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OCCURRENCE OF *OSTREA BELOITI* LOGAN IN CENOMANIAN ROCKS OF TRANS-PECOS TEXAS

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INTRODUCTION

The important Upper Cretaceous marine oyster, *Ostrea beloiti* Logan, has been found at several localities in Trans-Pecos Texas. The species is widely distributed in the Western Interior from Manitoba to New Mexico but heretofore has not been recorded from Texas. However, *O. beloiti* was found at Cerro de Cristo Rey in New Mexico just west of El Paso, Texas (Strain, 1976, p. 82). This easily recognized oyster usually occurs abundantly in thin beds of coquinid limestone. In Kansas, where the species is especially abundant and conspicuous in the Graneros Shale and Greenhorn Formation, the name *Ostrea beloiti* Assemblage Zone has been applied (Hattin, 1965, p. 40).

While examining Cenomanian outcrops in Trans-Pecos Texas (fig. 1), we observed *O. beloiti* in thin beds of calcarenite and coquinid limestone in the lower part of the shaly rocks that overlie the cliff-forming Buda Limestone. These shaly rocks have been referred to as the Eagle Ford Formation in the Eagle Mountains area (Smith, 1940, p. 617; Gillerman, 1953, p. 32), Chispa Summit Formation in the area between the Van Horn Mountains and the Sierra Vieja (Adkins, 1932, p. 426; Twiss, 1959) as well as in the Eagle Mountains (Underwood, 1963, p. 11), Ojinaga Formation in the southern Quitman Mountains (Powell, 1963, p. 309; Jones and Reaser, 1970, p. 11), Boquillas Formation in the Davis Mountains area (Young, 1958, p. 286) and in the El Paso area (Strain, 1968; 1976, p. 82), and Boquillas Limestone in the Davis Mountains area (Brand and DeFord, 1962).

