Mammitine Ammonites in Trans-Pecos Texas

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ABSTRACT

Ammonites of the Subfamily Mammitinae Hyatt commonly occur only in the early Turonian facies associated with the Chihuahua Trough and adjacent Cohuila and Diablo platforms in Texas and northern Mexico. *Mammites depressus* Powell occurs in middle and perhaps later Turonian rocks within this area. New material from Jeff Davis County, Texas, allows a more complete description and discussion of this taxon and its stratigraphic significance.

INTRODUCTION

Mammitine ammonites are not distributed widely in Turonian rocks in Texas and Mexico (Fig. 1). All of the undoubted occurrences of mammitines are from facies either deposited in, or closely associated geographically with the Chihuahua Trough (northern end of the "Mexican Geosyncline" of authors). Genera such as *Mammites* Laube and Bruder, *Pseudaspidoceras* Hyatt, and *Watinoceras* Warren have been reported at scattered localities around and upon the late Mesozoic Coahuila and Diablo platforms (Powell, 1965). Some of these ammonites and associated vascoceratid genera relate these facies to the Tethyan faunal province. Elsewhere in Texas and along the eastern flank of the Sierra Madre Oriental there have been no undoubted reports of mammitines. Early Turonian rocks in these areas are characterized by *Metoicoceras* Hyatt, *Kanabiceras* Reeside and Weymouth, *Sciponoceras* Hyatt, and *Proplacenticeras* Spath.

The species *Mammites depressus* Powell (1963b) occurs in both the platform and basin facies and in probably the youngest reported occurrence of a mammitine ammonite in Texas or Mexico.

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SUMMARY OF MAMMITINE OCCURRENCES

Böse (1918: 206–211) made the first descriptive mention of mam-

mitine ammonites in Mexico when he described "*Mammites*" *mohovanensis* and *Pseudaspidoceras* spp, from Cerro del Macho. Here the mammitines occur with *Vascoceras* aff. *V. adonense* Choffat and *Fagesia haarmanni* Böse. Associated forms include species of *Neotychites*, *Vascoceras*, *Metoicoceras*, *Trigonia*, *Crassatella*, *Tylostoma*, and *Inoceramus*.

Adkins (1931: 38, 62) listed "*Acanthoceras*" *coloradoense* Henderson and later (1932: 439) "*Watinoceras* (?) aff. *coloradoense* Henderson" as occurring at Chispa Summit at the south end of the Van Horn Mountains, Texas. At the same time he also recorded the presence of *Pseudaspidoceras* aff. *armatum* Pervinquiere, *P.* aff. *footeanum* (White), *P* aff. *footeanum* (Stoliczka), and *P.* aff. *pedroanum* (Petrascheck). This group, along with *Fagesia*, *Neoptychites*, *Vascoceras*, and *Inoceramus labiatus* (Schlotheim) may be indicative of the Tethyan faunal realm in this area.

Other brief and somewhat doubtful references to mammitines have been made by Imlay (1944: 1100, 1156) and Hazzard (1955: 35). A later report of a doubtful *Watinoceras* was published by Young (1958: 292). Stephenson (1952) described *Mammites? bellsanus* from the Templeton Member of the Woodbine Formation in North Texas, but the generic assignment remains in question.

