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Royal Ontario Museum 111

Redescription of Type Specimens of Species of the Bryozoan Genera *Atactoporella, Homotrypa,* and *Homotrypella,* from the Upper Ordovician Rocks of the Credit River Valley, Ontario, Canada

Madeleine A. Fritz

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   1965 Hibernation. In Mayer, W.V. and R.G. Van Gelder, eds. Physiological Mammalogy. Vol. 2 — New York, Academic Press, pp. 180–278.

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Redescription of Type Specimens of Species of the Bryozoan Genera *Atactoporella, Homotrypa,* and *Homotrypella,* from the Upper Ordovician Rocks of the Credit River Valley, Ontario, Canada

Abstract

Bryozoan species from the Upper Ordovician Georgian Bay (Meaford) Formation (*Atactoporella densa* Dyer, *Atactoporella peculiaris* (Dyer), *Homotrypa creditensis* (Dyer), *Homotrypa streetsvillensis,* and *Homotrypella hospitalis* Nicholson) are redescribed using the following criteria: number of zooecia in 2 mm in intermacular area, number of entire mesopores in 1 mm^2 in intermonticular area, maximal apertural diameter of zooecia in maculae, and maximum apertural diameter of zooecia in the intermacular area.

Introduction

This is the sixth publication of a series devoted to the redescription of trepostomatous bryozoan types from the Upper Ordovician rocks of Toronto and vicinity that are located in the Department of Invertebrate Palaeontology of the Royal Ontario Museum (Fritz, 1970, 1971, 1973, 1975, 1976a). The present paper deals with species of the genera *Atactoporella, Homotrypa,* and *Homotrypella* described by Dyer (1925) from outcrops in the Credit River Valley a few miles west of Toronto; these rocks were formerly included in the Meaford Formation (Foerste, 1924), but are now included in the Georgian Bay Formation (Liberty, 1969).

Materials and Methods

The primary types of the following species are treated in this paper:
Atactoporella densa Dyer (1925)
Atactoporella peculiaris (Homotrypella hospitalis peculiaris Dyer, 1925)
Homotrypa creditensis Dyer, 1925
Homotrypa streetsvillensis Dyer, 1925
Homotrypella hospitalis (Nicholson, 1881) (*Homotrypella expansa* Dyer, 1925)

In addition, the following are also studied:
Atactoporella multigranosa (Ulrich, 1879) — holotype 43626 USNM
Atactoporella newportensis Ulrich, 1883 — cotypes 43627 and 40193 USNM
Homotrypa austini Bassler, 1903 – cotype 41762 USNM
Homotrypa communis Bassler, 1903 – cotype 41755 USNM

The external features of the zoaria (i.e., shape of the colony, character of the surface) were observed with a hand lens, but the internal structures of each species were determined by means of thin sections. The mensuration of the number of zooecia in 2 mm in the intermonticular areas and measurements in millimetres of the maximum dimension of zooecial apertures in the monticular and intermonticular areas were made with a binocular microscope and a micrometer scale calibrated to 0.01 mm. The number of entire mesopores and the number of entire acanthopores in 1 mm^2 were obtained by using a compound microscope and a reticle calibrated to 1 mm^2. Statistical computations were made on the IBM 370/165 computer at the University of Toronto Computer Centre. As most of the samples had heterogeneous variances it was not possible to test differences among means using parametric statistical methods; instead, the samples were tested for differences in dispersion using the non-parametric Mann-Whitney U-Test (Siegel, 1956). In the tables, probability ranges associated with the significance tests are designated with asterisks as follows: *** $= P \leq 0.001$; ** $= P \leq 0.01$; * $= P \leq 0.01$; not significant = ns=$P > 0.05$.

Systematic Palaeontology

Order Trepostomata Ulrich, 1882a
Family Monticuliporidae Nicholson, 1881

Genus *Atactoporella* Ulrich, 1883

Type Species
Atactoporella typicalis Ulrich, 1883: 248-250.

Atactoporella densa Dyer (1925)

Fig. 1A–B

Original Description (Dyer, 1925)
"A single specimen of a bryozoan, showing the internal characters of the genus *Atactoporella*, was found in the zone of *Bythopora meeki* in the Streetsville member. It is not well preserved, but it differs so decidedly from any previously described member of the genus from the Cincinnatian series that it has been decided to erect a new species for its reception.

"The zoarium consists of four superimposed layers, which are rather thick for the genus, each layer varying from two to three millimetres in a vertical direction. It could not be ascertained, on account of the poor preservation of the fossils, whether the surface is monticulose or smooth. It apparently is not an incrusting form.

"In characters shown by both tangential and vertical sections, *A. densa* resembles *A. ortoni*

(Nicholson), of the Maysville of Ohio. The tubes are small, nine to ten in two millimetres, with the comparatively thick walls lined by average-sized acanthopores. As many as twelve acanthopores have been counted surrounding a single zooecial tube. The mesopores, so far as can be determined, are not as numerous as in *A. ortoni,* and are not filled by secondary deposits as in that species, but are open throughout their length. The mesopores are crossed by numerous diaphragms, while the zooecia have both diaphragms and cystiphragms.

"In addition to the differences already enumerated, *A. densa* differs from *A. ortoni* in the manner of growth. The latter species forms exceedingly thin, monticulose crusts, usually attached to the shells of brachiopods. The Streetsville form differs from *A. schucherti,* Ulrich, the only other member of the genus found in the Richmond, in the much smaller size of the acanthopores, in the smaller number of mesopores, and in the manner of growth."

Emended Description

EXTERNAL FEATURES

Dyer based his description on a single, roughly dome-shaped specimen (now fragmented), approximately 10 mm wide at base × 15 mm high; surface with small, round monticules 2 mm to 2.5 mm apart measuring from centre to centre. Acanthopores protrude beyond surface of zoarium. Polished surfaces now available through the specimen from top to bottom revealed a previously unsuspected symbiotic stromatoporoid–bryozoan sequence beginning on the coenosteum of a young stromatoporoid. Three successive growths appear in the sequence measuring respectively 1 mm, 2 mm, and 3 mm in maximum thickness.

During the course of my research, another example of *A. densa* was identified, providing further evidence of the validity of Dyer's species. This specimen occurs in the symbiotic sequence referred to in the description of *Homotrypella hospitalis* (p.19) and has a maximum thickness of 3 mm. This biocoenosis was described under the title "A Microbioherm" (Fritz, 1976b).

TANGENTIAL SECTION

Zooecia subangular to circular, 8.5 to 11 in 2 mm in intermonticular areas (Table 1), adjacent to or separated by microcrystalline deposits of varying extent. Walls of adjacent zooecia amalgamate or with a dense median line; width of amalgamate walls 0.01 mm (or less) to 0.02 mm, in monticules slightly thicker, walls with fine concentric laminae, laminae distinct only in magnifications ×150 or more. Mesopores few, round or angular (Table 1). Acanthopores prominent with relatively large lumen, moderately numerous (Table 1), composed of concentric laminae and situated mostly in subangular portions of zooecia, slightly inflecting zooecial apertures rendering them subpetaloid in shape, diameter 0.01 to 0.05 mm; small crystalline granules, which stud zooecial walls between acanthopores, might be taken for small acanthopores, but that they are not typical acanthopores is discussed in the following longitudinal section. In monticules, diameter of zooecia in mm in monticular areas 0.15 to 0.19 (Table 1), in intermonticular areas 0.07 to 0.10 (Table 1).

LONGITUDINAL SECTION

Zooecia subprostrate for a short distance above base of zoarium, becoming erect to periphery or erect throughout their entire course. Walls thin, thickening slightly towards surface. Diaphragms horizontal, diagonal, or V-shaped, spaced one-quarter to one tube diameter apart, extend across at least two-thirds of zooecial apertures and rest upon cystiphragms. Cystiphragms relatively small, bulbous, and overlapping,

line zooecia throughout their length. Mesopores few with diaphragms one-half to one tube diameter apart, some of which gradually disappear at surface. Acanthopores, of relatively coarse laminae that diverge at low angle and pass into diaphragms and cystiphragms; at close of each growth stage, acanthopores protrude beyond the surface as solid rods of dense laminae. The small crystalline granules mentioned in the tangential section can be traced in linear series along cut edges of zooecial walls or where a section grazes a fragment of wall. These structures, a very distinctive feature of this species, may represent crystal-filled pores, although no sign of an enclosing wall is evident, or they may represent specialized, residual acanthopores.

Remarks

Atactoporella densa and *A. peculiaris* are very closely related. Comparisons of these and other species of the genus together with their relationships are summarized in the "Remarks" following the description of *A. peculiaris*.

Locality

Meaford Formation, Streetsville, Ontario.

