October 1874, during his exploration of the Sandia Mountains in the territory of New Mexico, Cope (1877, p. 25) examined "a section carried across from Algodones on the Rio Grande to the Sandia Mountains, through the village and creek of Placita [now Placitas]." Cope (1877, p. 25) further noted that "in the interval between the hills, there is deposit of indurated clay… of Postpliocene age. I obtained teeth and other bones of *Elephas primigenius* subspecies *columbi* [=*Mammuthus columbi*] from this bed, and found bones of Elephants in place in the banks of the arroyo." Beyond the description of the fossil elephant localities as "Placita Creek and its tributary arroyos" (Cope, 1877, p. 25), we have no further locality information on Cope's sites near Placitas. The only fossil from Cope's Placitas collection that appears to survive in a museum paleontology collection is the partial mammoth molar described and illustrated below.

Hibben (1941, p. 6) reported, "Interesting and possibly significant deposits lie 5 miles [8 km] to the east of Bernalillo and 5 miles down the canyon from Sandia Cave. They are known as the Placitas deposits…" Hibben (1941, p. 7) further noted that "Robert Ariss, of the Department of Geology of the University of New Mexico, has recovered a variety of Pleistocene remains from these deposits, including horses (probably *Equus excelsus*) and mastodon (*Mamut americana*) [=*Mammut americanum*]." The current whereabouts of these fossils is unknown as horses (*Equus*) and mastodons (*Mammut*) are not present in the available fossil sample from Placitas. Several proboscidean fossils from Placitas collected by Robert Arris are preserved in New Mexico Museum of Natural History

(NMMNH) paleontology collection, designated as NMMNH Locality L-5759, and described here. The NMMNH proboscidean fossils from Placitas are here regarded as indeterminate at the genus or family level (see below), but could possibly be the mastodon fossils referred to by Hibben (1941).

In July 1961, Arthur Harris, then a graduate student at the University of New Mexico, collected a partial femur of a camel (*Camelops*) and a lower molar of a bison (*Bison*) from a locality described as a "Dissected area N of highway [presumably NM route 165], W of Placitas" (Harris, 2025). The Placitas locality discovered by Harris is designated as NMMNH Locality L-5760. The camel and bison fossils collected by Harris have never been studied, and are described and illustrated here.

GEOLOGIC SETTING

As noted above, Cope examined the geology in the vicinity of Placitas in 1874 as a member of the Wheeler Expedition. In one of his initial reports on the results of his work on the expedition, Cope reported Pleistocene mammals from the vicinity of Placitas in a deposit he called the "Zandia clay" (Cope, 1875, p. 997–998).

Cope (1877, p. 25), however, subsequently referred to the fossiliferous strata as the "Placita marl," stating that:

> "In the intervals between the hills [low hills of Cretaceous bedrock near Placitas] there is a deposit of indurated clay of 40 feet [12 m] thickness, of Postpliocene age. I obtained teeth and other bones of *Elephas primigenius* subspecies *columbi* [=*Mammuthus columbi*] from this bed, and found bones of Elephants in place in the banks of the arroyo. Shells of *Planorbis*, *Physa* &c [etc.], indicate the lacustrine character of the deposit, which I have called the Placita marl."

Cope (1877, plate 70, fig. 4) illustrated an occlusal view of a mammoth molar from the "Placita marl," but he provided no description or further discussion of this fossil.

Hibben (1941, p. 7) noted that "…the Placitas deposits have been worked as a geologic problem for some years under the direction of Dr. Stuart Northrop of the University of New Mexico. Although the small town of Placitas, around which the deposits lie, is considerably above the level of the Rio Grande Valley, the sediments are undoubtedly slack-water depositions. The body of water, presumably Pleistocene in date, responsible for them could never have been very large." Both Cope and Hibben stressed the lacustrine nature of the "Placita marl""and "Placitas deposits." Cope's interpretation of the "Placita marl" as lacustrine in origin was based on, in part, the presence of freshwater gastropods.

