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GLYPTODON FREDERICENSIS (MEADE) FROM THE SEYMOUR FORMATION OF KNOX COUNTY, TEXAS

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THE occurrence of *Glyptodon fredericensis* (Meade) is reported for the first time from the Seymour Formation of Pleistocene age in Knox County, Texas. Many previously unknown parts of the carapace and skeleton of this glyptodon are described. Evidence is presented for the assignment of these remains to the genus *Glyptodon* Owen.

Walter W. Dalquest of the Midwestern University, Wichita Falls, Texas, in 1956 gave many of the specimens here reported to the University of Michigan Museum of Paleontology. Additional fieldwork was conducted briefly by Claude W. Hibbard and me in Knox County in the summer of 1957, and we did more intensive work in the spring of 1958 and 1962. We were able to recover additional fossil vertebrates. All of the material here described comes from the Seymour Formation. The late Kansan age of this fauna has already been discussed by Hibbard (1960), Hibbard and Dalquest (1960 and 1962), and Stricklin (1961).

The remains of glyptodons are second only to those of the horses in the numbers of individuals represented in the Gilliland faunule. Parts of 117 specimens of glyptodons are cataloged in the collection. No complete individual was found, nor was a complete carapace recovered. The largest parts of a carapace contain 384 scutes. Some of the remains may be widely scattered parts of the same individual. However, parts of 80 carapaces have been found over an area of more than 130 square miles, and it is more probable that these carapace fragments represent nearly as large a number of individuals.

The presence of so many of these large and probably warmth-loving mammals adds further evidence for the conclusions drawn by Hibbard (1960) concerning the climatic conditions during late Kansan time for this part of Texas. The glyptodons show the most southern distribution of the different groups of edentates found

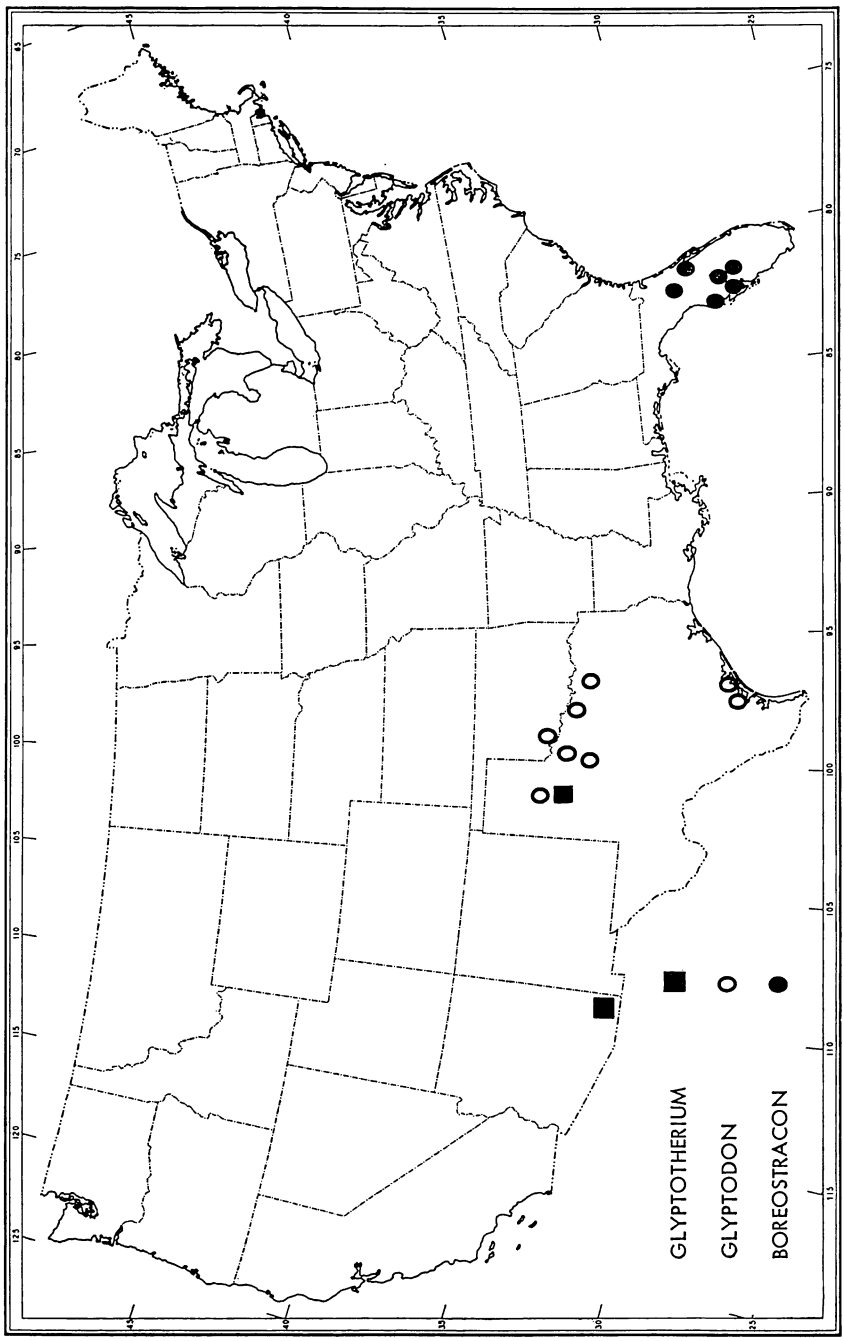


FIG. 1. Distribution of glyptodons in the United States.

in North America. Holmes and Simpson in 1931 published a map on the then known distribution of recent and fossil edentates in the U. S. Fig. 1 of this paper shows the localities where remains have been recovered of the three genera of glyptodons known from the U. S. References citing new localities shown in Fig. 1 are included in the literature cited (Brodkorb 1957; Hay 1916, 1926, and 1927).