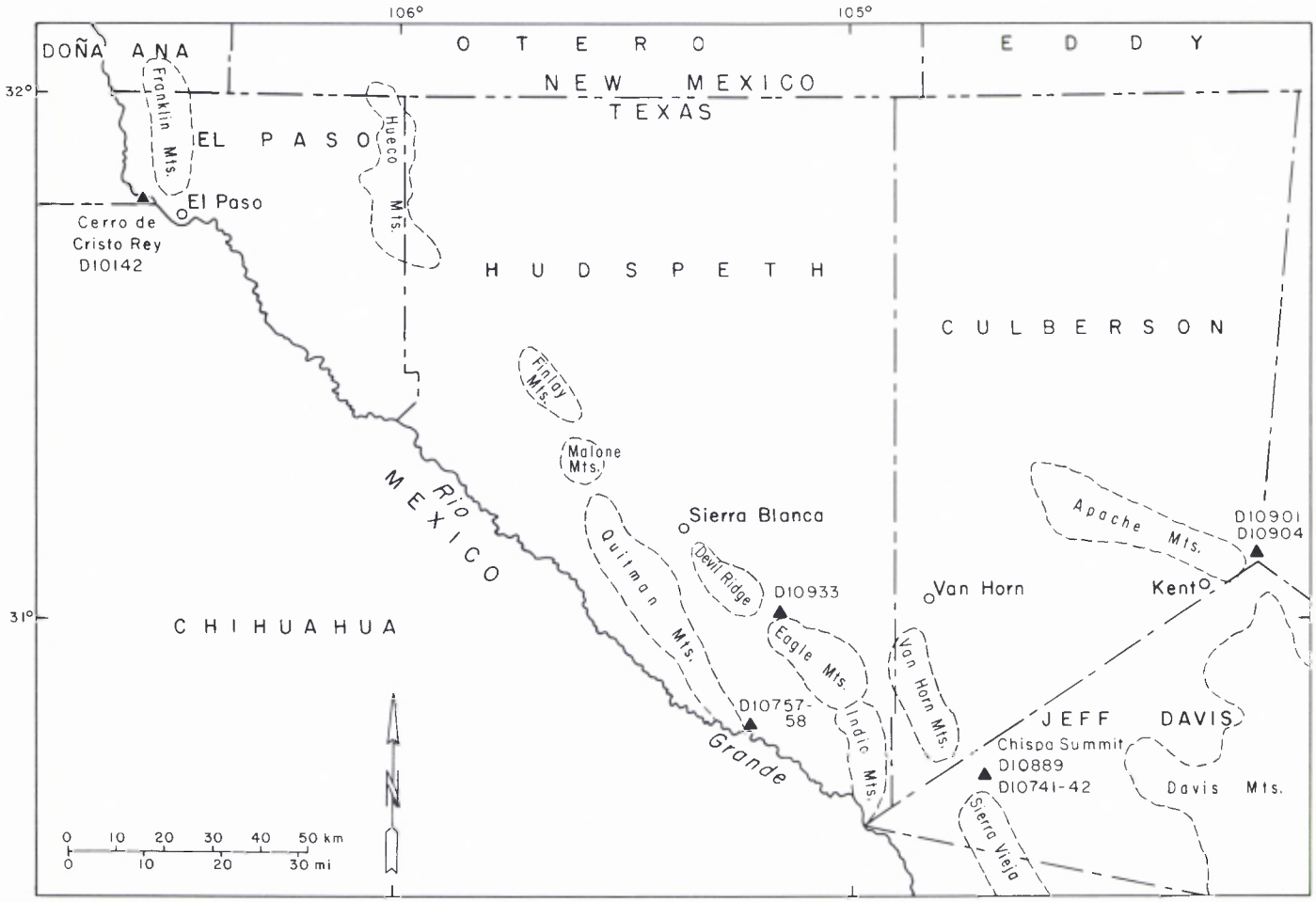


Figure 1. Map of the western part of Trans-Pecos Texas showing localities (▲) and collection numbers for Ostrea beloiti *Logan occurrences.*

OSTREA BELOITI LOGAN

Ostrea beloiti Logan (1899, p. 214, pl. 25, figs. 7, 8) (fig. 2) was originally described from the "Lincoln Marble horizon of the Benton" (Lincoln Limestone Member of the Greenhorn Formation) of north-central Kansas. The general features of the species were summarized by Cobban (1977, p. 20) as follows:

> "This is a small, mostly smooth oyster that tends to be elongated and gently curved. The shape, however, is considerably varied. The left valve is convex, and the right is almost flat. (Chomata) are numerous and conspicuous. A few inconspicuous radial ribs are present on the ventro-anterior part of the left valve of some individuals."

Ostrea beloiti is a marine species that inhabited shallow water of normal or near normal salinity. The shells were loosely cemented together to form thin biostromes, or they were attached to other objects, such as inoceramids (Cobban, 1977, pl. 7, fig. 4) or ammonites. The species usually occurs in thin beds of coquinid limestone. Whole valves are associated with fragmentary ones, and all have the original shell material preserved. The broken condition of most valves suggests a moderately high energy regime in an inner shelf environment.

