

THE AMERICAN BITHYNIA NOT WHOLLY AN INTRODUCED SPECIES.*

FRANK COLLINS BAKER, CURATOR, MUSEUM OF NATURAL
HISTORY, UNIVERSITY OF ILLINOIS.

One of the most abundant species of gastropod mollusks in the United States is the little snail known as *Bithynia tentaculata* first described by the great Linnaeus. Its late appearance in American molluscan literature (1880) and its later appearance in different parts of the Great Lakes area has led to the conclusion that it was introduced from Europe with some sort of cargo. Walker (1918, p. 132) remarks that "This well known European species has been introduced from Europe by commerce and has spread from the Hudson west to Lake Michigan". In a letter to the writer Dr. Walker says "There is no doubt but that this common European species was introduced into America from Europe in the ballast of the timber ships that used to carry long, squared timber from Holland, Saginaw and other Lake Michigan ports, directly to Europe. The species was detected at these points as early as 1891".

The present wide-spread distribution of *Bithynia tentaculata*, now found in all the Great Lakes excepting Lake Superior, in such lakes as Oneida and Cayuga, in New York, Winnebago in Wisconsin, and Black Lake and other inland points in Michigan, in addition to other places in New York State, Erie Canal and Hudson River, taken in connection with its great abundance wherever found, raises the question as to whether it is not another species inhabiting both Europe and America., as *Stagnicola palustris* and *Margaritana margaritifera*. Until recently, its numbers and wide distribution (it seems doubtful that it could spread so far in 48 years, 1879 to 1927) have been the only factors that could be urged for the acceptance of a two continent distribution theory.

Two years ago Dr. Alvin R. Cahn, of the Department of Zoology, University of Illinois, collected a number of

*Contribution from the Museum of Natural History, University of Illinois, No. 46.

Pleistocene fossils from Chicago deposits which included a number of *Bithynia tentaculata*. This material with the associated species, is tabulated below:

I. Southwest corner Michigan Boulevard and Walton Place, nine feet below level of Lake Michigan.

<i>Lampsilis siliquoidea</i>	<i>Pleurocera acuta</i>
<i>rosacea</i>	<i>Goniobasis livescens</i>
<i>Elliptio dilatata</i>	<i>Campeloma rufum</i>
<i>Sphaerium simile</i>	<i>Amnicola limosa porata</i>
<i>Sphaerium solidulum</i>	<i>Valvata bicarinata</i>
<i>Sphaerium flavum</i>	<i>perdepressa</i>
<i>Pisidium virginicum</i>	<i>Bithynia tentaculata</i>
<i>Pisidium compressum</i>	
<i>pellucidum</i>	

II. Southwest corner Tower Court and Pearson Street, about 15 feet below street level.

<i>Sphaerium solidulum</i>	<i>Pleurocera acuta</i>
<i>Sphaerium flavum</i>	<i>Bithynia tentaculata</i>
<i>Goniobasis livescens</i>	

III. Pearson Street, west of Michigan Avenue, about half a mile west of the lake, 25 feet below street level.

<i>Fusconaia undata</i>	<i>Pleurocera acuta</i>
<i>Sphaerium solidulum</i>	<i>Planorbis trivolvis</i> , var.
<i>Sphaerium flavum</i>	<i>Amnicola limosa porata</i>
<i>Goniobasis livescens</i>	<i>Bithynia tentaculata</i>

In the above lists, *Elliptio dilatata* and *Fusconaia undata* are not found in Lake Michigan at the present time, and the latter species is only known as a fossil in the Chicago area, *Fusconaia flava* being the species found in the streams in the vicinity.

The location of the fossil deposits is about a fourth of a mile west of Lake Michigan and half a mile north of the Chicago River, not far from the Chicago Avenue water works. The surface at this point is 10 feet above Lake Michigan level, so that the depths at which fossils were found are from five to 15 feet below lake level, in undisturbed strata. The localities are also about 2000 feet south of the south end of the old Graceland bar and the geological time of the formation was probably the Toleston stage of Glacial Lake Chicago (see Baker, 1920, p. 79, pl. 37, 38).