CLASS MAMMALIA

ORDER EDENTATA

Family Glyptodontidae

Genus *Glyptodon* Owen, 1838

Glyptodon fredericensis (Meade)

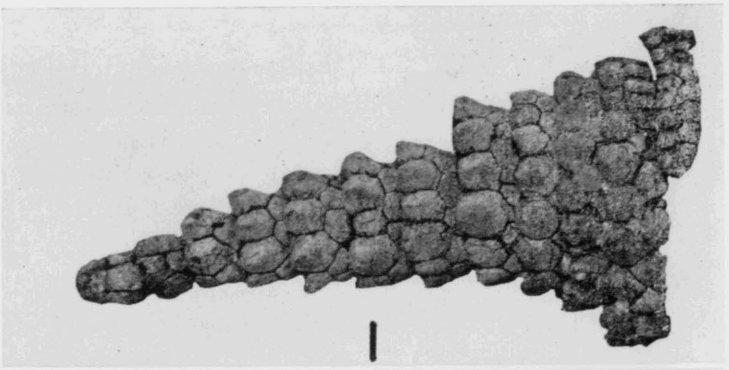
(Pls. I-III; Figs. 1-3)

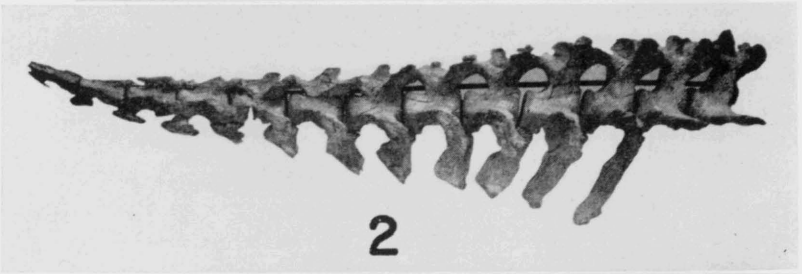
Glyptodon petaliferous Cope, Hay and Cook, 1930, p. 10.

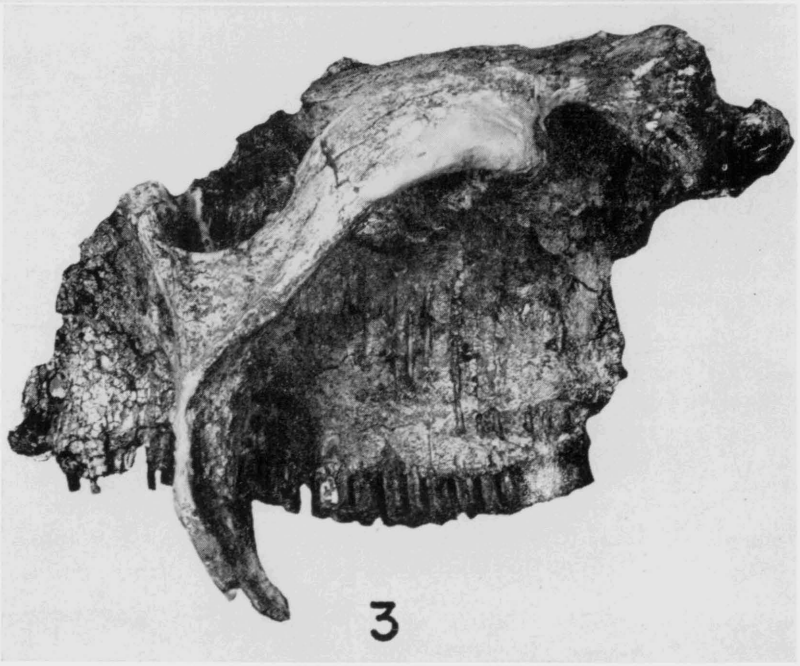
Xenoglyptodon fredericensis Meade, 1953, p. 455.

Description

Skull.—The skull of the glyptodon is characterized by the tremendous descending zygomatic processes which end well below the crowns of some of the anterior lower teeth (Pl. I, Fig. 3). The elements of the skull are fused posteriorly and there is a distinct occipital crest below the head shield posteriorly. The external occipital proturbance sits well forward for the attachment of heavy neck muscles. There are numerous foramina in the occipital-parietal area of the skull beneath the head shield. The frontals appear to lap or fold down over the maxilla in the center of the orbital area. The anterior opening of the infraorbital foramen is a wide vertical slit, and to the rear it is divided by a septa into a dorsal foramen and a ventral foramen. The front part of the frontals and the nasals are absent on both parts of the skulls recovered. Specimen No. 34826 UMMP is the most complete skull of the North American glyptodons so far reported. However, the nasals must have been very wide and short. A complex of turbinate bones are exposed







EXPLANATION OF PLATE I

FIG. 1. *Glyptodon fredericensis* tail armor (UMMP 34826) about 1/12.
FIG. 2. *Glyptodon fredericensis* tail vertebrae (UMMP 34826) about 1/12.
FIG. 3. *Glyptodon fredericensis* skull (UMMP 34826) about 1/3.

between the maxillaries, which are fused, and no midline suture is apparent. The premaxillaries are either fused or absent as in other genera of glyptodons.