From Chihuahua, Powell (1963a) described a fauna very similar

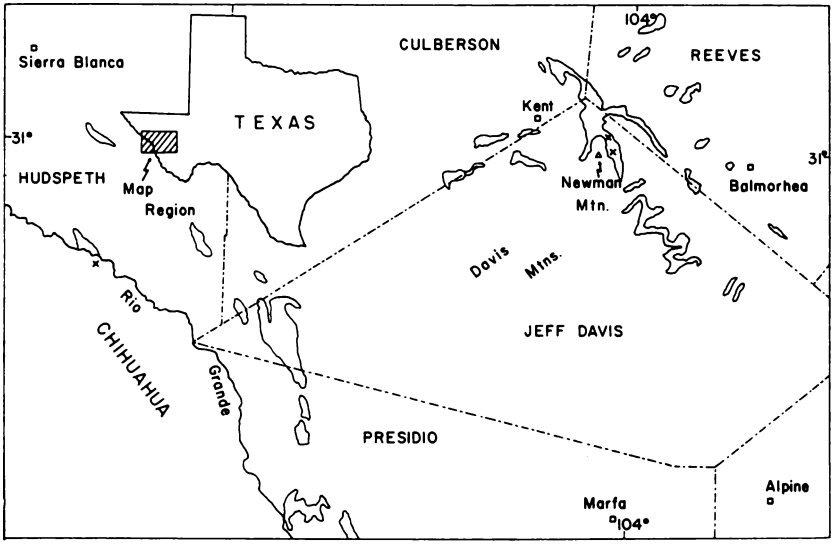

Fig. 1. Location map. "X's" represent occurrences of *Mammites depressus* Powell; irregular patches represent outcrops of Gulfian strata in Texas.

to the one of Adkins at Chispa Summit and that of Böse at Cerro del Macho. Included in the Chihuahua fauna are *Mammites nodosoides* (Schlotheim), *Mammites* sp. aff. *M. nodosoides*, *Pseudaspidoceras flexuosum* Powell, *Acanthoceras* (*Schindewolfites*?), *Fagesia*, *Vascoceras*, *Pachyvascoceras*, and *Quitmaniceras*. Many of these forms are commonly found in the lower Turonian (Salmurian) of Europe, India, and North Africa.

The late Cenomanian and Turonian rock of western Texas and adjacent Mexico has not been studied in great areal detail. However, most of the known localities where ammonites of this age are preserved in the basin facies (Powell, 1965) yield one or more species of mammitines. These species are nearly always associated with other forms having Tethyan affinites. The absence of early Turonian mammitines and their vascoceratid associates in other Texas areas (facies), such as those in the Rio Grande and East Texas embayments (Murray, 1961: 99), suggests a faunal shift to the Boreal province, although mammitines and vascoceratids have been reported from Kansas (Morrow, 1935) and Montana (Reeside, 1923).

The youngest occurrence of mammitines in Texas and Mexico is described below. The Texas occurrence (Jeff Davis County), in rocks belonging to the platform carbonate facies, is associated with *Coilopoceras* and *Prionocyclus*, and is probably of later Turonian (middle?) age. The fauna in the calcareous facies of the Coahuila-Diablo Platform is probably as closely related to the Boreal realm to the north (Western Interior region) and east as it is to the Tethyan realm to the south and southeast.

SYSTEMATIC DESCRIPTION

Genus Mammites Laube and Bruder, 1887

Mammites depressus Powell, 1963
Figures 2–5

Holotype: *Mammites? depressus* Powell, 1963b, p. 1128, pl. 168, figs. 1–3, pl. 170, figs. 4, 5, pl. 171, fig. 1; Text-figs. 5e, 6f-h.

Diagnosis. This is a large species with a wide umbilicus (Fig. 2) that may reach 40 to 50% of the shell diameter. The whorl-section is very depressed and rectangular (Figs. 3, 4). The venter is wide and nearly flat (Fig. 5) with an intermittent slight raising of the ventral mid-line. Both primary and secondary ribs are present and may be erratically spaced. Some ribs are bifurcated in early stages. In later stages the ribs become less and less prominent and number from 9–11 on the

last whorl. The umbilical tubercles tend to migrate slightly toward mid-flank with maturity as the umbilical wall becomes less steep and more rounded on the last whorl. The ventrolateral horns form at an intermediate stage and may be oblique or projected laterally. The suture has a noticeably narrow and rather deep siphonal lobe and first lateral saddle, and the typical wide, broadly bifurcated, first lateral lobe.

Discussion. Powell (1963b: 1228) had only immature specimens of *M. depressus*, except for one large fragment that was found not in association with the described specimens. Since then several more specimens have been found in Texas, allowing a more complete study of the species and its relations within the subfamily Mammitinae.

