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PALEONTOLOGY.—*Generic descriptions of Upper Paleozoic Bryozoa.*[1] R. S. Bassler, U. S. National Museum.

This is the first of several short contributions in which the writer proposes to describe and illustrate the genotypes of some new or imperfectly known genera of fossil Bryozoa. In the author's *Index and bibliography of genera and genotypes of Bryozoa,* comprising Part 67 of the *Fossilium catalogus* published by W. Junk at The Hague, 1934, the systematic position of the described genera was suggested. Since then special efforts have been made to study either the types or typical specimens, with the result that in many cases illustrations of their internal structure can now be offered.

The death of Dr. George H. Girty in 1939 precluded further work on the many invertebrates he had described without illustration in his article *New genera and species of Carboniferous fossils from the Fayetteville shale of Arkansas,*[2] wherein descriptions only of eight new bryozoan genera of Trepostomata and Cryptostomata from this Mississippian formation were given. Short diagnoses of these genera and notes upon *Stenopora* Lonsdale and *Nemataxis* Hall, genera of earlier date, with illustrations of their internal structure, form the subject of the present paper. The type specimens of Dr. Girty's Fayetteville shale Bryozoa are missing, but the thin sections of the genotypes studied by him are still available. Thus further work on the various species is still necessary, but the sections will serve for the illustration of the generic characteristics. Furthermore, Dr. Girty's descriptions are so very detailed that for present purposes short diagnoses emphasizing the essential generic characteristics in addition to the illustrations are sufficient.

Order TREPOSTOMATA (family BATOSTOMELLIDAE Ulrich, 1890)

Genus **Stenopora** Lonsdale, 1844[3]

The recent discovery of a well-preserved example of the genotype in the national collections has permitted the illustration of the true internal char-

[1] Published by permission of the Secretary of the Smithsonian Institution. Received February 20, 1941.
[2] Ann. New York Acad. Sci. 20(no. 3, pt. 2): 189–238. Oct. 1910 (1911).
[3] Lonsdale in Darwin's *Volcanic islands,* appendix, p. 161. 1844.

acters of this genus, namely, the presence of strongly beaded zooecial walls and of a large and a small set of acanthopores, the lack of mesopores, and the practical absence of diaphragms of any nature. Formerly *Stenopora* was held for species with perforated diaphragms. Then with Lee's work in 1912,[4] the genus was restricted to ramose forms with complete diaphragms, and *Tabulipora* Young, 1883, was recognized for the species with perforated ones. In 1929, the present author, misled by the original illustrations and descriptions of *Stenopora* and by the prevailing opinion of authors, proposed the genus *Ulrichotrypa* for ramose species in which diaphragms were absent. Now, as shown here in figs. 5, 6, the internal structure of *S. tasmaniensis* is the same as that described for *Ulrichotrypa*, thus reducing the latter to synonymy.

Genotype: *S. tasmaniensis* Lonsdale, 1844. Permian of Tasmania. (Figs. 5, 6.)

Genus **Amphiporella** Girty, 1911 (*op. cit.*, p. 199)

Zoarium of large tortuous solid flat fronds in which the zooecia proceed in opposite directions from a middle plain but not from a median plate as in typical bifoliate species. Zooecial structure with strongly moniliform (beaded) walls as in typical *Stenopora* but differing in the occurrence of perforated diaphragms and numerous mesopores. In tangential sections acanthopores of medium size are seen at the junction of the walls and a connecting row of granules occurs along the line of zooecial contact. The frondose growth and mesopores alone distinguish *Amphiporella* from *Tabulipora*, features perhaps of no generic importance.

