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PENNSYLVANIAN INVERTEBRATES  
OF THE MAZON CREEK AREA, ILLINOIS

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MARINE FAUNA

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FIELDIANA: GEOLOGY

VOLUME 12, NUMBER 3

*Published by*

CHICAGO NATURAL HISTORY MUSEUM

JANUARY 25, 1956

PRINTED IN THE UNITED STATES OF AMERICA  
BY CHICAGO NATURAL HISTORY MUSEUM PRESS



# Marine Fauna

## INTRODUCTION

The occurrence of fossil invertebrates in the Middle Pennsylvanian Francis Creek shale of Will and Grundy counties, Illinois, has been discussed (this volume, no. 1). The fauna is composed almost entirely of land and fresh-water forms, inhabiting a vegetated delta plain during submergence of a coastal plain. There they were associated with the famous Mazon Creek flora. A very few fossils of marine animals are found in the spoil heaps of the strip mines, where the overburden of concretion-bearing Francis Creek shale has been piled, in mining for the underlying Number 2 (Wilmington) coal. Fossils of the plants and terrestrial invertebrates are common in the concretions.

Marine forms known to me include a serpulid worm, an amphineuran, and a pectinoid clam, all described below; a trilobite, which Professor J. Marvin Weller once saw in a private collection but which I have not seen; a few teeth of xenacanth sharks and one fragment of shark cartilage; and one coiled cephalopod. As the cephalopod came to my attention while this paper was in press, I cannot include a description of it here.

The marine fossils described below are excellently preserved; the pelecypod is represented by a fine impression of a single valve, scarcely worn, and the amphineuran is fully articulated. Such preservation indicates deposition under quiet conditions, with little or no transportation after death. This may be taken to indicate that a tongue of the invading sea advanced across the Mazon Creek deltaic plain briefly during Francis Creek time. The stratigraphic relations of the fossils have been obscured by the dumping of the entire thickness of the shale in spoil heaps during the mining, so it is not possible to determine whether the marine invasion occurred early or late in Francis Creek time. Since the marine fossils are very scarce in the fauna as a whole, it was probably a brief invasion, represented by only a thin bed of shale.

† The pelecypod specimen was found slightly south of the east-west road from Coal City to Wilmington (see map, fig. 3, this volume,

no. 1). The worm came from about two miles farther north, at about the point where the Santa Fe Railroad track crosses the Grundy-Will County line. It is probable that the marine tongue covered the entire strip-mining area.

#### SYSTEMATIC DESCRIPTIONS

Phylum ANNELIDA

Class CHAETOPODA

Family SERPULIDAE

**Howellitubus**, new genus

Straight or slightly bowed shell, composed of many layers arranged as cones one within the other, circular or subcircular in cross section; tapering, with increasing flare at apertural end; shell thick apically, thin aperturally.

*Genotype*.—*Howellitubus whitfieldorum*, new species.

*Remarks*.—This genus is apparently very similar to the Cretaceous genus *Longitubus* Howell (Howell, 1943, p. 161), from which, however, it differs in its definitely tapering form. Some specimens of *Longitubus* from the Merchantville clay (Upper Cretaceous of New Jersey) are also distinctly tapering (see fig. 32), but as these specimens are in the form of steinkerns, it is not unlikely that the tapering is caused by thickening of the shell apically, and that the outside of the tube may have been nearly parallel-sided. Two specimens of *Serpula antiqua* Sowerby from the Gault (Lower Cretaceous) of England, CNHM nos. P3312 and P3313, show this condition, as does the specimen of *Howellitubus* described below. The new genus is distinguished from *Serpula* by its nearly straight form.

The genus is named for Professor B. F. Howell, of Princeton University, in recognition of his work on fossil worms and his long encouragement of my work.

**Howellitubus whitfieldorum**, new species

Figure 33

Aside from the characters noted above as being probably of generic value, other characters of the species are: outer surface unornamented, inner surface with fine growth rings. The growth rings are not strictly transverse to the length of the tube, but rise in a low lobe on one side. The spaces between them are occupied by very fine longitudinal striae.