The upper teeth are described from specimen UMMP 34826. The occlusal length of the eight teeth in the upper tooth row is 203.3 mm on the right side and 200 mm on the left (see Table I for measurements of teeth). The teeth are here designated N^1, N^2-N^8, as suggested by Hoffstetter (1956). N^1 (the first upper tooth) is, more or less, a long irregular oval with an osteodentine pattern of a reversed sigma and a faint transverse line across the

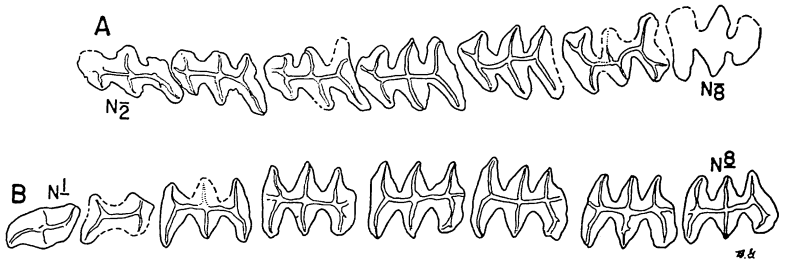


FIG. 2-A. Occlusal pattern of lower teeth. × ½.
B. Occlusal pattern of upper teeth. × ½.

center (Fig. 1B). N^2 contains a distinct front and rear lobe, but no center lobe. N^3 is the first trilobed tooth, and the remainder are trilobed through N^8. The osteodentine pattern consists of a central line nearly parallel to the long axis of the tooth with a branch extending at nearly right angles to the tips of each lobe. The central line extends from the anterior to the posterior margin of the tooth, or terminates at the point where the anterior or posterior branch enters the end lobes (Figs. 1A, B). This pattern, as well as the shape of the teeth, is quite variable, as shown by the teeth in specimens UMMP 34826 and UMMP 38761.

Lower jaw.—The most complete lower jaw, UMMP 38761, consists of the left half, which was broken just posterior to the first tooth (Fig. 3). It contains seven teeth, N_2-N_8 (Fig. 2A), see Table I for measurements. The right side lacks the anterior part and was broken between the second and third lobe of N_4. It contains the posterior part of N_4-N_8. The following measurements were taken from the left side of the jaw. The maximum height of the jaw is 238.0 mm (Fig. 3). The length of jaw from N_2 to the posterior

TABLE I

MEASUREMENTS (IN MM) OF THE OCCLUSAL SURFACE OF UPPER TEETH, UMMP 34826, AND LOWER TEETH, UMMP 38761, OF *Glyptodon fredericensis*

Tooth	Length	Width	Tooth	Length	Width
N^1	18.4	9.6	N_1	–	–
N^2	17.0	11.0	N_2	23.0	14.0
N^3	27.6	16.0*	N_3	23.0	16.0
N^4	24.9	18.0	N_4	26.0	19.0
N^5	26.0	20.0	N_5	26.0	18.0
N^6	26.2	22.0	N_6	22.0	19.0
N^7	25.8	19.0	N_7	22.0	17.0
N^8	24.1	17.0	N_8 †	19.0	19.0

* Minimum width; medial lobe broken on crown of labial side.
† Crown missing; measurements approximate.

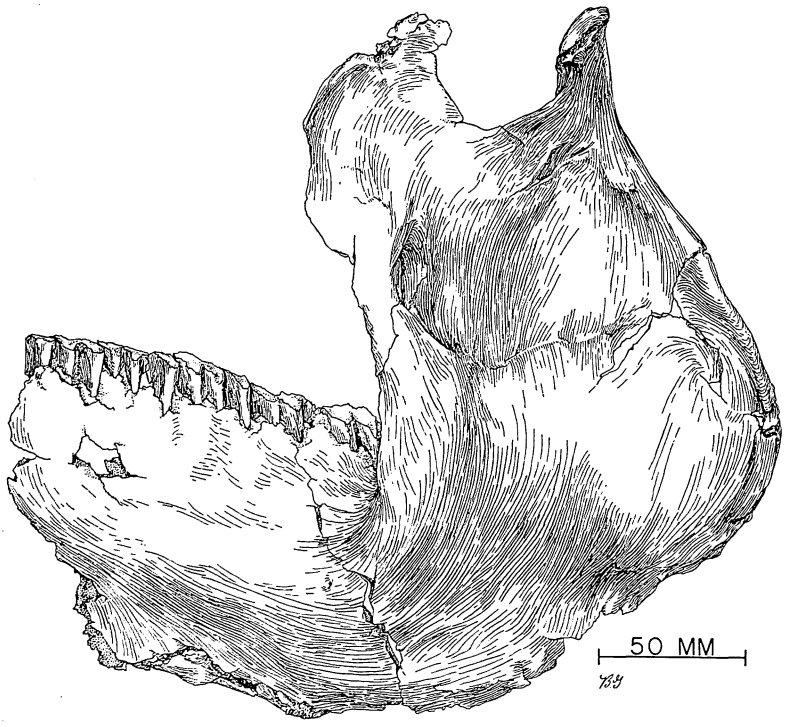


FIG. 3. Labial view of left lower jaw, UMMP 38761.

edge of the ascending ramus is 263.0 mm. The depth of the jaw below the fourth tooth (N_4) is 104.0 mm. There are parts of four other jaws without teeth in the collection, representing three other individuals. Tooth fragments of three other individuals are in the collection.