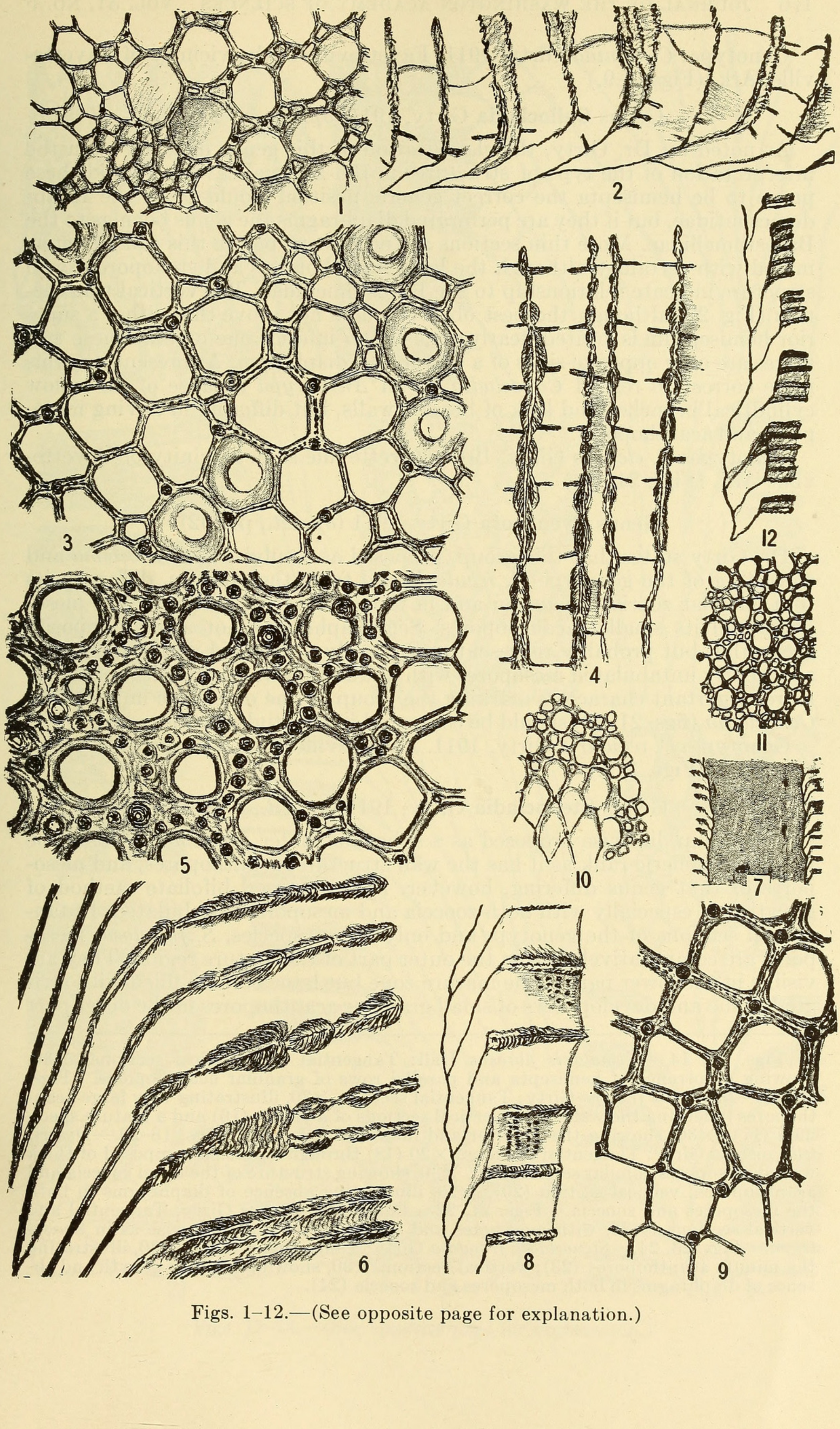
Genotype: *A. maculosa* Girty, 1911. Fayetteville shale, vicinity of Fayetteville, Ark. (Figs. 3, 4.)

Genus **Coeloclemis** Girty, 1911 (*op. cit.*, p. 201)

Described as a new subgenus under probably *Anisotrypa* although the genus is not mentioned, thin sections of the genotype, *C. tumida*, indicate a zoarium of hollow epithecated stems formed by a single layer of zooecia, with internal zooecial structure similar to *Anisotrypa* except that well-developed acanthopores occur and diaphragms of all kinds are absent. Vertical sections show a very short immature region with the tubes bending abruptly outward into an equally short mature zone, a structure so similar to certain Cryptostomata that it is possible that future discoveries may show that the genus is incorrectly placed in the Batostomellidae. At present, however, *Coeloclemis* is considered the same as *Anisotrypa* save that clearly outlined acanthopores occur usually at the zooecial junctions and the walls in tangential sections show a single or double row of small granules.

[4] Lee, G. W., Mem. Geol. Surv. Great Britain, Paleontology, **1**(pt. 3): 135–195, pls. 14–16. 1912.

Figs. 1, 2.—*Pycnopora regularis* Girty: Tangential and vertical sections, ×30, illustrating the untabulated mesopores and perforated diaphragms. Figs. 3, 4.—*Amphiporella maculosa* Girty: Tangential and vertical sections, ×30, showing acanthopores, beaded walls, perforated diaphragms, and numerous mesopores. Figs. 5, 6.—*Stenopora tasmaniensis* Lonsdale: Tangential and vertical sections, ×30, showing beaded walls, absence of diaphragms, and occurrence of two sets of acanthopores are shown. Figs. 7–9.—*Coeloclemis tumida* Girty: Vertical section, ×4½, and part of the same ×30 (7, 8), and tangential section, ×30 (9) exhibiting characters as in *Anisotrypa* save that acanthopores are developed and diaphragms are wanting. Figs. 10–12.—*Syringoclemis biserialis* Girty. Tangential sections (10, 11) the first near the base of mature region illustrating cryptostomatous shape of mature zooecium, and the second in the most mature portion, ×20, with vertical section, ×20 (12) showing absence of hemisepta and diaphragms.



