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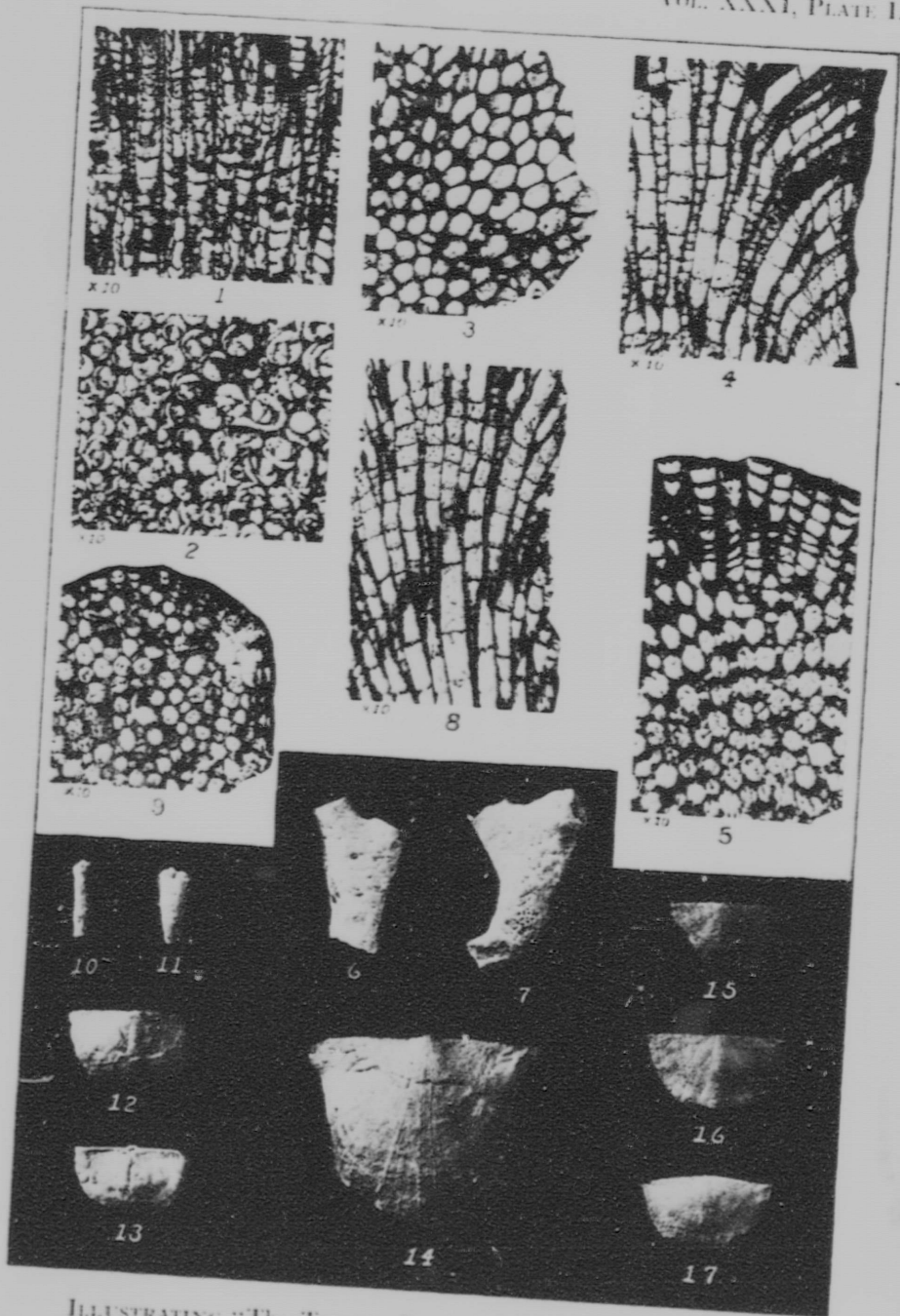
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ILLUSTRATING: "The Trenton Fauna of Wolfe Island, Ontario,"
by Kirtley F. Mather.

THE OTTAWA NATURALIST

Vol. XXXI.

JUNE-JULY, 1917.

Nos. 3 and 4.

THE TRENTON FAUNA OF WOLFE ISLAND, ONTARIO.

BY KIRTLEY F. MATHER, QUEEN'S UNIVERSITY, KINGSTON, ONT.

West of the Frontenac axis in Ontario, the most easterly outcrops of Trenton limestone are those on Wolfe Island at the foot of Lake Ontario between Kingston, Canada, and Cape Vincent, New York. The strata exposed there are the northward continuations of the Ordovician rocks of northern New York and present quite a different succession from that in the Ottawa Valley. It is evident that the Frontenac axis even in mid-Ordovician time was sufficiently defined to influence the boundaries of land and sea.