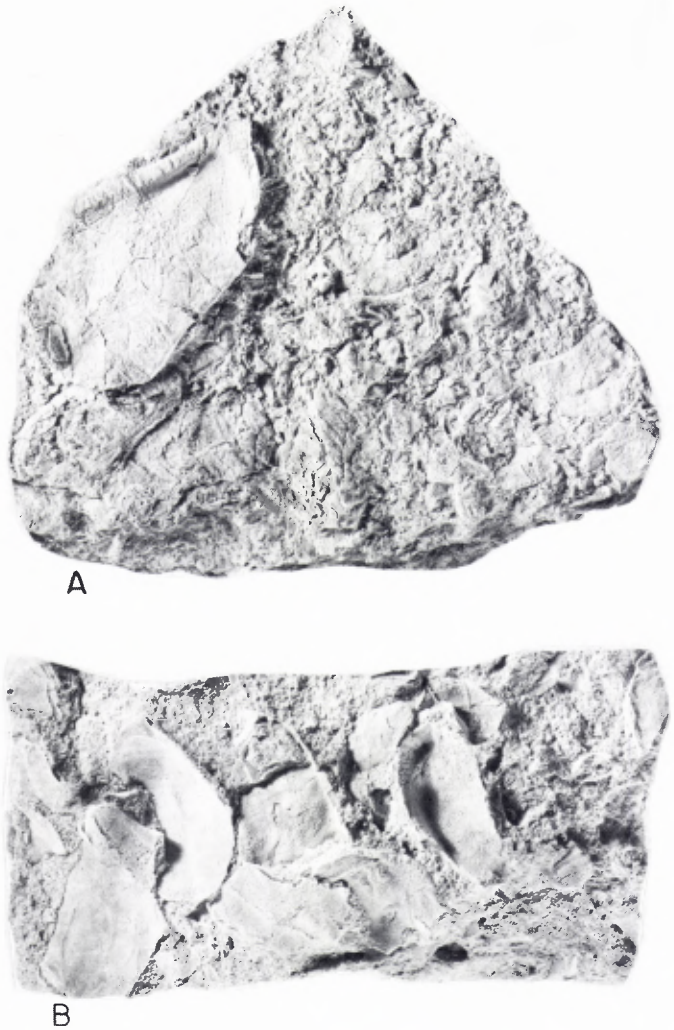


Figure 2. Entire and broken valves of Ostrea beloiti *Logan in coquinid limestone, natural size.* A, *Hypotype USNM 304276, from 1.8 meters above base of Chispa Summit Formation in Eagle Mountains area at USGS Mesozoic locality D10933.* B, *Hypotype USNM 304277, from base of Boquillas Formation west of El Paso, Texas, at USGS Mesozoic locality D10142.*

In another paper (Hook and Cobban, 1980, p. 42), we have drawn attention to the synonomy of *Ostrea beloiti* Logan, 1899, and *O. elegantula* White, 1883. Although *O. beloiti* is a synonym of *O. elegantula*, the name *O. beloiti* should be retained owing to its extensive record in the literature, and *O. elegantula*, which has not been used for more than 50 years, should be considered a forgotten name (*nomen oblitum*).

STRATIGRAPHIC RANGE

Ostrea beloiti is known only from rocks of middle and late Cenomanian age. The species first appears in the ammonite zone of *Colycoceras (Conlinoceras) tarrantense gilberti* Cobban and Scott, where a few specimens that are probably *O. beloiti* have been found in the Thatcher Limestone Member of the Graneros Shale in southeastern Colorado (Cobban and Scott, 1972, p. 12) and in the age-equivalent part of the Oak Canyon Member of the Dakota Sandstone in west-central New Mexico (Cobban, 1977, p. 8, 20). The highest occurrence of the species is in the zone of *Dunveganoceras pondi* Haas in the Lincoln Limestone Member of the Greenhorn Formation of the Great Plains area and in the age-equivalent part of the Whitewater Arroyo Tongue of the Mancos Shale of west-central New Mexico (Cobban, 1977, table 3). The species has its greatest geographic distribution in the middle Cenomanian ammonite zones of *Acanthoceras alvaradoense* Moreman and *A. amphibolum* Morrow.

GEOGRAPHIC DISTRIBUTION

North and Caldwell (1975, p. 314, 315) and McNeil and Caldwell (1974) noted the occurrence of *Ostrea beloiti* in the Ashville Shale in its outcrop belt along the Manitoba escarpment of southern and western Manitoba and as far north as the Pasquia Hills in eastern Saskatchewan 470 kilometers north of the international boundary. In the Western Interior of the United States, *O. beloiti* has been found in southeastern Montana, southwestern South Dakota, the eastern half of Wyoming, central Kansas, much of Colorado and New Mexico, and in the Oklahoma Panhandle (fig. 3).

