REPRINT

NOTES ON FOSSILS FROM LIMESTONE OF STEEPROCK LAKE, ONTARIO

BY

CHARLES D. WALCOTT

(Reprint of App. to Memoir No. 28, Geological Survey, Canada.)

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NOTES ON FOSSILS FROM LIMESTONE OF STEEPROCK SERIES, ONTARIO,[1] CANADA.

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Through the courtesy of Dr. Andrew C. Lawson, I have had the opportunity of studying some organic remains occurring in the Steeprock series of Steeprock lake, northwest of Atikokan, on the Canadian Northern railway, west of Port Arthur, Ontario, Canada.[2]

Mr. H. L. Smyth concluded from his studies that the Steeprock series rested unconformably upon a basement complex, and Van Hise and Leith, in their great memoir on the Geology of the Lake Superior Region, have included the Steeprock series of Smyth in the lower Huronian.[3]

The Steeprock Lake region was studied by Dr. Lawson during the season of 1911, who found in the lower limestone above the conglomerate of the Steeprock series the remains of fossils described in these notes; and from his field observations placed the Steeprock series above an erosion interval beneath which occurs the Keewatin of the Archæan.

After a preliminary study of the material, I was inclined to the view that the remains indicated the presence of the *Archæocyathinæ*[4] of the lower Cambrian; but after making thin sections and treating the silicified specimens with acid, I decided that they

[1] Presented to the Geological Society of America, December 28, 1911, by permission of the Director of the Geological Survey, Canada.

[2] Structural Geology of Steeprock lake, Ontario, by Henry Lloyd Smyth. American Jour. Sci., Vol. XLII, 1891, pp. 317-331, Pl. XI.

[3] The Geology of the Lake Superior Region. Monogr. U.S. Geol. Surv., Vol. 52, 1911, p. 148.

[4] For definition of this family and review of the Archæocyathinæ, consult memoir by Wm. T. Griffith Taylor, "Archæocyathinæ from the Cambrian of South Australia." Mem. Royal Soc. South Australia, Vol. 2, Pl. 2, 1910.

It is unfortunate that in this otherwise very full memoir there is no reference to the genera and species noted and illustrated in the Tenth Annual Report of the U. S. Geol. Surv., 1891, pp. 599-602, Pls. 50-55.

represented a group of organisms related to the sponges, or possibly to forms possessing characters of both the sponges and *Archæocyathinæ*.

The central cavity, radiating tubes, and general form of *Atikokania lawsoni* (Pl. 1, figs. 1-5), recall at once the lower Cambrian genus *Syringocnema* of Taylor.[1] In each there is a cylindrical inner cavity, an outer and inner wall with radiating tubes connecting them; the tube walls are perforate in *Syringocnema*, and they appear to be so in *Atikokania*. The presence of irregular septa in *Atikokania* serves to distinguish the genus from *Syringocnema*, and to cause a comparison to be made with irregularly septate genera of the *Archæocyathinæ*, such as *Pycnoidocyathus* Taylor (Pl. XII, fig. 68), and *Sprirocyathus irregularis* Taylor (Pl. XVI, figs. 93 and 94).[2]

A second and possibly a third species of *Atikokania* is associated with *A. lawsoni*.

If the interpretation of the stratigraphic position of these interesting fossils is correct they are probably older than the Pre-Cambrian *Beltina* fauna of Montana[3] and quite unlike it; with the possible exception of a fragment (Pl. II, fig. 3) that suggests *Crytozoan ? occidentale*.[4] The genus *Atikokania* has more of a Cambrian aspect than we should expect to find in a very ancient Pre-Cambrian fauna. The *Archæocyathinæ* are of late lower Cambrian age, and if the stratigraphic position were not well determined I should be inclined to consider *Atikokania* as a lower Cambrian genus.

DESCRIPTION OF FOSSILS.

Genus Atikokania, *new genus.*

General form cylindrical, pear-shaped or somewhat irregularly elongated, semi-globose. Central cavity more or less cylindrical and of varied form and proportions.

Walls.—The outer and inner walls are more or less well-defined, and they are united by a series of small, more or less hexagonal

[1] Loc. cit., p. 153, Pl. 14.
[2] Loc. cit. Footnotes 1, preceding page, and 1, above.
[3] Pre-Cambrian Fossiliferous Formations, Walcott. Bull. Geol. Soc America. Vol. 10, 1899, pp. 235-239.
[4] Loc. cit., p. 233. Pl. XXIII, figs. 1-4.

tubes that radiate outward and upward at varying angles. The walls of the radial tubes are perforate, and divided by more or less irregular incomplete septa.

