

FURTHER NOTES ON THE POST-GLACIAL BIOTA
OF GLACIAL LAKE, CHICAGO

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At the Chicago meeting of the Illinois Academy of Science in 1911¹, the writer presented certain facts concerning the biota contained in the sedimentary strata of the bed of Glacial Lake Chicago. Since that time data have been accumulating which have added largely to our knowledge of the life of these early days. Attention has also been directed to the southwestern portion of Michigan, bordering Lake Michigan, which contains sedimentary deposits referable to several of the lake stages.

To understand the northward migration of the life, one must have clearly in mind the condition of this part of the country as the great ice sheet melted back into the Michigan basin. There was at first a large glacial lake in the Kankakee marsh area, known as Lake Kankakee, which extended northeasterly almost to South Bend; later came Lake Dowagiac which extended northeasterly up the area now occupied by the great Dowagiac swamp; still later, after this drainage was largely abandoned, a long arm of glacial Lake Chicago extended into Michigan and connected with the Grand River outlet of glacial Lake Saginaw.

Just how rapidly the biota followed the retreating ice is not known, but we may safely infer that certain hardy types (as for example the *Physas*, some *Lymnæas*, *Sphaeria*, *Planorbis*, etc.), took advantage of the new water courses at a very early time. It is this cold temperate, almost subarctic fauna that is found in the earliest deposits of glacial Lake Chicago.

Many, if not all, of the lakes in southwestern Michigan, (including Berrien, Cass and Van Buren counties), contain marl beds of post-glacial origin. The life entombed in these marl deposits, consisting of mollusks, reached these lakes, for the most part by direct migration from the region south of the Wisconsin ice sheet. In what manner and by what routes they came is one of the most interesting questions open to the student of zoogeography. Three localities in the region under discussion contain the remains of a more ancient life, one previously known, the others here recorded for the first time.

1. Trans. Ill. Acad. Sci., IV. pp. 108-116, 1912.

1. BUCHANAN, BERRIEN COUNTY

Two miles west and a little north of Buchanan, Berrien county, is a stretch of low land known as Bakertown marsh. The marsh was previously a lake about three miles long and a mile wide, but is now grown up in marsh grass and is practically dry. A ditch about a mile in length drains the marsh, and exposes the strata, which exhibit the following section:

VIII.	Marsh bog.....	16 inches
VII.	Recent peat	20 inches
VI.	Peat and drift wood.....	10 inches
V.	Lake silt (no shells)	8 inches
V.	Semi-ligneous peat	12 inches
III.	Shells and lake drift.....	8 inches
II.	Blue Clay	7 inches
I.	Quicksand	7 to 10 feet

The thickness of the sedimentary deposits above the sand is 81 inches, or 6 feet, 9 inches.

The quicksand (stratum I) evidently represents the period of Lake Dowagiac when the glacial waters rushed down the lake into the Kankakee River, loaded with sediment. The clay, (stratum II), represents a quieter stage, after the main drainage had shifted to the Chicago outlet. Stratum III probably represents the bottom of a larger St. Joseph River, for the species of naiads represented are mostly of the river type. An arm of Lake Chicago extended up the St. Joseph River from Benton Harbor to about the vicinity of Berrien Springs, and the river drained into this extension of Lake Chicago.

The fluviatile mollusks may have reached this locality from two sources; (1), by way of the Chicago outlet, across Lake Chicago and up the St. Joseph River; or (2), by way of the Kankakee when it was connected with the St. Joseph and Dowagiac rivers via South Bend. The mussels are mostly of the river type and their natural migration route would be by way of a river. Just how long after the formation of Lake Chicago the St. Joseph-Kankakee drainage persisted is not definitely known, but it is believed to have continued for some time in a more or less modified form. The naiads represent a climate fully as warm as the present and they could not invade the waterways of the icy drainage. Certain boreal types of mollusks could and evidently did take advantage of this waterway at an early stage. It is probable that both drainages were used and the fauna represents a mixture of the two migrations. This stratum may be safely correlated with the Tolleston stage of Lake Chicago.

2. See Leverett, Illinois Glacial Lobe, plate XV.

The five and a half feet of silt and peat above the shell deposit represent the later stages of this locality and indicate its change from a river to a lake and finally to its present marsh-bog character. The mollusks (42 species) and other remains of life found in this deposit are listed below.³

MOLLUSCA

- Symphynota compressa* (Lea) = *pressus* Lea
Symphynota costata (Raf) = *rugosa* Barnes
Anodonta grandis footiana Lea
Anodontoides subcylindraceus (Lea)
Alasmidonia calceola (Lea) = *deltoidea* Lea
Eurynia iris (Lea) = *novi-eboraci* Lea
Eurynia ellipsiformis (Lea) = *spatulatus* Lea
Lampsilis ventricosa (Barnes)
Sphaerium simile (Say)
Sphaerium striatinum (Lam)
Pisidium near *abditum* Prime
Pisidium compressum Prime
Pisidium medianum Sterki
Pisidium milium Sterki
Pisidium pauperculum Sterki
Pisidium roperi Sterki
Pisidium ventricosum Prime
Pisidium near *vesiculare*
Campeloma integrum (Say)
Campeloma integrum obesum (Lewis)
Campelima subsolidum (Anth)
Pleurocera elevatum (Say)
Goniobasis livescens (Menke)
Valvata tricarinata Say
Amnicola limosa (Say)
Amnicola lustrica Pilsbry
Physa ancillaria Say
Physa integra Hald
Physa heterostropha Say
Ancylus rivularis Say
Planorbis antrosus Conrad
Planorbis campanulatus Say (= *bicarinatus* Say)
Planorbis trivolvis Say
Planorbis deflectus Say
Planorbis parvus Say
Galba obrussa (Say) = *disidiosa* authors
Galba humilis modicella (Say)
Lymnaea stagnalis appressa Say
Carcyrium exiguum (Say)
Succinea ovalis Say
Strobilops labyrinthica (Say)
Vitrea hammonis (Ström) = *radiatula* Ald