Figs. 1–12.—(See opposite page for explanation.)

Genotype: *C. tumida* Girty, 1911. Fayetteville shale, vicinity of Fayetteville, Ark. (Figs. 7–9.)

Genus **Callocladia** Girty, 1911 (*op. cit.*, p. 212)

As noted by Dr. Girty, the classification of this genus depends upon the interpretation of the type of structures in the zooecial cavity. Should these prove to be hemisepta the correct generic position would be in the Rhabdomesontidae, but if they are perforated diaphragms the genus belongs to the Batostomellidae. More thin sections are necesssary before this can be determined with certainty although the large acanthopores and stenoporoid wall structure indicate relationship to the Batostomellidae. The vertical thin section (Fig. 22) although the best observed does not prove that either a superior hemiseptum is located nearly opposite an inferior one or that these two plates are only opposite sides of a perforated diaphragm. At present it seems more correct to regard *Callocladia* as an *Anisotrypa* because of its hollow cylindrical branches and lack of beaded walls, but differing in having mesopores and acanthopores.

Genotype: *C. elegans* Girty, 1911. Fayetteville shale, vicinity of Fayetteville, Ark. (Figs. 21, 22.)

Genus **Pycnopora** Girty, 1911 (*op. cit.*, p. 202)

Dr. Girty states that this group, proposed as a subgenus of *Lioclema* and consisting of the genotype *P. regularis* and two other species, differs in its thin lamellar zoarial expansion and in its greatly reduced number of mesopores and its smaller acanthopores. Semidiaphragms not always opposite each other but probably representing centrally perforated diaphragms, and apparently untabulated mesopores with undulating walls, are additional and more important characters marking the group as one of generic importance. *Callocladia* (figs. 21, 22) should be compared in the study of this genus.

Genotype: *P. regularis* Girty, 1911. Fayetteville shale, vicinity of Fayetteville, Ark. (Figs. 1, 2.)

Genus **Stenocladia** Girty, 1911 (*op. cit.*, p. 204)

This group, likewise proposed as a subgenus under *Lioclema*, seems to be worthy of generic rank as it has the wall structure, acanthopores, and mesopores of that genus differing, however, in a supposed bifoliate method of growth and especially with both zooecia and mesopores untabulated. In tangential sections of the genotype and only known species, *S. frondosa*, mesopores are comparatively few in the outer part of the mature region. They are visible in the lower part of the mature zone but later become filled with striated tissue and develop rows of small granular acanthopores in the outer part

