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CORALS FROM THE UPPER CRETACEOUS OF SOUTH-CENTRAL NEW MEXICO

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Abstract—Fossil corals are extremely rare in the Upper Cretaceous deposits of the Western Interior epicontinental seaway, with only three documented reports in the published literature from New Mexico. We add to this record an occurrence of the ahermatypic coral *Archohelia dartoni* Wells from Mescal Canyon in the northern Caballo Mountains, Sierra County, New Mexico. The coral fossils occur at a single horizon over approximately 0.7 km of strike in the Rio Salado Tongue of the Mancos Shale, 31 m below the base of the Atarque Sandstone Member and thus are of middle Turonian age. The corals display features characteristic of *Archohelia dartoni*, including circular individual branches with persistent axial corallites and small, circular corallites that branch at right angles from the axial corallite and ascend the branch in spirals. The coral fossils are isolated and broken branches that occur in lenticular masses of sedimentary breccia or conglomerate as much as 100 cm across and as thick as 25 cm. Coral branches are concentrated near the top of each breccia mass and show no preferred orientation. Clearly, these corals are not an in situ thicket but represent reworked and redeposited debris, perhaps reflecting a Turonian storm event or tsunami, and subsequent thicket destruction.

INTRODUCTION

The epicontinental seaway that covered much of the Western Interior during the Late Cretaceous had a prolific biota. Most conspicuous were inoceramid bivalves, ammonoid cephalopods, sharks and marine lizards, the mosasaurs. Corals, however, were rare in the Western Interior Seaway, with only a few, scattered records in the literature (Wells, 1933; Coates and Kauffman, 1973; Cobban et al., 1989; Kirkland, 1996). Ecological restrictions due to salinity and circulation probably largely excluded corals from living in the seaway (Kauffman, 1967). Therefore, it is unusual for corals to occur in Upper Cretaceous strata in New Mexico. The only three documented examples are a coral thicket described by Coates and Kauffman (1973) from the Carlile Shale near Lamy in north-central New Mexico, an occurrence in the Big Burro Mountains (Cobban et al., 1989) and *Trochosmila moorei?* recorded from the Bridge Creek Limestone in the Cooke's Range (Hook and Cobban, 1981). Here, we document a third record of corals from the Upper Cretaceous of New Mexico. NMMNH refers to the New Mexico Museum of Natural History and Science, Albuquerque.

OCCURRENCE

The corals reported here were collected at NMMNH locality 3278 (Fig. 1), in the SE¼ NW¼ NW¼ sec. 36, T13S, R14W, Sierra County (UTM 3668440N, 293811E, zone 13). This locality is on the northeast flank of Mescal Canyon in the northern Caballo Mountains. Corals occur here at locality 3278 as well as in stratigraphically equivalent lenses along strike to the south for 0.7 km.

S. Hook and W. A. Cobban originally discovered this coral occurrence. It is in a generally northerly-dipping section of Upper Cretaceous strata described by Melvin (1963), Wallin (1983), and Lozinsky (1985). The coral fossils occur in a 25 cm-thick bed of limestone-pebble conglomerate encased in shale in the lower part of the Rio Salado Tongue of the Mancos Shale (Turonian), about 31 m below the base of the overlying Atarque Sandstone Member of the Tres Hermanos Formation. The conglomeratic bed crops out as lenses approximately 1 m across with corals occurring as isolated branches and other debris at the top.

We collected numerous samples of the conglomeratic bed with coral branches in place. They are now catalogued as NMMNH P-

