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A Pennsylvanian Ophiuroid from Southwestern Iowa

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ROGER K. PABIAN and HARRELL L. STRIMPLE. A Pennsylvanian Ophiuroid from Southwestern Iowa. *Proc. Iowa Acad. Sci.*, 80(1): 39-40, 1973.

SYNOPSIS: A collection of fossils from the Doniphan Shale, Virgilian Stage, Upper Pennsylvanian contains a small ophiuroid identified as *Archeophiomusium burrisi* (Miller). The discovery of the Iowa specimen lowers the lower boundary of the range-

zone of this species and considerably extends its geographic distribution.

The ophiuroid is associated with at least seventeen other species of marine invertebrates. Like specimens collected from the Permian of Kansas and Oklahoma, the Iowa specimen is in rock classed as shelly facies *sensu* LaPorte (1962).

In the fall of 1964, one of the authors (Pabian) collected a fossil ophiuroid from the Kaser Construction Company Quarry situated in the C, NE 1/4, Sec. 27, T-73-N, R.-38-W, Montgomery County, Iowa. The specimen was collected from the Doniphan Shale Member, Lecompton Formation, Shawnee Group, Virgil Stage, Upper Pennsylvanian. This is unit 9 of the section given by Hershey and others (1960, p. 74-75). The specimen occurs in a brownish-yellow (2.5Y 7/5) to brownish-gray (2.5Y 7/2), clayey, fossiliferous limestone.

There are at least seventeen species of associated invertebrate fossils, the productoid brachiopod *Linoproductus* being most common. There are four genera of burrowing bivalves: *Astartella*, *Schizodus*, *Permophorous*, and *Edmondia*; and one genus of free-swimming bivalve, *Aviculopecten*. Cephalopods are represented by the small, coiled ammonoid, *Neogaganides*, and what appears to be a straight-shelled nautiloid. *Donaldina*, *Goniasma*, *Anematina*, and *Murchisonia* make up the high-spined gastropods whereas only one low-spined gastropod, *Naticopsis*, is found. There are two genera of ectoprocts, the branching *Rhombopora* and a small clump of the encrusting *Fistulipora*. At least two species of crinoids, based on disassociated ossicles, were present. There are also several genera of ostracods present, *Bairdia* being most common. The fauna associated with the Iowa ophiuroid is strikingly similar to that associated with Permian ophiuroids collected from the Cottonwood Limestone by Merriam and reported by Hattin (1967, p. 489). Laporte (1962, p. 532) classified certain Cottonwood (Permian) rocks from Northern Oklahoma as shelly facies. These rocks contain the productoid brachiopod *Reticulatia*, and also the brachiopods *Neochonetes*, *Derbyia*, and *Meekella*; the low-spined gastropods *Amphiscapha* and internal molds of high-spined gastropods; the bivalves *Aviculopecten* and *Septimyalina*; the trilobite *Ditomopyge*; echinoid and crinoid fragments. Because of the similar, and often identical generic faunal elements, as well as similarity in lithology, the Doniphan rocks from which the Iowa ophiuroid was collected are also classified as shelly facies *sensu* LaPorte, 1962. These sediments were deposited offshore in only moderately turbulent, well circulated waters of nearly normal salinity; this observation was based on abundance and diversity of fossils and fine-grained matrix.

The occurrence of *Archeophiomusium burrisi* in the Doniphan Shale of Iowa extends the range-zone of this species from the Doniphan Shale Member, Lecompton Formation, Shawnee Group, Virgil Stage, Upper Pennsylvanian to the Cottonwood Limestone Member, Beattie Formation, Council Grove Group, Big Blue Stage, Lower Permian. The geographic distribution of this species is extended from Northern Oklahoma (Hattin, 1967) to southern Kansas (Miller, 1958) to southwestern Iowa (Pabian and Strimple, this paper).

SYSTEMATIC PALEONTOLOGY

PHYLUM ECHINODERMATA

SUBPHYLUM ELEUTHEROZOA

CLASS STELLEROIDEA

SUBCLASS OPHIUROIDEA

ORDER OPHIURAE

Family Ophiolepididea Lyman, 1878.

Genus *Archeophiomusium* Hattin, 1967.

Type species.—*Ophiuraster burrisi* Miller, 1958, p. 360-361, Text-figs. 1-4.

Other species included.—None.

Diagnosis.—See Miller, 1958, p. 359-360.

Remarks.—Upon learning that the name *Ophiuraster* Miller, 1958, was preoccupied, Miller (1963, p. 725) questionably referred his species to *Ophiomusium*, a Cretaceous (Danian) genus. Hattin (1967, p. 492) showed that the Kansas and Oklahoma specimens differed from *Ophiomusium* Lyman in at least three respects: (1) aboral plates are imbricate and not abutting; (2) tentacle pores are present along the greater length of the arm; and (3) the dorsal and ventral arm shields are not minute or vestigial and extend along the greater length of the arm.

Archeophiomusium burrisi (Miller) 1958

Figures 1, 2

Ophiuraster burrisi, Miller, 1958, p. 360, text-figs. 1-4; Hattin, 1959, p. 1125-1126, text-fig. 1.

Ophiomusium burrisi Miller, 1963, p. 725.

