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RESULTS OF THE MERSHON EXPEDITION TO THE
CHARITY ISLANDS, LAKE HURON.

MOLLUSCA.

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The molluscan fauna of the Charity Islands, as represented by the collections made by the several members of the Mershon Expedition¹ of 1910, is not an extensive one, consisting of only thirty-five species, of which nine are terrestrial and twenty-six are aquatic. As would naturally be expected, it is, as far as it goes, the same as that of the sand dune region of the south shore of Saginaw Bay² and that of the mainland to the north and west.³ Since there are no streams on the islands, the species characteristic of such an habitat are, of course, lacking, except as a few have found a suitable home in the pond in the interior of Charity Island. The aquatic fauna found along the shores of the islands is the same as that which occurs all along the Lake Huron coast from Saginaw Bay to Mackinaw City.

¹ A list of the published reports of this expedition is given at the end of this paper.

² Baker, H. B., Pub. 4, Biol. Ser. 2, Mich. Geol. & Biol. Sur., 1911, 121.

³ Walker, Bryant, Naut., VII, 1894, 125, and Baker, F. C., Trans. Acad. Nat. Sci. St. Louis, XVI, 1906, 1.

The few species of land snails are all common forms of general distribution throughout the northern part of lower Michigan. With the exception of the two larger species of *Polygyra*, they are also prevalent forms along the shores of the rivers on both sides of the Bay, and, consequently, might easily be washed out by freshets in times of high water and in this way, perhaps, be carried on floating debris to the islands. It is also possible that the larger species reached the islands in this way.

LIST OF SPECIES.

1. *Polygyra albolabris* (Say). This species occurs on Charity and Little Charity and shows no special differentiation on either. The fourteen mature and perfect specimens collected vary in height from 17 to 20.5 mm., with an average of 18.5, and in diameter from 25 to 28.5 mm., with an average of 26.33. The axial index varies from .65 to .75, with an average of .704. A comparison of the average shell of this series with the average shell from the Upper and Lower Peninsula (Walker Pr. A. N. S. P., 1910, p. 36) may be made as follows:

LOCALITY.	ALTITUDE.	DIAMETER.	AXIAL INDEX.
Upper Peninsula	17.02.	25.81.	.654.
Charity Islands	18.51.	26.33.	.704.
Lower Peninsula	18.10.	27.10.	.677.

This shows the island shells to be larger in diameter than those from the Upper Peninsula and smaller than those from the Lower Peninsula, but more elevated than either.

1a. *Polygyra albolabris* var. *dentata* (Tryon). A single specimen of this form was collected on Little Charity Island.

2. *Polygyra thyroides* (Say). A few rather thin, pink-tinted examples were collected "under old logs and stumps in the interior of Charity Island."

3. *Polygyra monodon* (Rackett). The typical form, varying from 12 to 14 mm. in diameter, was very abundant on Charity Island.

4. *Pyramidula alternata* (Say). Abundant on Charity

and Little Charity. On Charity Island two quite distinct races were found. In the interior of the island, shells from "under rotten logs and stumps" are deeply colored, the ground color throughout being a reddish-yellow with dark, conspicuous flammules above, which extend a short distance below the periphery and, in most cases, terminate abruptly, being bounded below by a conspicuous band of the ground color, below which the base is distinctly streaked. Occasionally the upper flammules extend more or less distinctly over the band and connect with the basal streaks, but in such cases the flammules are narrowed and abruptly curved as they pass over the band, which is, consequently, always obvious.

In shells collected along the shore, the ground color is much lighter and the base is entirely without streaks, or, when present, the streaks are faint and narrow.

Unfortunately this difference was not noted in the field and no exact records of the range of the two races were made. But from the occurrence of occasional individuals of the dark race among the beach shells and *vice versa*, it is probable that the two races inosculate more or less along the borders of their respective habitats. On the whole, however, the two races are distinctly marked and easily separable. In size they run about the same, but the shells from the interior of the island appear to be rather more elevated.

The specimens from Little Charity are mostly bleached, but, though smaller than those from the main island, appear to be more closely related to the darker colored race found there.

5. *Pyramidula cronkhitei anthonyi* Pilsbry. Apparently abundant on Charity Island. A rather thin, light colored form with fine striæ, but otherwise typical.

6. *Zonitoides arborea* (Say). Abundant on Charity Island.

7. *Bifidaria contracta* (Say). A few examples were collected on Charity Island.

8. *Succinea avara vermèta* Say. A single specimen was found on Charity Island.

9. *Succinea retusa* Lea. Two very distinct forms of this species were found on Charity Island:

A. About typical, with a short spire, the largest specimen measuring 11.5 mm. in length, aperture 8.5 and spire 3.

B. Larger, more elongated and very obliquely coiled. The largest specimen measures 16 mm. in length, the aperture being 9.5 and the spire 6.5. This is evidently the same race that has been recorded from Saginaw (Naut. VII, p. 127), but it does not apparently attain the same size, as the Saginaw shells reach 19.75 mm. in length, a difference of nearly 25%

10. *Lymnaea emarginata* Say. A few specimens from Charity Island are fairly typical of the lake form as found abundantly at Mackinac Island, but most of the specimens belong rather with the following variety.

10a. *Lymnaea emarginata ontarioensis* Muhlfeldt. Abundant on the west beach of Charity Island and also on Little Charity. This is one of the characteristic species of the beaches here, as it is all along the Lake Huron shore north to Mackinac City. The large majority of the specimens have the "flat-sided" upper whorls and slightly impressed suture characteristic of the form, but there is a complete gradation into the rounded whorls and deeper suture of the typical form.