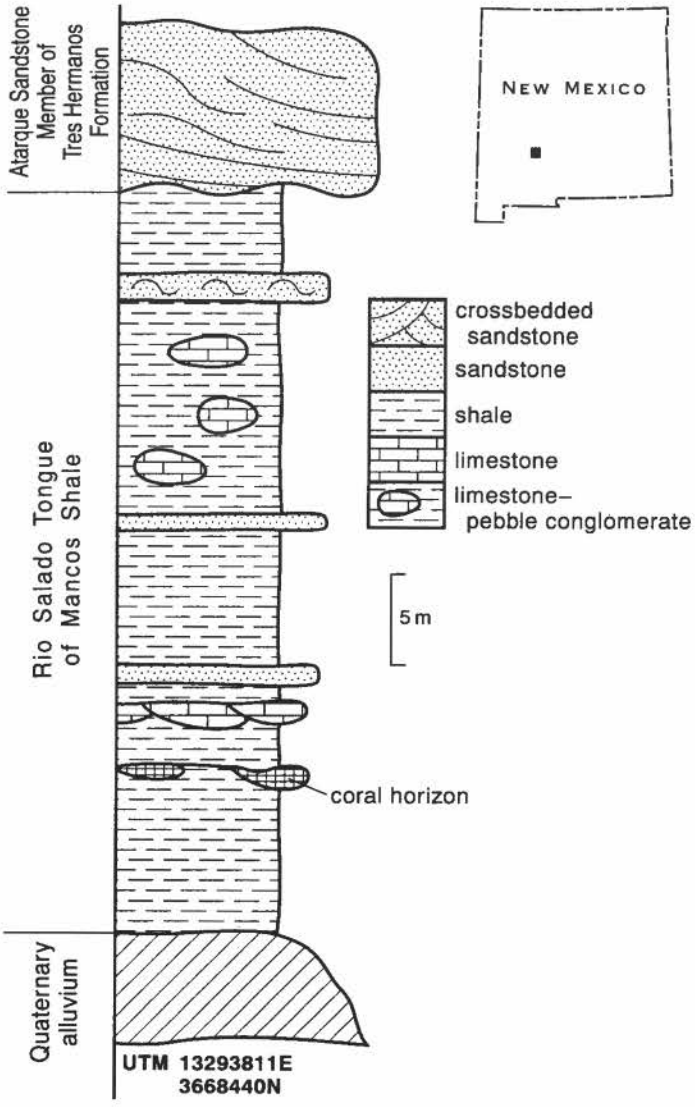

FIGURE 1. Index map and measured stratigraphic section showing the horizon at which the fossil corals occur.