The only species closely related to *M. depressus* is *M. hourcqi* Collignon (1939: 82). The latter is known only by its immature forms

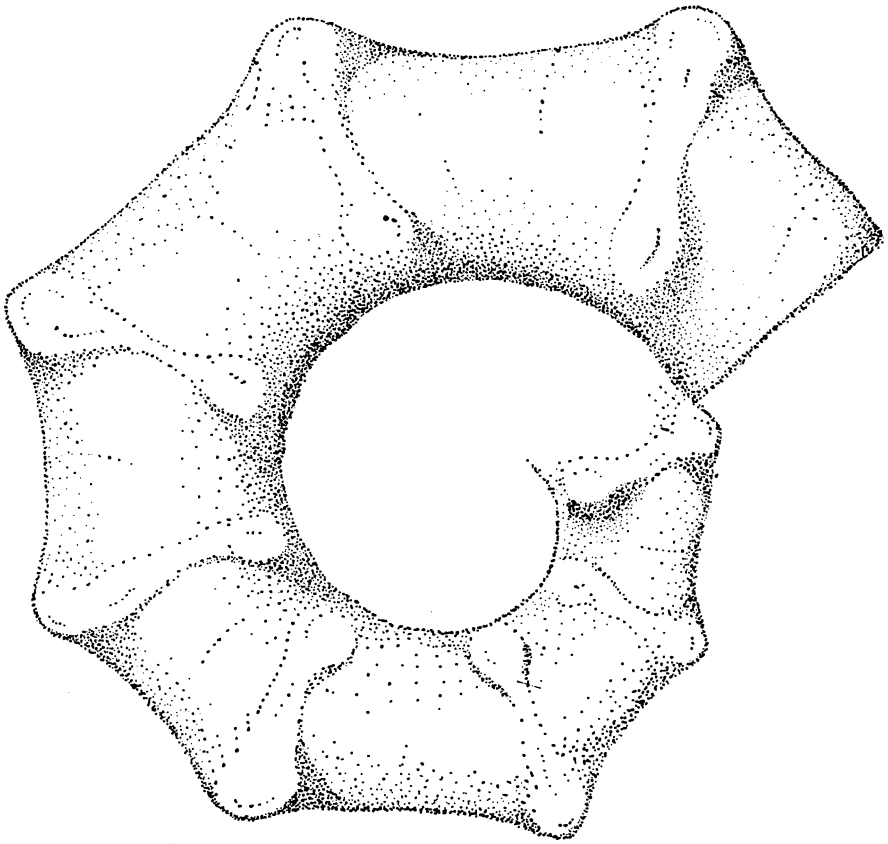

Fig. 2. Lateral view of restored specimen of *Mammites depressus* Powell, X.4.

