New Occurrences and a New Species of Pennsylvanian Polyplacophorans (Mollusca) in Ohio[1]

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Abstract. Occurrences of polyplacophorans new to Ohio include *Camptochiton squarrosus* Debrock, Hoare, and Mapes in the Desmoinesian Putnam Hill limestone and *Acutichiton allynsmithi* Hoare, Mapes, and Atwater in the shale associated with the Atokan Lower Mercer limestone. These occurrences extend the geographic ranges of these species to Ohio from Texas and Oklahoma respectively and extend the stratigraphic range of *A. allynsmithi* from the Morrowan to the Atokan. *Arcochiton concisus* n. sp. is described from the Atokan Boggs? limestone.

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INTRODUCTION

Pennsylvanian polyplacophorans have been reported from Ohio by Hoare and others (1972), Hoare and Sturgeon (1976, 1979), and Hoare and Mapes (1986). Over 40 Pennsylvanian localities in Ohio are known from which specimens have been found. Most collections have been made by disaggregating shale samples although a few occurrences in weathered limestones and one in a silicified limestone were found. Differences in faunal diversity were discussed in Hoare and Mapes (1986). Associations found in algal limestones and shales have a greater diversity than in carbonaceous shales.

The purpose of this report is to describe the occurrence in Ohio of two species, *Camptochiton squarrosus* Debrock, Hoare, and Mapes (1984) and *Acutichiton allynsmithi* Hoare, Mapes, and Atwater (1983), previously known from Oklahoma and Texas. A new species, *Arcochiton concisus*, is described from Ohio.

MATERIALS AND METHODS

Samples of shale were disaggregated by boiling using a solution of water and Quaternary O. Limestone samples containing silicified specimens were dissolved in a 5% solution of hydrochloric acid. Residues were dried and sieved to separate sample sizes. Samples were then studied under a binocular microscope and specimens were placed on slides. Photography was done with a Leica camera.

SYSTEMATIC PALEONTOLOGY

Specimens have been placed in the repository in the Orton Museum, The Ohio State University (OSU).

Family Camptochitonidae Sirenko, 1997

Genus *Camptochiton* Debrock, Hoare, and Mapes, 1984

Camptochiton squarrosus Debrock, Hoare, and Mapes, 1984

Figure 2.1-2.9

Camptochiton squarrosus Debrock, Hoare, and Mapes, 1984, p. 1120, Figs. 2A, B, 3; Sirenko, 1997, p. 4.

Discussion

Camptochiton squarrous was originally described from the Desmoinesian Lazy Bend Formation in Texas. At the type locality of the species the formation contains an abundance of the crustose, calcareous alga *Archaeolithophyllum* associated with the polyplacophoran fauna. The new Ohio occurrences of *C. squarrosus* were found at two localities (locs. 1, 2) in the Desmoinesian Putnam Hill limestone (Fig. 1) in Tuscarawas County where *Archaeolithophyllum* is abundant. Other polyplacophorans found associated with *C. squarrosus* in Ohio include *Gryphochiton simplex* (Raymond, 1910), *Arcochiton raymondi* Hoare and Sturgeon, 1976, *Acutichiton pyrmidalus* Hoare, Sturgeon, and Hoare, 1972, and *Glaphurochiton carbonarius* (Stevens, 1858) which is a somewhat similar, but less diverse, association than present in the Lazy Bend Formation.

Material

OSU 49757-49764.

Family Acutichitonidae Hoare, Mapes, and Atwater, 1983

Genus *Acutichiton* Hoare, Sturgeon, and Hoare, 1972

Acutichiton allynsmithi Hoare, Mapes, and Atwater, 1983

Figure 2.10-2.19

Acutichiton allynsmithi Hoare, Mapes, and Atwater, 1983, p. 996, Figs. 4A, B, 5.

Discussion

Acutichiton allynsmithi was originally described from the Morrowan Gene Autry Formation in Oklahoma. This species has been found in Ohio in the shale just above the Atokan Lower Mercer limestone in Coshocton County. It is associated with *Acutichiton pyrmidalus*, *Arcochiton raymondi*, *Gryphochiton simplex*, and *Glaphurochiton carbonarius*. This occurrence in Ohio extends the known stratigraphic range of *A. allynsmithi* from the Morrowan into the Atokan Series and the known ranges of the associated species, with the exception of *G. carbonarius*, to Atokan-Desmoinesian in Ohio.

Material

OSU 49765-49770.