The Trenton limestones on Wolfe Island rest upon somewhat similar formations of Black River age. All dip at a very low angle toward the southwest. The contact between Trenton and Black River strata is not exposed but is probably similar to that in the Cape Vincent-Watertown district, a few miles to the southeast in New York State. A distinct unconformity is there indicated* by the presence of a basal conglomerate and an irregular contact. Disconformity is strongly suggested on Wolfe Island by the marked change in fauna between the Black River limestones along the north shore and the Trenton strata which outcrop in the interior and along the southern shore.†

Prasopora simulatrix orientalis, *Pachydictya acuta*, *Dalmanella rogata*, and *Rafinesquina alternata* are the ubiquitous and characteristic members of the local fauna. They indicate its alliance to that of the "Prasopora zone" or true Trenton as that term is used by Raymond.‡ The fauna at hand has little in common with that of the Hull formation in Ottawa Valley or of the Glens Falls limestone in Mohawk

*H. P. Cushing, *Geology of the Thousand Island Region*; N. Y. State Mus. Bull. 145, p. 91, 1910.

†See geologic map by M. B. Baker, *The Geology of the Kingston district*; Ontario Bureau Mines, vol. 25, pt. 3, 1917. The Wolfe Island Trenton is described by E. M. Kindle in Appendix I of the same report.

‡P. E. Raymond, *The correlation of the Ordovician strata of the Baltic basin with those of eastern North America*: Bull. Mus. Comp. Zool., vol 56, p. 255, 1916.

Valley. *Triplecia extans* and *Receptaculites occidentalis* are listed by Raymond as characteristic of the Rockland formation which underlies the Hull near Ottawa. Both are present in the Wolfe Island Trenton but are represented in the collections at hand by only two and one specimens respectively.

The collections and studies upon which this paper is based were made in part during the preparation of a report* on the geology of the Kingston district. After that report had gone to press, additional collections were made from the old as well as from new localities. The complete faunal list follows.

TRENTON-FAUNA OF WOLFE ISLAND.

	Locality			Numbers		
	222	223	224	226	308	309
PORIFERA.						
<i>Receptaculites occidentalis</i> Salter-----		x				
ANTHOZOA.						
<i>Streptelasma corniculum</i> Hall-----				x		
BRYOZOA.						
<i>Prasopora simulatrix orientalis</i> Ulrich-----	x		x	x	x	x
<i>Eridotrypa aedilis</i> (Eichwald)-----			x	x		
<i>Eridotrypa aedilis minor</i> (Ulrich)-----			x	x		
<i>Eridotrypa exigua</i> Ulrich-----	x					
<i>Hallopora ampla</i> (Ulrich)-----		x				
<i>Hallopora obliqua</i> n.sp.-----		x				
<i>Hallopora varia</i> n.sp.-----				x		x
<i>Batostoma winchelli</i> Ulrich-----			x	x		
<i>Stictoporella angularis</i> Ulrich-----			x		x	x
<i>Pachydictya acuta</i> (Hall)-----	x		x	x	x	x
BRACHIOPODA.						
<i>Trematis</i> sp.-----	x					
<i>Schizocrania filosa</i> (Hall)-----				x		
<i>Orthis tricenaria</i> Conrad-----		x		x		
<i>Dalmanella rogata</i> (Sardeson)-----	x	x	x	x	x	x
<i>Dinorthis pectinella</i> (Emmons)-----		x		x		
<i>Plectambonites curdsvillensis</i> Foerste-----			?	x	x	
<i>Plectambonites punctostriatus</i> n.sp.-----	x				x	
<i>Rafinesquina alternata</i> (Emmons)-----		x	x	x		x
<i>Rafinesquina deltoidea</i> (Conrad)-----	x			x		

*M. B. Baker, The geology of the Kingston district, with appendices by E. M. Kindle, Alice E. Wilson, and Kirtley F. Mather; Ontario Bureau Mines, Vol. 25, part 3, 1917.

	Locality			Numbers		
	222	223	224	226	308	309
<i>Triplecia extans</i> (Hall) -----	x	x	---	---	---	---
<i>Parastrophia hemiplicata</i> (Hall) -----	---	x	---	x	---	---
GASTROPODA.						
<i>Sinuities cancellatus</i> (Hall) -----	x	x	---	---	---	---
<i>Liospira vitruvia</i> (Billings) -----	---	x	---	x	---	---
<i>Hormotoma gracilis</i> (Hall) -----	x	---	---	x	---	x
<i>Hormotoma trentonensis</i> Ulrich and Scofield -----	---	---	---	x	---	---
CONULARIDA.						
<i>Conularia trentonensis multicosta</i> Ruedemann -----	---	---	---	x	---	---
CEPHALOPODA						
<i>Orthoceras junceum</i> Hall -----	x	---	---	x	---	x
<i>Endoceras proteiforme</i> Hall -----	---	---	---	x	---	---
TRILOBITA.						
<i>Isotelus gigas</i> De Kay -----	x	---	---	x	---	---
<i>Bumastus</i> sp. -----	---	x	---	---	---	---
<i>Calymene senecaria</i> Conrad -----	x	---	---	x	---	x
<i>Ceraurus dentatus</i> Raymond and Barton -----	x	---	---	---	---	---
<i>Ceraurus pleurexanthemus</i> Green -----	x	x	---	---	---	---
OSTRACODA.						
<i>Leperditia</i> sp. -----	---	x	---	---	---	---

Locality List.