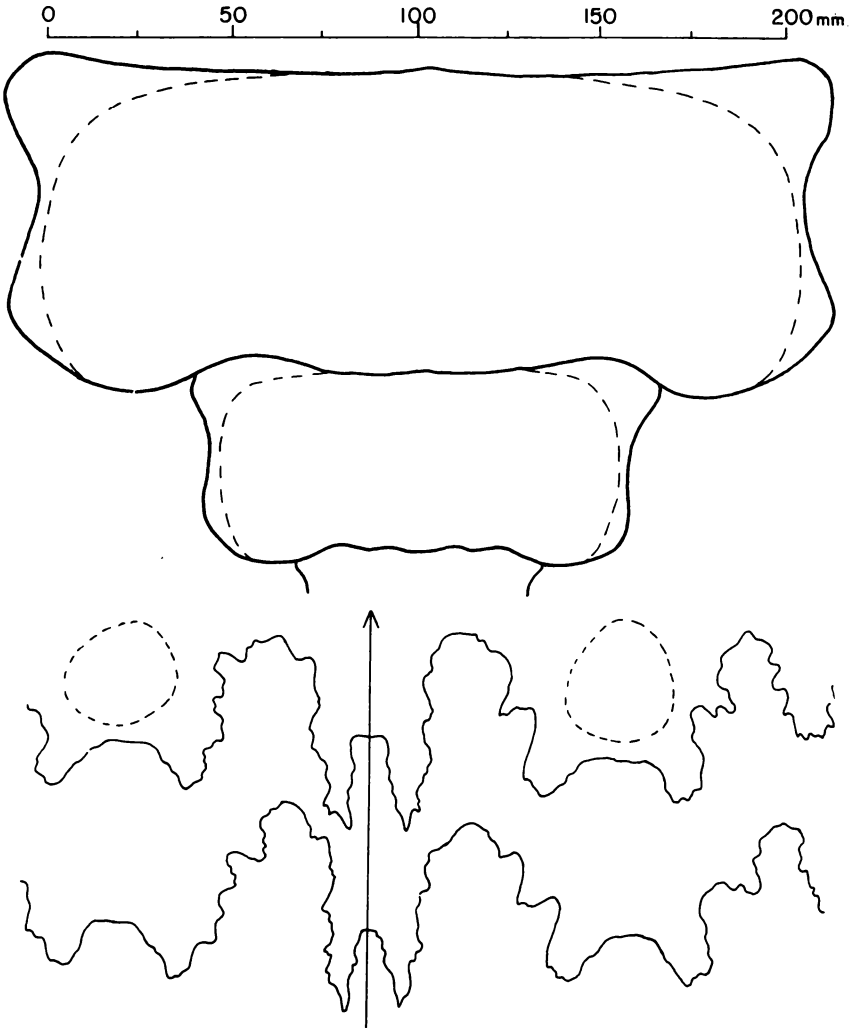

Fig. 3. Diagrammatic representation of whorl sections and partial external suture pattern of TTC1657.

which differ from *M. depressus* in having no secondary ribs and a broader first lateral saddle. The present species calls to mind the general shape of *Euomphaloceras cunningtoni* (Sharpe) and especially the forms from Japan designated by Matsumoto, *et al.* (1957: 35, 36, pls., 17, 18) as "*Euomphaloceras* (*Acanthoceras*?) sp. indet." The latter is similar to *Euomphaloceras* ("*Cunningtoniceras*") *roguense* (Anderson) (1958: 246). Although the general shape and suture of

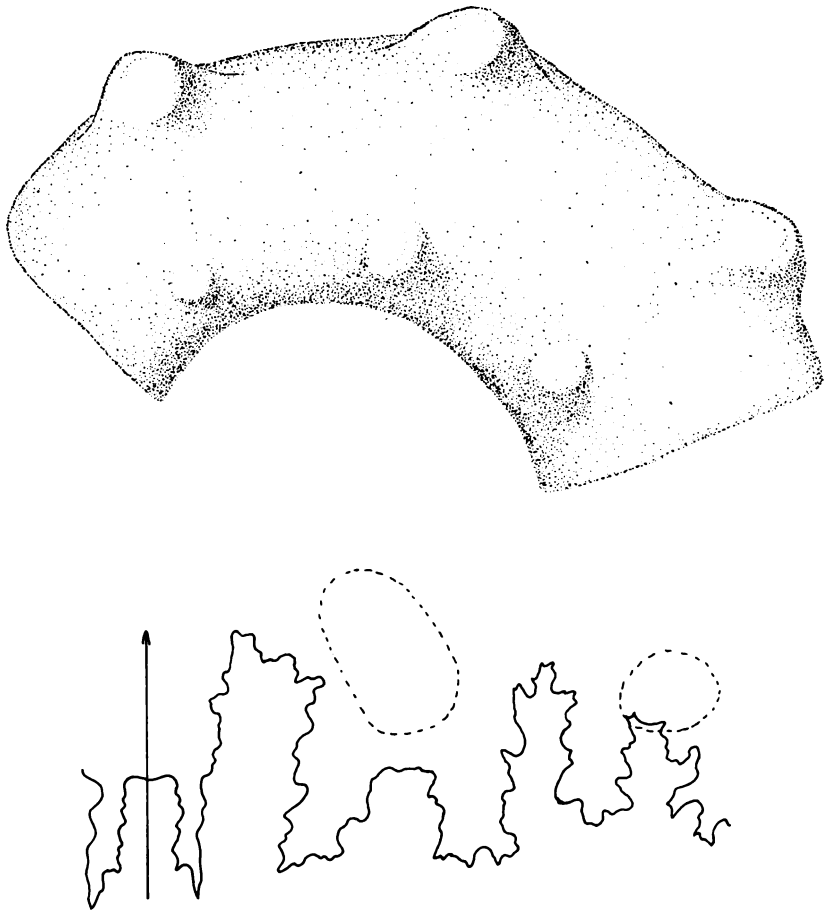

Fig. 4. Lateral view and suture of S-369, X.4.