Growth.—The mode of growth appears to have been essentially the same as that of *Archæocyathinæ*, where individuals press against each other that appear to have united at the point of contact by a more or less confused compact growth.

Affinities.—For the present and awaiting larger collections and possibly much better material, a relation may be assumed with the *Porifera* on the one hand and the *Archæocyathinæ* on the other, with a strong tendency towards the first.

Observations.—There are two species now referred to the genus: *A. lawsoni*, n. sp., and *A. irregularis*, n. sp. One or two other species are indicated, but the material is not sufficiently complete for specific description.

Genotype.—*Atikokania lawsoni*, n. sp.

Atikokania lawsoni, n. sp.

(Pl. I, figs. 1-5; Pl. II, fig. 2.)

The general form of this species is elongate conical or cylindrical as far as can be determined from several fragmentary specimens. Central cylindrical cavity relatively small and expanding towards the upper outer portion of the central cavity.

Walls.—The outer and inner walls are fairly well defined, but owing to the condition of preservation none of their details of structure are preserved.

Tubes.—The walls of the tubes are pressed one against the other so as to form a practically solid mass of tubes that have a more or less hexagonal outline. The tubes are so arranged in the cylindrical specimens that they radiate like the spokes of a wheel from the inner to the outer walls and increase in number by interpolation of additional tubes. In one vertical section (fig. 1, Pl. I) the tubes rise from the inner wall with a slope of about 10°–15°. In other sections the slope is greater. The tubes vary in size from a sharp elongate point where they start between other tubes to 2 mm. in diameter at their outer end.

Septa.—Incomplete, irregular septa occur in the tubes at irregular distances.

Pores.—Pores appear in the walls between the tubes, but none have been seen in either the inner or outer wall.

Exothecal Growth.—The presence of exothecal tissue somewhat similar to that so common in *Archæocyathus* is suggested by some specimens, but it is not sufficiently clear to warrant giving it as a character of the genus or species.

Growth.—The mode of growth appears to have been individual, although, as illustrated by fig. 5, Pl. I, two central cavities appear in what would otherwise have been considered an individual. The radial tubes are more or less confused where those that radiate from the two cavities come in contact. My present impression is that the two grew side by side, with only a very slight distance between them, when small; as they grew, the central cavities were crowded farther apart.

Formation and Locality.—Limestone of Steeprock series, Steeprock lake, west-northwest of Lake Superior, Ontario, Canada.

Atikokania irregularis, n. sp.

(Pl. II, Fig. 1.)

The specimen representing this species is a weathered, oblique section, 6·5 cm. in height and 11 cm. in width. The radiating tubes are more irregular and smaller than those of *A. lawsoni*, and the general appearance of the specimen is more like that of a portion of a large semi-globular sponge.

A second fragment that may be referred to this species indicates that the central cavity was very small.

This species is associated in the same limestone with *A. lawsoni*.

DESCRIPTION OF PLATE I.