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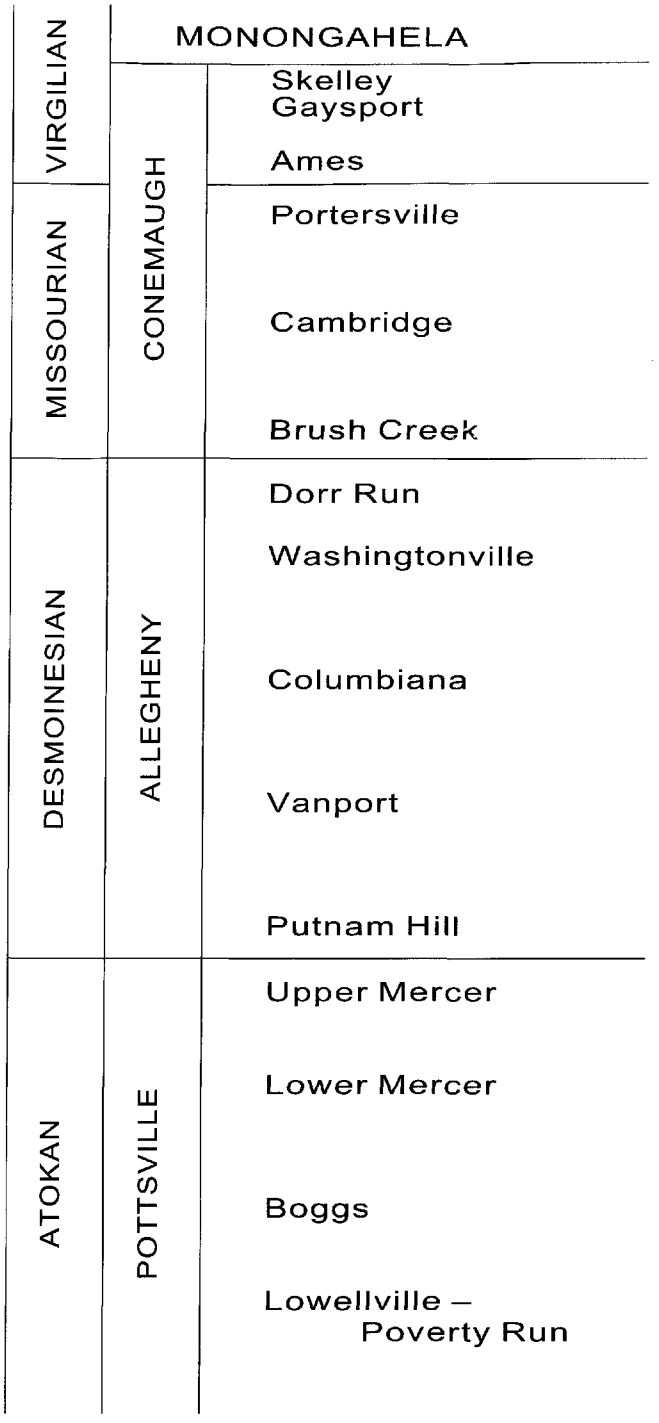

FIGURE 1. Stratigraphic column of the principal marine units in the Pennsylvanian System in Ohio (modified from Hull, 1990).

Genus *Arcochiton* Hoare and Sturgeon, 1976

Arcochiton concisus n. sp.

Figure 2.20-2.28

Arcochiton raymondi Debrock, Hoare, and Mapes, 1984, p. 1134, Fig. 10.

Diagnosis

Strongly arched tail plate with short, narrow, longitudinally ridged hypotyche on ventral surface.

Description

Head plate steeply sloping anteriorly from apex; anterior and lateral margins broadly curved; posterior margin incomplete; apical area not preserved; surface ornamented with small closely-spaced pustules.

Intermediate plates narrow, strongly arched; apex slightly mucronate; posterior margin gently convex before curving sharply into short lateral margins; anterior margin subparallel to posterior margin; jugal area strongly curved laterally, not set off from lateropleural areas; lateral area narrowly triangular in shape with coarse comarginal ridges near lateral margin; apical area on ventral surface short, extending as narrow ridge along posterior margin; sutural laminae wide, relatively short; surface with small, closely-space pustules.

Tail plate arched with strong concavity from anterior margin to mucro located on posterior margin; jugal area narrowly arched laterally, continuing into slightly concave lateral areas; posterior margin more sharply curved than lateral margins; anterior margin nearly straight, curving sharply into lateral margins anterolaterally; hypotyche on ventral surface short medially, continuing as tapered bands along lateral margins to just posterior of anterolateral corners, ridged longitudinally; sutural laminae fairly wide, short; surface with small, closely-spaced pustules.