M. depressus are similar to those of *Euomphaloceras*, the lack of constrictions and siphonal tubercles on the present form leave little doubt as to its mammitine affinity.

Laube and Bruder (1886: 229) and more recently (Wright, 1957: L416), in their generic diagnoses, allowed considerable latitude in the genus *Mammites*. A reasonable case might be made for establishment of a new subgenus of *Mammites* for *M. hourcqi* and *M. depressus* on the basis of degree of evolution and depression of the whorl section and the consequent wide umbilicus and broad venter. However, little practicality would be gained by such a split.

Collignon (1939: 83) expressed some doubt about the late Ceno-

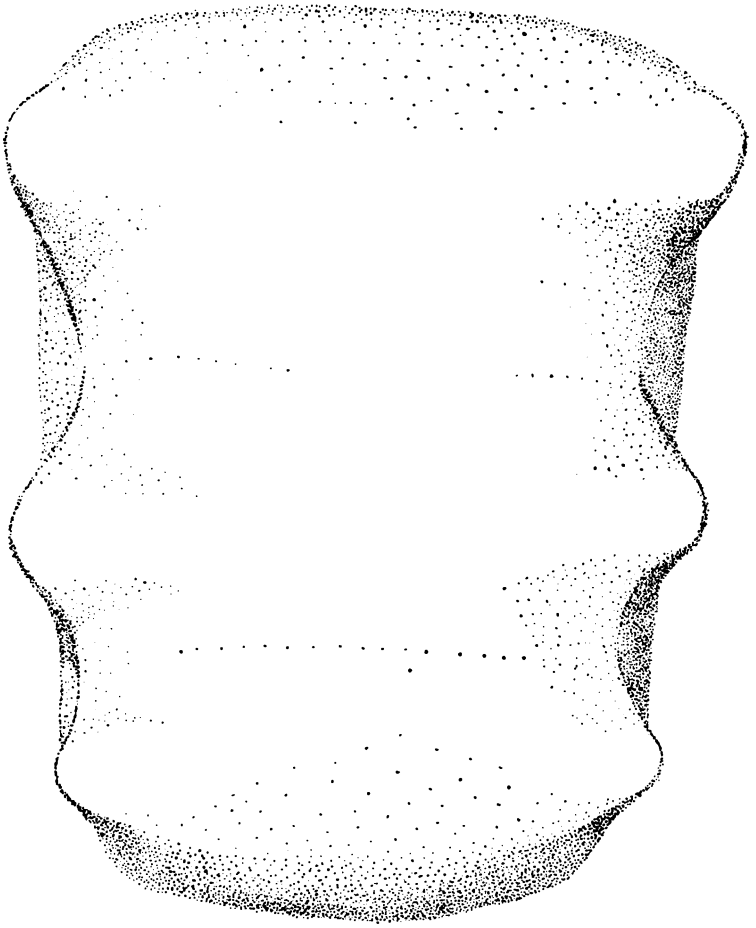

Fig. 5. Ventral view of restored specimen of *Mammites depressus* Powell, X.4.

manian age that he suggested for *M. hourcqi*, and this form could be early Turonian. He also compared *M. hourcqi* with the younger *M. daviesi* Spath and *M. obliquus* Karrenberg (*Fallotites* of Wiedmann, 1964). However, as Collignon stated, the present form is easily distinguished from other mammitines by its dimensions and large umbilicus.

Estimates in measurements of the larger specimens were made necessary by incomplete preservation and crushing. Allowances for crushing were made both for the overall diameter and the individual whorl height and width. The width of the whorl was taken between the ribs. The height includes the greatest vertical distance on the whorl

Measurements.