That this species of *Bithynia* was not found in any of the Wilmette Bay deposits studied in 1910-1912 is perhaps not strange since the portion of the old bay studied did not extend south of Bowmanville, which is about five miles north of the location under discussion.

The present habitat of *Bithynia tentaculata*, in America, is in fairly open water in more or less exposed situations where there is good wave motion (see Baker, 1916, 1924 for habitats in lakes Oneida and Winnebago). It is preëminently a mollusk of vegetation and is seldom found away from it. It is a vegetable eater, being particularly fond of filamentous algae, among which it is usually found in abundance. It is also found on the stems of *Scirpus* and *Elodea*, plants that were common in old Wilmette Bay during Pleistocene times. The lower part of Wilmette Bay was not unlike Winnebago Lake in some respects, being 10 miles long and two miles wide, and rather shallow.

The present American distribution of *Bithynia tentaculata* is as follows, as far as available records have determined.

Wisconsin: Winnebago and Butte des Morts lakes, Calumet and Winnebago counties; Sturgeon Bay, Door Co.; Kenosha Co., Lake Michigan (Baker); Green Bay (Pearse).

Michigan: Black Lake, near Holland, Ottawa Co.; Bay City; Winona Beach, Bay Co.; Muskegon Lake, Muskegon Co.; Lake Michigan, New Buffalo, Berrien Co.; La Plaisance, Monroe Co.; Manistee River, Manistee Co.; Detroit River, Gibraltar, Wayne Co.; Lake Huron, Harbor Beach and Sandusky, Huron Co. (Walker).

Pennsylvania: Erie Harbor, Erie Co. (Walker).

Ohio: Ohio Canal, Stark Co. (Sterki); Ashtabula Harbor, Ashtabula Co. (Streator); mud flats near Toledo, near Maumee Bay, Lucas Co. (Goodrich).

Illinois: Shore of Lake Michigan (Baker).

Indiana: Shore of Lake Michigan (Baker, Daniels).

New York: Oswego, Lake Ontario, Oswego Co.; Erie Canal, Syracuse, Onondaga Co. (Beauchamp); Erie Canal, Rochester, Ontario Co. (Walton); Genessee River, near Rochester and Lake Ontario, Ontario Co.; Thousand Islands, St. Lawrence River; Oneida Lake (Baker); Seneca

River at Waterloo and Cayuga Lake (Maury); Lake Champlain and Niagara Falls (Walker).

Canada: Cornwall and Toronto Bay, Ontario; Duck Island, Ottawa River; Bay of Quinte, near Belleville, Toronto (Latchford).

The fossil *Bithynia* are like the form now living in Lake Michigan. This would suggest that it may be another species of a circumboreal nature, like *Aplexa hypnorum*. It might have been a migrant by way of the northeast land connection and could have reached our shores at the same time as the land snail *Helix nemoralis* which was for a long time thought to be an introduced species until it was finally found in Pleistocene deposits. There seems no question concerning the authentic character of the material from the Chicago deposits as being of Pleistocene age, and representing life that lived at the entrance to Wilmette Bay during the later stages of Glacial Lake Chicago.

A critical examination of specimens from Europe and America seems to indicate that they are not exactly alike, the lake form being heavier, the whorls more rotund, the spire usually shorter and the sutures less deeply impressed than in ditch forms from England. The columellar callus is also usually thicker, forming a rather heavy deposit in the lake shells. These differences reflect a response to a lake environment, the European form living in ditches, small rivers and relatively quiet bodies of water. The American localities, on the other hand, are subject to more or less violent wave action. There also appear to be some differences between the published figures of the radulae of the American and the European form, but whether this is due to differences in drawing the teeth or are real distinctions in the radulae is not at present determinable. It is possible that the American form should be separated as a distinct variety.