*Holotype*.—Two halves of a concretion, with parts of the shell and the steinkern adhering to each. CNHM no. PE150. Collected in 1953 by Dr. and Mrs. Robert H. Whitfield and Mr. Jon S. Whitfield, and presented by them to the Museum. On or near the Will-Grundy County line, about 2½ miles north of Braidwood, Illinois.



FIG. 32. *Longitubus linearis* Howell,  $\times 1.4$ ; Upper Cretaceous, New Jersey. CNHM no. PE3426.



FIG. 33. *Howellitubus whitfieldorum*, new species, holotype. The specimen on the right, the counterpart of the other, is illuminated from the right.  $\times 1.1$ . CNHM no. PE150.

(Coordinates F2.1, e4.3 on map, fig. 3, this volume, no. 1.) Length, as preserved, 38 mm.; greatest width, 4 mm.; width at narrow end, 2.3 mm.

*Remarks*.—The trivial name is given in recognition of the contribution of the Whitfield family to our knowledge of the Mazon Creek fauna, through their tireless collecting in the strip-mine dumps, and through their generously donating their most significant specimens to the Museum.

Phylum MOLLUSCA

Class AMPHINEURA

Order POLYPLACOPHORA

Suborder EOPLACOPHORA

Dall (1882) has reviewed the fossil genera of chitons; Quenstedt (1932a and b) has discussed some of them. The Paleozoic genera

are not adequately monographed, except for certain ones not relevant to the present discussion that were treated by Bergenhayn about ten years ago. As I am not prepared to revise the diagnoses, I accept the classification used by Dechaseaux (1952) and the descriptions of Salter (1846) and Dall (1882). *Helminthochiton* Salter 1846 appears to be the genus to which the two known Illinois Pennsylvanian chitons should be referred.

### Genus *Helminthochiton* Salter 1846

*Helminthochiton* was based on a Silurian species, *griffithii* Salter, described (Salter, 1846, p. 51) as follows: “. . . elongate; plates as long as wide, subquadrate, thin; apex of anal plate remote from its front edge; sustentacula [sutural laminae] widely separated; shell but very little covered by the mantle (mantle expanded, smooth, thin). Tropical?”

Dall's definition (1882, p. 280), from the manuscript of P. P. Carpenter, is essentially the same, with the addition of a note distinguishing the genus from *Gryphochiton* Dall. Dechaseaux (1952, p. 214), who places *Gryphochiton* in the synonymy of *Helminthochiton*, describes the genus as follows (translated): “Form slender—certain species have a length of 10 to 12 cm. and a width of 2½ cm.—; plates thin, quadrangular; two small sutural laminae.”

Quenstedt (1932a, p. 555), in defining his order Helminthochitonida, includes as a character, “Middle and lateral fields not yet differentiated.” However, in our specimen and in those figured by de Koninck (1844, pl. 23) and Dechaseaux (1952, fig. 3) there is a faint differentiation due to a gentle fold radiating from the beak and not accompanied by a change of ornamentation.

Salter (1846) noted that *H. priscus* (Münster) was common in the Mississippian of Tournay, but as separated plates. Articulated specimens, though rare, are occasionally found in marine sediments.

### *Helminthochiton concinnus*, new species

#### Figures 34–36

This is the second *Helminthochiton* to be reported from the Pennsylvanian of Illinois, the first being *Chiton carbonarius* Stevens (Stevens, 1858, p. 264; Meek and Worthen, 1873, p. 608, pl. 29, fig. 15, *a-h*; Shimer and Shrock, 1944, p. 527, pl. 216, figs. 27–34). The ornamentation is apparently much the same in the two species, though Meek's detail drawing is rather obscure. Stevens' specimens

(of dissociated valves) imply a chiton about twice as large as the single specimen here described.