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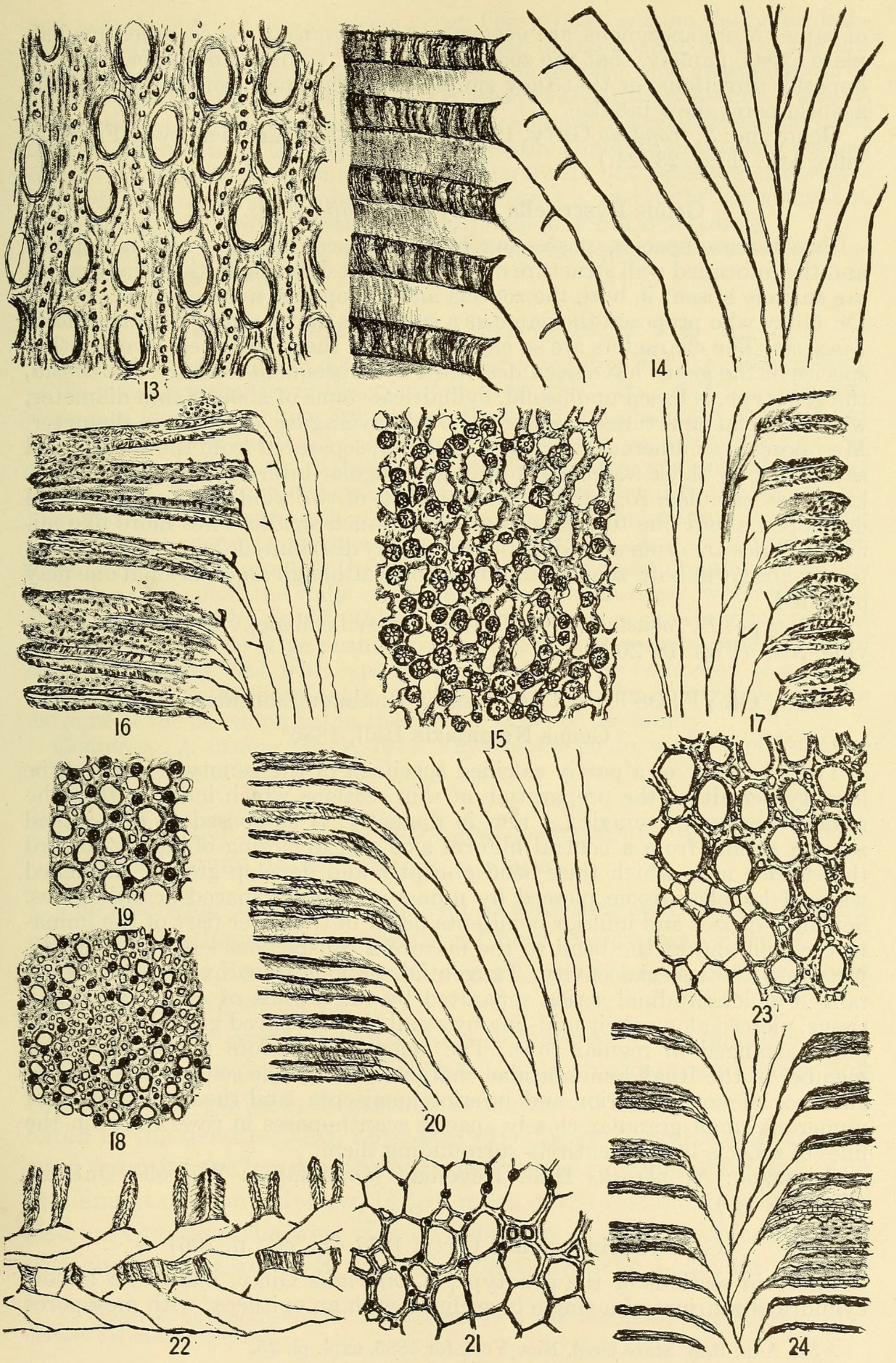
Figs. 13, 14.—*Nemataxis fibrosus* Hall: Tangential and vertical sections, ×30, showing occurrence of hemisepta and parallel rows of granular acanthopores. Figs. 15–17.—*Idioclema insigne* Girty: Tangential section, ×30, illustrating very large acanthopores indenting the walls (15); vertical sections of a young (16) and a mature specimen (17), ×30, showing the superior and inferior hemisepta. Figs. 18–20.—*Dyscritella robusta* Girty: Tangential sections, ×20 (18) through a macula composed of thick walled mesopores; similar section (19), ×30, showing structure of the usual zooecia and acanthopores; vertical section (20), ×20, illustrating absence of diaphragms in both the mesopores and zooecia. Figs. 21, 22.—*Callocladia elegans* Girty: Tangential and vertical sections, ×20, with mesopores and acanthopores but otherwise as in *Anisotrypa*. Figs. 23, 24.—*Stenocladia frondosa* Girty: Tangential section, ×30, illustrating the minute acanthopores (23); vertical section, ×30, showing bifoliate growth and absence of diaphragms in both mesopores and zooecia (24).



Figs. 13–24.—(See opposite page for explanation.)

of same. More specimens are necessary to prove that the so-called median plate exists, namely, that the zooecia arise back to back and proceed out in opposite directions, or that they simply form flattened fronds. Some of the acanthopores show tabulae.

Genotype: *S. frondosa* Girty, 1911. Fayetteville shale, vicinity of Fayetteville, Ark. (Figs. 23, 24.)

Genus **Dyscritella** Girty, 1911 (*op. cit.*, p. 193)

Two ramose species, possessing numerous acanthopores and mesopores and the unbeaded wall structure of *Lioclema* but differing in that diaphragms are entirely absent in both the zooecia and mesopores, were assigned here by Dr. Girty who proposed the name as a subgenus under either *Batostomella* or *Lioclema*. The characters are so clearly marked that since then several other species of the genus have been described by subsequent authors. *D. robusta*, the genotype, is based upon solid, cylindrical stems of about 8 mm diameter, with zooecial apertures circular to oval, averaging 0.1 mm in diameter. Mesopores are numerous, circular to angular, separated from the zooecia and each other by thick walls, and forming at regular intervals the aggregations known as maculae. Acanthopores abundant, of two kinds, one set large and developed about one to a zooecium, while much smaller ones more like minute tubules are often abundant but unequally distributed. Diaphragms practically absent in both zooecia and mesopores although an occasional one may be noted.