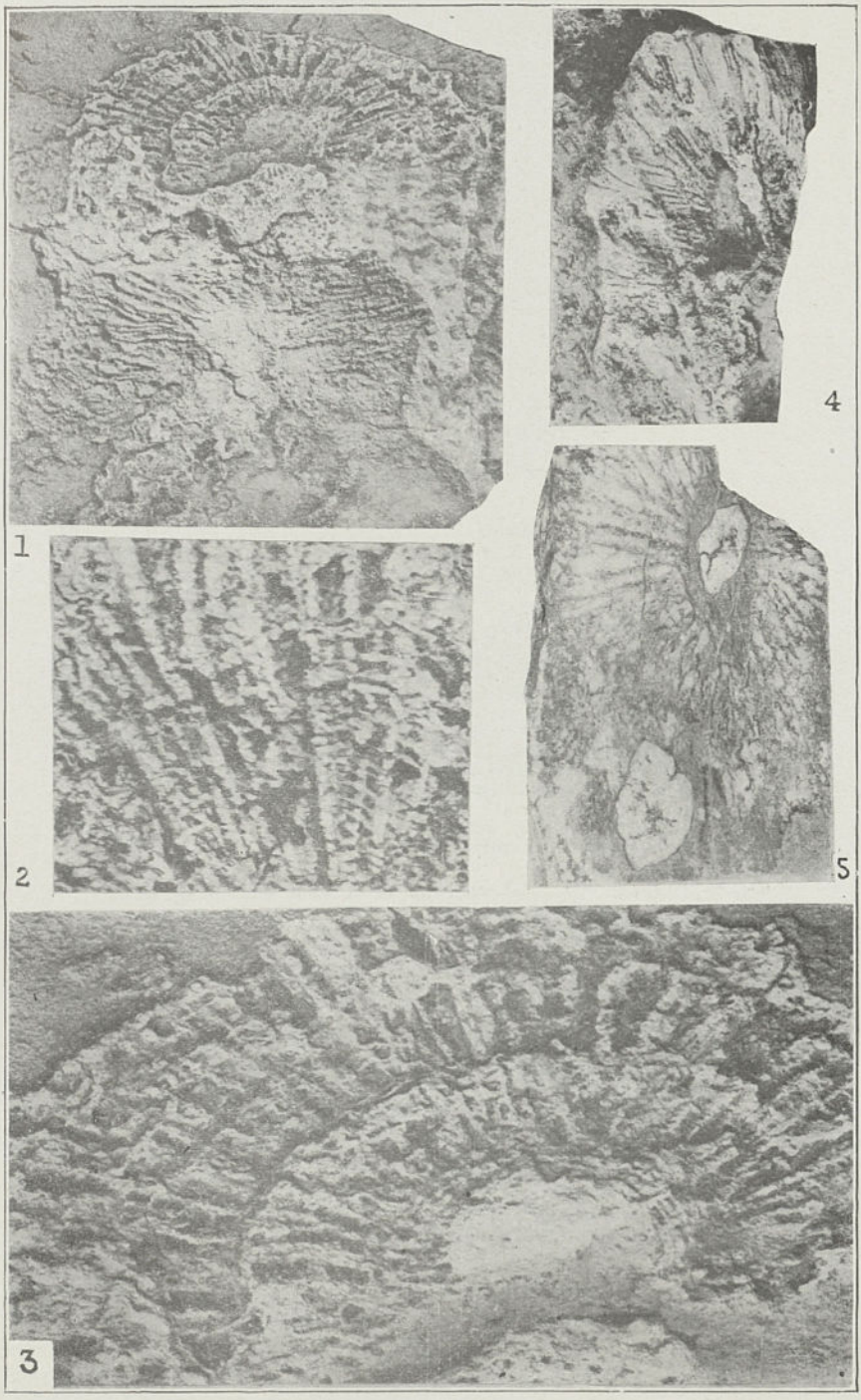
Fig. 1.—Natural size. A naturally weathered cylinder or pipe that is silicified in its limestone matrix. This shows quite clearly the central cavity at the summit, also where it is cut across below by the erosion of the specimen. U.S. National Museum, Catalogue No. 58313. Geological Survey, Canada, Catalogue No. 8059*a*.

" 2.—Enlargement × 6, of a portion of the weathered section in Fig. 1, which shows the walls of the tubes with pores at *a*, also somewhat irregular septa crossing the tubes.

" 3.—Enlargement × 3, of the upper surface of Fig. 1.

" 4.—Natural size. A weathered specimen where erosion has worn down into the central cavity. U.S. National Museum, Catalogue No. 58314. Geological Survey, Canada, Catalogue No. 8059*b*.

" 5.—Natural size. An oblique transverse section, cutting across the central cavities of two individuals that occur side by side. U.S. National Museum, Catalogue No. 58315. Geological Survey, Canada, Catalogue No. 8059*c*.



Figs. 1–5. ATIKOKANIA LAWSONI Walcott.

DESCRIPTION OF PLATE II.

PAGE.

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Fig. 1.—Natural size. A weathered section, showing irregular tubes radiating from what was probably a portion of the central cavity. U.S. National Museum, Catalogue No. 58317. Geological Survey, Canada, Catalogue No. 8059*d*.

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Fig. 2.—Natural size. Polished section of a piece of limestone where the radiating tubes are cut across at different angles. The sections of the tubes on the right half are nearly at right angles to the tubes, while those on the left are more or less oblique. All of the sections of the tubes appear to have been more or less disturbed by the compression of the limestone in which they are embedded. U.S. National Museum, Catalogue No. 58316. Geological Survey, Canada, Catalogue No. 8059*e*.

