

## Land and Fresh Water Mollusca of New Hampshire

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A glance at the literature covering the occurrence of the Mollusca in the state of New Hampshire shows that this fauna is less known than that of any other state in New England. In Johnson's List of Mollusca (1915) the absence of records from this state is noteworthy. A search of the literature shows that but seven papers have been published on the molluscan fauna of New Hampshire. These are listed at the end of this paper. One of these deals with the region near Keene, one in the Mt. Monadnock area and two on the territory about Intervale and North Conway. Two papers by Clench and Russell cover the Merrimack and Connecticut drainages.

A careful survey of the state over a period of years would probably yield a molluscan fauna equal to that of Maine, which, in fact, the fauna of New Hampshire greatly resembles. Land snails are abundant in certain localities and absent from other territory which is unsuited to their development. Eighteen species are listed from near North Conway by Temple Prime. Twelve species are noted by W. H. Dall from the Mt. Monadnock area.

Fresh water species are plentiful in some bodies of water and are absent from others. Walker and Coolidge list 19 species from near Keene. Clench and Russell, in their two reports in the Biological Survey of the Merrimack and Connecticut water sheds (1938, 1939) list 47 species of fresh water shells as occurring in the state and 30 species which are likely to be found, a total of 77 species and races. Specific localities are given in these papers and a good start has been made for a thorough understanding of the distribution and contents of the fluviatile and lacustrine mollusk fauna of the state.

A part of the summer of the years 1939, 1940, and 1941 was spent in New Hampshire and with the lack of sufficient specific information on the New Hampshire fauna in mind, collections were made in several places in the state, including the Winnepesaukee Lake region, the Lake Sunapee area, Newfound Lake, the upper Connecticut River and several places widely separated from these areas. Twenty-one species of fresh water mollusks were collected including four species not listed by Clench and Russell.

## Fresh Water Mollusca

*Elliptio complanatus* (Dillwyn).—Merrimack Drainage: Carroll Co., Lake Wentworth; Mirror Lake; Lake Kanasatka (Long Lake); Belknap Co., Halfmoon Lake; Grafton Co., Newfound Lake; Saco Drainage: Carroll Co., Chocorua Lake; Connecticut Drainage: Sullivan Co., Lake Sunapee.

This species is the most abundant and widely distributed mussel in New Hampshire. In the lakes examined it was found buried in a sandy or clay

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bottom in water two to five feet deep. In this state, as elsewhere, it seems to be the favorite food of the muskrat.

*Alasmidonta undulata* Say.—Merrimack Drainage: Carrol Co., Lake Wentworth, the only place in which this species was found. Its usual habitat was in 3-4 feet of water buried in a fine, hard sand bottom. The shells are small, the largest specimen measuring 42 mm. in length. The surface is bright and shining and is distinctly rayed with greenish. The nacre is silvery with a suffusion of rose color near the anterior and posterior ends.

*Anodonta cataracta* Say.—Merrimack Drainage: Belknap Co., Halfmoon Lake; Connecticut Drainage: Sullivan Co., Sunapee Lake, west shore. Halfmoon Lake is a shallow lake or pond with mud bottom and is choked with vegetation. The mussels were found near the middle of the pond on a small island surrounded by six feet of water, where presumably the clams lived as they could not be found in shallow water. The shells are large, attaining a length of 113 mm.

In Sunapee Lake the clams were found in Burkehaven Bay on a sand and clay bottom in water from 3 to 5 feet deep. These specimens were much smaller than those from Halfmoon Lake, the largest measuring 91 mm. in length.

*Anodonta implicata* Say.—Merrimack Drainage: Carroll Co., Wentworth Lake; Mirror Lake; Lake Kanasatka (Long Lake). This species was observed living on a firm sand bottom in water from 3 to 6 feet in depth. The largest specimen observed measured 85 mm. in length. One specimen 70 mm. long showed repair work from an injury when it was 35 mm. long. A break in the left valve 25 mm. long had been repaired by the formation of a long blister on the inside of the shell. Both valves had been affected. The nacre was salmon colored and the left valve contained many small, pin-head pearls.

These two *Anodontas*, *implicata* and *cataracta*, are very variable and are often difficult to separate. Typically, the beaks or umbonal markings of *implicata* begin as a faint double loop but soon become straight and run parallel with the hinge line. In *cataracta*, the umbonal markings are strongly double-looped, as in *Anodonta grandis*, to which *cataracta* is related. Also, *implicata* is more polished, has distinct rays, and the shell is often a vivid green near the posterior end. In *cataracta* the epidermis is rough and the color of the shell is more uniformly greenish-brown. Both Ortmann and Simpson call attention to the difference in umbonal markings of the two species.

Clench and Russell (1939, p. 224) state that *implicata* is unrecorded from New Hampshire and list all of this form of *Anodonta* under *cataracta*. The specimens from Lake Wentworth are like the figure 5, plate iv, of the 1939 report of Clench and Russell, and the specimens here listed as *cataracta* are like figure 3, plate A of the 1938 report. The shells from Lake Wentworth, and elsewhere, have the umbonal markings of *implicata* and should, apparently, be included in this species, which is, therefore, found in New Hampshire.

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## COCHLICOPIDAE

*Cochlicopa lubrica* (Müller).—Maine to Connecticut (Johnson). Carroll Co., North Conway (Prime).

\**Cochlicopa lubrica morseana* Doherty. — Carroll Co., west side Lake Wentworth. Sullivan Co., near Burkehaven, Lake Sunapee.

Specimens of *Cochlicopa* personally collected have been referable to the race *morseana*. Probably both the typical form and the race live in the state but they have not previously been differentiated.

## VALLONIIDAE

It is noteworthy that no specimens of *Vallonia* have thus far been reported from New Hampshire. None were seen during the three summers of collecting and none are listed by Johnson, Dall, Rehder, or Prime. Prime, in fact, states that he could not find *pulchella*. As the genus is recorded from Maine and Massachusetts it should also be found in New Hampshire.

## SUCCINEIDAE

\**Succinea ovalis* Say (= *totteniana* Lea).—Carroll Co., west side Lake Wentworth; Passaconaway Road near Passaconaway, valley of Swift River. Sullivan Co., near Burkehaven, Lake Sunapee. Merrimack Co., Mt. Kearsage, at tourists camp. Coos Co., Stratford Hollow. Maine to Connecticut; Hillsboro Co., Frankestown (Johnson). Carroll Co., near North Conway (Prime). Cheshire Co., Mt. Monadnock (Dall).

*Succinea ovalis* is common but not abundant. It was usually found under debris and adhering to sticks and the under side of logs.

*Succinea retusa* Lea.—Maine to Connecticut (Johnson). No specimens of this species were found by the writer.

My thanks are due Dr. William J. Clench for the identification of some of the Physae and for assistance in making up the bibliography.

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