It should be noted, however, that it is doubtless true that European specimens of *Bithynia tentaculata* were introduced into American Localities as described by Walker and others. These may have interbred with the native form and produced the heavy lake species now found in the lake. There is also the possibility that *Bithynia* became extinct in Wilmette Bay and that the lake was populated by the

introduced form. There is more variation among the recent than among the fossil forms, some of the former approaching the long-spired forms so characteristic of the European Bythinia. More fossil examples are needed for comparison and the form should be found in additional strata near Chicago and elsewhere.

Published References to American Bithynia.

Anonymous.

1891. Western Range of *Bythinia tentaculata* (Black Lake, Ottawa Co., Mich., by Dr. De Camp). *Nautilus*, V. p. 71.

Baker, Frank Collins.

1898. The Molluscan Fauna of Western New York. *Trans. Acad. Sci. St. Louis*, VIII., p. 92.
1902. Mollusca of the Chicago Area, part II. *Bull. Nat. Hist. Surv., Chi. Acad. Sci.*, p. 328.
1903. Shells of Land and Water, Chicago. P. 22.
1906. A Catalogue of the Mollusca of Illinois. *Bull. Ill. State Lab. Nat. Hist.*, VII, p. 92.
1911. Mollusks of Wellesley Island and Vicinity, St. Lawrence River. *Nautilus*, XXV, p. 67.
- 1916a. The Relation of Mollusks to Fish in Oneida Lake. *Tech. Pub., N. Y. State Coll. For., Syracuse Univ.*, No. 4, p. 267.
- 1916b. The Freshwater Mollusca of Oneida Lake, New York. *Nautilus*, XXX, p. 8.
- 1918a. Further Notes on the Mollusca of Oneida Lake, New York; the Mollusca of Lower South Bay. *Nautilus*, XXXI, p. 87.
- 1918b. The Productivity of Invertebrate Fish Food on the Bottom of Oneida Lake, with Special Reference to Mollusks. *Tech. Pub., N. Y. State Coll. For., Syracuse Univ.*, No. 9, p. 168 (many references to habitat in other places).
- 1918c. The Relation of Shellfish to Fish in Oneida Lake, New York. *Loc. Cit., Circular No. 21.* fig. 7, No. 22, 23.
1919. Mollusks infested with Parasitic Worms. *Nautilus*, XXXII, p. 97.

1924. The Fauna of the Lake Winnebago Region. Trans. Wis. Acad. Arts, Sci. & Lett., XXI, pp. 134, 142.

Beauchamp, W. M.

1880. *Bythinia tentaculata* Linn. Amer. Nat., XIV, p. 52.
1882. *Bythinia tentaculata*. Amer. Nat., XVI, pp. 244, 245.
1886. Land and Fresh-water Shells of Onondaga County and New York State. Baldwinsville.
1891. Notes on Familiar Mollusks. Nautilus, V. p. 52.

Dall, W. H.

1881. American Work in the Department of Recent Mollusca during the Year 1880. Amer. Nat., XV, p. 716.

Daniels, L. E. (with *Blatchley, W. S.*).

1903. On Some Mollusca known to Occur in Indiana. 27th Ann. Rep. Dept. Geol. Nat. Res., Ind., 1902, p. 607.

Daniels, L. E.

1903. A Check List of Indiana Mollusca. Op. Cit., p. 641.

Latchford, F. R.

1914. *Valvata piscinalis* in Canada. Nautilus, XXVIII, p. 10.
1925. *Bythinia tentaculata* Linn. The Canadian Field Naturalist, XXXIX, pp. 41-43. (Review of supposed introduction and subsequent distribution of this species).

Letson, Elizabeth J.

1905. Check List of the Mollusca of New York. Bull. N. Y. State Mus., 88, p. 18.

Maury, Carlotta J.