CRYPTOZOA ? sp. undt..... 11

Fig. 3.—Natural size. Photograph of a thin section of what may be a form allied to the Pre-Cambrian Cryptozoan of the Grand Canyon section of Arizona. U.S. National Museum, Catalogue No. 58318. Geological Survey, Canada, Catalogue No. 8059*f*.

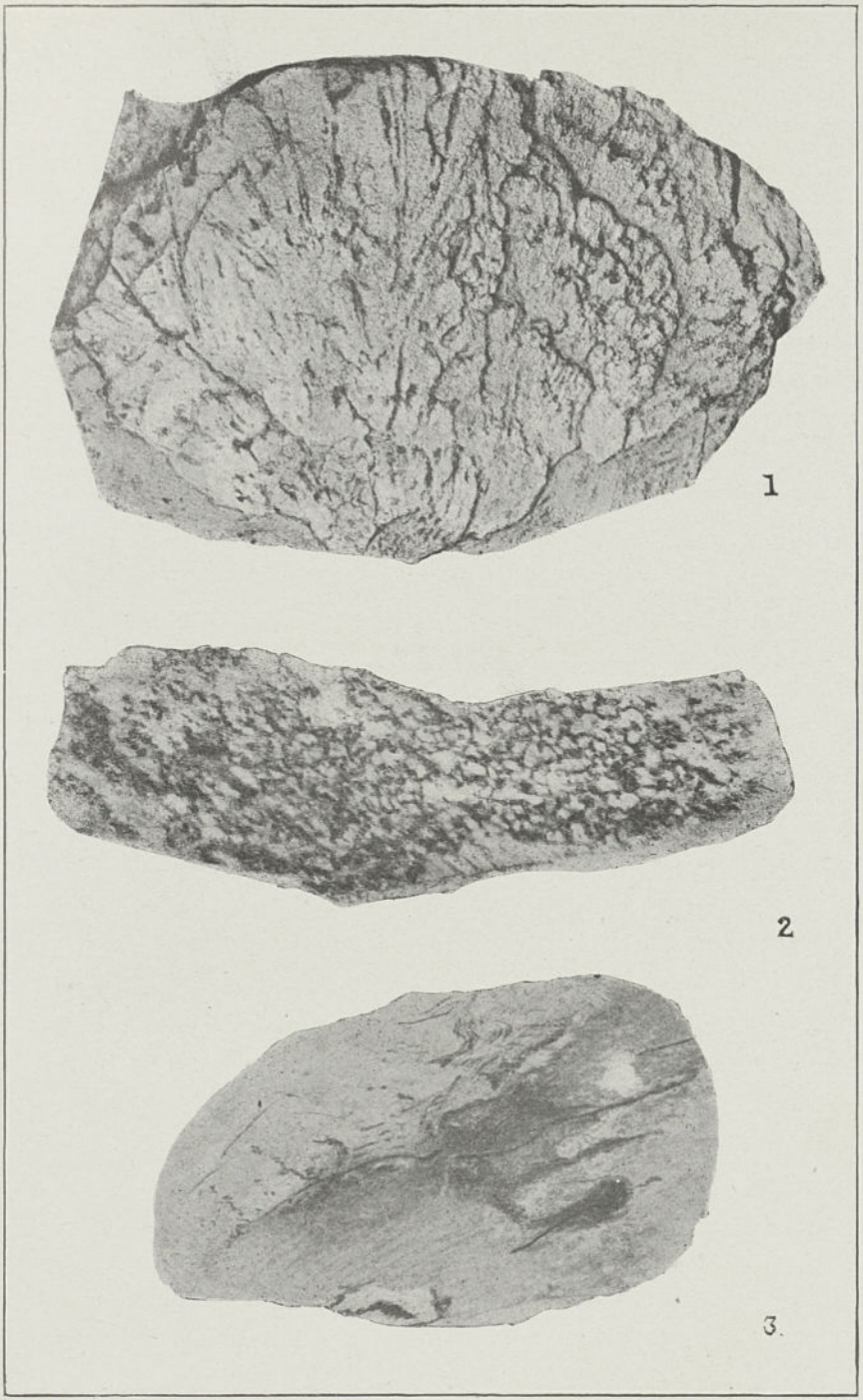

Fig. 1. ATIKOKANIA IRREGULARIS Walcott.
" 2. " LAWSONI Walcott.
" 3. CRYPTOZOAN ?? sp. undt.