

ABSTRACT: *Holothurian sclerites from the Permian Florena shale are assigned to four species, belonging to four different genera. Two of the genera and three of the species are new.*

Holothurian sclerites from the Florena shale (Permian) of Kansas

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INTRODUCTION

For a number of years the authors of this paper have been engaged in a detailed stratigraphic, petrographic, and paleontological analysis of the Florena shale member of the Beattie limestone, a lithologically variable but laterally persistent unit in the mid-continent Wolfcampian. In the course of this work, well preserved holothurian sclerites were found in samples from three localities in northern Kansas. Although a systematic search for holothurian sclerites has not been made to date at other localities, it is highly probable that these fossils are widely distributed in the Florena. Indeed, the general scarcity of published reports of fossil holothurians is almost surely due to the lack of attention this group has received rather than to any inherent rarity. In this connection it is pertinent to note that Hattin (1957) has reported holothurians from the Schroyer limestone and the Speiser, Havensville, and Wymore shales of the Kansas Lower Permian. For an excellent summary of holothurian paleontology, the reader is referred to Frizzell and Exline (1955).

The material described in this paper was collected as part of a project sponsored by the Geological Society of America and the State Geological Survey of Kansas. Catalog numbers cited in the explanation of Plate 1 refer to the Columbia University paleontology collections.

LIST OF LOCALITIES

Locality 1: Roadcut 4 miles southeast of Manhattan, NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 34, T. 10 S., R. 8 E., Riley County, Kansas.

Locality 6: Roadcut in the NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 6, T. 6 S., R. 13 E., Jackson County, Kansas.

Locality 10: Railroad cut in the NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 36, T. 16 S., R. 9 E., Morris County, Kansas.

SYSTEMATIC DESCRIPTIONS

Phylum ECHINODERMATA

Class HOLOTHUROIDEA

Family THEELIIDAE Frizzell and Exline, 1955

Genus **Microantyx** Kornicker and Imbrie, **new genus**

Type species: Microantyx permiana Kornicker and Imbrie, n. sp.

Diagnosis: Sclerites in the form of wheels with short spokes; raised central hub and peripheral rim on lower side, and four depressions in central portion of upper side.

Comparisons: *Microantyx* differs from *Protocaudina* in having a central hub on the lower side. It differs from *Paleochiridota* in having four depressions in the central portion of the upper side.

Remarks A paratype of this species was examined by Frizzell and Exline, who concluded that this genus may have been derived from *Protocaudina* by the addition of a simple hub, and may be "... an end member of the typical *Protocaudina* lineage, which originated (as far as we yet know) in the Devonian" (personal communication, 1956).

Range: Permian.

Microantyx permiana Kornicker and Imbrie,
new species

Plate 1, figures 1-6

Description: Sclerite in the form of a wheel with ten spokes; outline nearly circular; interspoke spaces low, and triangular in shape; central part of upper side with four central depressions; central depressions subtriangular; lower surface with raised rim and prominent central hub. Diameter 0.17-0.27 mm.; average diameter 0.23 mm.

Comparisons: *Microantyx permiana* is the only known species of this genus.

Occurrence: Type material was collected from the Florena shale at locality 10.

Family STICHOPITIDAE Frizzell and Exline, 1955

Genus UNCINULINA Terquem, 1862

Uncinulina lunata Kornicker and Imbrie, **new species**
Plate 1, figure 7

Description: Sclerite in the form of a curved rod with ends bent sharply at an angle of about 85°; one end of the rod tapering to a point, the other end flaring; flared end of holotype apparently broken. Length of holotype 0.53 mm.; average diameter of rod 0.09 mm.

Comparisons: *Uncinulina lunata* differs from *Uncinulina angulata* Frizzell and Exline and from *Uncinulina arcuata* (Deflandre-Rigaud) in having a straight central portion. It differs from *Uncinulina polymorpha* Terquem and from *Uncinulina terquemi* Frizzell and Exline in that the end portions form a slightly obtuse angle with the central part of the rod. *Uncinulina lunata* is smaller than all other known species of this genus.

Occurrence: Type material was collected from the Florena shale at locality 10.

