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Glyptosaurine lizard from Eocene Baca Formation, south-central New Mexico

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Introduction

Continental (mostly red) mudstone, sandstone, and conglomerate mapped as Baca Formation form discontinuous outcrops east of the Rio Grande in the Carthage–Joyita Hills area, south-central New Mexico (Wilpolt and others, 1946; Wilpolt and Wanek, 1951). Although these rocks have long been considered to be of Eocene age, fossil evidence to confirm this age assignment is sparse. A fossil mammal (brontothere perissodactyl) reported by Gardner (1910) and a similar fossil recently documented by Lucas and others (1982) suggest that middle Eocene (Bridgerian) strata are present in the Baca Formation near Carthage (Lucas, 1983). Here we document the occurrence of a glyptosaurine lizard from the Baca Formation near Carthage that is consistent with the Bridgerian age assignment, is the first glyptosaur from the Baca Formation, and is representative of the youngest glyptosaur known from New Mexico.



FIGURE 2—Outcrop of Baca Formation near Carthage (SE¼ sec. 16, T. 5 S., R. 2 E.) showing locations where brontothere (a), documented by Lucas and others (1982), and glyptosaur (b), reported here, were collected.

immediately overlies the mudstone bed in which it was found.

IDENTIFICATION—UNM BE-012 (Fig. 3) consists of articulated rectangular body osteoderms that have been flattened. The articulated osteoderms display a characteristic arrangement of tubercles in a concentric ring pattern on the external surface, are of intermediate size for glyptosaurine lizards, and are further characterized by the possession of prominent keels. One side of the specimen (Fig. 3A) displays four complete osteoderms with centrally located keels. These central keels indicate that the osteoderms are from the dorsum of the lizard directly above the vertebral column. Five nearly complete and imbricated body osteoderms are preserved on the other side of the specimen (Fig. 3B); their keels traverse from the right anterior to the left posterior. This keeling orientation indicates that the osteoderms are from the right side of the lizard's torso. Although Sullivan (1979, 1982) stated that osteoderms are of little utility in assigning generic rank, other morphologic features of these osteoderms support tentative assignment to *Glyptosaurus* sensu stricto (Sullivan, 1979).

Glyptosaurus (Sullivan, 1979, p. 15) is characterized, in part, by a concentric arrangement of tubercles on the dorsal surface of the osteoderms, an arrangement that is present on UNM BE-012. Concentric arrangement of tubercles also has been noted in specimens of *Eoglyptosaurus* and *Paraglyptosaurus*, so this feature alone is of limited use for determining generic assignment. However, comparison of UNM BE-012 to a nearly complete specimen of *Glyptosaurus* sp. (Carnegie Museum of Natural History 37469, from the Washakie Formation) shows agreement in this feature

as well as in general size. Assignment to *Paraglyptosaurus*, a robust glyptosaurinid, is unlikely because of the large osteoderm size of UNM BE-012. Known species of *Eoglyptosaurus* are smaller than UNM BE-012 and, so far as is known, are restricted to the Wasatchian (early Eocene), although this restraint does not eliminate the specimen as a possible candidate. The Baca specimen is not referable to the Oligocene glyptosaurine *Helodermoides* because *Helodermoides* is characterized by thick osteoderms that do not have tubercles arranged in a concentric pattern.

Taxonomic assignment to any of the melanosaurinid genera also is not probable. The large melanosaurinids *Melanosaurus* and *Arpadosaurus* are restricted to the Wasatchian and do not display the concentric ring pattern of tubercles on the body osteoderms. *Xestops*, an enigmatic melanosaurinid from the North American Bridgerian, is much smaller than UNM BE-012. *Peltosaurus*, a smaller melanosaurinid from the Oligocene of the western Great Plains, does not display a concentric pattern of tubercles on the osteoderms. *Proxestops*, a middle and late Paleocene melanosaurinid characterized by incipient development of tubercles on the osteoderms, is like-