West and north of Placitas there are outcrops of Cretaceous strata (Connell et al., 1995; Lucas, 2026) as well as various Quaternary sedimentary deposits. These Quaternary deposits are described as an alluvial sequence that is a mixture of poorly sorted, poorly to moderately stratified, clast- and matrix-supported alluvium having predominantly gravelly and sandy textures (Connell et al., 1995). These strata do not match Cope's description of the "Placita marl," so it was likely a very local deposit not recognized by later mappers and it is either covered or has eroded away.

VERTEBRATE PALEONTOLOGY

Most of the vertebrae fossils described here, including specimens collected near Placitas by Robert Ariss in 1940 and by Arthur Harris in 1961, were originally curated in the University of New Mexico (UNM) paleontology collection. The vertebrate fossils from the UNM paleontology collection were transferred to the New Mexico Museum of Natural History in 2002 and are listed here with their NMMNH catalog numbers. The mammoth tooth from Placitas mentioned by Cope (1877) is now curated in the vertebrate paleontology collection of the U.S. National Museum of Natural History (USNM), Smithsonian Institution.

Mammalia: Artiodactyla: Camelidae: *Camelops hesternus* (Leidy, 1873)

A partial femur of the large camel, *Camelops hesternus*, was collected by Arthur Harris from NMMNH Locality L-5760 on the western edge of Placitas. This specimen is a left femur, including the femoral head and the nearly complete distal end. It is cataloged as NMMNH 43795 (Figs. 1A–1C). The femoral head is almost perfectly hemispherical with a well-developed, centrally located fovea that is elliptical in shape. The two articular condyles on the distal end of the femur are subequal in size with the medial condyle rounder and the lateral condyle somewhat narrower. A rather deep fossa proximal to the lateral condyle is typical of *Camelops*. The patellar groove is broad and deep, extending well anterior to the shaft.

The camel femur from Placitas is very similar in morphology but slightly smaller than a distal femur referred to *Camelops hesternus* from the late Pleistocene White Mesa Mine, located in Sandoval County about 45 km (~28 mi) northwest of Placitas (Morgan and Rinehart, 2007). Measurements of NMMNH 43795 are very similar to those of a series of femora of *C. hesternus* from the late Pleistocene Rancho La Brea tar pits in southern California (Webb, 1965). The Placitas femur is here referred to *C. hesternus*. Measurements of NMMNH 43795: diameter of femoral head 67.5 mm; maximum distal width, 129.8 mm; width of distal articular condyles, 117.2 mm; width of patellar groove, 48.5 mm.

Mammalia: Artiodactyla: Bovidae: *Bison* sp.

A heavily mineralized lower molar of a bison was collected by Arthur Harris from NMMNH Locality L-5760 on the western edge of Placitas. This tooth is a left first or second lower molar (m1 or m2), here referred to *Bison* sp. It is cataloged as NMMNH 43796 (Figs. 1D–1E). This tooth is identified as *Bison* by its overall similarity to other bovid lower molars, large size, hypsodont crown, presence of a well-developed ectostylid in the deep labial valley between the protoconid and hypoconid, curved hook-like parastylid at the anterior margin, and a narrow, triangular entostylid at the posterior margin. The tooth is in an early stage of wear, as the crown is compressed transversely and the ectostylid is still unworn.