Type

Holotype ROM 12148; hypotype ROM 254HR (with *Homotrypella hospitalis).*

Atactoporella peculiaris (Dyer)

Figs. 1C–D, 2A–B

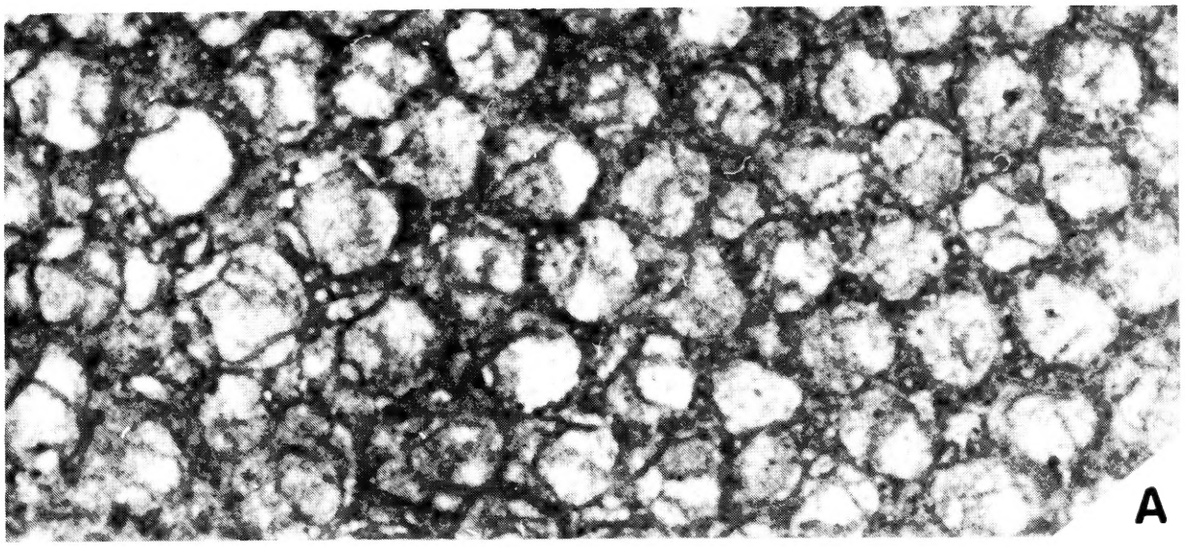
Homotrypella hospitalis peculiaris Dyer, 1925: 69, 70.

Original Description (Dyer, 1925)

"*H. hospitalis* is abundant in all the subdivisions of the Richmond formation on the Credit River, with the exception of the Queenston. At times it forms very regular, hemispheric or sub-conical zoaria, while at other times the zoaria are very irregular in shape. In addition, a few specimens have been ascribed to a new variety.

"*H. hospitalis peculiaris* differs from the type in one feature only, namely, in the possession of numerous minute acanthopores, which are situated along the zooecial walls between the large acanthopores, characteristic of the type. These small acanthopores are much more pronounced near the surface of the zoarium, where as many as six have been counted between two large acanthopores. Deeper in the zoarium they may disappear altogether. They are apparently of the nature of true acanthopores since hollow centres have been seen in many instances."

Fig. 1 A–B. *Atactoporella densa* Dyer, holotype, ROM 12148.
A. Tangential section, ×60.
B. Longitudinal section, ×30.
C–D. *Atactoporella peculiaris (Homotrypella hospitalis peculiaris* Dyer), holotype, ROM 12166.
C. Tangential section, ×30.
D. Longitudinal section, ×30.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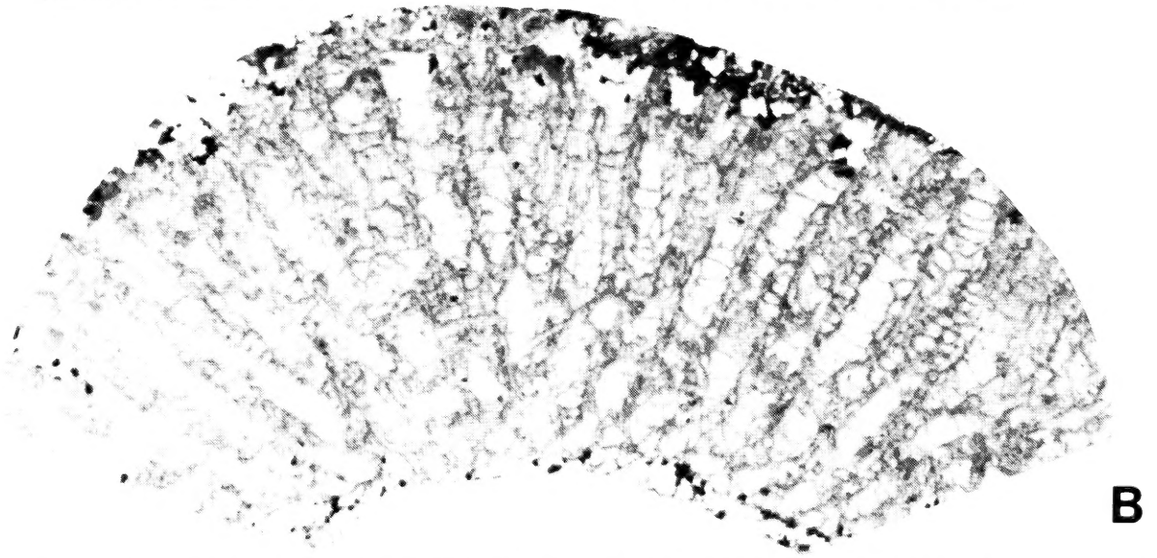
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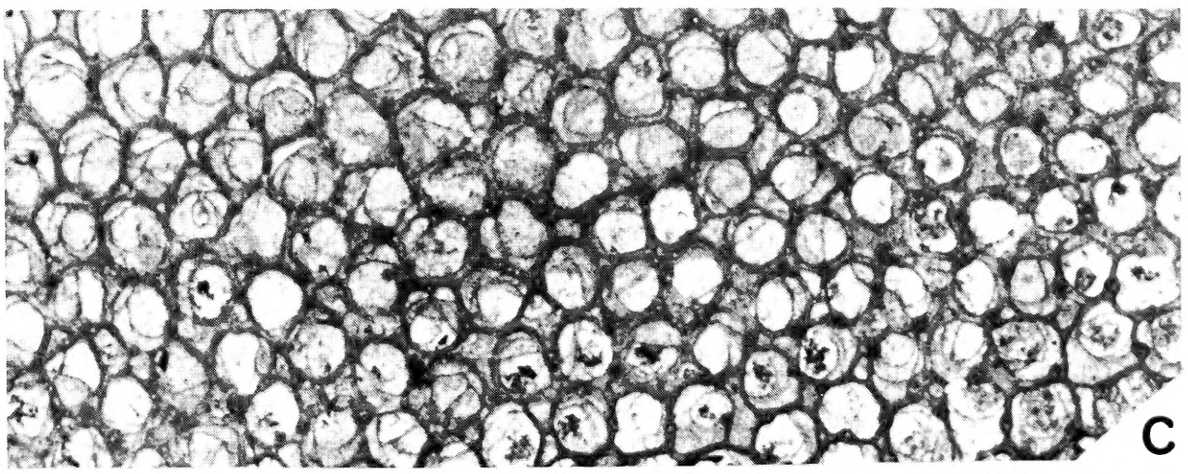
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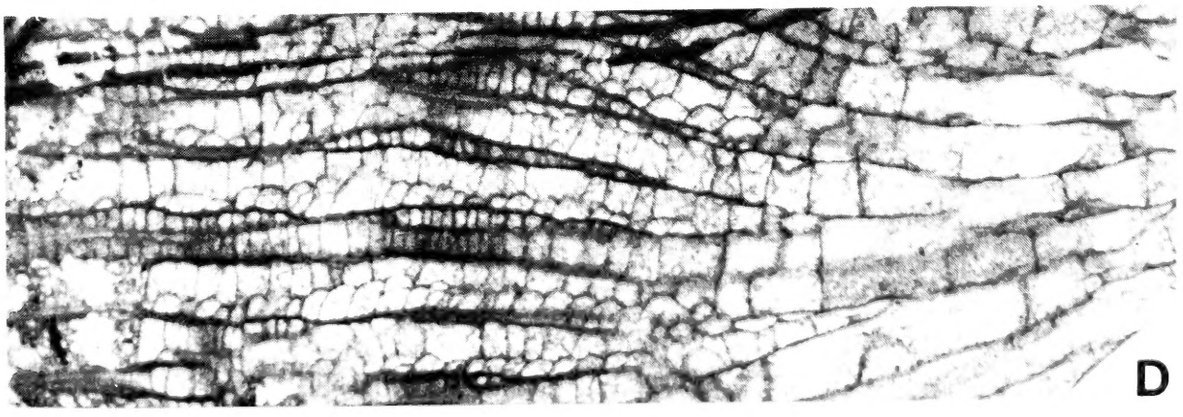
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Emended Description

EXTERNAL FEATURES

Zoarium lobate with semi-ramose or nodular protrusions, holotype 25 mm wide, 15 mm in height, surface with low monticules about 2 mm to 2.5 mm apart measuring from centre to centre, consisting of larger zooecia than in intermonticular areas; acanthopores protrude beyond zoarial surface.