The lower teeth, like the uppers, are evergrowing. The front of the lower teeth are convex except N_8, which is concave. The posterior face in all the teeth but N_8 is concave. N_8 is the reverse, concave to the front and lobate posteriorly. The osteodentine pattern extends to the apexes of the lobes of the teeth. The anterior lobe of N_2-N_7 has a triradiate pattern which connects with the + pattern of the median and the posterior lobes of N_2-N_7. The crown of the N_8 is broken and missing, so it is not known if the osteodentine pattern of N_8 is reversed. The angle of the occlusal surface of the teeth with the posterior edge of the ascending ramus is 55°. The angle measured between the occlusal surface and the anterior edge of the ascending ramus is 53°. The anterior edge of the ascending ramus extends further forward in specimen UMMP 38761, than in two other rami of specimen UMMP 46237, and in the type of *Xenoglyptodon fredericensis* Meade. Specimen UMMP 38761 is a slightly larger and probably an older individual than the others.

Vertebra.—The atlas is free and is very short. The posterior dorsal parts of the alar processes extend upward rather than outward. The dorsal arch is convex, with a rough dorsal tuberosity. The alar foramina have distinct grooves running mesially to the dorsal tuberosity. The ventral arch is slightly convex. The intervertebral foramina pass through the alar processes just above the well-defined articular surfaces for the axis. The ventral tubercle is broadly concave, with a well-defined articular surface for the odontoid process. One complete specimen, UMMP 34826, and two fragmentary atlases are in the collection.

The axis, the 3rd, 4th, 5th, and 6th cervical are fused; and the neural canal forms a continuous tube. They are shorter in length than in width. There is a ventral and anterior articular surface on the odontoid process. No clearly defined separation occurs between the vertebrae other than the nerve openings. The neural spines are fused into a single ridge of bone. On either side of the neural tube at the rear are two articular facets for the large and complicated 7th cervical. The posterior mesial facets of the 6th vertebrae are oval, and the lateral facets are greatly elongated horizontally.

On the anterior ends of the 7th cervical, short oval articular processes extend forward mesially, as do lateral articular processes, which are considerably longer. The 7th cervical is fused with the first thoracic vertebra. They are so broken that it is not possible to determine whether the 2d thoracic was also fused with them. Fused to the 1st thoracic vertebra is the large first rib, which expands ventrally and mesially into a broad plate. The head of the rib appears to be fused in part to the 7th cervical vertebra.

No remains of other thoracic and lumbar vertebrae, pectoral girdle, humerus, ulna, and pelvis were found.

Manus.—A nearly complete left forefoot (manus) consisting of digits II, III, IV, and V and a left hind foot (pes) consisting of digits I to V are found with specimen UMMP 38761. The principal bones recovered for the forefoot are essentially the same as those described by Burmeister (1870, p. 338). The number of sesmoids is uncertain. There are seven carpals; the four bones of the proximal row are present with articular facets for the missing pisiforme. The second digit is missing. Metacarpals III, IV, and V and nine phalanges are present; however, the articular facets are present for metacarpal II. The distal end of the radius was associated with the above foot.

Femur.—Parts of three femori were found, one being a part of an articulated leg lacking only the patella. The femur is longer than any previously described from North American glyptodons.

The length of the complete femur, UMMP 46231, is 488.0 mm, measured parallel to the long axis. Other measurements are given in Table II. The femur has a large trochanter major and a tremendous lateral epicondyle (Sisson 1938). The medial epicondyle curves upward.

Tibia-fibula.—The tibia-fibula is solidly ankylosed, as in other glyptodons. Two complete bones and one broken about halfway down the tibial side are in the collection. The shortest tibia-fibula, UMMP 33524, is 253.0 mm, and the longest is 283.0 mm. UMMP 46232, which is 262 mm long, would be longer if all of the distal surface was present. The tibia-fibula are longer and average about 12% to 30% longer than the one described from *Glyptotherium arizonae* Gidley (1926). A summary of the measurements is given for comparison in Table III.

Pes.—The bones of the hind foot of the glyptodons are quite distinct from the other major groups of edentates.

Two completely articulated left rear feet were collected by

TABLE II

MEASUREMENTS (IN MM) OF *Glyptodon* AND *Glyptotherium* FEMURS

	Glyptodon fredericensis No. 46231	*Glyptotherium arizonae* *
Length of internal side	488	456
Width at greater and internal trochanters	253	–
Width of lower condyles	135	130
Narrowest width of shaft	89	100

* Gidley, 1926 (No. 10536, U. S. National Museum).

