

The differences show that the outstanding error in the time of the tide at South-west Point would thus be reduced by 20 per cent.

The analysis of the tidal record for Father Point itself, would be in accord with the modern view taken by the most eminent authorities on tidal questions. When the means available for this Survey are so limited, however, that the analysis of tidal record for the principal harbours of the country has to be deferred from year to year, the hope of doing similar work for Father Point would seem a long way off. It is because of this that the exhaustive examination into the tidal relations on the Lower St. Lawrence, above referred to, was undertaken, in the hope of securing improvement in the meantime.

BAY OF FUNDY.—TIDAL DIFFERENCES.

In the summer of 1898, eight secondary stations were established around the Bay of Fundy, in order to extend the usefulness of the tables for St. John, N.B., to the whole of this region. The extent of the region is 210 miles, from Yarmouth to Moncton.

The reasons for the selection of the stations chosen, have been explained in the last report; as well as the levels of the tide as ascertained by the observations. The station at Welchpool on Campobello Island, opposite Eastport, Maine, affords a valuable connection between the work of this Survey, and the United States Coast Survey. At the four stations in the lower part of the bay, Yarmouth, Westport in Grand Passage, Digby, and Campobello, the whole range of the tide was obtained; from which results for both high and low water can be deduced. At the other four stations in the upper part of the bay, Windsor, Parrsboro', Hopewell Cape, and Moncton, only the upper part of the tide was obtained; as a record of the whole tide could not be secured where the range is so great, without very largely increasing the expenditure.

In deriving tidal differences from these observations, it was first necessary to ascertain whether any part of the region at the mouth of the Bay of Fundy, could better be referred to Halifax than to St. John as its port of reference. With this object, a trial comparison was made for a period of one month, between the time of high water at Yarmouth, at the mouth of the bay, and Halifax on the one hand and St. John on the other. The month selected was July 18 to August 18, 1898; and the condensed result of the comparison is as follows, when reduced to the same standard time:—

Yarmouth and Halifax. Difference in time of high water varies from 2 h. 26 m. to 3 h. 0 m. later; showing a range of 34 minutes.

Yarmouth and St. John. Difference in time of high water varies from 1 h. 01 m. to 1 h. 14 m. earlier; showing a range of only 13 minutes.

It thus appears that if the tide at Yarmouth is referred to St. John rather than to Halifax, much greater accuracy can be secured; as the error corresponding to the above variation, is only one-third as much.

The tide on the south-eastern coast of Nova Scotia as far as Cape Sable, can well be referred to Halifax; but from that cape to Yarmouth it changes rapidly in character, though the distance is only fifty miles. The greater variation in the difference of time with Halifax, in the above comparison, is due to modification in the diurnal inequality in the tide, as between Halifax and Yarmouth. It may therefore be concluded from this comparison, that the tides throughout the Bay of Fundy above Yarmouth, can best be referred to St. John.

In the earlier part of the record at some of the secondary stations of 1898, there is a little uncertainty in the accuracy of the time used. The resulting tidal differences are therefore based upon the parts of the record which are thoroughly trustworthy, as follows:—

Yarmouth, N.S.—From July 15 to December 31; affording a series of 319 simultaneous observations for the difference in time of high water with St. John; and 314 for low water.

Westport, in Grand Passage.—From August 8 to December 29, with an interruption of twenty days from November 24; affording 195 differences for H. W. and 212 for L. W.

Digby.—From August 3 to December 18; affording 238 differences for H. W. and 244 for L. W.