

# THE RELATIONSHIP OF THE FOSSIL MARL FAUNA OF MACKAY LAKE, OTTAWA, TO THE PRESENT MOLLUSCAN FAUNA OF THE LAKE.\*

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## PHYSICAL FEATURES OF THE LAKE.

MacKay or Hemlock Lake is a small body of water in Rockcliffe, just east of the city of Ottawa. It is irregular in shape, about 500 yards in length and 215 yards in greatest breadth. The long axis of the lake runs approximately north and south. One eighth of the total water area is occupied by a deep bay indenting the eastern shore to a depth of 150 yards. The surface of the lake is 15 feet above the Ottawa River and its greatest depth is only thirty feet. The history of this basin dates back to the end of the Pleistocene, when the land was emerging from the Champlain sea. The shore on the west side consists in part of bedrock of Chazy age, while on all other sides are marine sands and clays and some small areas of recent deposits. The topography about the lake reflects these two contrasting types. In the part of the lake enclosed by bedrock the shores are high, small ramparts of sandstone outcrop, and there is a complete absence of peaty or mucky deposits. Elsewhere the shores are low and owing to their boggy nature the water cannot be approached on foot. A small area at the extreme southern end where the muck deposits are absent, is the only exception.

At the south end there are two small rills which form the only visible inlets to the lake. A considerable volume of water is brought down by them in time of spring flood, but in summer they are nearly dry, and the only supply comes from seepage and springs from the surrounding land areas. As this is inconsiderable in amount, the water becomes quite stagnant. The waters of MacKay Lake find an outlet through a small stream, half a mile in length, which flows into the Ottawa. This creek has cut a valley from 25 to 40 feet deep and from 80 to 100 feet wide at the top through the Pleistocene clays. Originally, on the emergence of the land from the Champlain Sea, the erosion must have been very rapid through this soft unconsolidated material. At the present time, however, owing to the insignificant volume of water carried the bed of the stream is being lowered very slowly. Its erosive power is further diminished by the abundance of water plants over much of its course.

Though of small extent, the marl deposits of

MacKay lake have been known for a long period.\*\* They are very accessible, and new parts of the beds have been constantly brought to view as further advances were made into the sand beds which they overlie. The elevation of the marl beds above the present level of the lake is 18-20 feet, and is without doubt due to the lowering of the lake since their deposition by the cutting down of the outlet. This erosion must have occupied a considerable period of time. Formerly the lake must have been somewhat larger than now, although, at present, the deposits of marl are found only at the south end of the lake, at a distance of about 100 yards from the water. Elsewhere, presumably, the beds have been removed by erosion. The marl is from three to five feet in thickness and is overlain by a small amount of superficial soil and peaty matter on which grows a luxuriant forest of both large trees and undergrowth, whose roots have filled the beds with a network of interlacing fibres. The underlying material is for the most part sand, which frequently shows cross-bedding, and is occasionally replaced by heavy gravel or boulder—suggesting that these lower beds are of fluvial origin.

The marl was formerly used in making brick and cement but is not being worked at the present time. In appearance it is yellowish-white to pure white, but is occasionally rust-stained from overlying deposits. It is very slightly coherent, crumbling readily between the fingers, and a block placed in water will break down like loaf sugar. It consists of a large proportion of fresh water shells well preserved in a matrix of almost impalpable powder which is not made up of shell fragments as in the case of many marls. Its origin will be discussed later.

A chemical analysis made in 1894\* shows over 93% of calcium carbonate, and nearly 5% of organic matter such as root fibres and humus, indicating a very pure marl.

## THE FAUNAS.

The fresh water shell remains in the marl of MacKay Lake are the most modern fossils in the area and belong to a late Pleistocene or early

\*\*Geol. Survey of Canada Report 1845-46, p. 96.

Report of Progress, 1862, p. 765.

Annual Report 1892, vol. VI, p. 70AA.

Annual Report 1894, vol. VII, pp. 23, 24R.

(Chemical analysis).

Annual Report 1892, vol. XII, p. 47.

\*Annual Report, Geol. Survey of Canada, 1894, vol. VII, pp. 23-24R.

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