TABLE III

MEASUREMENTS (IN MM) OF THE TIBIA-FIBULA OF *Glyptodon* AND *Glyptotherium*

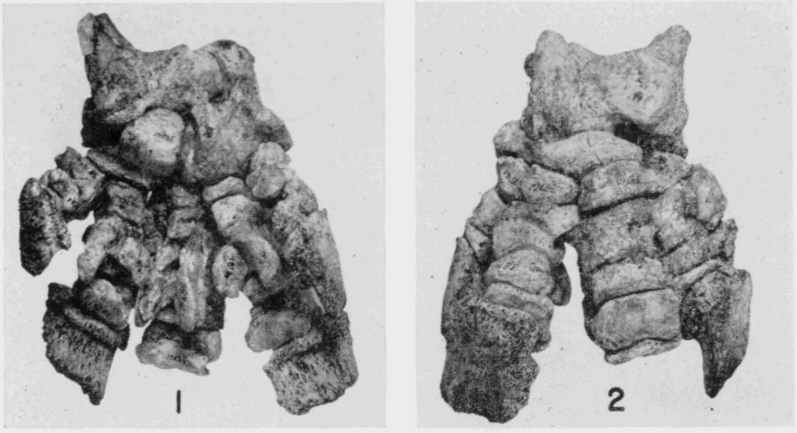
	Glyptodon fredericensis		*Glyptotherium arizonae* *
	No. 46231	No. 33524	
Total length	253	283	220
Proximal width	157	163	–
Width of tibia	147	132	–
Width of fibula	102	112	–
Anterior length of the tibia-fibula opening	123	160	–
Width of center opening	64	64	–
Distal width	143	134	130
Width of astragulus articular facet	63	63	–

* Gidley, 1926 (No. 10536, U. S. National Museum).

Walter Dalquest, one a part of the articulated leg, UMMP 46231, and the other UMMP 38761. The tip of the calcanium is missing on both specimens. Several other isolated foot and toe bones also are present in the collection.

There are 39 bones in each of the complete left feet: 7 tarsals,

5 metatarsals, 15 phalanges, and 12 sesmoids. Burmeister lists 14 phalanges and 10 sesmoids for *Glyptodon asper*. He found no 2d phalanx and no distal sesmoids on digit I. In both of the feet recovered, digit I had 2 phalanges and 2 distal sesmoids. The tarsals are greatly compressed and flattened to bear the weight of the heavy bony carapace. The metatarsals and the proximal toe bones are flattened. The distal toe bones are short and wedge-shaped. The ungals are blunt and broad (Pl. II, 1 and 2).



EXPLANATION OF PLATE II

FIG. 1. *Glyptodon fredericensis* rear foot (UMMP 38761) plantar (ventral) view. × ⅓.

FIG. 2. *Glyptodon fredericensis* rear foot (UMMP 38761) dorsal view. × ⅓.

Carapace and scutes.—The central carapace scutes are more or less hexagonal, with sturdy interlocking borders. The scutes along the midline of the carapace are fused. They come apart readily a few scutes from the midline, except in the sacral region. There is no evidence that the vertebra were fused to the carapace, except in the sacral region.

In general, the central figure of a scute is round to hexagonal, being larger along the margins and growing relatively smaller toward the center of the carapace. The central figure is deeply depressed. The depression is often below the radial grooves that delimit it. In some cases the central figure is no larger than the peripheral figures. In outline the scutes are generally hexagonal, but they frequently depart from this pattern, some even approaching

a four-sided condition, or others a highly irregular shape. Occasionally corners of four adjoining scutes are contiguous. No two scutes present the same appearance.

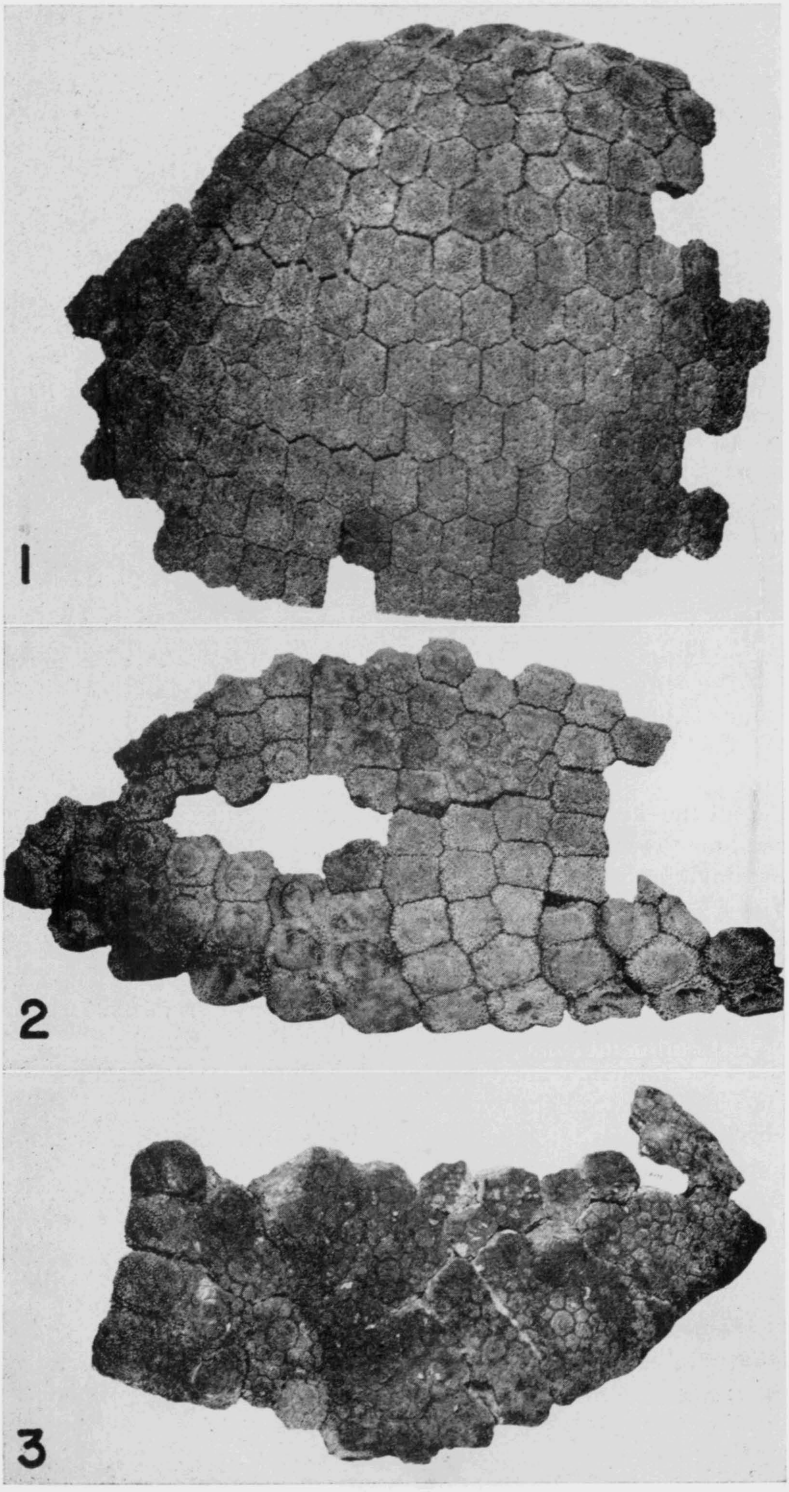
On many of the body scutes, the peripheral figures are a part of two scutes, and the peripheral number may vary from six to as many as 15 in the sacral region of the carapace. Near the margin of the carapace where the scutes are most consistently alike, there are seven to nine peripheral figures which are entirely contained on the scute. Nine is the most consistent number of peripheral figures.