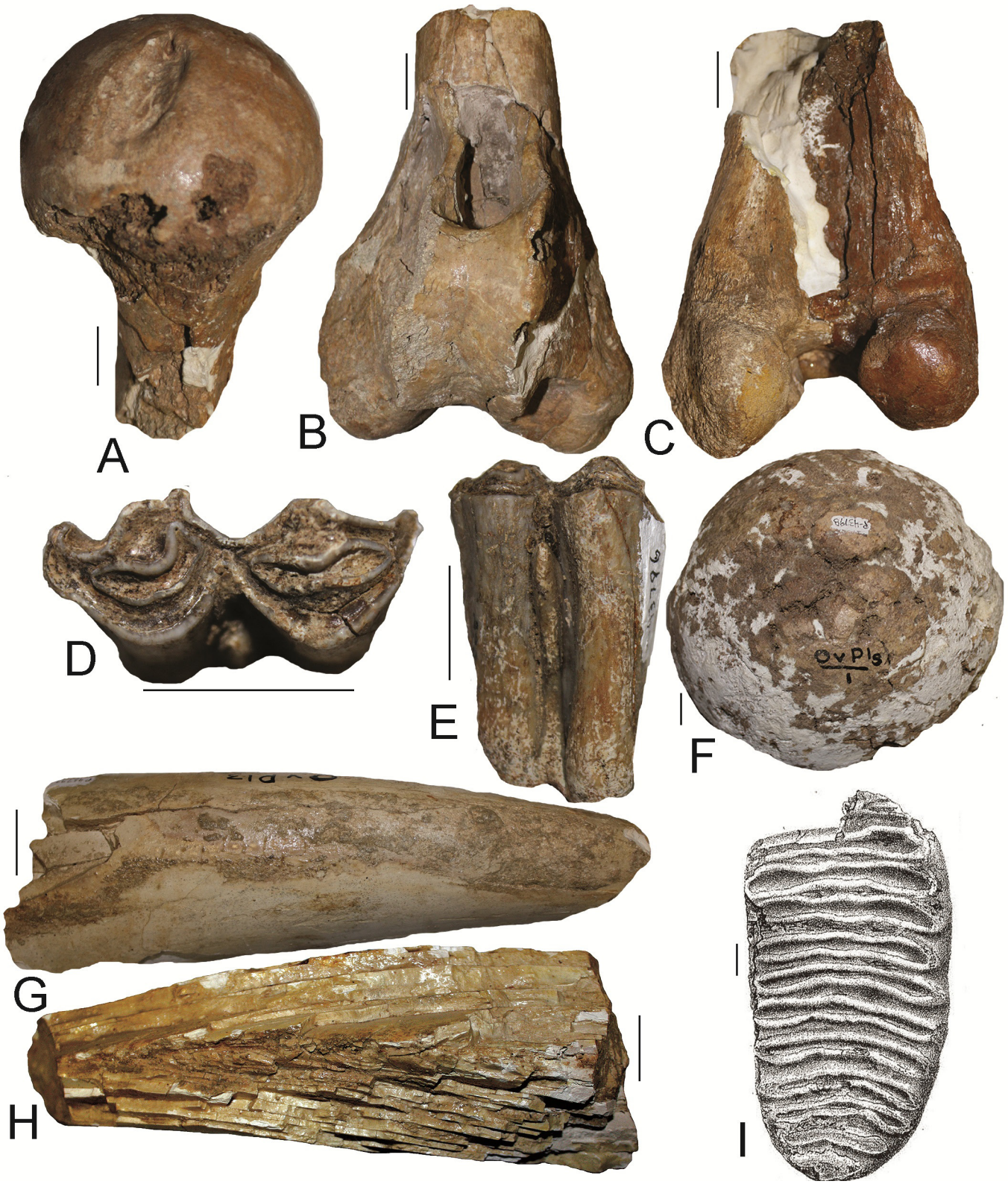


FIGURE 1. Late Pleistocene (Rancholabrean NALMA) mammals from the Placitas Local Fauna, Sandoval County, New Mexico. A–C: left femur of *Camelops hesternus*, NMMNH 43795. A: femoral head; B: distal femur, anterior view; C: distal femur, posterior view. D and E: left m1 or m2 of *Bison* sp., NMMNH 43796. D: occlusal view; E: labial view. F–H: indeterminate Proboscidea. F: femoral head, NMMNH 43798; G: fragment of tusk, NMMNH 43797, external view; H: fragment of tusk, NMMNH 43797, internal view showing layers of ivory. I: Partial molar of *Mammuthus columbi*, USNM 4180 (illustration from Cope, 1877, plate 70). All scale bars are 2 cm.

The species of *Bison* are identified based on horn cores, so this isolated tooth can only be referred to genus as *Bison* sp. *Bison* is also present in the late Pleistocene White Mesa Mine (Morgan and Rinehart, 2007). The presence of *Bison* in the Placitas LF is important, as this is the defining genus for the Rancholabrean North American Land Mammal Age (NALMA) of late Pleistocene age (Bell et al., 2004). Measurements of NMMNH 43796: anteroposterior length, 34.8 mm; transverse width, anterior, 13.5 mm; transverse width, posterior, 13.2 mm; and maximum crown height at entoconid, 49.4 mm.