TANGENTIAL SECTION

Zooecia 8 to 10 in 2 mm in intermonticular areas (Table 1), adjacent to or separated by microcrystalline deposits; walls of adjacent zooecia amalgamate or with a median dark line, width of amalgamated walls 0.01 mm (or less) to 0.02 mm, a little thicker in monticules; walls finely laminate, laminae detected only under magnifications ×150 or more. Mesopores few (Table 1), small, round, triangular or quadrangular. Acanthopores prominent, relatively numerous (Table 1), at times slightly inflecting zooecia, rendering aperture irregular in shape, diameter 0.02 mm to 0.06 mm, large lumen surrounded by dense laminae. Small crystalline granules stud zooecial walls between acanthopores; these structures occur also in *Atactoporella densa* (p. 2). Diameter of zooecial aperture in monticular areas 0.23 mm to 0.28 mm (Table 1), 0.14 to 0.20 mm in intermonticular areas (Table 1).

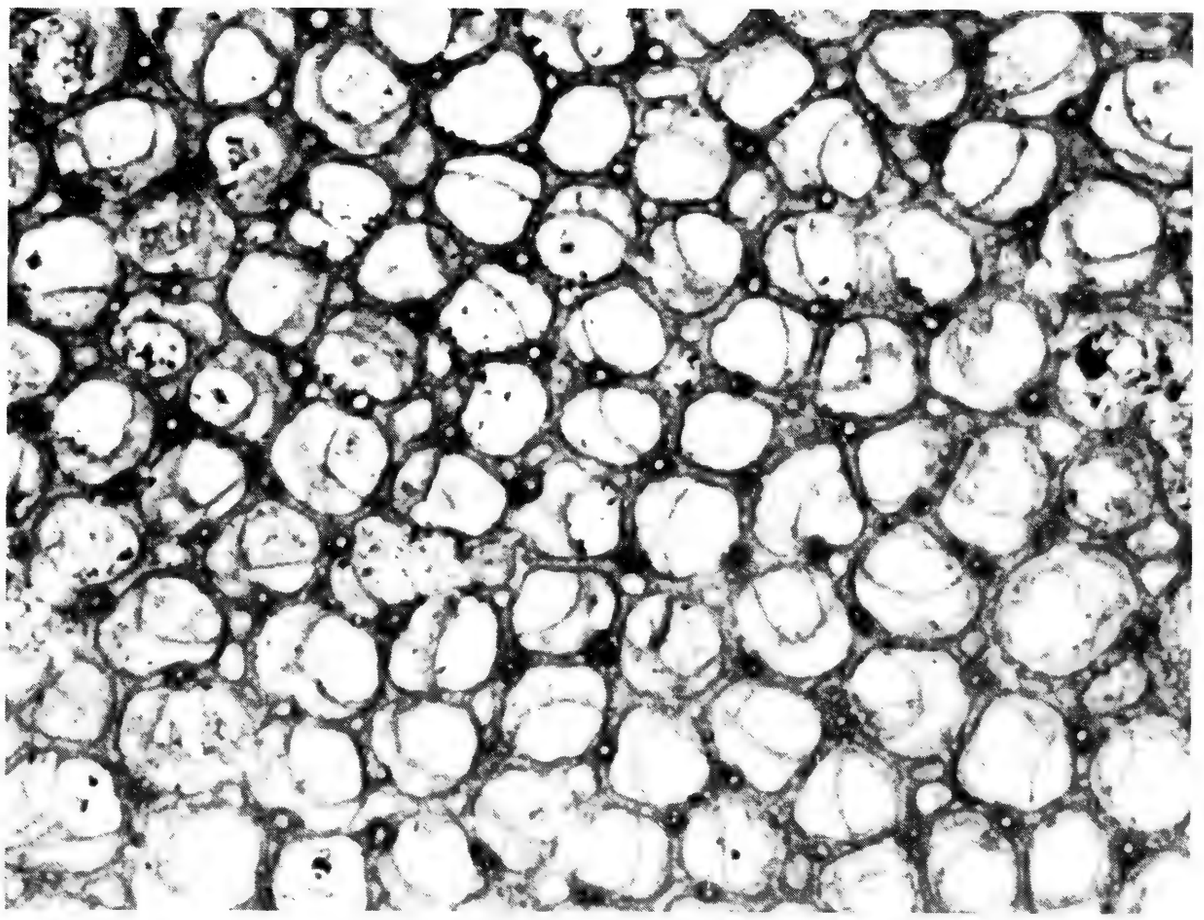
LONGITUDINAL SECTION

Zooecia subprostrate for a short distance above base, then erect, intersecting zoarial surface at approximately right angles; walls thin, fine laminate, straight or slightly undulating in axial region, then gradually thickening from base of peripheral region to surface; granules in linear arrangement present in parts of ideally cut section. Horizontal diaphragms in axial region, one to three tube diameters apart, closer from subperipheral region to surface, where 13 may occur in space of 1 mm. Globose cystiphragms, at times overlapping, occur on the distal walls throughout post-axial region; larger cystiphragms often present on proximal wall. Diaphragms rest either distally, medially, or proximally upon cystiphragms. Mesopores with close-set diaphragms, more numerous in deep sections, may gradually disappear as growth proceeds. Acanthopores prominent, with large central tube flanked by relatively coarse laminae that diverge at a low angle and pass into diaphragms and cystiphragms.

Remarks

Atactoporella densa and *Atactoporella peculiaris,* each with granular walls, are closely related species, although the smaller zooecia and more compact skeletal structure of *A. densa* distinguish it qualitatively from *A. peculiaris,* which has larger zooecia and a more open framework. Furthermore, as far as known, *A. densa* forms incrusting, symbiotic zoaria whereas *A. peculiaris* forms lobate zoaria from which extensions protrude, resembling aborted branches. Quantitatively the two are compared in Table 1, which shows that they differ significantly in the maximum

Fig. 2 A–B. *Atactoporella peculiaris (Homotrypella hospitalis peculiaris* Dyer, hypotype, ROM 12275.
A. Tangential section, ×60.
B. Longitudinal section, ×30.



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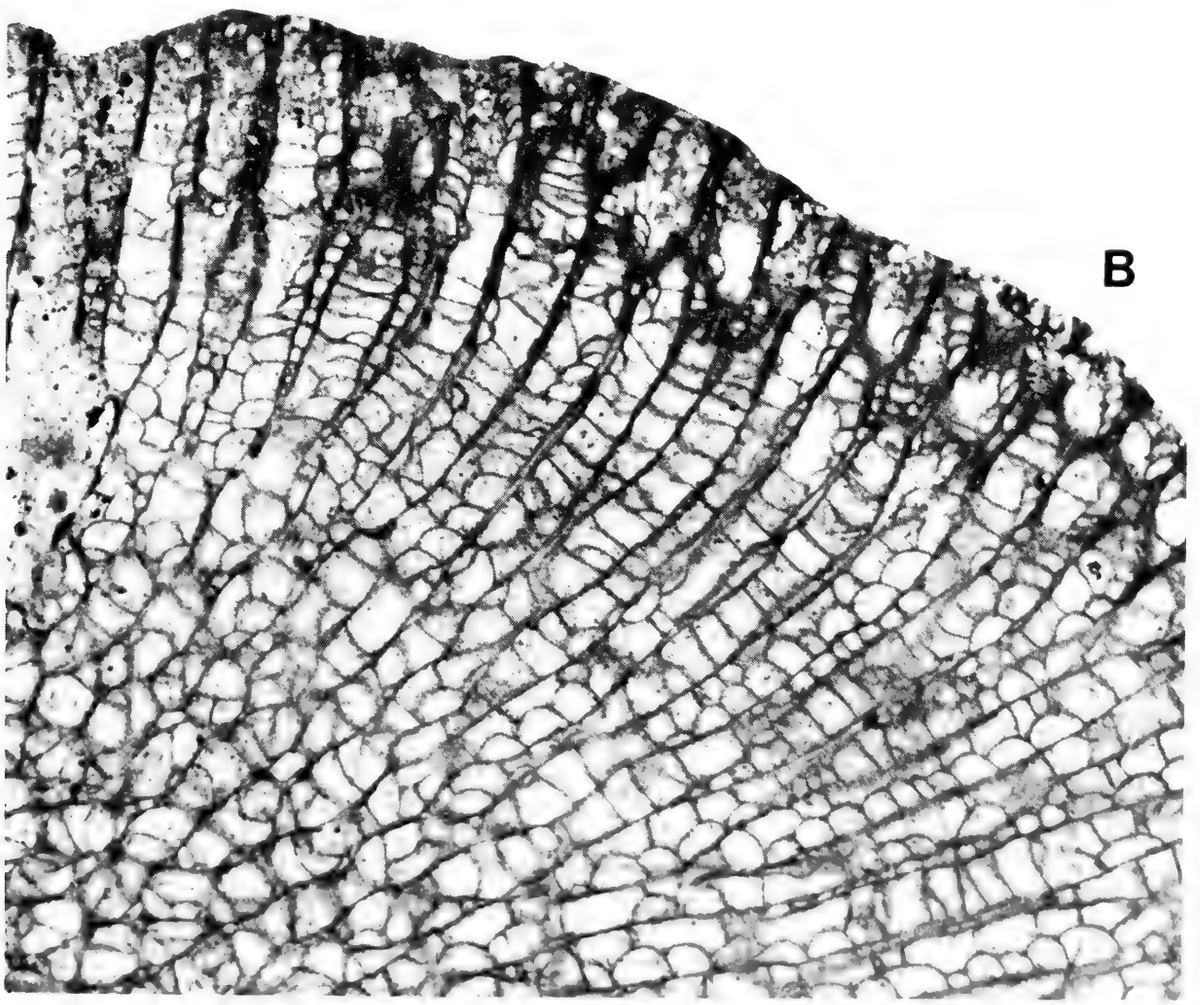