The sutures, while highly irregular, are generally interlocked firmly. There are no depressions or radiating grooves along the margins of the scutes as in *Boreostracon* (Holmes and Simpson, 1931, pp. 582-583). Castellanos (1953, pp. 397-398) states that the sculpture of the scutes of the genus *Boreostracon* differs from the sculpture of the scutes of *Glyptodon* especially in the dorsal regions of the carapace. In *Boreostracon*, the central figures and the slightly smaller peripheral figures are not very rough, although they are very punctate.

Near the anterior margin of the carapace of *Glyptodon fredericensis* there are generally only a few large pores on each scute. About the 4th row of scutes posterior to the anterior margin there are four to seven pores in the anterior part of the groove around the central figure. Toward the center of the carapace, they become fewer, or more obscure.

The surface texture of most of the scutes are extremely rough, particularly near the front margin. The first row of nuchal scutes and those near the anterior margin have no recognizable central figure or peripheral figurines, although they generally contain a deep central depression. The surface of the marginal scutes in the nuchal area are slightly convex to deeply depressed, varying with the individual. These scutes are relatively small with four suture surfaces, with a suture surface laterally and two posteriorly. Quite frequently a very small irregularly shaped scute fills in a gap between two normal-sized scutes.

The anterior lateral border scutes are elliptical. Their ventral edge is straight along the anterior lateral margins and become more pointed until they reach a nearly triangular shape with the apex directed rearward (Pl. III, 2). The size and shape varies somewhat with the individual. The elliptical scutes are generally depressed in the center. The scutes along the side are arranged in fairly



EXPLANATION OF PLATE III

FIG. 1. Front of carapace. Nuchal border at top. (UMMP 46241).
FIG. 2. Lateral border of carapace. Caudal opening towards left. (UMMP 46230).
FIG. 3. Posterior border of carapace. Caudal opening towards left. (UMMP 38761).
All × 1/6.

straight vertical rows starting from the marginal scutes. The vertical rows divide where necessary to provide the curvature of the carapace.

The posterior marginal scutes are very large and thick. They have a large circular or oval central figure of up to 63 mm in diameter, although the average size is around 50 mm. The greatest width of the scute is 86 mm, and the greatest thickness is 53 mm. The central figure may be convex but never approaches a peaked or pointed outline. Other scutes are depressed deeply.

The exact shape of the carapace can only be inferred from the larger fragments. The front opening is lower than the rear. The rear of the carapace slopes downward and turns upward in the caudal region.

The maximum width of carapace UMMP 46320 exceeds 2140 mm, measured across the curvature of the carapace just anterior to the sacral region.

Scutes of five young individuals are present in the collection. These scutes are small, their greatest width being less than 35 mm, they contain no central figure and no peripheral figures. They possess a very rugose surface and a deep central depression on the exterior of the scute. One specimen, UMMP 46297, consisting of five scutes, has a distinct groove on the ventral side of the scutes which extends around the interior margin. This groove may have been for the attachment of the scute to the dermis. These scutes are closely sutured on the dorsal surface, but on the ventral surface they are separated by a distance of two to four mm. The dorsal surface has numerous large pores around the central depression. Not enough material is present to tell which part of the carapace these scutes are from.