OCCURRENCES IN TRANS-PECOS TEXAS

In southeastern Culberson County, Texas, *Ostrea beloiti* occurs abundantly in a 10-cm-thick bed of limestone 3.4 m above the base of the Boquillas Limestone of Brand and DeFord (1962). The locality (USGS D10904) is 2.5 km north of Stocks Ranch, which is 11.3 km east-northeast of Kent. The specimens are associated with *Inoceramus arvanus* Stephenson, *Acanthoceras alvaradoense* Moreman, *Desmoceras (Pseudouhligella)* sp., and *Tarrantoceras* sp. Many of the oysters, inoceramids, and ammonites have been fragmented. At this locality, *Inoceramus arvanus* also occurs in a 10-cm-thick bed of limestone 0.9 m above the base of the Boquillas (USGS D10903). The base of the Boquillas is a fine-grained quartzose sandstone bed as much as 8 cm thick that contains *Ostlingoceras brandi* Young, *O. davisense* Young, *Desmoceras (Pseudouhligella) elgini* Young, and *Anchura* sp. (USGS D10901). These taxa are part of a fauna similar to the fauna described by Young (1958) from the same stratigraphic position in the nearby Davis Mountains. The thin basal quartzose sandstone bed is overlain by less than a meter of orange-weathering siliceous shaly claystone that also contains *Ostlingoceras brandi* and *O. davisense* as well as *Forbesiceras brundrettei* (Young) in the lower 30 cm (USGS

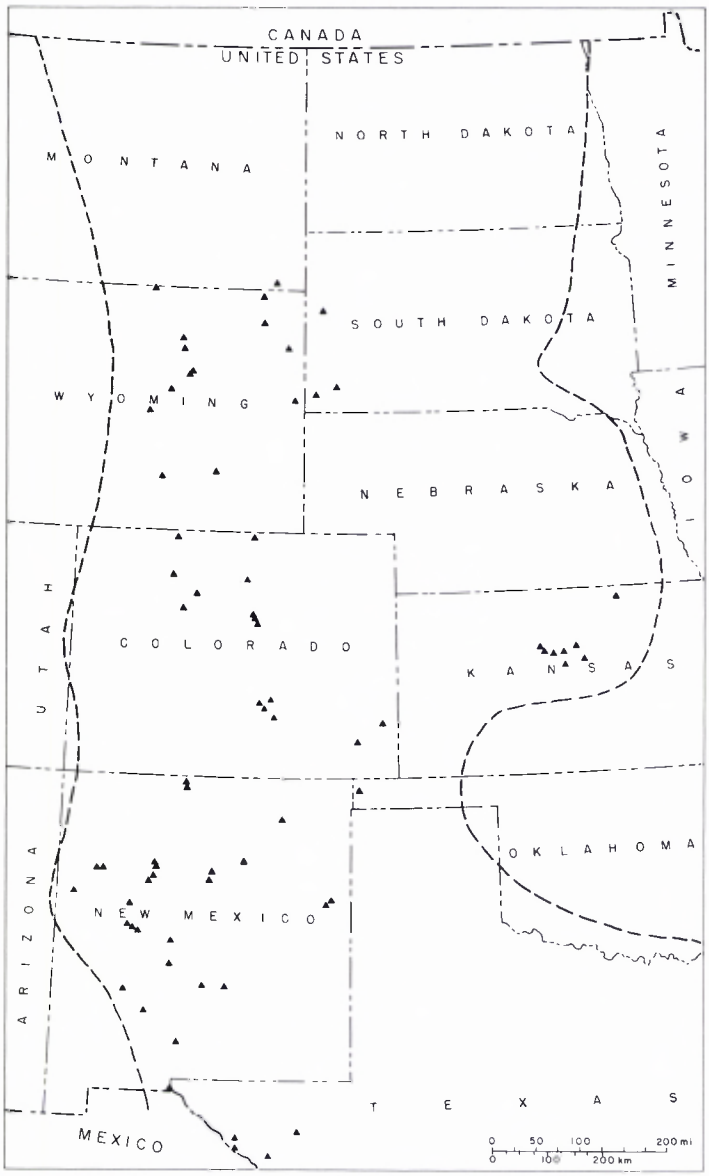


Figure 3. Map of Western Interior of North America, showing localities (▲) where Ostrea beloiti *Logan has been collected and the general position of the eastern and western shorelines (dashed lines) during the time of* Acanthoceras amphibolum *Morrow.*

D10902). The presence of *Ostrea beloiti* less than a meter above rocks that contain the *F. brundrettei* fauna is significant. The Texas "Zone of *Forbesiceras brundrettei*" (Young and Powell, 1976, p. 25, 24) is slightly older than the zone of *Acanthoceras alvaradoense*.