B

Table 1. Comparison of *Atactoporella peculiaris* (ROM 12166) and *A. densa* (ROM 12148). Measurements are given in millimetres. Figures in parentheses denote ranges.

	A. peculiaris		*A. densa*		
	n	Mean ± S.E.	n	Mean ± S.E.	Mann-Whitney U Statistic
Number of zooecia in 2 mm in intermonticular area	20	8.92 ± 0.15 (8–10)	20	9.45 ± 0.21 (8.5–11)	146.0 ns
Number of entire mesopores in 1 mm² in intermonticular area	20	3.15 ± 0.35 (1–6)	20	2.55 ± 0.15 (2–4)	155.0 ns
Number of entire acanthopores in 1 mm² in intermonticular area	20	14.55 ± 0.36 (11–16)	20	14.35 ± 0.34 (11–16)	192.0 ns
Maximum apertural diameter of zooecia in monticules	20	0.25 ± 0.004 (0.23–0.28)	20	0.17 ± 0.003 (0.15–0.19)	0.0 ***
Maximum apertural diameter of zooecia in intermonticular area	20	0.17 ± 0.004 (0.14–0.20)	20	0.09 ± 0.003 (0.07–0.10)	0.0 ***

apertural diameter of the zooecia in intermonticular areas and in the maximum apertural diameter of zooecia in monticular areas.

From an examination of Ulrich's holotype USNM 43626 of *Atactoporella multigranosa* from the Upper Ordovician, Maysville (Fairmount) Hamilton, Ohio, I believe it to be a near ancestor of *A. densa;* however, the larger acanthopores and more numerous granules are distinctive features of Dyer's species.

From a study of Ulrich's cotypes of *Atactoporella newportensis* USNM 43627 and 40193 from the Upper Ordovician, Eden Formation of Newport, Kentucky, I consider that species to be a forerunner of *A. peculiaris*. These two species agree in the lobate–ramose nature of the monticulose zoarium and in the size and shape of the zooecia. However, Ulrich did not differentiate in the size of acanthopores and granules which he lumped under the term "spiniform tubuli". In *A. peculiaris* the acanthopores are considerably larger than the granules; the latter are distinguishable in longitudinal sections as linear rows of pores.

Atactoporella schucherti Ulrich (1883) from the Richmond of Ohio differs from *A. densa* and *A. peculiaris* in that it possesses large inflecting acanthopores and lacks granules.

Atactoporella spicata Bassler (1928) from the late Upper Ordovician, Ellis Bay Formation of Anticosti Island, differs from Dyer's species in having thick zooecial walls inflected by prominent acanthopores between which are numerous relatively large granules, which often appear in sections as double rows.

Atactoporella irregularis Boulange (1963) from the Upper Ordovician of Montagne-Noire has circular zooecia separated by large angular mesopores, few acanthopores, and an absence of granular walls. This combination of features seems to preclude its inclusion in the genus *Atactoporella*.

Atactoporella depressa Astrova (1957) from the Silurian of Russia also lacks the granular structure of the genus according to the author's figures. She states that her species most closely resembles *A. typicalis* Ulrich (1883) from the Eden Formation of Kentucky, a formation that is considered equivalent to the Dundas Formation of Toronto.

Locality
Meaford Formation, Streetsville, Ontario.

Type
Holotype ROM 12166, hypotype ROM 12275.

Genus *Homotrypa* Ulrich, 1882b

Type Species
Homotrypa curvata Ulrich, 1882b: 242–243.

Homotrypa Ross, 1970.

Regarding the genus *Homotrypa,* a taxonomic problem arose in 1920 when Vinassa de Regny proposed two new genera, *Cadornipora* and *Gortanipora,* to which he

referred certain species long thought to belong to *Homotrypa*. Vinassa de Regny cited *Homotrypa nodulosa* Bassler (1903) as genotype of *Cadornipora* and *Homotrypa bassleri* Nickles as genotype of *Gortanipora*. Bassler (1953) regarded *Cadornipora* as a junior synonym of *Homotrypa* but *Gortanipora,* with "hook-shaped" cystiphragms characteristic of the genotype *H. bassleri,* he considered to be a valid genus.

Utgaard and Perry (1964) discussed this problem at considerable length in their study of the Whitewater fauna, which has much in common with that of the Credit River. They concluded by stating, "We prefer to recognize only the genus *Homotrypa* pending further elucidation of the generic features of *Gortanipora.*"

Dyer's species redescribed herein possess only "hook-shaped" cystiphragms characteristic of *Gortanipora*. I agree with Utgaard and Perry that *Gortanipora* is not an acceptable genus as it is at present described. Dyer's species are therefore retained in the genus *Homotrypa*.

Homotrypa creditensis Dyer, 1925

Fig. 3A–B

Original Description (Dyer, 1925)

"This member of the *Homotrypa communis* group of *Bryozoa* occurs in the zone of *Homotrypa streetsvillensis,* in association with the type species of the zone. *H. creditensis* is the only member of the genus in the Credit River section which bears monticules. These are distributed regularly over the surface of the zoarium with an average distance of three millimetres between them. Their character cannot be determined by an examination of the surface, but tangential sections show them to be composed of mesopores, surrounded by zooecial tubes of almost twice the average size.

"In tangential sections, the zooecial tubes are seen to be small, twelve occurring in two millimetres. Their walls are thin for the greater part of their course but appear thicker near the surface of the zoarium, as the mesopores in this part are filled with a secondary deposit of calcite. Numerous angular mesopores are scattered throughout the zoarium as well as being grouped into the monticules as mentioned above. Acanthopores are present but are small and unimportant.

"In vertical sections, it is seen that cystiphragms only are present in the zooecial tubes. They are restricted to the younger part of the mature region, both zooecia and mesopores being empty near the surface. Closely crowded diaphragms are found in the mesopores.