Measurements

Holotype, tail plate (est.), 4.3 mm long; 5.0 mm wide; 1.5 mm high. Head plate (est.), 1.8 mm long; 4.2 mm wide; 3.0 mm high. Intermediate plate (est.), 1.7 mm long; 2.6 mm wide; 2.1 mm high.

Etymology

Latin, *concisus*, brief, short.

Types

Holotype, OSU 49773; paratypes, OSU 49771, 49772, 49774-49780.

Type Locality

The Boggs? limestone exposed at locality 4.

Discussion

Arcochiton concisus differs from *A. raymondi* Hoare and Sturgeon, 1976, the type species of *Arcochiton*, primarily in the stronger longitudinal concavity of the tail plate and the shorter, narrower hypotyche on the ventral surface of this plate. The silicified preservation of specimens of *A. concisus* is not complete, the margins of most plates are missing, and most plates are broken. The shapes of the head and intermediate plates and the pustulose ornamentation are the same in the two species as far as can be observed.

The limestone at the type locality has been labeled as Boggs in the past (Hoare and Sturgeon, 1985) but investigation has shown it to be younger than the type Boggs of southern Ohio (MC Hansen, Ohio Geological Survey, personal communication, 1966). The unit has not been named as yet, hence the question mark.

Arcochiton raymondi was originally described from the Desmoinesian Vanport limestone in Jackson County. It since has been found in the Putnam Hill limestone in