*Description*.—Shell about  $4\frac{3}{4}$  times as long as wide, omitting the girdle. Anterior valve broadly rounded in front, longer than wide, shortest medially, overlapping the next valve. Anterior and body valves with elevated triangular areas probably overlying small

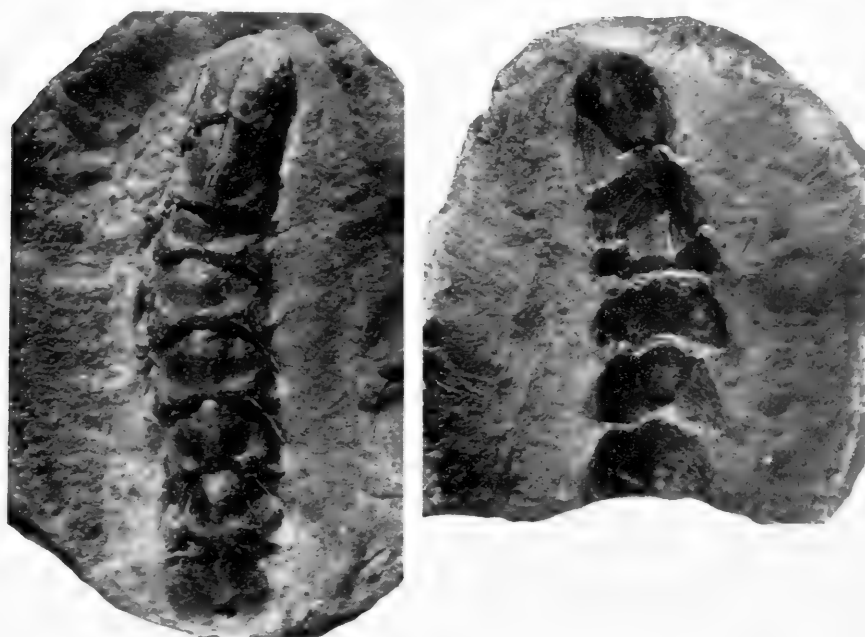


FIG. 34. *Helminthochiton concinnus*, new species, holotype. Left, impression of under side of shell. Right, impression of upper surface of shell. Both  $\times 1.5$ . In collection of Mr. and Mrs. John M. McLuckie.

sutural laminae of the valves behind; the sutural laminae not known. Tail valve about semicircular, with prominent keel terminating behind the center in a blunt mucro. Ornamentation of all valves consisting of concentric rows of fine tubercles and irregular fine concentric growth lines; no differentiation of ornament on lateral areas. Girdle unknown.

*Remarks*.—The size difference between *H. carbonarius* and *H. concinnus* is not, of course, important, as we know nothing about individual growth in these species. The median valves of *carbonarius* are projected dorsally in an acute apex overlapping the next valve; the corresponding parts of the valves of *concinnus* are broken off,

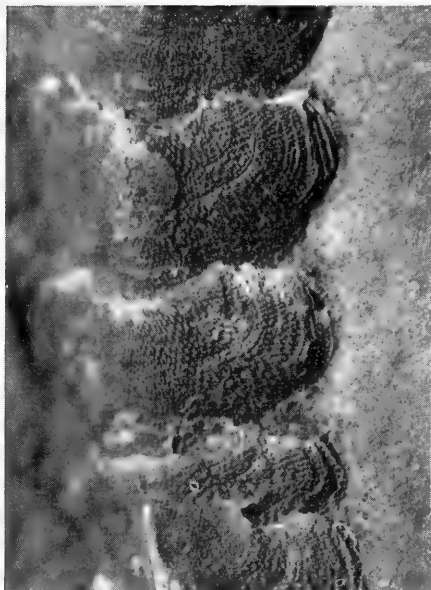


FIG. 35. *Helminthochiton concinnus*, new species, holotype; detail, showing ornamentation;  $\times 3.3$ .



FIG. 36. *Helminthochiton concinnus*, new species, holotype; impression of radula on steinkern;  $\times 4.5$ .

but the position of the apex was probably anterior to the outer edge of each valve, to judge from the position of the folds bounding the lateral fields. The keel of the tail valve of *concinnus* extends farther back and is more bluntly terminated. The head valve of *concinnus* is perhaps slightly narrower.

A groove in the anterior part of the impression of the under side of the shell is taken as representing the radula (fig. 36), the first known occurrence, so far as I am aware, of a radula in a Paleozoic mollusk. Under the microscope, it is seen to consist of parts of eight rows of small conical teeth. The radula is undoubtedly incomplete, so that we cannot say that this *Helminthochiton* had fewer than the seventeen rows of radular teeth typical of modern chitons. The radula is folded lengthwise and measures about 13 mm. in length and about  $1\frac{1}{3}$  mm. in greatest width.