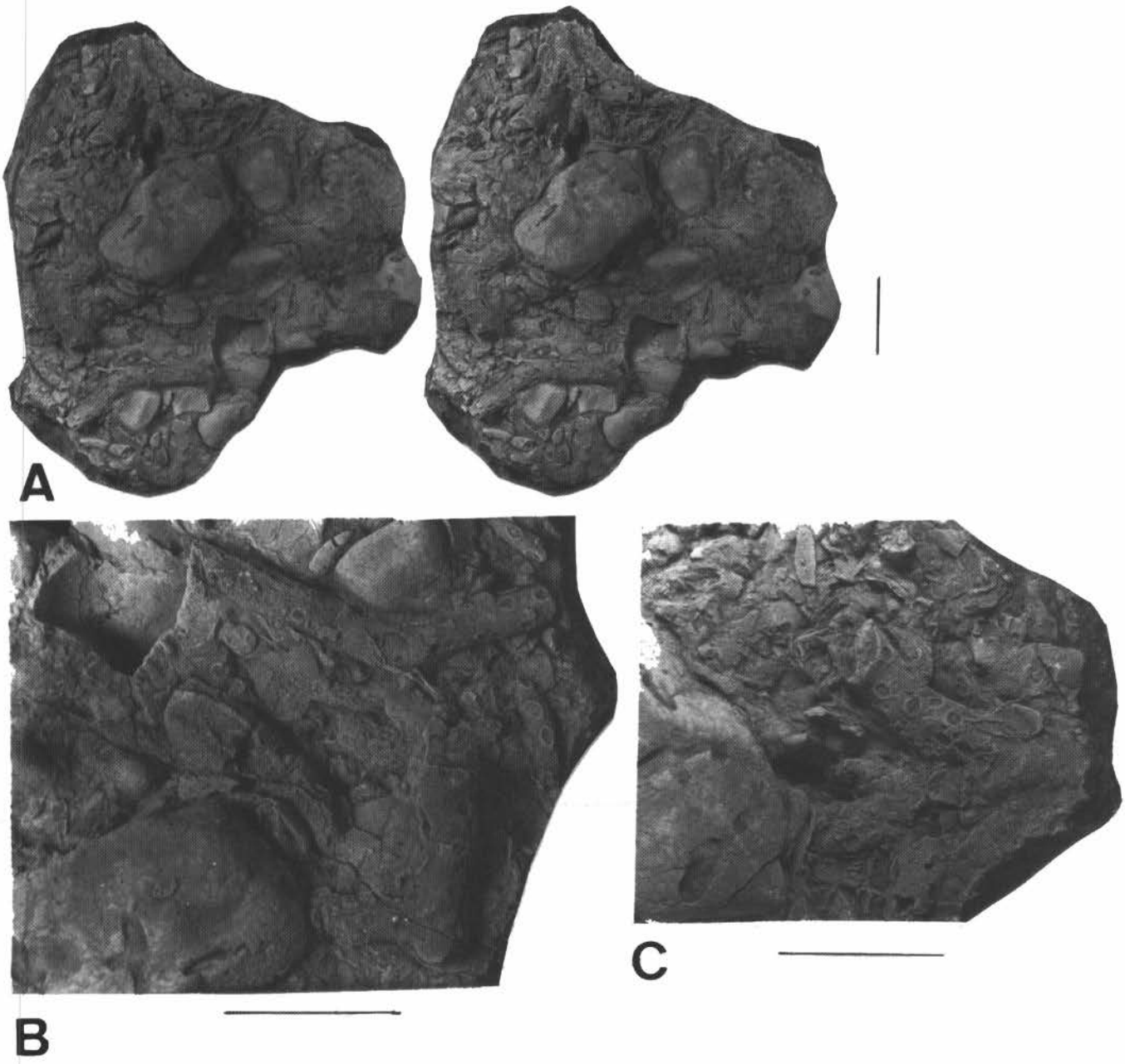

FIGURE 2. NMMNH P-26106, conglomerate fragments with coral branches and debris. **A**, stereophotograph. **B–C**, close-ups of coral branches. Scale bars = 2 cm.

26106 (two pieces), 26107 (two pieces), 26108 (four pieces), and 26109 (nine pieces).

Being that *A. dartoni* is considered to be a relatively deep-water fauna (Coates and Kauffman, 1973), the conglomeratic facies in which it occurs requires some explanation; the host bed is clearly not a quiet-water lithology. The conglomerate lies encased in shale and must represent some type of storm surge, tsunami, etc., which produced high-energy environments far below wave base, such that the sea floor was effected. The lack of both channeling and graded bedding rule out a turbidity flow, however, the presence of organic detritus at the top does represent pseudo-graded bedding which followed thicket destruction. It was the interaction of this high-energy system (however short-lived) with an irregularity on the sea floor (coral thicket) that produced the coral bearing conglomeratic or breccia facies, and thus the occurrence is local. It is, moreover, quite possible that the preservation was in shallower water than that in which the corals grew. Nonetheless, other such beds are likely present in the area and remain to be discovered.

Distance offshore can only be inferred from the few published paleogeographic maps (Molenaar, 1983). Based on these we speculate that the regressing, early Turonian, Tres Hermanos shoreline lay not more than 100–120 km to the west, west-southwest. Given the low offshore gradients characteristic of the Western Interior Seaway water depth was unlikely to have been more than 100 m.

IDENTIFICATION

The coral fossils (Fig. 2) are isolated branches of a small ahermatypic coral. They display characteristic features of *Archohelia dartoni* Wells, to which they are assigned (see Wells, 1933, p. 141–142, pl. 12, figs. 11–12, pl. 14, figs. 31–35; Coates and Kauffman, 1973, pl. 1; Cobban et al., 1989, p. 15, fig. 14; Kirkland, 1996, p. 13,

pl. 19, figs. A–D, F). The individual branches are circular to oval in cross-section, and are at least 4 cm long and 0.7 cm in diameter. There are persistent axial corallites and small, circular corallites that branch at right angles from the axial corallite, ascending the branch in spirals. The corallites have three cycles of septa and well-developed papillose columnellae. The corallites are raised with radial costae that extend away from the rib, but the extensive peritheca is smooth away from the costal-bounding corallites.

