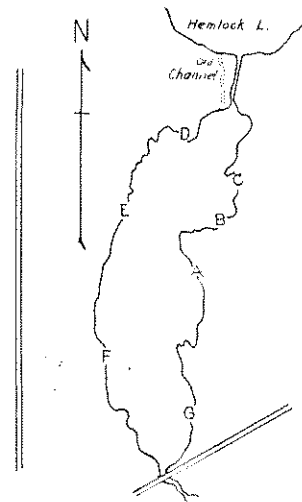


An Unusual Naiad Fauna of a Southern Michigan Lake

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During the summer of 1931 the Institute for Fisheries Research at the University of Michigan conducted a series of lake surveys in Hillsdale County, Michigan. Among the lakes surveyed was Carpenter Lake, a relatively small lake, belonging to the St. Joseph River drainage, and situated between two lakes of a series. Incidental to this work a few Naiades were collected. When I received them I doubted the accuracy of the label, inasmuch as the series contained several specimens of *Lampsilis ventricosa*, which I recognized as the river form and unlike anything ever seen before from a lake.



Carpenter Lake

It might be well at this time to make a few remarks on the various forms of this species that are found within the St. Lawrence drainage. Three can be readily recognized. The Great Lakes, together with some of the land-locked lakes of the Southern Peninsula, have developed a very much stunted form, which, in general, is distinct enough to warrant the subspecific name of *canadensis*, which has been given it. Another is one which seems to bridge the gap between the true river form and *canadensis*, resembling the true river form in all respects except size. It is usually somewhat stunted and occurs in lakes of the river-lake type. The river form of the Michigan region is similar

to that found in the Mississippi drainage. It is large, and quite distinct from the river-lake form.

In August of 1931, a few weeks after receiving the shells from the Institute for Fisheries Research, I visited Carpenter Lake to check the accuracy of the data given. I visited a single shoal (see A on chart) and found that river forms were there exactly as reported. The species collected were: *Anodonta grandis footiana* (6), *Lampsilis siliquoidea* (14), *Lampsilis ventricosa* (9), *Micromya iris* (1), and *Strophitus rugosus* (1). This series is of interest since it would indicate that we had here a river-lake. Yet a few of the specimens represented were true river forms.

A year later, September 23, 1932, I again visited this lake in order to learn more about its fauna and the ecological conditions there. At that time the stations shown on the chart were established. I shall briefly give the data obtained, and then attempt to give an explanation for these unusual conditions.

Station A: *Anodonta grandis footiana* - fairly common.
Lampsilis siliquoidea - abundant. This approaches the river form.
Strophitus rugosus - 6 specimens.
Lampsilis ventricosa - more abundant here than at any other station.
 It was of particular interest that I could not find any *Micromya iris*, though it was found the previous year.

Station B: *Anodonta grandis footiana* - numerous.
Lampsilis siliquoidea - common.

Station C: *Anodonta grandis footiana* - common.
Lampsilis siliquoidea - common.
Lampsilis ventricosa - 1 male and 1 gravid female.
 This is a fish-spawning bed on the east shore.

Station D: *Anodonta grandis footiana* - abundant.
Lampsilis siliquoidea - common.

Station E: Checked because it was marked as a fish-spawning bed. It was thought that it might offer a place on the west side of the lake where river forms might be found. A careful search was made, but the area did not offer the type of spawning bed found on the east side of the lake. No river forms could be found here; in fact this station was not favorable even for lake forms.

Station F: *Anodonta grandis footiana* - mostly.
Lampsilis siliquoidea - a few. Conditions here were much more boggy. An attempt was made to find river forms, but none occurred.

Station G: *Anodonta grandis footiana* - mostly.
Lampsilis siliquoidea - a few.
Lampsilis ventricosa - 1 specimen, a large male.
Strophitus rugosus - 1 specimen, full grown.
 This station is a fish-spawning bed with ideal bottom and shoal conditions as found at A. Also note that it is found on the east side of the lake, the same side as A.

One of the fundamental questions bearing on this problem relates to the possibility that river-lake conditions exist. With this in mind, the inlet and

outlet were examined relative to flow of water. The inlet, at the south end, was found to have a soft peaty bottom on which grew a luxuriant growth of water-plants, particularly pond-lilies. There was practically no current here, which I believe a more or less permanent condition, considering the silted bottom conditions and the type of vegetation which was dominant. No shells could be found on the soft bottom. This is significant, since I had hoped to find river forms here. Surely river conditions should exist here if such conditions were to be expected anywhere in this lake chain. The outlet of the lake was quite similar to the inlet. There was practically no flow, and there were no indications that river conditions had ever occurred.

With this in mind, it is hardly justifiable to consider this a river-lake. But, grant it to be of this category, the presence of true river forms still must be accounted for. A list of the species of fish recorded for this lake was obtained from the Institute for Fisheries Research. Two species from this list, the Stone Roller and the Horned Dace, are normally river fish and not common to most lakes. Here we have a situation similar to that recorded at the same place for Naiades. The occurrence of these fish may be accounted for in one of two ways: they migrated from neighboring creeks, or they were introduced into the lake by fishermen who used them for bait. I am inclined to believe the latter is the more probable, since in neighboring creeks it does not seem likely that *Lampsilis ventricosa* would occur. This reasoning is based on the records I have for the distribution of *Lampsilis ventricosa* in other drainages.

* In conclusion—we are evidently confronted with a situation where an unusual distribution of mussel forms is being brought about passively by humans when they introduce fish parasitized with mussel glochidia from river to lake environments. A more important aspect is not so much the fact that this can take place and is taking place as the fact that such forms are stable enough not to become modified immediately in their new environment.

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