

At Father Point the outer end of the inlet pipe was again carried away by ice on December 16, 1898; and when this occurs, the lowest of the low waters are not recorded on the gauge. This pipe could not be replaced until the early spring; and some of the low waters were accordingly lost during the winter. In relaying it, it was made more secure than before; so that the ice grounding upon it, might not shift it. There was also an interruption of six days at the end of January; for repair to the gauge clock. The balance-wheel escapement had to be removed and sent to Quebec for this repair.

At St. Paul Island, some trouble again occurred because of the partial chokeage of the inlet to the gauge, by the accumulation of gravel in the autumn storms. This accumulation is due to the shallow water in the bay where the tide gauge is situated, and the severe exposure on the eastern side of the island. On the western side the water is deep, close to the rocks; but if the gauge were placed there, it would be necessary to have a special observer, and to build a house for him and provision it; as there is no habitation on that side of the island. It is more economical therefore, to persevere under the existing difficulties.

There was also an interruption here of three days in August, owing to the difficulties of communication. Supplies shipped on April 20 were not delivered on the island till August 10. Meanwhile, on July 13, the observer cabled for additional tide sheets for the recording instrument; but with the best arrangements that could be made, the last tide sheets on hand were used before new ones were received.

At South-west Point, Anticosti, the crib-work and tide-well of the gauge were damaged in a severe storm in December, 1897. The observer succeeded in getting it to work again in February. As the expense of repairs could not be afforded in the ensuing season of 1898, it was decided to let the gauge go on as it was, as long as it would work. It so continued until January, 1899; when the sand and gravel accumulating within the damaged crib-work, caused partial chokeage of the inlet to the tide-pipes; and the record became in consequence unreliable.

After careful consideration, it was decided to discontinue the tide gauge at this station; the reasons being as follows:—It was found from the extensive series of tidal observations of 1896, that no large area in the Gulf of St. Lawrence can be referred with advantage to South-west Point as a port of reference. It must therefore be considered chiefly as a station commanding the entrance to the Lower St. Lawrence; and its record chiefly for use as a basis for tidal differences and ratios. The record already obtained, comprising more than three complete years, is sufficient for these purposes; for which it is extremely valuable in being simultaneous with the observations at Father Point and Quebec. The tidal relations between these three stations, are examined and discussed further on in this report.

When the observations were discontinued at this station, an exchange of time with Quebec Observatory was made by cable, in order to check the diploidoscope on which the accuracy of the time used throughout the period of the observations, has depended. It was found correct.

The station was not completely dismantled; but was left in condition to fit up as a summer station at any time, for reference when the tidal currents on the Lower St. Lawrence come to be more fully investigated.

The causes of interruption above cited will serve as examples of the nature of the difficulties to be met, against which foresight is required. The difficulty of obtaining a uniform datum level for the height of the tide, when open tide-scales cannot be used in winter, and the special appliances and office methods which have been devised for this purpose, need not be detailed here.

INSPECTION OF TIDAL STATIONS.

The tide gauges at Quebec and Father Point were inspected by myself in August, on the expiry of my leave of absence. At Father Point, an extensive series of levels was taken instrumentally, to compare the actual rise and fall of the tide on the beach with the record on the gauge; as this gauge works by siphoning through an inlet pipe

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