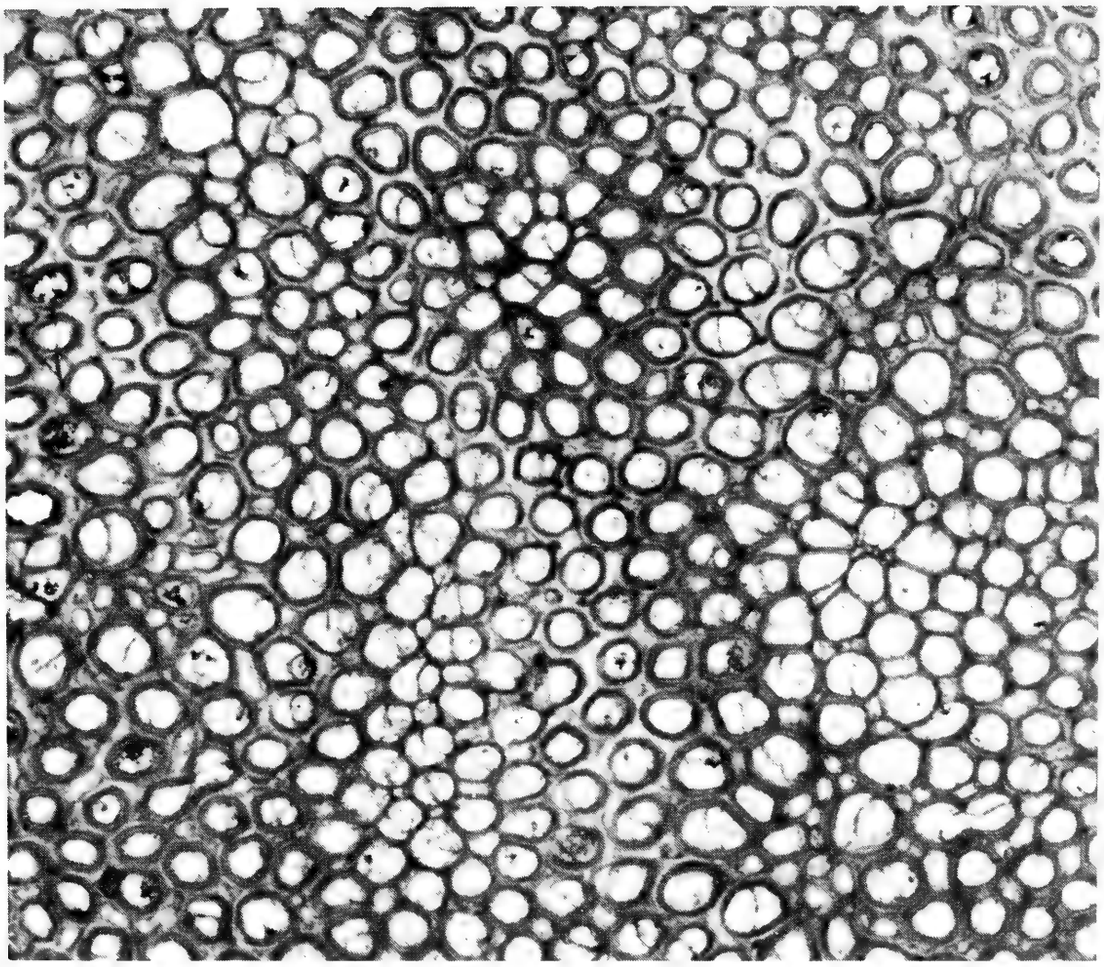
"*H. creditensis* is closer to *H. nodulosa,* Bassler, than to any other form, these two species being very similar in vertical sections, but differing decidedly in tangential sections, and in growth."

Emended Description

EXTERNAL FEATURES

Zoarium ramose, branches dichotomous, cylindrical to slightly compressed, maximum diameter 7 mm tapering to 4 mm. Surface with conical monticules, spaced 2 to 2.5 mm apart measuring from centre to centre.

Fig. 3 A–B. *Homotrypa creditensis* Dyer, holotype, ROM 12162.
A. Tangential section, ×30.
B. Longitudinal section, ×30.



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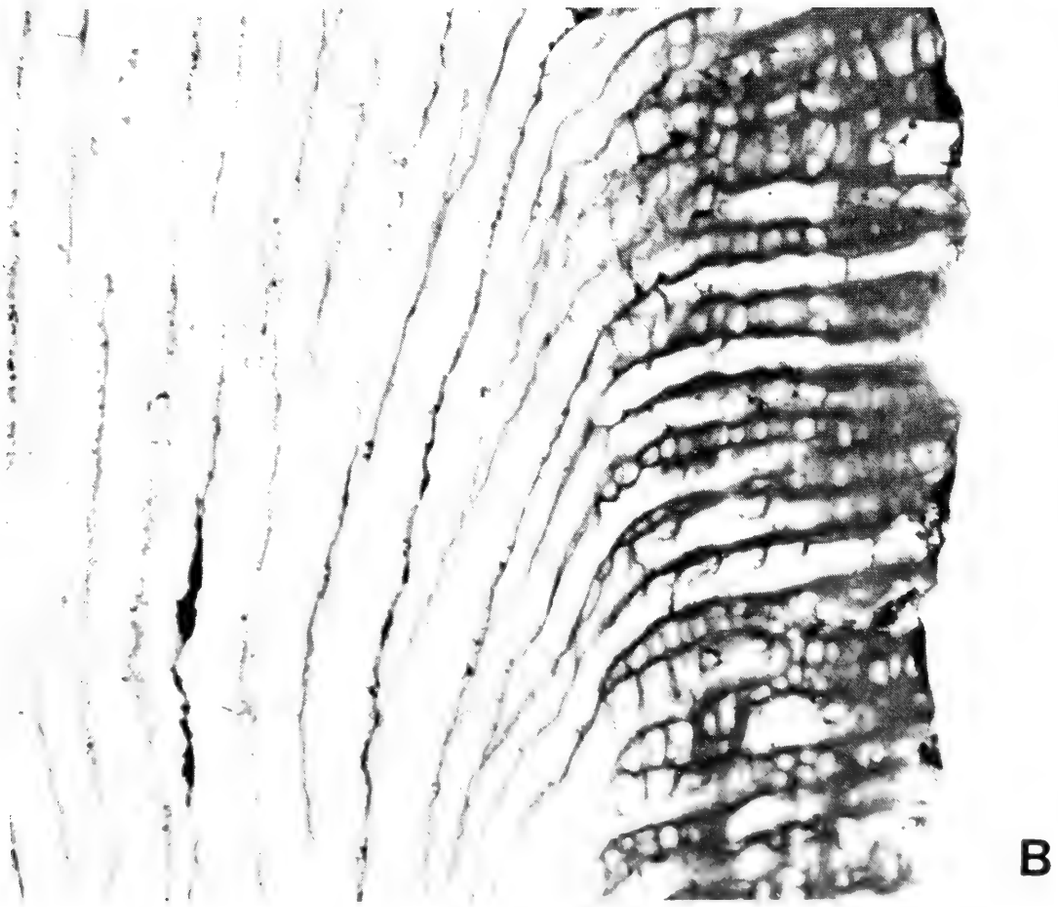

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TANGENTIAL SECTION

Zooecia round or oval, rarely angular, commonly 10 to 12 in 2 mm (Tables 2, 3); wall moderately thick, at surface 0.03 mm to 0.05 mm, reaching 0.07 mm in monticules; composed of homogeneous, concentrically arranged laminae, at times showing dark central band. Mesopores in intermonticular areas mostly small and angular (Tables 2, 3). Acanthopores moderately abundant, small, non-inflecting, 0.02 mm to 0.03 mm in diameter with central lumen flanked by close-set concentric laminae (Tables 2, 3). Monticules with small to relatively large angular mesopores varying in size and surrounded by larger zooecia than those in intermonticular areas; in certain monticules, acanthopores more numerous than in intermonticular areas. In monticules, apertural diameter of zooecia 0.14 to 0.20 mm (Tables 2, 3); in intermonticular areas apertural diameter 0.07 to 0.15 mm (Tables 2, 3).

LONGITUDINAL SECTION

Zooecia curve outwards from axial region at an angle of approximately 45°, opening somewhat obliquely at zoarial surface. Zooecial wall thin, slightly crenulated in axial region, thickening in subperipheral zone, becoming progressively thicker and somewhat moniliform towards periphery. Wall laminae in outer peripheral region broadly convex outwards, sharply convex outwards in innermost part of that region where central line of demarcation often visible; laminae then diverge at a low angle from central area to continue into zooecial diaphragms and cystiphragms and into diaphragms of mesopores. Diaphragms throughout axial region spaced two to three or four tube diameters apart, ''hook-shaped'' cystiphragms on proximal wall followed distally by one or two flat diaphragms. Mesopores in groups in peripheral zone (i.e., where section passes through a monticule) or otherwise mostly single; diaphragms closely spaced and thicker than those in zooecia. Acanthopores few, indistinctly visible in peripheral region, some cutting diagonally across zooecia; structure of acanthopores not clear.

Remarks

The genus *Homotrypa,* as already noted, is represented in the Upper Ordovician by a number of very closely related taxa, referred to as species, with slight morphological differences. In this case, as with other genera considered in this series of publications (Fritz, 1970, 1971, 1973, 1975, 1976a), discussion has centred upon populations (possibly interbreeding) which have been subjected to successive pressures resulting in minor morphological features which may or may not represent genetic mutations. As more intergrading taxa become known it may become possible to assess their true biological relationships.

Dyer (1925) compared *Homotrypa creditensis* with *Homotrypa nodulosa* Bassler (1903). Qualitatively, the two species resemble one another in the shape and monticuled surface of the zoarium. *H. creditensis* differs, however, in having small zooecia and fewer acanthopores of uniform size. Utgaard and Perry (1964) examined Bassler's cotype no. 41758 of *H. nodulosa* from the United States National Museum. Table 2 is a comparison of the data published by Utgaard and Perry with the measurements of *H. creditensis* obtained in the present study. Quantitatively, the two species differ insignificantly in the number of zooecia in 2 mm in intermonticular areas, but differ very significantly in the maximum apertural diameter of zooecia in

Table 2. Comparison of *Homotrypa creditensis* (ROM 12162) and *H. nodulosa* (Utgaard and Perry, 1964: 56). Measurements are given in millimetres. Figures in parentheses denote ranges.