1916. Freshwater Shells from Central and Western New York. Nautilus, XXX, p. 32.

Sterki, V.

1907. A preliminary Catalogue of the Land and Fresh-water Mollusca of Ohio. Proc. Ohio State Acad. Sci., IV, p. 386.
1911. Civilization and Snails. Nautilus, XXIV, p. 100.

Streator, Geo. J.

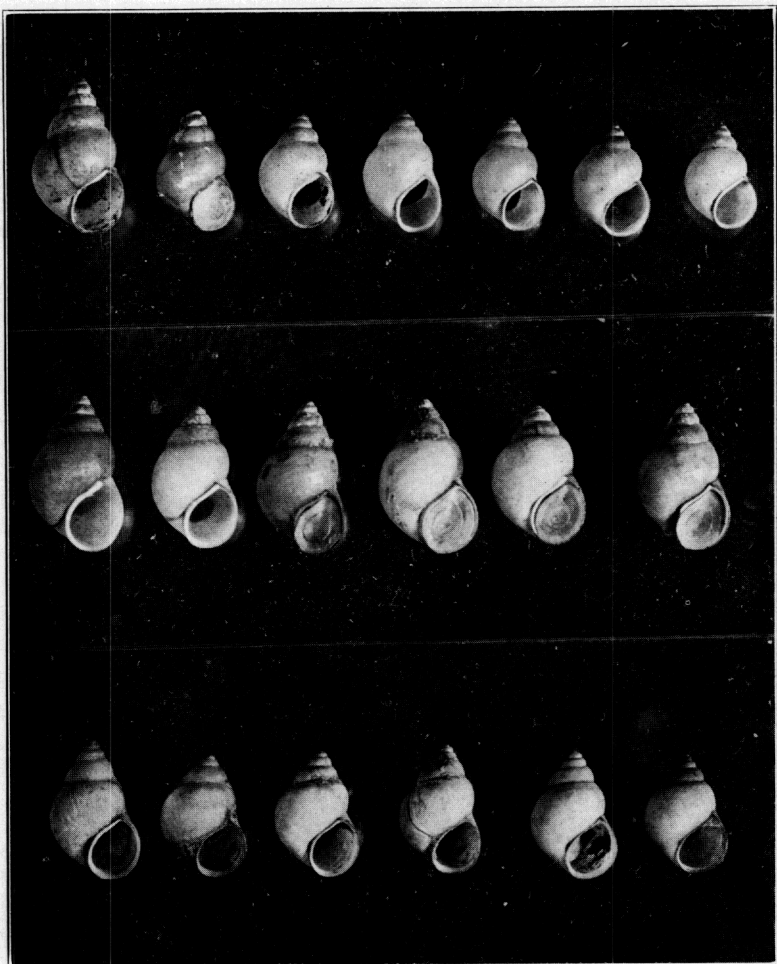
1889. *Bythinia tentaculata*, Linn., in Ohio. *Nautilus*, III, p. 46.

Walton, John.

1891. The Mollusca of Monroe County, N. Y. *Proc. Roch. Acad. Sci.*, II, p. 4.

Walker, Bryant.

1893. The Shell-bearing Mollusca of Michigan. *Nautilus*, VI, p. 139.
1911. A Check List of Michigan Mollusca. 13th Ann. Rep. Mich. Acad. Sci., p. 126.
1918. A Synopsis of the Classification of the Fresh-water Mollusca of North America, North of Mexico., etc. *Miscel. Pub., Mus. Zool., Univ. Mich.*, No. 6, p. 132.



DESCRIPTION OF PLATE

- Upper row: *Bithynia tentaculata* (Linn.). Ditch, Scarborough, England.
- Middle row: *Bithynia tentaculata* (Linn.), Variety. Lake Winnebago, near Oshkosh, Wis.
- Lower row: *Bithynia tentaculata* (Linn.), Variety. Chicago, fossil deposit No. 1. Figures enlarged about two diameters.