The absence of a girdle in a specimen so well preserved—as in the entire specimens of *H. priscus* from Belgium—is probably

related to the absence in this genus of insertion plates securing the girdle to the valves.

S. S. Berry (1922, pp. 399-400) has remarked: "Chitons are not considered as having much importance as fossils, and, taking the world as a field, surprisingly few fossil species or even specimens have been brought to light and recorded. Yet there are reasons for believing that the members of this group, when they do occur, have an intrinsic value as paleontological criteria rather above that of most groups of Mollusca. At any rate, it is not altogether well to neglect them. . . . Both individually and in associations of species, these animals are remarkably definite in their latitudinal distribution; and . . . this definiteness of geographical area inhabited extends even more sharply to station as well. The bathymetric range of most chitons is curiously narrow."

*Holotype*.—The type and only known specimen is in the personal collection of Mr. and Mrs. John M. McLuckie, in Coal City, Illinois, where it bears the number 3000-1.1. I am indebted to Mr. and Mrs. McLuckie for an extended loan of the specimen. Plaster casts are deposited in the fossil collections of Chicago Natural History Museum and Princeton University. The specimen is 55 mm. in length, measured along the slightly curved axis.

Class PELECYPODA

Order DYSODONTA

Suborder PECTINACEA

*Aviculopecten mazonensis* Worthen

Figure 37

*Aviculopecten mazonensis* Worthen, 1890, Illinois Geol. Surv., 8, p. 117, pl. 22, fig. 9; N. D. Newell, 1937, State Geol. Surv. Kans., 10, p. 56, pl. 4, figs. 19-22.

Both Mr. George Langford and Mr. John McLuckie have informed me that shells of pectinoid clams were formerly common in the small underground mine dumps south of the road from Coal City to Wilmington (see map, fig. 3, this volume, no. 1). The only specimen available to me, however, is an impression of a single right valve in the collection of Mr. and Mrs. John M. McLuckie, in Coal City. It matches the figures and description in Newell's paper (Newell, 1937) and is figured here simply to complete the record of the marine fauna of this deposit.

Newell cites fifteen specimens of this species, apparently from the Mazon Creek locality in Grundy County, but since specimens from the strip-mine dumps are commonly recorded as being from Mazon Creek, it is possible that some or many of those specimens are from the general vicinity of the one here figured.

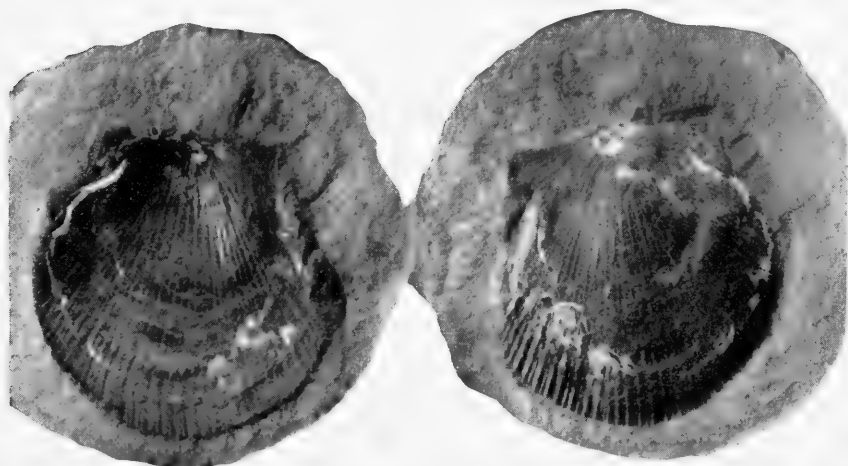


FIG. 37. *Aviculopecten mazonensis* Worthen; two halves of a concretion bearing the impression of a right valve; approximately  $\times 1$ .

The figured specimen is in the McLuckie collection, Coal City. It was found in an underground mine dump at Diamond. (Coordinates F1.0, g6.5, of map, fig. 3, this volume, no. 1.)

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