	H. creditensis		*H. nodulosa*		
	n	Mean ± S.E.	n	Mean ± S.E.	Mann-Whitney U Statistic
Number of zooecia in 2 mm in intermonticular area	20	8.0 ± 0.15 (10–12)	8	10.0 ± 0.267 (9–11)	34.0 *
Number of entire mesopores in 1 mm² in intermonticular area	20	4.3 ± 0.38 (0–7)		—	—
Number of entire acanthopores in 1 mm² in intermonticular area	20	10.55 ± 0.67 (7–16)	6	8.0 ± 2.28 (4–17)	35.5 ns
Maximum apertural diameter of zooecia in monticules	20	0.16 ± 0.004 (0.14–0.20)	6	0.26 ± 0.013 (0.21–0.30)	0.0 ***
Maximum apertural diameter of zooecia in intermonticular area	40	0.107 ± 0.003 (0.07–0.15)	10	0.166 ± 0.007 (0.14–0.20)	0.3 ***

Table 3. Comparison of *Homotrypa creditensis* (ROM 12162) and *H. austini* (USNM 41762). Measurements are given in millimetres. Figures in parentheses denote ranges.

	H. creditensis		*H. austini*		
	n	Mean ± S.E.	n	Mean ± S.E.	Mann-Whitney U Statistic
Number of zooecia in 2 mm in intermacular–intermonticular areas	20	8.0 ± 0.15 (10–12)	20	10.2 ± 0.19 (9–11)	123.0 *
Number of entire mesopores in 1 mm² in intermacular–intermonticular areas	20	4.3 ± 0.38 (0–7)	20	1.15 ± 0.13 (0–2)	24.0 ***
Number of entire acanthopores in 1 mm² in intermacular – intermonticular areas	20	10.55 ± 0.67 (7–16)	20	29.05 ± 0.96 (22–36)	0.0 ***
Maximum apertural diameter of zooecia in maculae–monticules	20	0.16 ± 0.004 (0.14–0.20)	20	0.17 ± 0.005 (0.22–0.36)	176.0 ns
Maximum apertural diameter of zooecia in intermacular–intermonticular areas	21	0.107 ± 0.003 (0.10–0.16)	40	0.132 ± 0.004 (0.07–0.15)	161.5 ***

monticules (Table 2) and in the apertural maximum diameter in the intermonticular areas (Table 2).

Homotrypa austini Bassler (1903) is a close relative of *H. creditensis* in the size and shape of the ramose zoarium, although *H. austini* has a macular rather than monticuled surface. Each of these two species possesses "hook-shaped" cystiphragms. I have examined Bassler's cotype no. 41762 from the USNM collections and have made measurements that permit the quantitative comparison of *H. austini* and *H. creditensis* (Table 3) in which the two differ insignificantly in the number of zooecia in 2 mm but differ very significantly in the number of entire mesopores in 1 mm^2 in the intermacular–intermonticular areas, the number of entire acanthopores in 1 mm^2 in the intermacular–intermonticular areas, and in the maximum apertural diameter in mm of the zooecia in the intermacular–intermonticular areas.

Locality
Meaford Formation, Credit River, Streetsville, Ontario.

Type
Holotype ROM 12162; hypotypes ROM 12263, 12294 (unfigured).

Homotrypa streetsvillensis Dyer, 1925

Fig. 4A–B

Original Description (Dyer, 1925)
"A ramose representative of the *Homotrypa communis* group is found in such numbers in a definite horizon of the Streetsville member that it has been selected as the type fossil of the zone.

"In this species the branches vary from five to ten millimetres in diameter, and in some cases reach a length of 50 mm. The surface is smooth without any indication of maculae; the apertures indicate thick-walled zooecia of small but uniform size—twelve in two millimetres.

"In tangential sections, the mesopores are few in number and the tubes polygonal in shape, but as the axial region is approached the mesopores become numerous and the tubes become rounded or oval in shape. Acanthopores of medium size are usually found at the angles of junction of the walls. The characters of this species as revealed by vertical sections are very much like those of *Homotrypa communis,* diaphragms being absent and the broken type of cystiphragms, so characteristic of that species, being well shown.

"The relationships of the present form, as already stated, are with *H. communis,* but a decided difference from that species is indicated by the smaller size of the tubes and by the absence of maculae of any kind. It perhaps resembles *H. austini,* Bassler, still more closely, but differs in having the cystiphragms distributed evenly throughout the peripheral zone, whereas in that species they are confined to the maculae."

Emended Description
Cotype ROM 12164 listed as *Homotrypa streetsvillensis* differs specifically from cotypes ROM 12163 and ROM 12165 redescribed herein. ROM 12164 represents an unidentified species known only from fragments, not necessarily related, but too small to section. I consider it *Homotrypa* sp. indet. Cotype ROM 12165 is selected as the lectotype and ROM 12163 as the paralectotype.

EXTERNAL FEATURES

Zoaria ramose, dichotomous, round (with diameter 4 mm) to slightly compressed branches (with minimum and maximum diameters ranging from 6 × 4, 11 × 5, and 15 × 10 mm respectively); surface smooth but with small maculae flush with surface and regularly spaced 1 to 1.5 mm apart measuring from centre to centre.

TANGENTIAL SECTION

Zooecia angular, apertures circular to oval, 10 to 12 zooecia in 2 mm in intermacular areas (Table 4). Zooecial walls near surface thick, commonly 0.03 to 0.05 mm, but up to 0.07 mm in maculae; composed of homogenous, concentrically arranged laminae, with dark line of demarcation between zooecia commonly present. Mesopores few, indistinct (Table 4). Acanthopores abundant (Table 4), varying in diameter from 0.02 mm (or less) to 0.06 mm, more numerous in maculae than in intermacular areas; each with small central lumen surrounded by dense, concentric laminae. Apertural diameter of zooecia in mm in maculae 0.13 to 0.19 (Table 4), in intermacular areas 0.07 to 0.13 (Table 4).