- Station 222—Lower five feet of Trenton limestone, four miles southwest from Marysville, Wolfe Island. Lot 2, north, Con. III.
- Station 223—Trenton limestone, probably ten or twelve feet above the base of the formation, one and one-half miles southeast from Marysville, Wolfe Island. Lot 1, north, Con. VIII.
- Station 224—Lower seven feet of Trenton limestone, immediately south of Cold Springs corner, Wolfe Island. Lot 3, Con. IX.
- Station 226—Trenton limestone, probably twenty or thirty feet above its base, along southern shore of Bear Point at southwestern extremity of Wolfe Island.
- Station 308—Trenton limestone, probably fifteen or twenty feet above its base, in small ravine one and one-quarter miles south-east from Cold Springs corner, Wolfe Island. Lot 1, north, Con. IX.

Station 309—Trenton limestone, about fifteen feet above its base, along course of small brook tributary to Bayfield Bay. Lot 1, south, Con. X., Wolfe Island.

DESCRIPTION OF SPECIES.

Phylum MOLLUSCOIDEA.

Class BRYOZOA.

Order TREPOSTOMATA.

Family HALLOPORIDAE.

Genus HALLOPORA Bassler.

HALLOPORA VARIA n. sp.

Plate I, figs. 3-7.

Zoarium composed of subcylindrical branches, 5 to 8 mm. in diameter, bifurcating at frequent intervals; one fragment 22 mm. long has given off five branches. Surface of branches gently undulatory but without conspicuous monticules or maculae. Zoecial apertures angular, about 10 in 5 mm.; walls ridge-like and thin; mesopores very few, generally occurring only in limited areas of the surface.

Tangential sections show the zooecia to be everywhere in contact with each other except in certain spots where small mesopores occupy the angles between zooecia. Vertical sections in the axial region display two sets of tubes, the smaller of which represents mesopores, and the proximal portion of zooecia; in the larger tubes the diaphragms are from 0.2 to 0.5 mm. apart, with an average distance of about 0.35 mm.; this is slightly greater than the diameter of the tubes, which almost invariably falls between 0.28 and 0.33 mm. The smaller tubes contain diaphragms which are only 0.11 to 0.17 mm. distant, generally about as far apart as the diameter of the tube. In the peripheral zone the tubes bend rather abruptly and proceed toward the surface with only slight obliquity; here the diaphragms are from one-third to one-half the diameter apart.

This form is most nearly related to *H. angularis* (Ulrich). The chief differences are the larger size of the branches, the greater distance between diaphragms in the axial portion of zoecial tubes, and the less pronounced crowding of diaphragms near the apertures.

Horizon and locality: Lower Trenton Limestone; Wolfe Island, Ontario, (Stations 226 and 309).

HALLOPORA OBLIQUA n. sp.

Plate I, figs. 8-11.

Zoarium ramose, composed of slender cylindrical branches, 2 to 4 mm. in diameter, bifurcating at comparatively remote intervals; surface of branches slightly undulatory but without conspicuous monticules or maculae. Zoecial apertures polygonal, with thin smooth ridge-like walls, about eleven in 3 mm. Mesopores open at the surface, polygonal in cross-section, about as numerous as the zoecial apertures.

Transverse sections show that the axial region is composed of two sets of tubes; the larger average 0.25 mm. in diameter and are hexagonal to octagonal in outline; the smaller are generally between 0.1 and 0.15 mm. in diameter and display triangular or quadrangular outlines. Peripheral region comparatively thin, less than 0.4 mm. in width in a section across a branch with a diameter of 3.9 mm.

Longitudinal sections display slightly flexuous zoecial tubes which intercept the surface quite obliquely and lack the decided curvature commonly found in other species of the genus. Mesopores are indistinguishable from the proximal portion of zoecial tubes and doubtless the two had similar functions. Diaphragms numerous and quite regularly spaced, crossing zoecial tubes in proximal and axial regions at distances equal to from one to two times the diameter of tube. Near the surface diaphragms are more numerous and generally two or three of them occur in a space equal to their diameter.

That the specimens at hand are mature individuals, even though the zoecial tubes approach the surface obliquely with little curvature from axial to peripheral regions, is evident from the closer spacing of the outermost two or three diaphragms in each tube as well as from the thickening of the wall near the aperture.

In comparison with *H. angularis*, which it resembles in the angular appearance of apertures, this species is distinguished by its smaller zooecia, the generally more slender branches of the zoarium, and the obliquity of the zoecial tubes. *H. obliqua* is probably more nearly related to *H. ampla* and *H. goodhuensis* than to any other described member of the genus. Its branches are on the average slenderer than the smaller of those two species while its zooecia are intermediate in size between them. More significant, however, is the much fewer number of diaphragms in the peripheral zone of the material at hand.

