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A NEW OCCURRENCE OF *SEMITEXTULARIA THOMASI* MILLER AND CARMER, 1933

BY

MURRAY J. COPELAND AND ROBERT V. KESLING

MUSEUM OF PALEONTOLOGY
UNIVERSITY OF MICHIGAN
ANN ARBOR

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A NEW OCCURRENCE OF *SEMITEXTULARIA THOMASI* MILLER AND CARMER, 1933

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INTRODUCTION

THE foraminifer *Semitextularia thomasi* Miller and Carmer, 1933, is here reported for the first time from the Middle Devonian of North America. This species appears to have a widespread geographic distribution, from Czechoslovakia to Iowa, and a long geologic range, at least from Middle to Upper Devonian. It has been described from the Cerro Gordo formation (Upper Devonian) of Iowa (Miller and Carmer, 1933), the Independence formation (Upper Devonian) of Iowa (Cushman and Stainbrook, 1943), and the Čelechovice beds (Middle Devonian) of Czechoslovakia (Pokorný, 1951). The Čelechovice beds are Upper Givetian in age (Pokorný, 1950, p. 581). The Middle Devonian occurrence reported in this paper is from the Wanakah shale member of the Ludlowville formation of the Hamilton Group in western New York. Study of the specimens furnishes additional information on the ontogeny of the species.

We are deeply grateful to Mr. Raymond R. Hibbard of Buffalo, New York, for supplying washed samples of shale from which the specimens were obtained, and to Dr. A. K. Miller of the State University of Iowa for the loan of type material. Photographs on the plate were made with equipment provided by the Horace H. Rackham School of Graduate Studies, University of Michigan. Dr. C. A. Arnold, Dr. G. M. Ehlers, and Dr. L. B. Kellum offered helpful criticism of the manuscript.

The specimens from the Wanakah shale are catalogued and deposited in the Museum of Paleontology, University of Michigan.

LOCALITIES

The specimens described from the Wanakah shale member are from the following localities:

LOCALITY

1. Roadside exposure 2 miles southeast of East Bethany, Genesee County, New York. Upper part of Wanakah shale member. Shale, gray, weathering easily to clay; highly fossiliferous, with microfossils. Samples collected by Raymond R. Hibbard.
2. Abandoned shale pit off Big Tree Road, just east of the railroads at Bay View, Erie County, New York. Lower part of the Wanakah shale member, *Pleurodictyum* bed. Shale, gray, about 4 or 5 feet below the lowest trilobite bed of Grabau (see Grabau, 1899, p. 236).

SYSTEMATIC DESCRIPTION

Phylum PROTOZOA
Class SARCODINA
Order FORAMINIFERA
Family Textulariidae
Subfamily Textulariinae
Genus *Semitextularia* Miller and Carmer

Type Species.—By original designation, *Semitextularia thomasi* Miller and Carmer, 1933, pp. 429–30, Pl. 50, Figs. 10*a–e*.

Semitextularia thomasi Miller and Carmer

(Pl. I, Figs. 1–13)

Semitextularia thomasi Miller and Carmer, 1933, pp. 429–30, Pl. 50, Figs. 10*a–e*.
Semitextularia thomasi Cushman, 1940, p. 109, Pl. 42, Figs. 22*a–c*.
Semitextularia thomasi Cushman and Stainbrook, 1943, p. 77, Pl. 13, Figs. 24–28.
Semitextularia thomasi Cushman, 1948, p. 114, Pl. 43, Figs. 11*a–c*.
Semitextularia thomasi Pokorný, 1951, pp. 19–20, Fig. 15.
Semitextularia thomasi Pokorný, 1954, p. 121, Fig. 92.

Original description.—The following description is quoted in its entirety from Miller and Carmer (1933, pp. 429–30).

Test free, small, being slightly less than 3/5 [three-fifths] mm. in length, about four-fifths as wide as long, and about one-fifth as thick as long. Shape somewhat variable; typically frond-shaped and essentially symmetrical, with more or less serrate margins. However, the adapical portion of some specimens is relatively narrow and in others is more or less curved in the plane of the flattening. Cross section of test lenticular except in last-formed chamber, where it is narrowly elliptical. Longitudinal section somewhat irregular but in general compressed-V-shaped.

The adapical portion of the test is planispiral and the first four chambers, which are subovoid in shape, are coiled about a spherical proloculum, which is thus removed from the base of the test. The planispiral arrangement of these early chambers has been observed only in one of the better preserved specimens with the aid of transmitted light. This internal construction of the adapical portions of the test is very feebly manifested on the exterior. The following five chambers are biserially arranged, and the last six chambers are uniserial. In well-preserved specimens there is a minute spine on the termination of each of the chambers in the uniserial portion of the test.