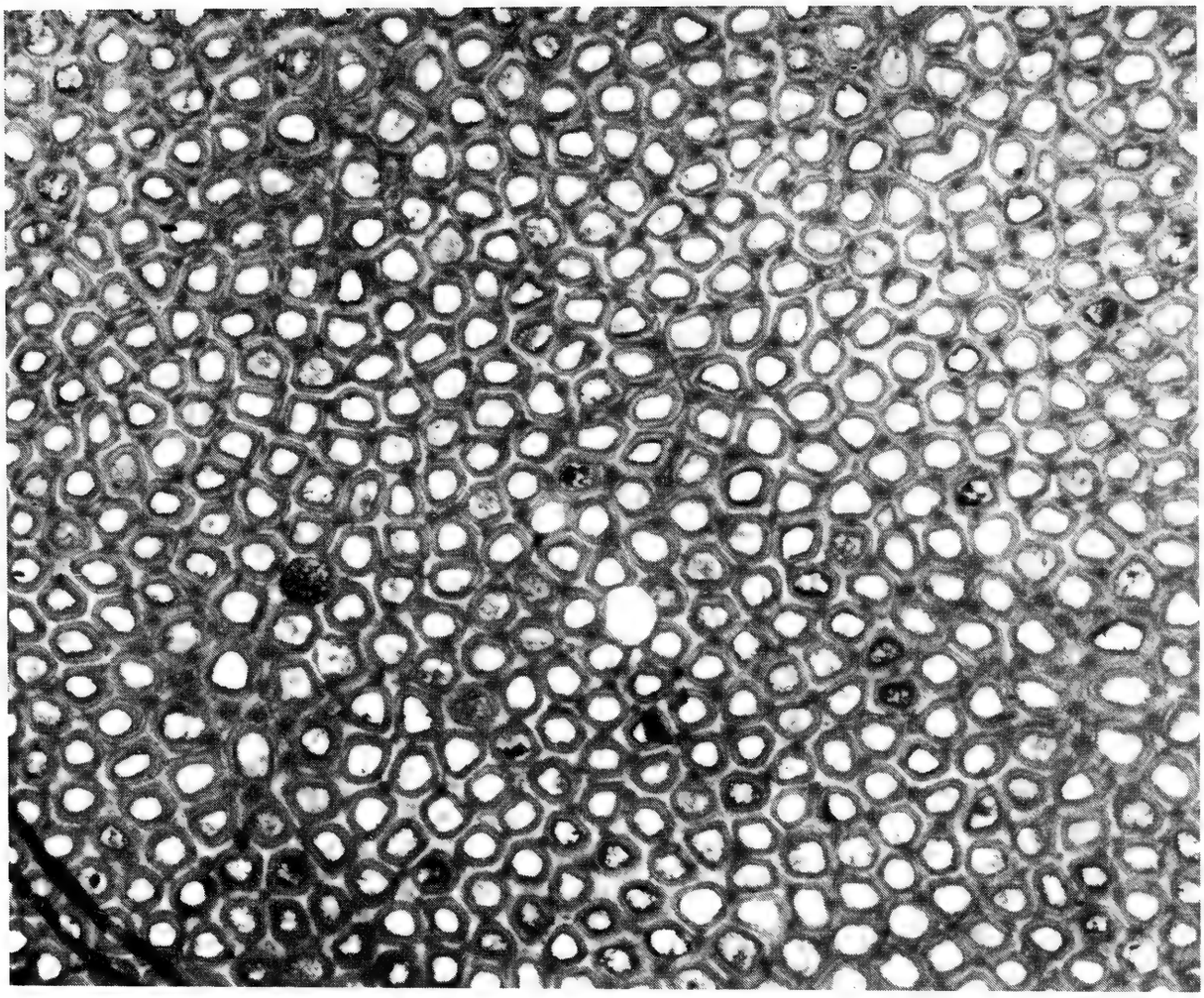
LONGITUDINAL SECTION

Zooecia curve gradually from outer axial region to periphery, opening slightly obliquely at zoarial surface. Zooecial walls thin in axial region, straight or locally crenulated, thickening abruptly at base of peripheral area and maintaining that thickness to surface, wall laminae broadly convex outwards, then sharply diverging at a low angle before continuing into the diaphragms and cystiphragms and into the diaphragms of the mesopores. Diaphragms in axial region of zooecia thin and widely spaced, in certain sections absent (likely due to lack of preservation), one or two in outer axial zone, and few sporadically developed near periphery. Cystiphragms "hook-shaped", commonly one or two at base of peripheral zone where thickening of the wall occurs, followed by one or two flat diaphragms spaced about one tube diameter apart in outer half of zooecia. Acanthopores conspicuous mainly in peripheral zone, with relatively large central lumen on either side of which laminae diverge steeply, then pass into diaphragms and cystiphragms; acanthopores extend beyond surface terminating into a pointed extremity, thus giving the surface a hirsute appearance.

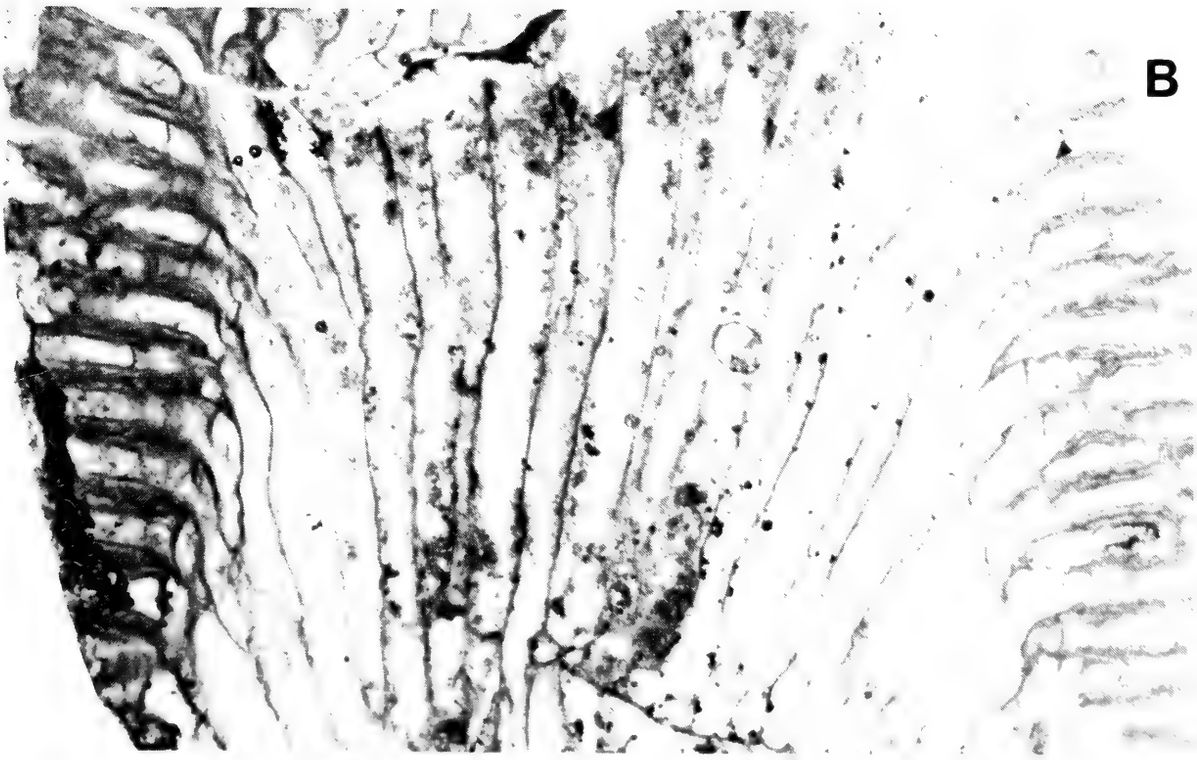
Remarks

Homotrypa streetsvillensis Dyer and *Homotrypa communis* Bassler are closely related. An examination of Bassler's cotype USNM 41755 of *H. communis* shows the presence of central clusters of mesopores in the maculae that are absent in *Homotrypa streetsvillensis*. Measurements on Bassler's type permit the quantitative comparison of the two species. Table 4 shows that the two species differ significantly in the number of mesopores in the intermacular areas, the number of acanthopores in the intermacular areas, and the apertural diameter of the zooecia in the intermacular areas.

Fig. 4 A–B. *Homotrypa streetsvillensis* Dyer, lectotype, ROM 12165.
A. Tangential section, ×30.
B. Longitudinal section, ×30.



A



B

Table 4. Comparison of *Homotrypa streetsvillensis* (ROM 12165) and *H. communis* (USNM 41755). Measurements are given in millimetres. Figures in parentheses denote ranges.

	H. streetsvillensis		*H. communis*		
	n	Mean ± S.E.	n	Mean ± S.E.	Mann-Whitney U Statistic
Number of zooecia in 2 mm in intermacular area	20	11.0 ± 0.20 (10–12)	20	11.0 ± 0.20 (10–12)	188.0 ns
Number of entire mesopores in 1 mm^2 in intermacular area	20	1.0 ± 0.16 (0–2)	20	4.6 ± 0.58 (1–9)	40.0 ***
Number of entire acanthopores in 1 mm^2 in intermacular area	19	30.37 ± 0.84 (23–36)	20	38.2 ± 1.32 (30–48)	39.5 ***
Maximum apertural diameter of zooecia in maculae	20	0.16 ± 0.005 (0.13–0.19)	20	0.16 ± 0.005 (0.13–0.20)	197.5 ns
Maximum apertural diameter of zooecia in intermacular area	21	0.099 ± 0.003 (0.07–0.13)	20	0.126 ± 0.005 (0.09–0.16)	82.5 **

Locality
Meaford Formation, Upper Ordovician, Credit River, Streetsville, Ontario.

Type
Lectotype ROM 12165, paralectotype ROM 12163.

Homotrypella Ulrich, 1886

Homotrypella instabilis Ulrich, 1886.

Homotrypella hospitalis (Nicholson, 1881)

Fig. 5A–B

Monticulipora (Prasopora) selwynii, var. *hospitalis* Nicholson, 1881: 209.
Homotrypella expansa Dyer, 1925: 69.

Original Description (Dyer, 1925)

"A specimen was found in the Streetsville collection of *Bryozoa* in the Royal Ontario Museum of Paleontology, which in its internal characters resembles *Homotrypella hospitalis* (Nicholson), very closely. The growth, however, is vastly different from the typical growth of the latter species, the zoarium being a broad, undulating expansion, 90 mm in diameter, with an average thickness of three millimetres instead of a sub-hemispheric, sub-conical, or irregular compact mass. In places the expansion consists of a single layer, in other places of two or more successive layers. Over the surface are evenly distributed low but distinct monticules, which consist of tubes somewhat larger than average in size.

"The presence of monticules and the peculiar form suggest that the species might be referred to the genus *Monticulipora,* but it has been retained in the genus *Homotrypella* on account of its very close similarity, internally, to *H. hospitalis,* and because the walls are clear and definite in structure. Bassler states that one of the best features for the determination of the genus *Monticulipora* is the hazy, indefinite character of the walls."

Emended Description

EXTERNAL FEATURES

The zoarium described by Dyer as an "undulating expansion" is a composite structure, made up of a number of nodular growths, individually varying in size from 15 to 40 mm wide and 12 to 20 mm thick, and the collective whole reaching 90 mm in width. A polished surface in the longitudinal plane through one of the larger nodular growths reveals a hitherto unsuspected alternating and progressively developing stromatoporoid–bryozoan sequence starting on a mamelose stromatoporoid. Early in the sequence is a growth 3 mm thick of *Atactoporella densa* Dyer (see description of this species on p. 2). *Homotrypella hospitalis* (Nicholson) 11 mm in thickness covers the entire assemblage except for a thin incrustation of *Ceramoporella sp.* too poorly preserved to warrant description. Surface of specimen with inconspicuous monticules 1 to 1.5 mm apart measuring centre to centre.