Horizon and locality: Lower Trenton limestone; Wolfe Island, Ontario, (Station 224).

Class BRACHIOPODA.
Order NEOTREMATA.
Family TREMATIDAE.
Genus TREMATIS Sharpe.

TREMATIS sp.

The shell thus identified is imperfectly preserved but undoubtedly represents a new species of this genus. The specimen is very small, about 3 mm. long and 4 mm. wide, and consists of a pedicle valve, from which the apex is broken away, revealing a portion of the interior of the brachial valve. The apex appears to have been much nearer the posterior margin than the center of the valve. Surface markings are of the *T. umbonata* type and consist of radiating rows of circular pits

separated by flat interspaces which are generally broader than the diameter of the pits. Between 15 and 20 rows occur in the space of 1 mm. The general outline of the valves is transversely elliptical, somewhat similar to that of *T. punctostriata*.

Horizon and locality: Lower Trenton limestone; Wolfe Island, Ontario, Station 222.

Order PROTREMATA.

Family STROPHOMENIDAE.

Genus PLECTAMBONITES Pander.

PLECTAMBONITES PUNCTOSTRIATUS n. sp.

Plate I, figs. 15-17.

Shell of medium size, transversely semi-elliptical in outline, cardinal angles slightly acute but not auriculate; adult shells varying in width between 16 and 21 mm., in length between 9.5 and 12 mm. Surface of both valves marked by fine, thread-like, radiating lirae, 4 to 6 of which occur in the space of 1 mm.; every second or third lira slightly more prominent than the intermediate, newly developed ones; depressions between lirae occupied by rows of minute punctures which give the whole surface a finely rugose aspect. Dimensions of four typical specimens are: width, 14.1, 16.0, 18.3, and 20.8 mm.; length, 7.8, 9.6, 10.3, and 11.7 mm.

Pedicle valve more convex than in *P. curdsvillensis*, with the point of greatest convexity a little behind the mid-length of the shell; beak and cardinal area as in the general *P. sericeus* type; lateral margins rounding broadly into the convex anterior margin. A low, narrow, mesial fold originates near the beak and broadens anteriorly; in most individuals this is a fairly conspicuous feature of the shell, but in a few it is scarcely perceptible. Cardinal margin crenulated by a series of oblique wrinkles which in most specimens make their appearance within 2 mm. of the beak and become progressively longer toward the cardinal extremities; about 4 or 5 wrinkles occur in the space of 3 mm. and the angle between them and the hinge line is generally between 30° and 40°; in some individuals the crenulations are scarcely perceptible but they are rarely entirely lacking. Interior of valve not known.

Brachial valve not positively identified.

The shells subsumed here are most nearly related to *P. rugosus* (Meek), but the present species differs from that one most conspicuously in the presence of a mesial fold and sinus as well as in the greater equality of its radiating lirae.

Horizon and locality: Lower Trenton limestone; Wolfe Island, Ontario, Stations 222 and 308.

PLECTAMBONITES CURDSVILLENSIS Foerste.

Plate I, figs. 12, 13.

Plectambonites curdsvillensis Foerste, Bull. Sci. Lab. Denison Univ., Vol. 17, p. 122, pl. 10, figs. 15a, b, 1912. Curdsville bed, Glenn Creek Station, Woodford country, Ky.

Shell of medium size, transversely semi-elliptical in outline, ordinarily between 16 and 21 mm. in width and from 9 to 11.5 mm. long; cardinal angles slightly acute, but not produced; surface of each valve marked by exceedingly fine, hair-like, radiating lirae, 5 to 7 of which occur in the space of 1 mm., with every third or fourth liration slightly more prominent than the intermediate ones. The dimensions of three typical individuals are: width, 16.4, 18.6, and 20.9 mm.; length, 9.0, 10.1, and 11.4 mm.

Pedicle valve moderately convex, with regular curvature of surface both longitudinally and transversely; beak and cardinal area conforming to the general *P. sericeus* type; lateral margins converging slightly from the cardinal extremities forward to the mid-length of the valve and then rounding broadly into the anterior margin; a faint, broad, median sinus generally developed in front of the middle of the shell, causing the anterior outline to be straightened or even slightly emarginated.

Brachial valve moderately concave, with curvature of surface and outlines conforming to the opposite valve; a faint, broad, median fold developed in many individuals corresponding to the ventral sinus. "The interior of the brachial valve is thickened near the anterior and lateral margins, the thickening beginning about 2 or 2½ mm. from the margin and extending to within 1 mm. of the latter. However, between the thickened border and the margin of the valve, the shell is much thinner and is traversed, in the same direction as the radiating striae, by a series of short, vascular grooves, of which about 7 occur in a width of 2 mm. . . . The two median ridges separating the two adductor areas usually are prominent and sharp, as in the less mature stages of *P. rugosus*, although sometimes thickened anteriorly. The lateral outlines of the adductor areas tend to be crescentic." (Foerste).