Sutures slightly depressed, more or less obliterated by the coarser sand grains on the exterior of the test, but distinct in the uniserial portion of most specimens and discernible with difficulty in the adapical portion of well-preserved specimens.

Texture finely arenaceous or agglutinated with two sizes of sand grains. A few relatively large sand grains adhere to the exterior of the test, but otherwise the test is fairly smooth.

Aperture multiple and consists of two groups of five small circular pores arranged alternately in a double row; one group is located in each end of an elongate depression in the top of the last-formed chamber.

Remarks.—(1) Material from the Cerro Gordo formation. Specimens from this formation, which are illustrated by Miller and Carmer (1933, pp. 429–30, Pl. 50, Figs. 10*a–e*), are heavily coated with calcium carbonate and agglutinated material. This encrusting matter obscures the arrangement of the chambers, particularly in those of the apical part of the test. The thick incrustation makes it extremely difficult to interpret the chamber arrangement in the type specimens.

In our examination of the type specimens we found no evidence of the planispiral arrangement of chambers surrounding the proloculus, such as Miller and Carmer (1933, p. 429), Cushman (1940, p. 109; 1948, p. 114), and Cushman and Stainbrook (1943, p. 77) described in these and others from Devonian deposits in Iowa. Because of the encumbering extraneous deposits on the types, we cannot be certain of the arrangement of the chambers. We believe, however, that the apical chamber in each specimen is the proloculus and, therefore, doubt the validity of the statements by Miller and Carmer and Cushman that the early part of the test is planispiral.

By reflected light at a low angle some of the early chambers can be seen in relief. They are biserial. The chambers immediately in contact with the proloculus are so poorly preserved that we cannot determine their outlines or arrangement. Sutures of several (four to six) ovoid to arched, biserial chambers can be distinguished. This series of chambers is in direct contact with the slightly arched, elongate, uniserial chambers which reach to the adapical end of each test. The uniserial chambers are well exposed in all the specimens that were examined.

We also question the reported apertures and their positions. Miller and Carmer (1933, p. 429) described apertures situated in an elongate depres-

sion in the apertural face. Within this groove, they wrote, ten apertural pores are aligned in two rows on the lateral extremities of the ultimate chamber. We examined the specimens dry, immersed in water, and immersed in oil and by reflected light and transmitted light, but we were unable to discern apertures in the type specimens.

(2) Material from the Wanakah shale member. Samples from this shale yielded many, well-preserved specimens. Most of them are partly or completely replaced by pyrite, but some are completely calcareous. The calcareous specimens can be examined both by transmitted and reflected light. Some of the others have pyrite deposited within the individual chambers, so that light is transmitted only through the surrounding calcareous chamber walls (Pl. I, Fig. 11).

The good preservation and lack of external coating on the Wanakah foraminifers aid in revealing that the initial stage is a single proloculus which gives rise directly to a series of semiovate biserial chambers. No planispiral series of chambers intervenes between the proloculus and the biserial stage. The proloculus, in all individuals in which it could be clearly seen, lies at the apical extremity and is in direct contact with the first and second chambers of the biserial stage.

The specimens from the Wanakah shale seem to be dimorphic. (Cushman and Stainbrook (1943, p. 78) pointed out dimorphism in those from the Independence shale of Iowa.) Microspheric individuals have a very small proloculus and megalospheric individuals have a larger proloculus. The proloculus of the megalospheric dimorph is about three times the diameter of that in the microspheric. There is no planispiral arrangement of chambers in either dimorph. The proloculus lies in contact with the initial biserial chamber along one-half to three-quarters of its adapical margin, the remaining adapical surface is adjacent to the second biserial chamber.

From two to six biserial chambers have been observed within the early development of the specimens. Megalospheric individuals possess two to four biserial chambers. The microspheric dimorph has five to six biserial chambers.

The uniserial chambers of the test show marked variability in size, shape, and number. The earlier chambers are consistently shorter and narrower than the succeeding ones, giving the test a frondiculate lateral outline. The number of uniserial chambers varies markedly between the dimorphs. In the uniserial part of the test, megalospheric specimens have from six to ten chambers, whereas the microspheric ones have from five to seven.

The megalospheric specimens are the larger of the dimorphs, reaching .7 mm. in greatest length. The megalospheric tests are frondiculate, triangular, or ovate-triangular, but most microspheric ones are ovate-triangular.