ARTHROPODA

Head of dipterous insect.

VERTEBRATA

Mammut americanus (Kerr)

Considerable driftwood was observed, but none was identified. The shells occurred in little colonies, just as they are found today. It is probable that these colonies represent localities where the water had brought together and deposited

3. Walker Nautilus, XI., p. 121; XIII., p. 34; 55.

a quantity of dead shells, drift wood, and other debris, and not colonies of living shells. The mastodon skulls were found in and under the stratum of semi-ligneous peat, showing that these animals waded into the river after the shells were deposited. They were probably caught in the boggy bottom and were drowned.

The multitude of lakes which dot the surface of Berrien, Cass and Van Buren counties, especially in the swampy area near the Dowagiac and St. Joseph rivers, nearly all have marl deposits correlative with the later stages of the Great Lakes history. Many of these date from the glacial Lake Dowagiac, which had its outlet through the Kankakee River, while others are relics of the early stage of Lake Chicago when an arm extended into Michigan and up the valleys of the PawPaw and Black rivers.

2. MAGICIAN LAKE, CASS COUNTY

In the northwestern part of Cass county, and also partly in Van Buren county, is a lake of considerable size, known as Magician Lake. This body of water empties into the Dowagiac River through Dowagiac Creek. Swampy tracts and old shore lines indicate this lake was once considerably larger and deeper. On the north shore, and about midway of the lake, near the summer resort known as Magician Beach, is an old embayment which is a swampy terrace about two feet above the water line. The upper three feet are peaty and boggy; beneath this stratum is a marl bed of unknown depth, which is filled with mollusks, of which the following species have been identified:

- Unio*, fragments
- Sphaerium simile* (Say)
- Pisidium compressum* Prime
- Pisidium variabile* Prime
- Pisidium novboracense* Sterki
- Pisidium splendidulum* Sterki
- Pisidium adamsi affine* Sterki
- Valvata tricarinata* Say; Central carina almost absent in some specimens.
- Ammicola limosa* (Say)
- Ammicola lustrica* Pilsbry
- Paludestrina nickliniana* (Sea)
- Physa integro* Hald
- Physa ancillaria* Say
- Physa walkeri* Crandall
- Physa gyrina* Say
- Planorbis antrosus* Conrad
- Planorbis antrosus angistomus* Hald
- Planorbis parvus* Say
- Planorbis deflectus* Say
- Planorbis hirsutus* Gould
- Planorbis excrucus* Say

Galba palustris (Müller).
Galba galbana (Say)
Galba obrussa decampi (Streng)
Galba obrussa exigua (Lea)
Lymnaea stagnalis appressa Say

Of the above 25 species and varieties, 5 species formed about 90 per cent of the bulk of the material. These species are indicated in the order of their abundance.

Valvata tricarinata
Planorbis parvus
Amnicola lustrica
Paludestrina nickliniana
Galba obrussa decampi

Lymnaea stagnalis appressa, *Galba galbana*, and *Physa walkeri* do not live in the lake at the present time. This fauna probably migrated up the St. Joseph River to the Dowagiac River and then up Dowagiac Creek.

3. PIPESTONE LAKE, BERRIEN COUNTY

In the northeastern part of Berrien county, near the Van Buren county line, is another lake of about the same area as that of Magician Lake. This body of water drains into the St. Joseph River through Pipestone Creek. Marl beds similar to those of Magician Lake occur in Pipestone Lake, and have yielded a number of species of mollusks as indicated below:

Sphaerium simile (Say)
Sphaerium striatinum (Say)
Pisidium compressum Prime
Pisidium variabile Prime
Pisidium splendidulum Sterki
Valvata tricarinata Say
Amnicola limosa parva Lea
Amnicola lustrica Pilsbry
Physa integra Hald
Physa heterostropha Say
Planorbis trivolevis Say
Planorbis antrosus Conrod
Planorbis antrosus angistomus Hald
Planorbis antrosus striatus Baker
Planorbis campanulatus Say
Planorbis deflectus Say
Planorbis hirsutus Gould
Planorbis parvus Say, many monstrosities
Galba obrussa decampi (Streng)
Galba obrussa exigua (Lea)
Lymnaea stagnalis appressa Say.

These mollusks evidently migrated to Pipestone Lake either by way of the Chicago outlet, the St. Joseph River and Pipestone Creek, or up the Kankakee and St. Joseph rivers. It is probable that both routes contributed to the formation of both of these small lakes.

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