Foerste has called attention to the fact that the oblique wrinkles along the hinge lines of many individuals belonging to this genus are not characters of specific value. Nevertheless, it is evident that certain species show a marked tendency toward developing these wrinkles while others display just as marked an antipathy to them. Among the fifteen specimens referred to *P. curdsvillensis*, for example, only one shows any trace of oblique wrinkles and on it they are scarcely perceptible. Additional characters which distinguish it from allied species are the absence of a mesial fold on pedicle and sinus on brachial valve, the low convexity of pedicle valve, the absence of

cardinal auriculations, the thickened border in the interior of brachial valve, and the sharp prominent ridges along the axial margins of the adductor muscle scars.

Horizon and locality: Lower Trenton limestone; Wolfe Island, Ontario. Stations 224?; 226, and 308.

EXPLANATION OF PLATE.

PRASOPORA SIMULATRIX ORIENTALIS.

Figures 1, 2—Vertical and tangential sections, X 10, of an average specimen. Queen's University Paleontologic Museum No. 1263.

HALLOPORA VARIA.

Figures 3, 4, 5—Tangential, vertical and transverse section, X 10, of the holotype. Queen's University Paleontologic Museum No. 1272.

Figures 6, 7—Two of the plesiotypes, natural size. Queen's University Paleontologic Museum No. 1270.

HALLOPORA OBLIQUA.

Figures 8, 9—Vertical and transverse sections, X 10, of one of the cotypes.

Figures 10, 11—Two of the cotypes, natural size. Queen's University Paleontologic Museum No. 1276.

PLECTAMBONITES CURDSVILLENSIS.

Figure 12—A pedicle valve showing the faint mesial sinus commonly observed on the shells thus identified.

Figure 13—The interior of a brachial valve from the same locality. Queen's University Paleontologic Museum No. 1269.

RAFINESQUINA DELTOIDEA.

Figure 14—A pedicle valve. Queen's University Paleontologic Museum No. 1262.

PLECTAMBONITES PUNCTOSTRIATUS.

Figures 15, 16, 17—Three of the cotypes, pedicle valves. Queen's University Paleontologic Museum No. 1277.

NOTES ON THE LAND MOLLUSCA OF DE GRASSI POINT,
LAKE SIMCOE, AND OTHER ONTARIO LOCALITIES.

BY E. M. WALKER, F.R.S.C., UNIVERSITY OF TORONTO.

(Continued from page 22.)

22. *Zonitoides arborea* (Say). The commonest of all our land Mollusca, occurring in the woods everywhere, from the tamarack swamp to the hardwood forests. Toronto, May-October; De Grassi Point, April 27th—September; Go Home Bay, July 15th-17th; Giant's Tomb Island, July 20th; St. William's, September 3rd.

23. *Zonitoides exigua* (Stimpson). This minute ribbed species is common at De Grassi Point under leaves and rubbish in the woods. It was also taken at Go Home Bay and the Giant's Tomb Island.

24. *Zonitoides milium* (Morse). Toronto, De Grassi Point and the Giant's Tomb Island, not rare under leaves in woods.

25. *Gastrodonta intertexta* (Binney). Port Rowan, September 2nd, 1915, a single mature specimen; St. William's, September 3rd, a few living specimens and numerous shells in good condition on a steep wooded slope. It was associated here with considerable numbers of *Polygyra thyroides*, *P. fraudulenta* and *Pyramidula alternata*.

Gastrodonta ligera (Say) has been recorded from Toronto, but I have not seen specimens of it.

LIMACIDAE.

26. *Agriolimax agrestis* (Linn.) This slug is very abundant at Toronto, De Grassi Point, Port Rowan and St. William's and doubtless everywhere in the cultivated parts of Ontario. During the summer only immature specimens were seen at De Grassi Point and they had scarcely reached their full size when I left on September 23rd. Adults are plentiful at Toronto in the fall and may be found in abundance until well into November. They are most plentiful in low, grassy places.

27. *Agriolimax campestris* (Say). Toronto, De Grassi Point, Port Rowan, St. William's. Abundant and generally distributed, occurring with the preceding species and also in woods.

At De Grassi Point these two slugs are particularly numerous about the narrow belt of woods along the shore where *Vitrina limpida* occurred (vide antea). The individuals seen during the summer were mostly immature. Adults are common in the fall until November.

28. *Limax maximus* Linn. A single specimen of this large European slug was found at Toronto by Mr. H. T. White, in 1916.

ARIONIDAE.

29. *Arion circumscriptus* Johnston. This is also a European slug though it has become thoroughly naturalized in the neighbourhood of Toronto, occurring in almost every little patch of woods under logs and rubbish. It is common from spring to autumn.

ENDODONTIDAE.