Mammalia: Proboscidea: Elephantidae: *Mammuthus columbi* (Falconer, 1857)

Cope (1877, p. 25) reported "…teeth and other bones of *Elephas primigenius* subspecies *columbi*…" from near Placitas, New Mexico. As noted above, we do not know the exact locality of these specimens. Furthermore, only a single molar of a mammoth from Placitas appears to be preserved in a museum collection, cataloged as USNM 4180. This tooth is illustrated (Fig. 1I) and described here. This is a partial tooth missing an unknown number of enamel plates on the anterior margin. As preserved, the tooth has 12 enamel plates. Although we do not have exact measurements, based on the scale in Cope (1877), which is half natural size, this partial tooth is approximately 200 mm in length. We can also determine that the lamellar frequency is 6 enamel plates or laminae per 100 mm of tooth length. This lamellar frequency, comparatively thin enamel, and large size indicate this tooth represents the large late Pleistocene (Rancholabrean) mammoth *Mammuthus columbi*.

Mammalia: Proboscidea: Family and Genus Indeterminate

Two proboscidean specimens collected in Placitas by Robert Ariss in 1940 are now curated in the NMMNH paleontology collection, a fragment of a tusk (NMMNH 43797; Fig. 1G–1H) and the head of a femur (NMMNH 43798; Fig. 1F). The tusk fragment is from near the distal tip and has a maximum diameter of 72 mm. Broken fragments of ivory in this specimen show the cross-hatching pattern typical of proboscidean ivory. The femoral head has a maximum diameter of 155 mm; it is proboscidean based on its hemispherical shape and large size.

Both of these specimens are clearly from proboscideans but are not identifiable to the family or genus level. They almost certainly represent either mammoth (*Mammuthus*) or mastodon (*Mammut*), as these are the only two proboscideans found in late Pleistocene faunas in New Mexico (Morgan and Harris, 2015). Hibben (1941) reported the mastodon *Mammut americanum* from Placitas, but there are no specimens in the UNM or NMMNH paleontology collections that are identifiable as that genus.

DISCUSSION

The tooth of a mammoth (*Mammuthus columbi*) from Placitas was one of the first Pleistocene mammal fossils reported from New Mexico (Cope, 1875, 1877), together with a mammoth tooth from Santa Fe reported by Leidy (1873). Later records of fossil mammals from the Placitas area (Hibben, 1941; Harris, 1993; Morgan and Lucas, 2005; Morgan and Harris, 2015) added several species to the faunal list, including the camel *Camelops hesternus* and bison *Bison* sp. Neither of the species of mammals reported from Placitas by Hibben (1941), the horse *Equus excelsus* and the mastodon *Mammut americanum*, can be confirmed based on fossils in the UNM or NMMNH paleontology collections. It would be difficult to confuse fossils of a horse with those of any other Pleistocene mammal from New Mexico, and therefore we assume the *Equus* fossils from Placitas have been misplaced in the 85 years since they were collected. It is possible the two proboscidean specimens from Placitas reported here that were collected by Robert Ariss in 1940, a femur head and tusk fragment, are the same fossils identified as *Mammut americanum* by Hibben (1941), although we consider these two fossils to be indeterminate proboscideans.

The late Pleistocene Placitas LF consists of only three species, *Camelops hesternus*, *Bison* sp., and *Mammuthus columbi*. These three species, together with *Equus*, are the four most common large mammals in late Pleistocene (Rancholabrean) open sites (i.e., not in caves) throughout New Mexico (Morgan and Harris, 2015). All four of these genera are large grazing mammals that would have inhabited grassland environments. The Placitas LF shares *Camelops hesternus* and *Bison* with the White Mesa Mine LF near San Ysidro in Sandoval County, which has a radiocarbon date on a *Camelops* metapodial of 12,910 ± 60 ^{14}C years BP (Morgan and Rinehart, 2007). All three mammals from Placitas, *Camelops hesternus*, *Bison* sp., and *Mammuthus columbi*, are also known from the Albuquerque Gravel Pits Fauna, located in Albuquerque about 25 km (~15 mi) southwest of Placitas (Morgan and Harris, 2015).