Despite the availability of well-preserved material, the presence and nature of the apertures could not be distinguished. It is assumed that the apertures, if present, are very small, without necks or lips, and are obscured by the agglutinated material of the test. After it had been etched by dilute acetic acid, one specimen did show some indistinct porelike structures on its apertural face. These may be considered to be apertural pores situated at irregular intervals along the length of the ultimate chamber. No evidence of pores through the preceding septa could be observed.

Irregular vertical pillars are present in the biserial and uniserial chambers of most specimens. Some extend across the width of individual chambers. The pillars of one chamber do not appear to align with those of adjacent chambers. In thin sections no parts of these structures could be seen: hence, it is assumed that they do not extend into the interior of the test. The pillars are longer and thicker in the uniserial than in the biserial chambers.

Tests on all specimens obtained from the Wanakah shale are imperforate and composed mostly of calcium carbonate. The agglutinated particles of the test are not conspicuously delineated from the calcareous cement by relief or by color differences.

Systematic position.—The monotypic genus *Semitextularia* Miller and Carmer, 1933, was placed in the subfamily Spiroplectammininae of the family Textulariidae by Miller and Carmer (1933, p. 429). The assignment to this subfamily was based on the reported presence of a planispiral series of chambers surrounding the proloculus of the type species *Semitextularia thomasi* Miller and Carmer. Because, as stated in the preceding paragraphs, such a planispiral series cannot be discerned in the type specimens and is not present in the Wanakah specimens, we assign the genus *Semitextularia* to the subfamily Textulariinae of the family Textulariidae.

Occurrence.—Middle Devonian: Wanakah shale member, Ludlowville formation, Hamilton group, New York; Čelechovice beds (Upper Givetian), Czechoslovakia. Upper Devonian: Cerro Gordo and Independence formations, Iowa.

Types.—Syntypes No. 12018 and specimen No. 12019, State University of Iowa; hypotypes, Nos. 31915—31925, Museum of Paleontology, University of Michigan.

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ADDENDA

I. Another reference has been found to *Semitextularia thomasi,* since this paper was submitted for publication. The species occurs in Upper Devonian rocks, obtained as cores of oil wells drilled in northeastern Alberta. This occurrence is reported on page 192, and *Semitextularia thomasi* is figured in Plate 1, Figures 7 and 8, of the following paper:

LORANGER, D. M. 1954. Ireton Microfossil Zones of Central and Northeastern Alberta. *In* Western Canada Sedimentary Basin, American Assn. Petrol. Geol., pp. 182–203, 2 pls.

II. We have also collected specimens of this foraminifer from washings of Devonian strata at the following localities:

1. Cut of the Delaware, Lackawanna, and Western Railway, about 1½ miles west of East Bethany, Genesee County, N. Y. Centerfield limestone member, Ludlowville formation, Hamilton group, Middle Devonian. Collected by R. V. Kesling in 1953.

2. Field exposures on the north side of Sumner Road, just west of Simons Road, 2 miles northeast of Darien, Genesee County, N. Y. Centerfield limestone member. Collected by R. R. Hibbard in 1952.

3. Roadside exposure, 2 miles southeast of East Bethany, Genesee County, N. Y. Upper part of Wanakah shale member, Ludlowville formation, Hamilton group, Middle Devonian. Collected by R. R. Hibbard in 1952.

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PLATE

EXPLANATION OF PLATE I

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FIGS. 1, 6, 7, 12. Lateral views of megalospheric specimens from the upper Wanakah shale, as seen by transmitted light. Hypotypes Nos. 31915, 31920, 31921, and 31925. Nos. 31915 and 31921, × 84; No. 31925, × 86; No. 31920, × 87.

FIGS. 2, 3, 4, 10. Lateral views of microspheric specimens from the upper Wanakah shale, as seen by transmitted light. Hypotypes Nos. 31916, 31917, 31918, and 31923. Nos. 31917 and 31923, × 85; No. 31916, × 88; No. 31918, × 80.

FIG. 5. Lateral view of megalospheric (?) specimen, with the proloculus broken off, from the upper Wanakah shale, as seen by reflected light. Hypotype No. 31919, × 84.

FIG. 11. Thin section of megalospheric specimen from the upper Wanakah shale, as seen by transmitted light. Hypotype No. 31924, × 86.

FIG. 9. Lateral view of megalospheric specimen from the lower Wanakah shale, as seen by transmitted light. Hypotype No. 31922, × 84.

FIG. 8. Lateral view of syntype from the Cerro Gordo formation. State University of Iowa, No. 12018, × 77.

FIG. 13. Lateral view of specimen from the Cerro Gordo formation. State University of Iowa, No. 12019, × 66.

PLATE I