30. *Pyramidula alternata* (Say). This is by far the commonest of our larger snails and persists longer than most species in small patches of woods and thickets in the environs of the city. Toronto, De Grassi Point, generally distributed in woods. Also found at Go Home Bay, Giant's Tomb Island, Port Rowan and St. William's.

31. *Pyramidula cronkhitei anthonyi* Pilsbry. One of our most abundant species, occurring very generally in low woods at De Grassi Point. Also found at Toronto, Go Home Bay, Giant's Tomb Island and St. William's, April-October.

32. *Helicodiscus parallelus* (Say). De Grassi Point, May 10th—August 25th, not uncommon. Most of my specimens were found in shady thickets or woods of cedar, poplar, elm, etc. It was also taken by Miss Ford at York Mills, north of Toronto, July 22nd, 1 specimen, and at Point au Baril, Georgian Bay, August 11th, 2 specimens.

33. *Punctum pygmaeum* (Draparnaud). De Grassi Point, May 14th—August; Giant's Tomb Island, July 20th. Found on the under surface of decaying leaves in the forest litter, associated with *Zonitoides exigua*. Considerable search was made for this minute species but it was not often taken.

34. *Sphyradium edentulum* (Draparnaud). Several examples of this little pupiform snail were taken at De Grassi Point from the debris in a small grove of cedar, elm and poplar on July 22nd. They were associated with *Vertigo elatior*, *Helicodiscus parallelus* and a few other common species. Another specimen was taken in a somewhat swampy wood on August 15th, and it was again taken on May 5th, 1917.

PHILOMYCIDAE.

35. *Philomycus carolinensis* (Bosc.). This large slug occurs commonly in rotten logs in the hardwood at De Grassi Point, and I found a number of specimens in a wooded ravine at Go Home Bay, July 16th, and on the Giant's Tomb Island, July 20th. It also occurs at Toronto and St. William's. The earliest capture of the adults was that of the Go Home Bay specimens.

Pallifera dorsalis Binney, has been recorded from Toronto but I have not met with it at all.

SUCCINEIDAE.

36. *Succinea retusa* Lea. Very abundant at De Grassi Point in open marshes and readily collected by sweeping the marsh grasses and sedges with an insect net.

36a. *Succinea retusa* var. *decampii* Tyron. Miss Ford collected a number of specimens of this variety from several localities in the vicinity of Toronto (East Toronto, Mimico and Lambton). All were taken during September.

37. *Succinea ovalis* Say. De Grassi Point, May 10th—August 25th, common in low, rich woods; sometimes occurring under bark and rubbish, sometimes on leaves of shrubs some distance from the ground. It is also common at Toronto and a specimen was taken at St. William's.

Two specimens resembling the var. *totteniana* Lea, were found at Toronto by Miss Ford, April 29th (old shell) and June 21st, fresh adult.

38. *Succinea avara* Say. First noticed at De Grassi Point on June 23rd, 1915, but apparently common throughout the summer,

occurring in low woods and along the margins of streams. A pair in copula were observed on May 9th, 1917.

PUPILLIDAE.

39. *Strobilops virgo* (Pilsbry). Go Home Bay, July 16th and 17th, several specimens were taken and it may have been plentiful but was not distinguished from *Euconulus* until examined later. Found in a wooded ravine. A dead specimen was also taken from the drift along the Don River, Toronto, in November.

40. *Acanthinula harpa* (Say). Living specimens and fresh shells, mostly mature, were found in considerable numbers in a sandy pine wood on the Giant's Tomb Island, July 20th. It was not observed elsewhere.

41. *Bifidaria armifera* (Say). Miss Ford has a single specimen taken at Lambton, (West Toronto) from a "dry, rocky flat," September 9th, 1916. It has already been recorded from the Toronto district.

42. *Bifidaria contracta* (Say). I found a few specimens of this species on July 24th under wet logs and stumps on the edge of Wilson's Creek (De Grassi Point), in its upper part where it is a mere brook. One or two others were found in a low wood near the lake shore. At Toronto I found them in much larger numbers along the banks of the Don River, in November.

43. *Bifidaria tappaniana* (C. B. Adams). A specimen, nearly mature, was found in a rich hardwood forest on the Giant's Tomb Island, July 20th. Another specimen, fully mature, was taken at Toronto, from the banks of the Don River in November. A single adult was also found at De Grassi Point.

44. *Vertigo ovata* Say. A single adult was taken at De Grassi Point on August 25th, from a low wood of poplar, cedar, etc., near the lake shore. Another, very nearly mature, was taken from the banks of the Don River, Toronto, in November.

45. *Vertigo ventricosa* (Morse). Several specimens of this species were taken at De Grassi Point at the same spot where *V. ovata* was found. Adults were found during July, August and September. A single specimen was also taken from the drift along the edge of the Don River in November.

46. *Vertigo elatior* Sterki. De Grassi Point, associated with *V. ventricosa* and apparently commoner. It was not recognized as distinct until determined for me by Mr. Bryant Walker.