Specimen	Diameter mm	Umbilical width %	Whorl Height(H) %	Whorl Width(W) %	Ratio of H/W	Remarks
UT30986	28	.28	.50	.64	.77	
UT30953	90	.30	.40	.53	.75	Holotype
S-369	275(est)	.45	.33	.50	.66	
TTC1659	200(est)	. .	.48	.72	.64	
TTC1658	225(est)	.47	.34	.73	.47	
TTC1657	250(est)	.47	.36	.80	.45	

(between ribs) at the given diameter, i.e., from the umbilical shoulder vertically to the venter and not as in Arkell (1951: 24).

One individual (S-369) is a large uncrushed fragment that is septate throughout and has an estimated diameter greater than that of the more complete specimens (TTC 1657, 1658). This specimen, (which could belong to a different, and less depressed type) if complete, would undoubtedly attain a diameter greater than 300 mm. At these diameters (250–300 mm) the whorl width is about as great as the diameter of the whole shell, an unusual occurrence in evolute ammonites.

Materials and Occurrence. Specimens from 3 localities (Fig. 1) are available for study. The lot bearing the "UT" numbers, UT 30953 (holotype), 30986, 35545, 35546, is deposited in the collections of the Department of Geology, The University of Texas, Austin. These specimens are from the Cannonball Hill locality in Municipio de Guadalupe Bravo, Chihuahua, Mexico (Powell, 1963b: 1217), and were collected from the upper concretion beds in the Ojinaga Formation.

Professor John Brand of Texas Technological College, Lubbock, collected the second group of specimens (TTC 1657–1659) from Gold Hill on the northeast slope of Gomez Peak, Jeff Davis County, Texas (Brand and DeFord, 1962). These specimens are deposited in the collections of the Department of Geosciences of that school. All 3 individuals were collected from limestone beds 100–150 feet above the base of the Boquillas Formation. *Mammites depressus* occurs there with a poorly preserved *Prionocyclus* similar to *P. wyomingensis* Meek. Several feet below this occurrence Brand collected a few poorly preserved *Mammites* sp. At a nearby locality a species of *Bostrychoceras* was found at a level stratigraphically higher than the level of *M. depressus*. Young (1963: 43) believes the *Bostrychoceras* to be similar to but not the same as *B. secoense* Young. A fragment of *Peroniceras* sp. also has been found just above the *Bostrychoceras*. Young

(1958) recorded a late Cenomanian assemblage from limestones near the base of the Boquillas in this same area.

On the east side of Newman Peak and near Prizer Canyon at the north end of the Davis Mountains (Fig. 1) the writer collected the specimen marked S-369 along with other fragments of *M. depressus*? (deposited in Stratigraphic Collections, Department of Geology, Arlington State College, Arlington, Texas). This occurrence is from 85 to 110 feet above the base of the Boquillas Formation, and occurs with *Glebsoceras* sp., *Coilopoceras* sp., *Prionocyclus* sp., and several species of *Inoceramus*, including *I. dimidius*. Other fossils found at this locality are listed below in the measured section. A fault cuts this section and an attempt to allow for the offset was made.

MEASURED SECTION

The following section of the Boquillas Formation was measured by the writer, assisted by Paul Tellez, in July, 1965. The section is on the east side of Newman Peak and north of Prizer Canyon, northern Jeff Davis County, Texas. (See Fig. 6).