Genotype: *D. robusta* Girty, 1911. Fayetteville shale, vicinity of Fayetteville, Ark. (Figs. 18–20.)

Order CRYPTOSTOMATA (family Rhabdomesontidae Vine, 1883)

Genus **Nemataxis** Hall, 1886[5]

The discovery of a partly calcified specimen of the genotype at the type locality permitted the preparation of thin sections which indicate that the ramose zoarium, averaging 4 mm in diameter, is composed of thin-walled zooecia arising from a central filiform axis and diverging obliquely toward the surface near which they bend abruptly and develop greatly thickened walls of lamellar tissue pierced by numerous closely spaced acanthopores. Several superior and inferior hemisepta occur in the outer part of the immature region and at the bend to the mature a conspicuous superior one projects into the zooecial cavity. Tangential sections show oval apertures arranged in longitudinal series, separated by thick walls of dense laminated tissue, pierced along their mid-line by small closely spaced granular acanthopores arranged in regular rows. The genus is therefore a well-developed member of the Rhabdomesontidae characterized by the central axis, the occurrence of both superior and inferior hemisepta, and the development of numerous small granular closely spaced acanthopores in rows between the lines of zooecia but not entirely surrounding them.

Genotype: *N. fibrosus* Hall. Devonian (Onondaga): Walpole, Ontario. (Figs. 13, 14.)

Genus **Syringoclemis** Girty, 1911 (*op. cit.*, p. 206)

The thin sections of the genotype, *S. biserialis* Girty, indicate a hollow cylindrical zoarium of a single layer lined with an epitheca, with mesopores

[5] 5th Ann. Rep. State Geol. New York for 1885, expl. pl. 25.

and acanthopores of the *Lioclema* type. The vertical section, however, indicates relationships to the Rhabdomesontidae in the boxlike form of the immature region and the sudden bending to the mature zone characteristic of the Cryptostomata. Diaphragms and hemisepta are entirely absent. Tangential sections (Fig. 10) also indicate that the younger zooecial stages have the form characteristic of the Cryptostomata, so the reference to this order seems correct. *Callocladia* has a similar internal structure but possesses either perforated diaphragms or hemisepta. *Syringoclemis* is an interesting genus but more information from the study of additional material is necessary.

Genotype: *S. biserialis* Girty, 1911. Fayetteville shale, vicinity of Fayetteville, Ark. (Figs. 10–12.)

Genus **Idioclema** Girty, 1911 (*op. cit.*, p. 210)

This genus described in detail by Dr. Girty requires only the illustrations of the internal structure of the genotype to complete its definition. The zoarium is of freely branching cylindrical stems of 3 mm diameter, composed of zooecia possessing the family characteristics, namely, occurrence of superior and inferior hemisepta, of large and small acanthopores and absence of diaphragms. The superior hemiseptum occurs at the bend to the mature region and the inferior one below this in the thin-walled immature region. The acanthopores represent the two extremes of growth in these structures as the large ones increase often to the size of an ordinary zooecium and are so numerous as to indent the walls and hide the zooecial outlines, while the small set is represented by minute tubular-like structures perforating the general lamellar tissue. The large acanthopores of the usual cone-in-cone structure show the central tube with especial clearness and are composed of lamellar tissue pierced by dark granular tubules. Altogether the genus represents the extreme of the development in the simpler types of the family.

Genotype: *I. insigne* Girty, 1911. Fayetteville shale, vicinity of Fayetteville, Ark. (Figs. 15–17.)

PALEONTOLOGY.—*New Devonian stratigraphic units.*[1] G. Arthur Cooper, U. S. National Museum.

The following names are proposed so that they will be available for use on the forthcoming "Correlation Chart of Devonian Formations" of the National Research Council. Two names are new, but the others replace preoccupied terms.

Stony Hollow member of Marcellus formation: A conspicuous layer of sandstone ranging from 75 to 100 feet in thickness and consisting chiefly of fine-grained, calcareous sandstone. The type section is located at the bend of New York State Highway 28 and along the railroad opposite the bend at the entrance to the valley leading up to the settlement of Stony Hollow, 1¾ to 2 miles northwest of the bridge over Esopus Creek on the west side of Kingston, N. Y. This member was first encountered on U. S. Highway 209 near Echo Lake, Pa., and on

[1] Published by permission of the Secretary of the Smithsonian Institution. Received February 21, 1941.