The scutes that form the head shield are highly irregular in size and shape, varying from sesmoid-shaped drops, long cylinders, to a variety of flat or flattened irregularly shaped scutes. The anterior left half of the head shield was removed intact from skull UMMP 34826. The scutes are not as rough or rugose on the surface as the body scutes but are more punctate. The scutes are closely sutured but are thinner and do not interlock very well.

Tail.—The tail is composed of 13 caudal vertebrae and 12 rings of bony scutes. The last two vertebrae are slightly fused at the center of the joining faces of the centra. On caudal vertebrae seven and nine, a large foramen opens on the right side of the neural arch near the posterior end of these vertebrae for a branch from

the spinal cord. The metapophyses extend upward and laterally above the short neural spine on the 2d to the 11th caudal vertebrae to support the caudal rings. The first three caudal vertebrae have long transverse processes, and the dorsal surfaces of these possess articular facets which apparently articulated with the posterior part of the pelvis. The transverse processes of the 4th through the 11th caudal vertebrae have a sharply descending projection that articulates with the encircling ring of bony plates (Pl. I, Fig. 2). The longest downward process is on the 4th caudal vertebrae and they

TABLE IV

MEASUREMENTS (IN MM) OF CAUDAL VERTEBRAE AND CHEVRON BONES OF UMMP 34826

No.	VERTEBRA Length of Centra	Greatest Antero-Posterior Width	Length	Transverse-width Top	Transverse-width Bottom
1	73	–	–	–	–
2	68	49	162	66	36
3	73	44	137	64	60
4	84	54	116	53	51
5	88	59	91	49	43
6	91	64	81	40	52
7	89	55	67	38	60
8	87	56	48	32	52
9	83	57	32	23	48
10	78	55	28	25	44
11	79	32 *	19	26	29
12	74	42	18	20	–
13	84	–	9	fused	13

* Approximate.

gradually diminish to the 11th. The transverse process is poorly developed on the 12th and 13th caudal vertebrae. The chevron bones are fused on the 12th and 13th vertebrae and vary considerably in size and shape from anterior to posterior (Table IV and Pl. I, Fig. 2).

All of the caudal vertebrae but the first two have a complete circle of bony armor (Pl. I, Fig. 1). No armor was recovered for the first vertebra. Dorsal to the second vertebra is a double row of scutes that descended to about the midline of the tail. The armor of the 2d and 3d caudal vertebrae must have been under the

margin of the carapace, since they are rather smooth and less punctate than the last ten bony rings. All of the rings are composed of two rows of scutes. The proximal row of scutes are smoother, smaller, and flatter than those of the distal row. The dorsal and lateral scutes of the distal row in the bony rings three to ten are more or less tubercular. The tubercular projections on the two dorsal scutes, as well as the scutes along the lateral margins of the tail of the distal row of each ring, are better developed than on the other scutes. In the bony rings three to ten, the two ventral scutes are flat and smooth, and they join so that there is a noticeable V notch toward the rear where the chevron bone on the next anterior vertebrae articulated. The scutes of the last two rings are more irregular in shape and are all convex. The end of the caudal tube is bluntly rounded.

The total length of the caudal vertebrae is 42 inches or 1102 mm. The length of the caudal vertebrae in *Glyptotherium texanum* is 620 mm, and in *G. arizonae* 895 mm.

Discussion

Castellanos (1953) revised the subfamily Glyptodontinae and the genus *Glyptodon* Owen. He considers that the sculpture of the external face of the scutes of the carapace distinguishes the species of glyptodons. Therefore, he is able to establish some limits of generic characters which agree with other skeletal characteristics. Castellanos (p. 391) lists the following characters of the scutes as distinctive for the genus *Glyptodon*: (1) the central figure of each scute is pentagonal to round or elliptical; (2) the outer surface is generally very rough or rugose but may have some smooth-surfaced scutes; (3) the outline is flat, slightly convex, or deeply depressed; (4) the surrounding peripheral figures are small, generally smaller than the central figure, but rarely equal; (5) the number of peripheral figures on each plate varies from 5 to 9, with 9 being exceptional; (6) the outline is polygonal or angular. Species with 9 peripheral figures never have all the typical features of the genus *Glyptodon.*

Castellanos distinguishes the genus *Glyptodon* from *Glyptotherium* Osborn because *Glyptotherium* has a very large central figure on the scutes, which always represents more than half of each scute. The central figure is surrounded by 7 to 12 peripheral figures, which are separated by wide deep furrows. The tail of *Glypto-*

therium is different from any of the species of the genus *Glyptodon*, because it has seven movable rings and a short caudal tip. The tail of *Glyptodon* consists of 10 to 13 caudal vertebrae and 8 or more caudal rings and the caudal tip.

Simpson (1929, pp. 582-583) noted that specimens assigned to *Glyptodon petaliferus* by Hay from Hunt and San Patricio counties, Texas, differs from *Boreostracon floridanus* because the sculpture of the plates from the homologous regions of the carapace is different in that the marginal areas of the plates assigned to *G. petaliferus* are strongly punctate. In *Boreostracon*, these areas of the carapace are marked by prominent, irregular, radial grooves. Three distinct species of the genus *Boreostracon* have since been recognized in South America.