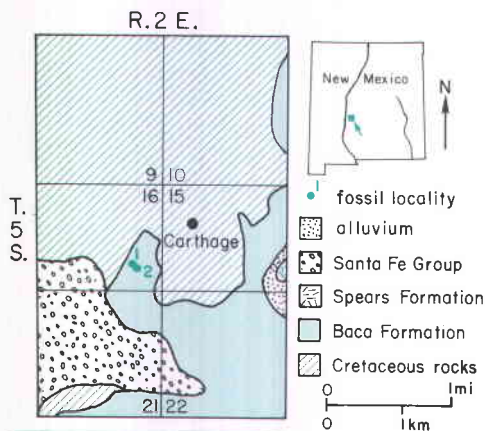


FIGURE 1—Geologic map of the Carthage area, south-central New Mexico, showing localities that produced specimen of cf. *Glyptosaurus* reported here (1) and specimen of cf. *Manteoceras* reported by Lucas and others (1982) (2). Geology modified from Wilpolt and Wanek (1951).

cf. *Glyptosaurus* sp.

PROVENANCE—The glyptosaurine specimen, UNM (University of New Mexico) BE-012, was collected as float on red mudstone of the Baca Formation in the SW¼ SE¼ sec. 16, T. 5 S., R. 2 E. (Fig. 1). This locality (Fig. 2) is approximately 30 m northeast of, and approximately 8 m stratigraphically lower than, the brontothere locality of Lucas and others (1982). Possibly the glyptosaur specimen was derived from a thin conglomerate bed that

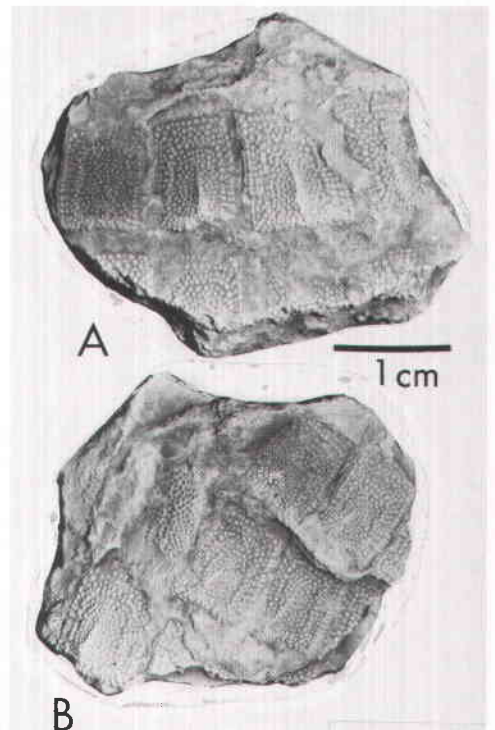


FIGURE 3—cf. *Glyptosaurus* (UNM BE-012) from Baca Formation. Dorsal osteoscutes (a) and osteoscutes from right side of torso (b).

wise not a probable candidate. *Glyptosaurus* sensu stricto (Sullivan, 1979) seems the most reasonable taxonomic assignment based on tubercular arrangement and osteoderm size.

Biostratigraphic and biogeographic significance

The discovery of cf. *Glyptosaurus* in the Baca Formation of south-central New Mexico is significant in three ways: 1) *Glyptosaurus* is a late Wasatchian–Uintan genus known from Colorado, Utah, and Wyoming (Sullivan, 1979); its occurrence in the Baca Formation near Carthage is consistent with, though not conclusive proof of, the Bridgerian-age assignment made by Lucas and others (1982). 2) Other glyptosaurus known from New Mexico are from the San Juan Basin and are of Paleocene and early Eocene age (Sullivan, 1981); therefore, UNM BE-012 is the youngest glyptosaurus known from New Mexico. 3) To our knowledge, UNM BE-012 also represents the most southerly occurrence of a specimen that apparently pertains to *Glyptosaurus*.