All of these Vertigos were taken most frequently from under the sides of chips and blocks of wood from a recently felled aspen poplar. A few were also taken from rubbish in a cedar grove, where they were associated with *Sphyradium edentulum*. A specimen of *V. elatior* was

also taken at Toronto in November, from the drift along the shore of the Don River.

47. *Vertigo gouldii* (Binney). A single dead specimen of this form was found at De Grassi Point on July 25th in the hardwood.

48. *Vertigo milium* (Gould). I found three shells of this tiny form, one of them fresh, at De Grassi Point on May 14th, 1917. They were taken from the forest litter at the edge of a low wood and were associated with *Carychium exile canadensis*. It has also been reported from the Toronto district.

The determination is my own and has not been verified, like the other species of *Vertigo*, by Mr. Bryant Walker.

COCHLICOPIDAE.

49. *Cochlicopa lubrica* (Muller). Common at Toronto where I have taken it in May and October. On October 10th, 1915, I found it in considerable numbers among the fallen needles and other debris at the edge of a pine grove in Wychwood Park. Miss Ford has specimens from Mimico, September 9th (1 specimen from dry, stony hillside); East Toronto, September 30th (5 adults and 3 young from beneath stones) and Rosedale, October 5th, (7 specimens from a wooded ravine.

Two specimens were also taken on the Giant's Tomb Island, July 20th.

49a. *Cochlicopa lubrica* var. *morseana* Doberty. De Grassi Point, August 19th, a single example from the hardwood. Another was taken by Miss Ford at Toronto ("old Belt Line Cut," under damp log, June 21st).

VALLONIIDAE.

50. *Vallonia pulchella* (Muller). Abundant at Toronto, April-November, occurring under stones, boards, etc. in more or less open places. In early November I found a considerable number crowded together under a chunk of wood which was half buried in the sand near the edge of the Don River. It is one of the few species which continues to thrive under urban conditions.

It was also common at De Grassi Point, in more or less grassy places, occurring plentifully throughout the summer.

51. *Vallonia costata* (Muller). Lambton (West Toronto), under dry log, September 4th, 2 specimens (Miss Ford); Rosedale, under dry log in ravine, October 5th, 1 specimen (Miss Ford).

AURICULIDAE.

52. *Carychium exiguum* (Say). Numerous dead specimens of this minute form were found in November in the drift along the Don River, Toronto. Living specimens were also found in wet depressions in a hardwood forest near St. William's, September 3rd. A few occurred at De Grassi Point, associated with the next species.

53. *Carychium exile* var. *canadense* Clapp. This little mollusk is extremely common at De Grassi Point, April-September, in wet places in the woods. It was first found in the moss of the tamarack swamp, but is much more easily collected from the under sides of leaves in damp depressions in deciduous woods. Dead shells were found with those of *C. exiguum* at Toronto in November.

PELORIA FLOWERS ON IVYWORT OR
IVY-LEAVED TOADFLAX.

[*Linaria Cymbalaria* (L) Mill.]

This Toadflax is a trailing plant, native to Southern Europe, where it is said to be used as a salad. I have found it wild, as a colonist, in England, growing on such ruins as St. Mary's Abbey, Yorkshire, and the Roman camp at Lanchester, County Durham: it is, however, rare. The flowers are somewhat small, streaked with lilac and yellow, and of a peronate or 'snap-dragon' form, but in a fine clump growing in my window box, in the beginning of March, I noticed a flower which was regular, with 5 spurs, 5 corolla lobes, and 5 stamens. This is the peloria form of flower, which has sometimes been found on *Linaria vulgaris*, but has not, as far as I am aware, been recorded for this species. The French proverb says, 'The English are troubled with afterthought' and doubtless it would have been better if, instead of dissecting it, I had tried to secure the seed, to attempt the propagation of this abnormal form. Another *Linaria* (*L. Dalmatica*) which I have grown here, exhibits the peloria form at the summit of each flower spike.

BLYTHE HURST, Charlottetown, P.E.I.

DISAPPEARANCE OF THE BLUE GRAY GNAT-CATCHER.

To the bird student who is continuously resident in one place comes the opportunity of noting the comparative abundance of a species in different years and to him falls the problem of the reasons for variation in numbers, which is usually baffling.

Around London, Ont., we have been interested in watching the increase of the grasshopper sparrow, cardinal, short-billed marsh wren,

the latter perhaps the most erratic of all birds, and for the last two years we have been amazed and puzzled by the dwindling of the blue gray gnat-catcher. I have seen it so common in this district that I was able to find on one morning three nests in a single wood. Last year my impression is that the combined efforts of our Club resulted in the report of one bird and this year not a single one has been noted. These birds usually nest in half open woods of oak, cherry, elm, etc., and we have usually found in the same woods the cerulean warbler and often the goldenwing but while the numbers of the two last mentioned have not fallen away seriously, the blue gray has vanished as far as our district is concerned.