Simpson (1929) also stated, "Copes specimen (*Glyptodon petaliferus*) is of historical interest as being the earliest indication of a glyptodon north of Mexico, but his name cannot now be used for specimens from other localities . . . I therefore have rather reluctantly taken the step of basing a new name on the incomparably better Seminole materials and of considering both *G. petaliferus* and *G. rivipacis* as *nomina nuda* [*nomina vanem*]."

From a study of the glyptodon material recovered from the Seymour formation, it is evident that these specimens belong to the genus *Glyptodon* Owen.

Meade (1953) described *Xenoglyptodon fredericensis*, a member of the Frederick local fauna recovered from the Holloman gravel pit a short distance north of the town of Frederick in Tillman County, Oklahoma. The holotype of *X. fredericensis* is in the University of Texas collections and has been compared with the material from Knox County, Texas. These specimens have been found to be conspecific. Therefore the name *Glyptodon fredericensis* is used for the specimens from Knox County, Texas, and Tillman County, Oklahoma.

The deposits at the Holloman gravel pit and the vertebrates from there have been studied. The deposits are considered to be of the same age as the sands and gravels of the Seymour formation (Late Kansan).

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I wish to express my appreciation to Claude W. Hibbard, curator of vertebrates at the University of Michigan Museum of Paleontology, for permission to publish the description of these specimens

and for the many helpful suggestions in preparing this manuscript and to Walter W. Dalquest of Midwestern University, who collected nearly all of the specimens described.

I also wish to thank John A. Wilson of the Department of Geology, University of Texas, for permission to examine the type of *Glyptodon fredericensis* and other glyptodon specimens in his care at Austin, Texas.

Permission to examine the formation from which the specimens were collected was kindly granted by the ranchers in the area, and I wish especially to thank O. L. Patterson and Bruce Burnett.

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LITERATURE CITED

BRODKORB, PIERCE. 1957. New Passerine Birds from the Pleistocene of Reddick, Florida. Jour. Paleon. 31 (1): 129-138.

BURMEISTER, GERMAN. 1870-1874. Monographica de los Glyptodontes en el Museo Publica de Buenos Aires, II (6): 1-395.

CASTELLANOS, ALFREDO. 1953. Anotacoes e Retificacoes ao Genero "Glyptodon" Owen e A Familia "Glyptodontinae". An. Acad. Brasil. Cien. 25 (4): 391-410.

GIDLEY, JAMES W. 1926. Fossil Proboscidea and Edentata of the San Pedro Valley, Arizona. U. S. Geol. Surv., Prof. Pap. 140B: 83-95, 13 pls., 4 figs.

HAY, O. P. 1916. Description of Two Extinct Mammals of the Order Xenarthra from the Pleistocene of Texas. Proc. U. S. Nat. Mus. 51: 107-123, 5 pls.

—— 1926. A Collection of Pleistocene Vertebrates from Southwestern Texas. *Ibid.* 68 (24): 1-18, 8 pls.

—— 1927. The Pleistocene of the Western Region of North America and Its Vertebrated Animals. Carnegie Inst. Wash. Pub. 322B: 346 pp., 12 pls., 19 figs.

—— AND HAROLD J. COOK. 1930. Fossil Vertebrates Collected Near, or in Association with, Human Artifacts at Localities near Colorado, Texas; Frederick, Oklahoma; and Folsom, New Mexico. Proc. Colo. Mus. Nat. Hist. 9 (2): 4-40, 14 pls.

HIBBARD, CLAUDE W. 1960. An Interpretation of Pliocene and Pleistocene Climates in North America. Mich. Acad. 62nd Ann. Rep. 5-30.

—— AND WALTER W. DALQUEST. 1960. A New Antilocaprid from the Pleistocene of Knox County, Texas. Jour. Mammal. 41 (1) : 20-23, 1 fig.

—— 1962. Artiodactyls from the Seymour Formation of Knox County, Texas. Pap. Mich. Acad. 47: 83-99, 4 figs.

HOFFSTETTER, ROBERT. 1956. Edentata: Traite de Paleontologic 6 (2) : 535-636, 64 figs.

HOLMES, W. W., AND G. G. SIMPSON. 1931. Pleistocene Exploration and Fossil Edentates in Florida. Bull. Am. Mus. Nat. Hist. 59 (7) : 383-418, 21 figs.

MEADE, GRAYSON E. 1953. An Early Pleistocene Vertebrate Fauna from Frederick, Oklahoma. Jour. Geol. 61 (5) : 452-460, 1 pl.

OSBORN, H. F. 1903. *Glyptotherium texanum*, a New Glyptodont from the Lower Pleistocene of Texas. Bull. Am. Mus. Nat. Hist. 19 (17) : 491-494, 1 pl.

OWEN, R. 1838. In Parish's "Buenos Ayres and La Plata", p. 178b (*Fide* Lydekker, 1887, p. 114). Cat. Fossil Mammalia Brit. Mus., pt. 5: 1-345.

SIMPSON, G. G. 1929. Pleistocene Mammalian Fauna of the Seminole Field, Pinellas County, Florida. Bull. Am. Mus. Nat. Hist. 56 (8) : 561-599, 22 figs.

SISSON, S., AND J. D. GROSSMAN. 1938. The Anatomy of the Domestic Animals. W. B. Saunders Co. 972 pp., 770 illus.

STRICKLIN, JR., FRED L. 1961. Degradational Stream Deposits of the Brazos River, Central Texas. Bull. Geol. Soc. Am. 72 (1) : 19-35, 9 figs.