Unit	Description	Thickness in feet
7	Shale: soft, calc., thinly laminated, alternating brown organic clay and grayish orange clay; contains poorly preserved baculitid ammonites (*Sciponoceras?*), *Prionocyclus*, *Scaphites*, *Inoceramus* and *Anatimya?*.	50+
6	Limestone and shale: micrite and calcsiltite containing fossil frags., very light ash gray, weathering chalky, to flattened nodular surface with loose discoid chips; shale light gray, soft, calcareous. (ls. to sh. ratio 6:1). Upper beds thicker (14" to 18"); lower beds thinner (1"–8"). Contains numerous *Inoceramus*, large *Prionocyclus* and crushed baculities.	66
5	Limestone flags: thin beds of light yellowish brown and grayish orange calcarenite with sparry calcite cement; interbedded thin shale, gray to brown, calcareous. (ls. to sh. ratio 4:1); slopes covered with slabby rubble. *Inoceramus dimidius*?	18
4	Limestone and shale: clayey micrite, very light gray blocky cobbles; shale, yellowish gray, calcareous, soft. (ls. to sh. ratio 1:1). Contains *Glebsoceras*, *Coilopoceras*, *Prionocyclus*, *Mammites*, and *Inoceramus dimidius*.	55
3	Limestone and shale: micrite and calcsiltite, with some clay and quartz silt, especially near base of unit, pale yellowish gray to grayish orange, thin beds (.5" to 4"). Shale, soft, calcareous, pale gray; (ls. to sh. ratio 1:2). Slopes partially covered with volcanic debris and caliche.	62

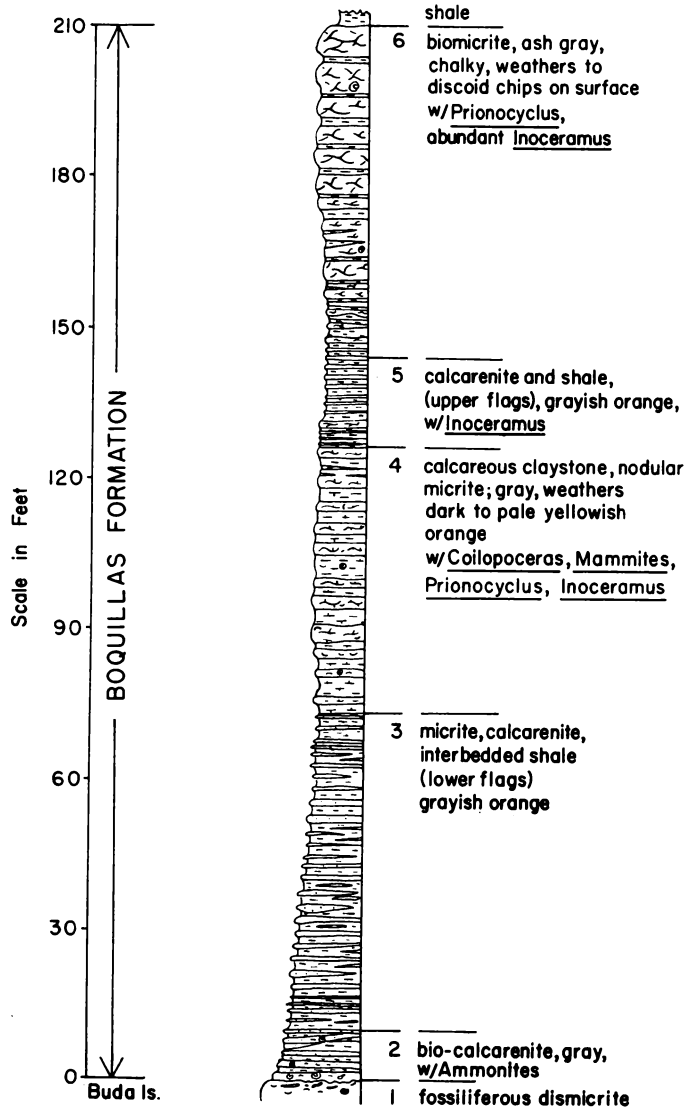

Fig. 6. Measured section of Boquillas Formation on the east side of Newman Peak, northern Jeff Davis County, Texas.

2	Limestone: calcarenite with sparry calcite cement, contains 25% fossil frags., light gray 2″ to 6″ beds, some interbedded gray shale: contains *Acanthoceras* cf. *A. alvarodoense* Moreman, turrilitids, *Eucalycoceras*, desmoceratids, *Inoceramus*, fish debris and oysters.	10
	TOTAL BOQUILLAS MEASURED	261+

BUDA LIMESTONE

1	Limestone: shell-fragment biomicrite, burrowed, pale gray to yellow mottled, weathers gray; with nodular silicified bodies; weathered surface with solution features.	10+
TOTAL MEASURED SECTION		271+

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