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Cephalopod aptychi from Los Moyos Limestone, Madera Group (Middle Pennsylvanian), near Albuquerque, New Mexico

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Introduction

Aptychi are bivalved structures that probably functioned as opercula on some cephalopods (see Yochelson, 1983), although they have also been interpreted as cephalopod lower jaws (Morton, 1981). Aptychi are known from many genera of Mesozoic ammonoids (Arkell, 1957, p. L82) but are extremely rare in the Paleozoic. Only two finds of aptychi from the late Paleozoic have been reported. Closs and others (1964) noted aptychi in a unit containing the ammonoid *Pseudogastrioceras* from the Permian of Utah, and Thompson and others (1980) described aptychi that, in life, were probably associated with the nautiloid *Liroceras* from the Bishop Cap Member, Magdalena Formation (Desmoinesian), in Vinton Canyon, El Paso County, Texas. The latter report is also important because it provides the first good circumstantial evidence that some late Paleozoic nautiloids may have possessed aptychi. Recently, well-preserved aptychi have been discovered in the Middle Pennsylvanian of central New Mexico, in an assemblage that contains both ammonoid and nautiloid phragmocones.

The purpose of this paper is to document a new occurrence of these rare Paleozoic fos-

sils, to discuss their relationships with the cephalopod conchs in the fauna, and to provide a brief summary of the fauna itself, which includes some taxa not previously reported from the Pennsylvanian of New Mexico. Specimens mentioned and illustrated here are in the University of New Mexico Department of Geology paleontology collections and have been assigned UNM numbers.

Location and geologic setting

The assemblage reported herein was collected by the author, Kenneth Kietzke, and members of a paleontology class from a roadcut on the east side of NM-14, 5.6 mi (9.1 km) south of the intersection of I-40 and NM-14 at Tijeras (Fig. 1). This locality is just north of the village of Cedro in the Manzano Mountains east of Albuquerque. The roadcut consists primarily of light-brown to grayish-brown, sparsely fossiliferous, fissile mudstones. Collections totalling approximately 30 kg were made from several levels within a 2-m-thick interval near the top of the roadcut, immediately below a massive limestone bed. These units are in the upper part of the Los Moyos Limestone (Madera Group) and are late Desmoinesian in age, based on fusulinid

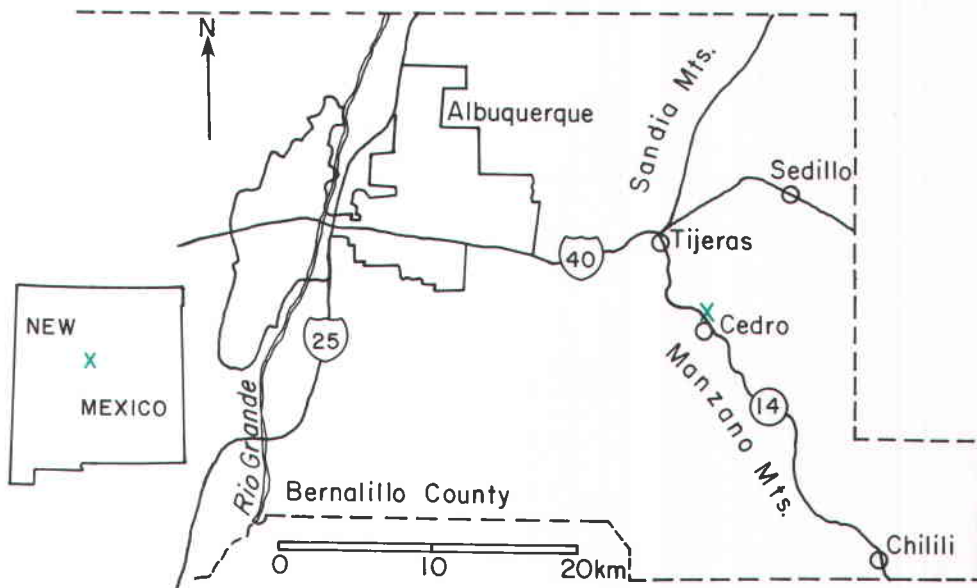


FIGURE 1—Map showing aptychi locality (x) in Cedro Canyon, south of Tijeras.