It is a well known fact that practically all of the annual increases of each species dies within a year but when the blue bird was almost exterminated in the winter of 1895 it proved to be possible for that species to hold a considerable portion of the annual gain of numbers so that in a few years it nearly reached the former standard of abundance and it is to be hoped that there are enough gnat-catchers left in Ontario to spread gradually over their former habitat.

W. E. SAUNDERS, London, Ont.

THE ROUGH-WINGED SWALLOW NEAR OTTAWA.

On June 28th, two tunnels used by Rough-winged Swallows as nesting sites were observed about one-half a mile apart in the sandy bank of the Rideau River above Hog's Back Lock. They were larger in diameter than those excavated by Bank Swallows, being about the same size as Kingfisher tunnels.

One of them, situated about two feet from the top of a thirty foot bank, was found to run in three feet and end in a chamber approximately eight inches in diameter. The nest, which contained six young, was made entirely of a liberal amount of dry grass. Instead of being symmetrically placed at the end of the tunnel, the nesting chamber was, without apparent reason, wholly on one side.

The Rough-winged Swallow has uniformly colored throat and breast while the Bank Swallow, which it resembles in appearance and habits, has white underparts with a brownish band across the breast. The flight of the Rough-wing is slower and less irregular than that of the Bank Swallow.

The Rough-winged Swallow should be watched for, as it has seldom been observed in eastern Canada.

CLYDE L. PATCH, Ottawa.

NOTES.

The daily papers reported that Vilhjalmur Stefansson, the Arctic explorer, was wintering with the gasoline schooner Polar Bear at Prince of Wales Strait, according to news brought by a Northwest Police expedition from Fort McPherson. Stefansson, who passed last summer exploring the new land discovered north of Prince Patrick Island, was hopeful that the ice would break up early the past spring and permit him to make the northeast passage and to sail up the St. Lawrence River to Montreal.

Eight new club members were secured in one of the Government buildings at Ottawa in two hours by a self-appointed committee of two of our members. Persons were found to be anxious to be elected to membership. Make up a list of your friends or take an attendance list of the employees in a department, ask each one if they wish to become a member, and send the names and addresses of those who do to the Secretary.

A number of rats which were stunted for various periods of time at the Connecticut Agricultural Exp. Station and Sheffield Scientific School, New Haven, Conn., showed that this retardation of growth tended to prolong their life beyond the average span; that is, physiologically age is not a function of time alone but also of growth. A rat three years old may be regarded as corresponding to a man ninety years old. Although none of the stunted rats began breeding until they had reached an age when normal rats are commonly believed to be approaching the menopause, they produced from three to six litters of young and successfully reared all but a few of them. Their young were apparently as vigorous as those born of younger mothers. Hence the menopause has been postponed long beyond the age at which it usually appears. In view of this, and the added fact that less than one-third of the stock rats reached an age of more than two years, whereas all of these stunted females lived longer, it appears as if the preliminary stunting period lengthened the total span of their life.

A third relief expedition will be sent to the Arctic this summer by the American Museum of Natural History to bring home the members of the Crocker Land expedition, which went north in 1913. The second relief ship, the Danmark, was reported in Melville Bay, 150

miles southeast of Cape York, on August 20, 1916. She probably reached North Star Bay at least and probably has the explorers on board. The third vessel will be sent to Etah, leaving St. John's early in July. The committee hopes to obtain a Newfoundland sealer for this purpose and to bring the Crocker Land expedition back to Newfoundland late in August.

For the third consecutive year a collector of plants has been put into certain of the northern counties of the State of Wisconsin by the Public Museum of the City of Milwaukee, devoting all of the season to the collection of plants of the regions. This work is toward a plant census of the State, on which the Museum has been working for several years.

According to the "Museums Journal," sanction has been given by the War Cabinet of Great Britain to establish a National War Museum and "a committee has been formed to carry it into effect." "The object is to collect and preserve for public inspection objects illustrating the British share in the war." The Tower of London has been suggested as an ideal place for such a "national storehouse of British Military History."

The Fisheries Branch of the Department of Naval Service, has recently published a supplement to the Sixth Annual Report, containing the following contributions to Canadian Biology: "The Winter Plankton in the neighborhood of St. Andrews, 1914-15," by Prof. J. Playfair; "Diatoms and Lobster Rearing," by Prof. W. T. MacClement; "On the Scales of the Spring Salmon," by Dr. C. McLean Fraser; "On the Life-history of the Coho," by Dr. C. McL. Fraser; "An Investigation of Oyster Propagation in Richmond Bay, P.E.I., during 1915," by Dr. J. Nelson; "The Marine Algæ of the Passamaquoddy Region, N.B.," by Prof. A. B. Klugh; "On Serially Striped Haddock in New Brunswick," by Prof. E. E. Prince; "Notes on the Phyto-Plankton of the Bay of Fundy and Passamaquoddy Bay," by Prof. L. W. Bailey; and "The Geological Features of the St. Croix River and Passamaquoddy Bay," by Prof. L. W. Bailey.

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