At Chispa Summit, in western Jeff Davis County, *O. beloiti* occurs in thin beds of calcarenite from 1.4 m to 4.8 m above the base of the Chispa Summit Formation. Specimens occur as current-sorted whole and fragmented valves. The lowest specimens (USGS D10741), in a 10-cm-thick bed of calcarenite, are associated with rare poorly preserved impressions of the ammonite *Tarrantoceras* sp. The highest specimens are in a thin bed of brown-weathering calcarenite that forms the top of the lowest major ledge in the Chispa Summit Formation (USGS D10742). Other fossils in this bed are *Inoceramus arvanus* Stephenson, *Acanthoceras stephensoni* Adkins, *Tarrantoceras* sp., and *Turrilites* sp. The basal 0.5 m of the Chispa Summit is a tan-weathering thick-bedded sandstone that rests disconformably on the Buda Limestone. The only fossil that we found in this sandstone was a poorly preserved fragment of a large adult body chamber of an acanthoceratid ammonite (USGS D10889).

At the northwest end of the Eagle Mountains in southeastern Hudspeth County, *O. beloiti* occurs at the base of a 1.5 m-thick unit of thin flaggy calcarenite beds 1.8 m above the base of the Chispa Summit Formation. The locality (USGS D10933) is an arroyo 1.8 km N 63°E of the Stone Ranch (Isbell Ranch of the Grayton Lake 7½-minute topographic quad.). A few whole valves occur with abundant broken valves (fig. 2A) and rare *Inoceramus arvanus* Stephenson.

In Mule Canyon in the southern Quitman Mountains, *O. beloiti* is associated with *Inoceramus arvanus* in thin beds of calcarenite about 12 m above the base of the Ojinaga Formation. The locality (USGS D10758) is 0.8 km N 65°W of the Love triangulation station on the Eagle Mountains SW 7½-minute quadrangle. Here a soft massive bed of argillaceous limestone about 20 cm thick 9 or 10 m above the base of the Ojinaga contains *Inoceramus arvanus* and the ammonite fauna described by Powell (1963) as *Euhystrichoceras adkinsi* Powell, *Pseudacompsoceras bifurcatum* Powell, and *Desmoceras (Pseudouhligella) elgini* Young. In addition, we found part of a small whorl of *Hypoturrilites* cf. *H. gravesianus* (d'Orbigny) (USGS D10757).

Ostrea beloiti occurs abundantly in pale-orange-weathering coquinid limestone at the base of the Boquillas Formation on the north flank of the Cerro de Cristo Rey uplift a few kilometers west of El Paso, Texas. The locality (USGS D10142) is in CN½2SW¼ sec. 9, T. 29 S., R. 4 E., Doña Ana County, New Mexico. Specimens occur as whole and broken valves (fig. 2B) associated with *Inoceramus arvanus* Stephenson, *Desmoceras (Pseudouhligella)* aff. *D. (P.) japonicum* (Yabe), *Puzosia?* sp., *Tarrantoceras rotatile* Stephenson, *Acanthoceras alvaradoense* Moreman, *A.* aff. *A. jukes-brownei* (Spath), *Calycoceras (Gentoniceras)* cf. *C. (G.) leonense* (Adkins), *Paracompsoceras landisi* Cobban, *Turrilites acutus americanus* Cobban and Scott, and *Anisoceras plicatile (J. Sowerby)*.

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Sixweeks grama plant, *Bouteloua barbata*.