Archeophiomusium burrisi Hattin, 1967, p. 489-491, text-figs. 1-3.

Description.—The specimen at hand is preserved such that a ventral view is seen. The mouth frame contains ten half-jaw ossicles that are arranged in five interradially situated pairs. There appears to be a small tooth situated between the paired half-jaw ossicles (Fig. 1). A maxiller or torus angularis is near one of the jaws. The articulation of jaw-ossicles to vertebra is displayed, however poorly, in several arms. There is a small, very narrow lateral buccal shield extending along the side of each half-jaw ossicle; the larger

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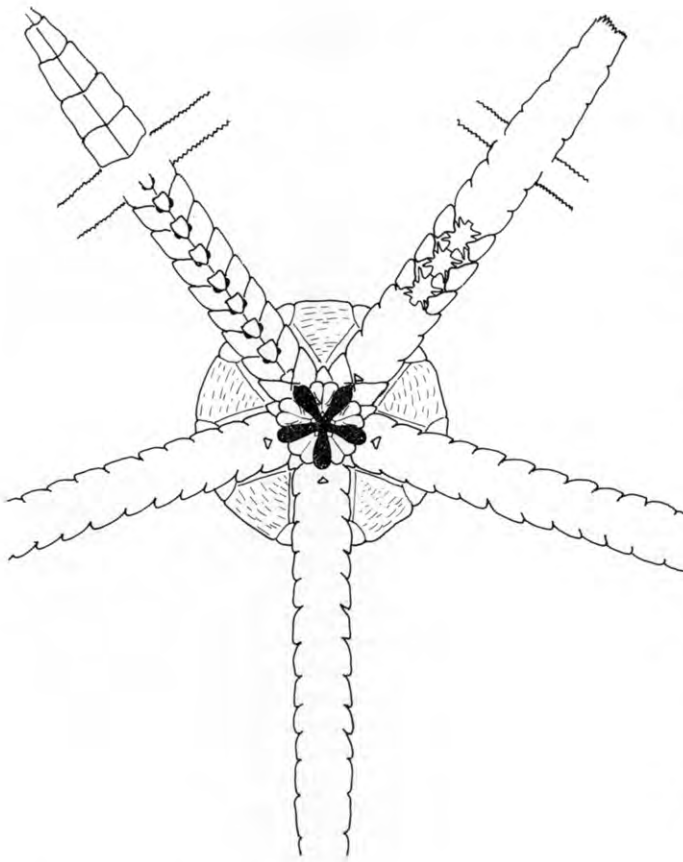


Figure 1. Line drawing of *Archeophiomusium burrisi* (Miller) showing ventral plate arrangement.

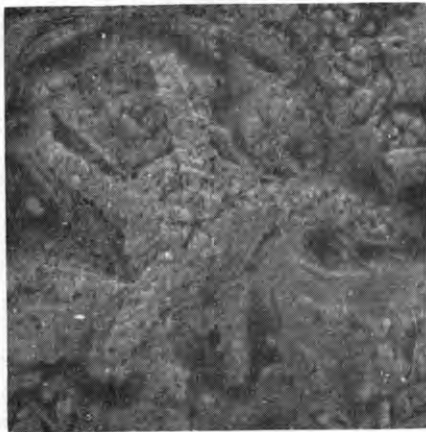


Figure 2. *Archeophiomusium burrisi* (Miller). Photograph of hypotype, UNSM-9629, x4.

end is directed orally (Fig. 1). It cannot be determined from the specimen under study whether or not the lateral buccal shield is connected to the first lateral arm shield. The buccal shield is a small, semi-navette-shaped plate occupying an interradial position. The interradial positions of the central disk appear to have a pair of long plates extending distally along the arm from the buccal shields toward the margin where they join a pair of semi-parabolic plates that extend to the margin. The area between the paired plates contains several small, imbricate plates arranged in uncertain orientation.

The first lateral arm plate is a nearly triangular element abutting the buccal shield and a half-jaw ossicle. There is a small, triangular ventral arm plate between the first pair of lateral arm plates. The second through about the tenth lateral arm plates are paired rhombic structures, between each pair of which there is a shield-shaped ventral arm plate. There appear to be paired tentacle pores near the proximal end of each ventral arm plate. The distally located lateral arm plates are paired quadrangular elements with no intervening ventral arm plates; however, there appears to be a small, single tentacle pore between the distal ends of each pair of plates.

Several of the arms are weathered and show the internally situated vertebra. These are spool-shaped and possess a pair of wings on each end. The proximal wings are directed upward and the distal wings are directed downward such that the proximal wings of one vertebra are located above the distal wings of the vertebra between the next most proximally located pair of lateral arm plates. The paired flanges of the vertebra are articulated with the adjacent pair of lateral arm shields.

TABLE 1. MEASUREMENTS IN MM. OF THE IOWA OPHIUROID SPECIMEN

Diameter of Disk	4.2
Length of Arm greater than	5.4
Width of Arm (Maximum)	1.2

Material studied and Repositories.—The Holotype, 11382H1, is deposited in the invertebrate paleontological collections, Department of Geology, University of Kansas, Lawrence. Hypotype, UNSM-9629, is deposited in the invertebrate paleontological collections of the University of Nebraska, Lincoln.

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