11. *Lymnaea catascopium* Say. A few specimens from Charity Island seem referable to this species.

12. *Lymnaea reflexa* Say. Apparently common on Charity Island, but the exact locality was not given. Taken as a whole the series seem to show that the island form is rather a small one. The largest specimen collected measures 29.5 mm. in length, but only an occasional shell exceeds 25 mm. in length and most of them fall below that.

12a. *Lymnaea reflexa walkeri* Baker. A few specimens occurred with the typical form. They are unusually slender and quite small, even as compared with the average shell of the series.

13. *Lymnaea elodes* Say. A considerable number of specimens of this species were found in "dried-up water-holes" in the interior of Charity Island. A decided tendency toward

longitudinal striping is exhibited in the series and occasional specimens are very conspicuously variegated in this manner.

14. *Lymnæa obrussa* Say. A few specimens of a rather small form were taken on Charity Island.

15. *Lymnæa dalli* Baker. A single specimen was found among the *elodes* from the interior of Charity Island.

16. *Physa ancillaria magnalacustris* Walker. A characteristic beach form of the Lake Huron shore. Typical examples were found on the west and south beaches of Charity Island under drift-wood. It also occurred on Little Charity, and all the shells found there seem rather thinner and more transparent than those from Charity Island, but as none are fully mature, this may not be a characteristic of the adult form.

17. *Physa integra* Haldeman. Quite a number of the solid lake form of this species were taken on Little Charity and a few immature shells on Charity Island.

18. *Physa heterostropha* Say. A few, not fully mature, specimens were collected on the west beach of Charity Island.

19. *Physa sayii* Tappan. A single specimen, 19.5 mm. in length, was found on Charity Island.

20. *Physa gyrina* Say. A single dead shell, without the apex, from Charity Island is probably referable to this species.

21. *Aplexa hypnorum* (Linnæus). Found abundantly under drift-wood on the west and south beaches of Charity Island. A few specimens were also found in the dried-up water-holes in the interior of the island.

22. *Planorbis truncatus* Miles. A few specimens of this, the most characteristic species of the Saginaw Bay region, were collected on Charity Island.

23. *Planorbis campanulatus* Say. Abundant on the mud-flats along the edge of the pond in the interior of Charity Island. The specimens are quite uniform in shape and belong to a flat form rather characteristic of the sandy region of the upper part of the Lower Peninsula. It has been seen from several localities and is more closely related to the var. *rudentis* Dall than to typical *campanulatus*. The largest and smallest specimens measure as follows:

Largest, altitude (body whorl) 5.5; greater diameter, 14; lesser diameter, 10.5 mm.

Smallest, altitude (body whorl) 4.5; greater diameter, 10.5; lesser diameter, 8 mm.

24. *Planorbis antrosus striatus* Baker. A single specimen was collected with the *campanulatus* from the pond on Charity Island.

25. *Planorbis parvus* Say. Two specimens only were collected on Charity Island.

26. *Segmentina crassilabris* Walker. A few from Charity Island.

27. *Goniobasis livescens* (Menke). The solid, livid form of this species, characteristic of the Great Lakes, was found abundantly on the beaches of both islands. Those from Charity Island were collected on rocks off the west shore in from 12 to 20 inches of water.

28. *Campeloma rufum* (Haldeman). A few dead specimens of this species were found on the south beach of Charity Island.

29. *Lampsilis ventricosa canadensis* (Lea). This depauperate form characteristic of the Great Lakes occurred in considerable abundance on the sandy beach at Light House Point, Charity Island.

30. *Lampsilis luteola rosacea* (DeKay). The dwarf form of this species characteristic of the Great Lakes, though usually lacking the colored nacre of the typical *rosacea*, can not otherwise be distinguished from it and must bear DeKay's name. It is apparently abundant along the shores of the islands. A few of the specimens collected were typically colored.

31. *Lampsilis nasuta* (Say). A few were collected on the shore of Charity Island.

32. *Unio gibbosus* Barnes. A few examples of the characteristic small Great Lakes form were found on Charity Island.

33. *Strophitus edentulus* (Say). A single valve of an immature specimen of this species was picked up on the beach of Charity Island.

34. *Sphaerium occidentale* Prime. A large colony of this common and widely distributed species was found in a water-hole formed by the over-turning of a tree on the east side of Charity Island.

35. *Pisidium* sp.? A single specimen of an, as yet, undetermined species was collected on Little Charity Island.

PUBLISHED REPORTS OF THE MERSHON EXPEDITION.

The results of the Mershon Expedition and additional work on the Charity Islands carried on by the Michigan Geological and Biological Survey have been partially summarized in the following papers.

The Mershon Expedition to the Charity Islands, Lake Huron, by A. G. Ruthven, *Science*, N. S., XXIII, 208-209.

Results of the Mershon Expedition to the Charity Islands, Lake Huron.

Birds, by N. A. Wood, *Wilson Bull.*, July, 1911, 78-112.

Plants, by C. K. Dodge, 13th Ann. Rept. Mich. Acad. Sci., 1911, 173-190.

Mammals, by N. A. Wood, *ibid.*, 131-134.

Preliminary Report on the Coleoptera, by A. W. Andrews, *ibid.*, 168-170.

Amphibians and Reptiles, by Crystal Thompson and Helen Thompson, 14th Ann. Rept. Mich. Acad. Sci., 1912, 156-158.

The Formicidae of Charity Island, by F. M. Gaige, *Occ. Papers of the Mus. of Zool.*, No. 5, 1914.

The Breeding Birds of Charity Island, with Additional Notes on the Migrants, by N. A. Wood, 14th Ann. Rept. Mich. Acad. Sci., 1912, 178-188.