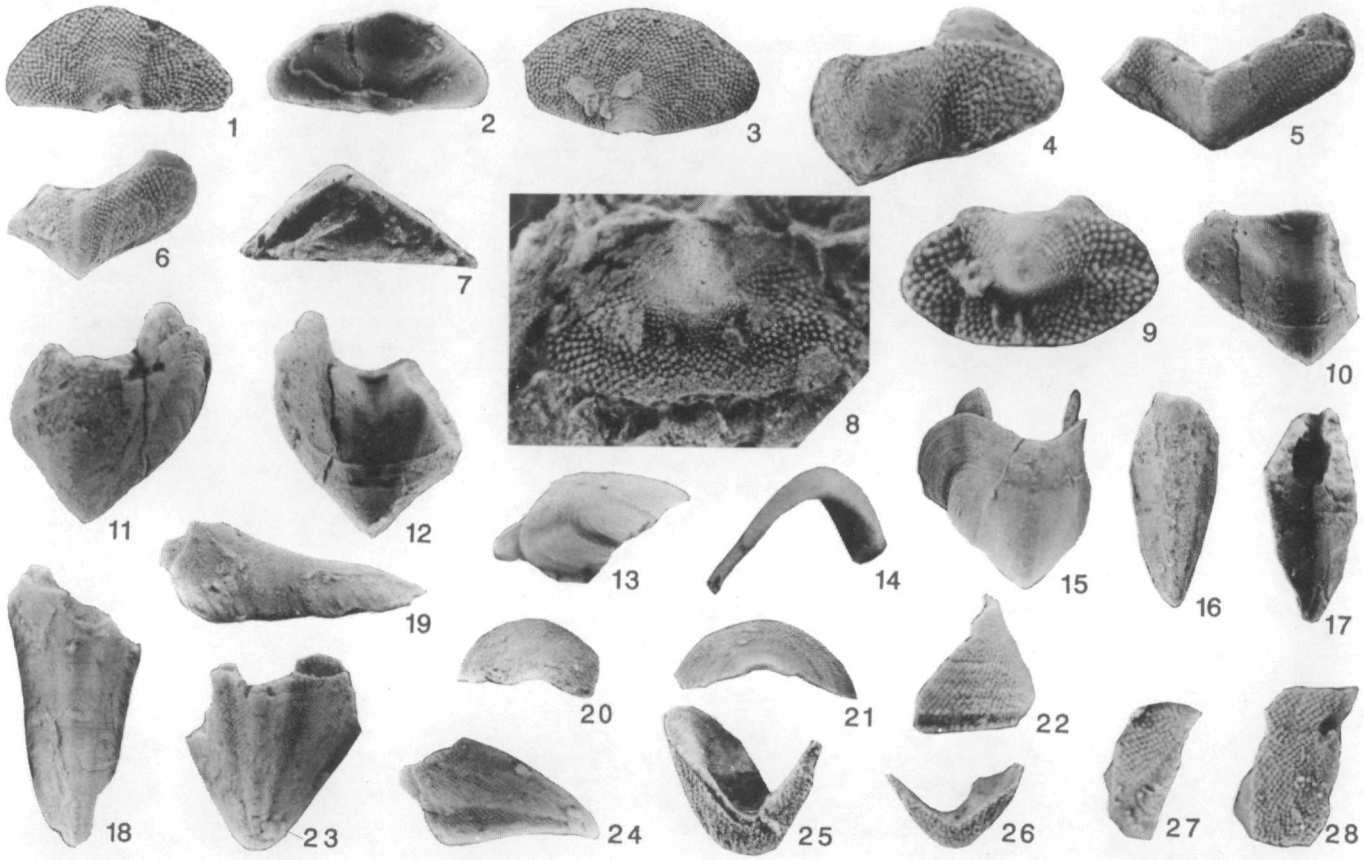

FIGURE 2. 1-9, *Camptochiton squarrosus* Debrock, Hoare, and Mapes from the Putnam Hill limestone. 1, 2, dorsal and ventral views of head plate, OSU 49757, x6; 3, dorsal view of head plate, OSU 49758, x6; 4, dorsal view of intermediate plate, OSU 49759, x6; 5, dorsal view of intermediate plate, OSU 49760, x6; 6, dorsal view of intermediate plate, OSU 49761, x6; 7, posterior view of intermediate plate, OSU 49762, x6; 8, dorsal view of tail plate, OSU 49763, x10; 9, dorsal view of tail plate, OSU 49764, x10. 10-19, *Acutichiton allynsmithi* Hoare, Mapes, and Atwater from the shale associated with the Lower Mercer limestone. 10, ventral view of intermediate plate, OSU 49765, x6; 11, 12, dorsal and ventral views of intermediate plate, 05U 49766, x6; 13, 14, 15, left lateral, posterior, and dorsal views of intermediate plate, OSU 49767, x6; 16, 17, dorsal and ventral views of tail plate, OSU 49769, x6; 18, 19, dorsal and left lateral views of tail plate, OSU 49770. 20-28, *Arcochiton concisus* n. sp. from the Boggs? limestone. 20, dorsal view of head plate, OSU 49771, x10; 21, 22, dorsal and right lateral views of head plate, OSU 49772, x6 and x10, respectively; 23, 24, holotype, dorsal and left lateral views of tail plate, OSU 49773, x6; 25, ventral view of tail plate, OSU 49774, x10; 26, ventral view of tail plate, OSU 49775, x10; 27, left lateral view of intermediate plate, OSU 49776, x10; 28, left lateral view of intermediate plate, OSU 49777, x10.

Tuscarawas County and the shale associated with the Atokan Lower Mercer limestone in Coshocton County. The occurrence of *A. concisus* in the Boggs? limestone and its presence in the Desmoinesian Lazy Bend Formation in Texas extends the geographic and stratigraphic ranges of the species.

SUMMARY OF RESULTS

1. The geographic occurrences of *Camptochiton squarrosus* Debrock, Hoare, and Mapes (1984) and *Acutichiton allynsmithi* Hoare, Mapes, and Atwater (1983) are extended from the Western Interior basin to the Appalachian basin.
2. The stratigraphic range of *Acutichiton allynsmithi* Hoare, Mapes, and Atwater (1983) has been extended from the Morrowan Series up into the Atokan Series.
3. The stratigraphic ranges of *Acutichiton pyrmidalus* Hoare, Sturgeon, and Hoare (1972), *Arcochiton raymondi* Hoare and Sturgeon (1976), *Glaphurochiton simplex* (Raymond, 1910), are extended from the Desmoinesian Series down into the Atokan Series.
4. *Arcochiton concisus* n. sp. is described from the Atokan of Ohio and is also known from the Desmoinesian of Texas.

LOCALITIES

1. Putnam Hill limestone exposed in a small abandoned strip mine on the east side of Interstate 77 south of New Philadelphia, York Twp., Tuscarawas Co., NW 1/4 sec. 17, T8N, R2W, New Philadelphia 7.5' quadrangle.
2. Putnam Hill limestone exposed in high roadcut on south side of US 250 approx. 0.5 km southeast of intersection with Interstate 77 just south of New Philadelphia, York Twp., Tuscarawas Co., E-cent. sec. 2, T8N, R2W, New Philadelphia 7.5' quadrangle.
3. Lower Mercer limestone exposed in high roadcut on the north side of US 36, 2.5 km east of junction with Ohio 93, approx. 3.2 km northeast of West Lafayette, Lafayette Twp., Coshocton Co., NE 1/4 sec. 1, T5N, R4W, Fresno 7.5' quadrangle.
4. Boggs? limestone exposed in roadcut on the east side of Ohio 146 approx. 5.0 km north of Dillon Falls

on the east side of Dillon Lake, just south of road elevation 788, Falls Twp., Muskingum Co., Dresden 7.5' quadrangle.

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