TANGENTIAL SECTION

Zooecia circular to subcircular, usually separated by mesopores 8 to 8.5 zooecia in 2 mm in intermonticular areas (Table 5); zooecial walls amalgamate. Acanthopores relatively few to moderately numerous (Table 5), slightly inflecting, relatively large, typically 0.02 to 0.06 mm in diameter but reaching 0.09 in monticules; consisting of central lumen surrounded by dense, concentric laminae. Mesopores variable in size and shape, relatively few to moderately abundant, angular to subangular (Table 5). Monticules composed of zooecia and with thicker walls than in intermonticular areas; maximum apertural diameter of zooecia in mm in monticular areas 0.23 to 0.32 (Table 5), maximum diameter of zooecia in mm in intermonticular areas 0.15 to 0.24 (Table 5).

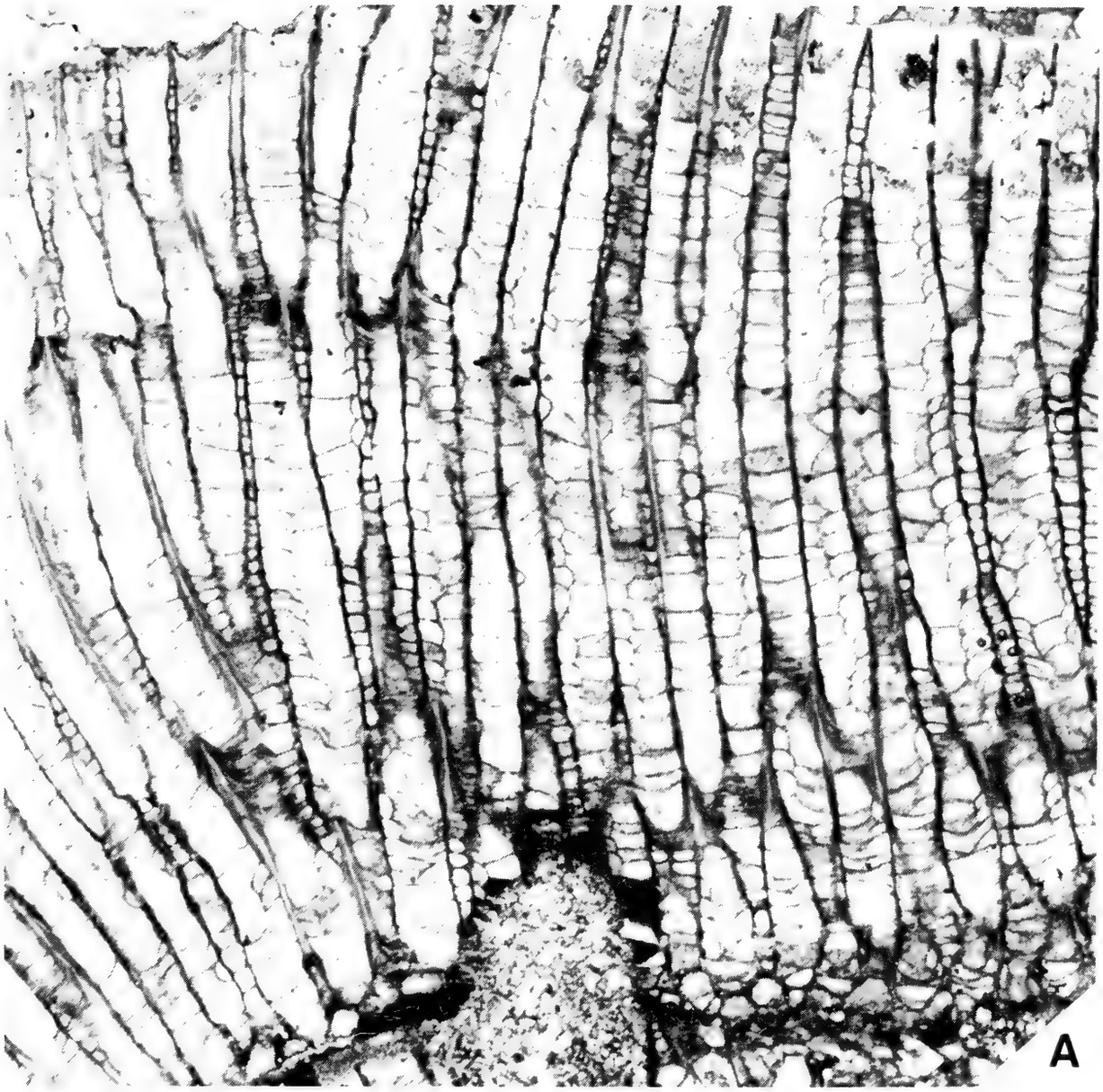
LONGITUDINAL SECTION

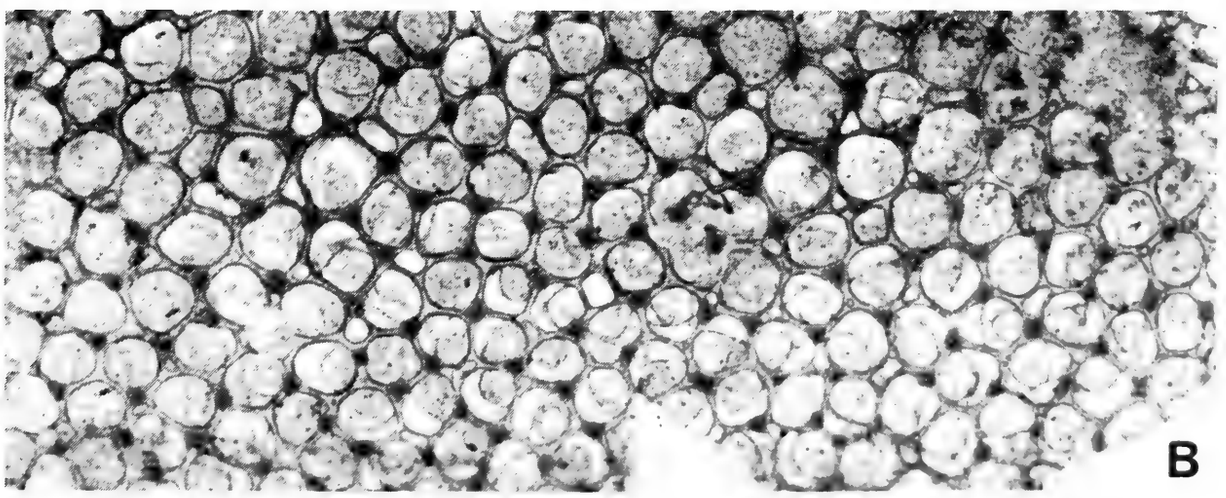
Zooecia subprostrate for short distance, erect for most part, flaring slightly near surface where section cuts summit of a lobe. Walls thin in axial region, thickening slightly from subperipheral region to surface. Diaphragms throughout zoarium generally one-quarter to two tube diameters apart; some gaps in sequence attributable to destruction through crystallization. Cystiphragms bulbous and overlapping, numbering at times 13 in 1 mm. Mesopores throughout section, with many close-set diaphragms. Acanthopores conspicuous, unusually well preserved particularly in peripheral region; containing central lumen flanked by laminae diverging at low angle from central tubule.

Table 5. Measurements of the taxonomic characters of *Homotrypella hospitalis* (ROM 254HR). Measurements are given in millimetres. Figures in parentheses denote ranges.

	n	Mean ± S.E.
Number of zooecia in 2 mm in intermonticular area	20	8.2 ± 0.06 (8–8.5)
Number of entire mesopores in 1 mm^2 in intermonticular area	20	16.35 ± 0.57 (8–21)
Number of entire acanthopores in 1 mm^2 in intermonticular area	20	14.35 ± 1.41 (8–28)
Maximum apertural diameter of zooecia in monticules	20	0.27 ± 0.006 (0.23–0.32)
Maximum apertural diameter of zooecia in intermonticular area	20	0.18 ± 0.005 (0.15–0.24)

Fig. 5 A–B. *Homotrypella hospitalis* Nicholson *(H. expansa,* Dyer), hypotype, ROM 254HR.
A. Longitudinal section, ×30.
B. Tangential section, ×30.


A


B

Remarks
Homotrypella expansa Dyer becomes a junior synonym of *Homotrypella hospitalis* (Nicholson). Utgaard and Perry (1964) came to this conclusion although they did not examine Dyer's type. Measurements on the Whitewater types of Utgaard and Perry as shown in their tables 11, 12, 13, 14, and 15 (1964; 64, 65) fall well within the range of structural variation of Dyer's type (Table 5).

Locality
Meaford Formation, Upper Ordovician, Credit River, Streetsville, Ontario.

Type
Hypotype ROM 254HR.

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Dr. Richard Boardman, Curator, Invertebrate Paleontology, of the United States National Museum, kindly loaned relevant USNM types.

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