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REFERENCES

Bell, C.J., Lundelius, E.L., Jr., Barnosky, A.D., Graham, R.W., Lindsay, E.H., Ruez, D.R., Jr., Semken, H.A., Jr., Webb, S.D., and Zakrzewski, R.J., 2004, The Blancan, Irvingtonian, and Rancholabrean mammal ages, *in* Woodburne, M.O., ed., Late Cretaceous and Cenozoic mammals of North America: Biostratigraphy and Geochronology: New York, Columbia University Press, p. 232–314. https://doi.org/10.7312/wood13040-009

Connell, S.D., Cather, S.M., Ilg, B., Karlstrom, K.E., Menne, B., Picha, M., Andronicos, C., Read, A.S., Bauer, P.W., and Johnson, P.S., 1995, Geology of the Bernalillo and Placitas quadrangles, Sandoval County, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Open-file Geologic Map OF-GM 2, scale 1:24,000. https://doi.org/10.58799/OF-GM-2

Cope, E.D., 1875, Report on the geology of that part of northwestern New Mexico examined during the field season of 1874: Annual Report upon the Geographical Explorations and Surveys West of the 100th Meridian (Wheeler). Being Appendix LL of the Annual Report, Chief of Engineers for 1875, p. 961–1097 [issued as a separate, p. 61–116].

Cope, E.D., 1877, Report upon the extinct Vertebrata obtained in New Mexico by parties of the expedition of 1874: Report, U.S. Geographical Surveys West of the 100th Meridian (Wheeler) Vol. 4, Part 2, 370 p. https://doi.org/10.5962/bhl.title.146777

Harris, A.H., 1993, Quaternary vertebrates of New Mexico: New Mexico Museum of Natural History and Science, Bulletin 2, p. 179–197.

Harris, A.H., 2025, Pleistocene vertebrates of southwestern USA and northwestern Mexico. www.utep.edu/leb/pleistnm/ (accessed March 2026)

Hay, O.P., 1924, The Pleistocene of the middle region of North America and its vertebrated animals: Carnegie Institution of Washington, Publication No. 322A, 324 p. https://doi.org/10.5962/bhl.title.82431

Hibben, F.C., 1941, Evidences of early occupation in Sandia Cave, New Mexico, and other sites in the Sandia-Manzano region: Smithsonian Miscellaneous Collections, v. 99, no. 23, p. 1–44.

Leidy, J., 1873, Descriptions of remains of Vertebrata from Tertiary formations of different states and territories west of the Mississippi River, *in* Hayden, F. V., ed., Report of the United States Geological Survey of the Territories, v. 1, Fossil Vertebrates, p. 227–264.

Lucas, S.G., 2026, Cretaceous stratigraphy at in the Sandia Mountains, New Mexico: New Mexico Geological Society, Guidebook 76, this volume.

Morgan, G.S., and Harris, A.H., 2015, Pliocene and Pleistocene vertebrates of New Mexico: New Mexico Museum of Natural History and Science, Bulletin 68, p. 233–427.

Morgan, G.S., and Lucas, S.G., 2005, Pleistocene vertebrate faunas in New Mexico from alluvial, fluvial, and lacustrine deposits: New Mexico Museum of Natural History and Science, Bulletin 28, p. 185–248.

Morgan, G.S., and Rinehart, L.F., 2007, Late Pleistocene (Rancholabrean) mammals from fissure deposits in the Jurassic Todilto Formation, White Mesa Mine, Sandoval County, north-central New Mexico: New Mexico Geology, v. 29, p. 39–51. https://doi.org/10.58799/NMG-v29n2.39

Webb, S.D., 1965, The osteology of *Camelops*: Bulletin of the Los Angeles County Museum, Science, no. 1, 54 p.



North American porcupine (*Erethizon dorsatum*) in the Rio Grande bosque, Albuquerque, New Mexico. Photograph courtesy of Celestyn Brożek.