Archohelia dartoni appears to be the only coral previously known from the Upper Cretaceous of New Mexico, having been documented from near Lamy (Wells, 1933; Coates and Kauffman, 1973) and from the Big Burro Mountains (Cobban et al., 1989). The species is also known from the lower Mancos Shale at Black Mesa in northeastern Arizona (Kirkland, 1996).

DISCUSSION

Archohelia dartoni has a stratigraphic range of Upper Cenomanian (*Sciponoceras gracile* zone) through Middle Turonian (*Prionocyclus hyatti* zone) (Cobban et al., 1989; Kirkland, 1996). It is too rare, however, to be of any biostratigraphic utility.

Coates and Kauffman (1973) suggested *A. dartoni* was a colonial ahermatypic coral that colonized firm substrates in cool, well oxygenated, relatively deep water. This may characterize the occurrences of *A. dartoni* where in situ thickets are preserved (Coates and Kauffman, 1973; Cobban et al., 1989). However, the occurrence at Mescal Canyon is not of in situ or little transported thickets. Instead, it is of isolated branches in a sedimentary breccia that may represent a storm deposit or some type of high-energy environment preserved in shallower water than that in which the corals grew.

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REFERENCES

Coates, A. G. and Kauffman, E. G., 1973, Stratigraphy, paleontology and paleoenvironment of a Cretaceous coral thicket, Lamy, New Mexico: Journal of Paleontology, v, 47, p. 953–968.

Cobban, W. A., Hook, S. C. and Kennedy, W. J., 1989, Upper Cretaceous rocks and ammonite faunas of southwestern New Mexico: New Mexico Bureau of Mines and Mineral Resources, Memoir 45, 137 p.

Hook, S. C., and Cobban, W. A., 1981, Late Greenhorn (mid-Cretaceous) discontinuity surfaces, southwest New Mexico: New Mexico Bureau of Mines and Mineral Resources, Circular 180, p. 5–20.

Kauffman, E. G., 1967, Coloradoan macroinvertebrate assemblages, central Western Interior, United States: Colorado School of Mines, Special Publication, p. 67–143.

Kirkland, J. I., 1996, Paleontology of the Greenhorn cyclothem (Cretaceous: late Cenomanian to middle Turonian) at Black Mesa, northeastern Arizona: New Mexico Museum of Natural History and Science, Bulletin 9, 131 p.

Lozinsky, R. P., 1985, Geology and late Cenozoic history of the Elephant Butte area, Sierra County, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Circular 187, 40 p.

Lucas, S. G. and Anderson, O. J., 1996, Late Cretaceous corals from south-central New Mexico: New Mexico Geology, v. 18, p. 48–49.

Melvin, J. W., 1963, Cretaceous stratigraphy in the Jornada del Muerto region, including the geology of the Mescal Creek area, Sierra County, New Mexico [M.S. thesis]: Albuquerque, University of New Mexico, 121 p.

Molenaar, C. M., 1983, Major depositional cycles and regional correlations of upper Cretaceous rocks, southern Colorado Plateau and adjacent areas; *in* Reynolds, M. W. and Dolly, E. D., eds., Mesozoic Paleogeography of west-central U.S., Rocky Mountain Section of the Society of Economic Paleontologists and Mineralogists, p. 201–224.

Wallin, E. T., 1983, Stratigraphy and paleoenvironments of the Engle coal field, Sierra County [M.S. thesis]: Socorro, New Mexico Institute of Mining and Technology, 127 p.

Wells, J. W., 1933, Corals of the Cretaceous of the Atlantic and Gulf Coastal Plains and Western Interior of the United States: Bulletins of American Paleontology, v. 18, p. 85–289.

Petrified conifer stump in growth position in the Upper Cretaceous Crevasse Canyon Formation, Jornada del Muerto. Hammer is 25 cm long. Photograph by Greg Mack.