Genus **Parvispina** Kornicker and Imbrie, **new genus**

Stichopiles Deflandre-Rigaud, emend. FRIZZELL AND EXLINE, 1955 (in part), Missouri, Univ., School Mines and Met., Bull., Tech. Ser., no. 89, p. 60.

Type species: *Stichopiles spinosus* Frizzell and Exline, 1955.

Diagnosis: Sclerite in the form of a straight tapering rod with spines.

Comparisons: *Parvispina* differs from other rod-like sclerites in possessing spines.

Remarks: *Stichopiles mortenseni*, the only species now remaining in *Stichopiles* as that genus is here construed, differs from species assigned to *Parvispina* in lacking spines and in possessing a distinct curvature. In the judgment of the authors, these differences are striking enough to warrant the erection of a new genus.

Range: Species of this genus have been found to date in Mississippian and Permian strata.

Parvispina harpago Kornicker and Imbrie, **new species**
Plate 1, figures 8-10

Description: Sclerite in the form of a tapering rod with unequal, slightly curved spines arranged in two mutually perpendicular planes passing through the axis. Length of a broken specimen 0.63 mm.; maximum width, including spines, 0.67 mm.; maximum spine projection 0.27 mm.

Comparisons: *Parvispina harpago* differs from *Parvispina spinosa* (Frizzell and Exline) in having spines that are more widely spaced and arranged in quadrate fashion.

Occurrence: Type material was collected from the Florena shale at locality 1.

PLATE 1

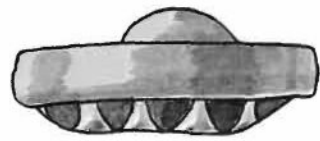
- 1-3 *Microantyx permiana* Kornicker and Imbrie, n. gen., n. sp.
Holotype, CU no. 28,620, × 170: 1, top view; 2, bottom view; 3, side view.
- 4-6 *Microantyx permiana* Kornicker and Imbrie, n. gen., n. sp.
CU no. 28,621, × 160: 4, top view; 5, bottom view (hub of specimen broken?); 6, side view.
- 7 *Uncinulina lunata* Kornicker and Imbrie, n. sp.
Holotype, CU no. 28,622, × 55.
- 8-10 *Parvispina harpago* Kornicker and Imbrie, n. gen., n. sp.
Holotype, CU no. 28,623, × 55: 8, side view; 9, bottom view; 10, top view.
- 11 *Achistrum brownwoodensis* (Croneis)
CU no. 28,624, × 45.
- 12-13 *Holothuroidea*(?) *incertae sedis*
12, CU no. 28,625, × 120; 13, CU no. 28,626, × 150.



1



2



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10



11



12



13

Family ACHISTRIDAE Frizzell and Exline, 1955

Genus ACHISTRUM Etheridge, emend.
Frizzell and Exline, 1955

Achistrum brownwoodensis (Croneis)
Plate 1, figure 11

Ancistrum brownwoodensis CRONEIS, 1932, in CRONEIS AND McCORMACK, Jour., Pal., vol. 6, p. 143, pl. 21, figs. 3-8, 19-22, 29, 39.

Achistrum brownwoodensis (Croneis).—DEFLANORE-RIGAUD, 1952, Monaco, Inst. Océanogr., Bull., no. 1012, p. 8.

Description: Sclerite in the form of a fish-hook without a barbed tip; shank straight; eye inclined slightly in the direction of hook projection. Eye-hole diameter smaller than diameter of shank.

Comparisons: This species differs from *Achistrum permianum* (Spandel) in having a straighter shank and inclined eye.

Occurrence: The occurrence of this species in the Florena shale previously reported by Kornicker (1954) was based on a single complete sclerite from locality 1. Twelve additional specimens (not complete) have since been obtained from locality 10.

Holothuroidea(?) incertae sedis

Plate 1, figures 12-13

Croneis and McCormack (1932, pl. 21, figs. 10, 13) illustrate fragments tentatively identified as holothurian fronds from the Chester sediments of Illinois. Serrated fragments of similar appearance occur in the Florena shale at locality 10 (pl. 1, figs. 12-13). Their actual affinity remains in doubt.

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