

It was expected that the tidal gauge at Father Point could be moved this season onto the new wharf there, as a better site for it; but no further work was done this year in extending this wharf, which does not yet reach to low water mark.

REDUCTION AND TABULATION OF TIDAL RECORD.

In order to utilize the tidal record for the calculation of tide tables by the modern method of harmonic analysis, it is necessary that it should be tabulated in hourly ordinates, which give the height of the tide at each hour throughout the year. With this object in view, it is of primary importance to secure an uninterrupted record, day and night, during the course of the year. Every endeavour in the way of foresight and vigilance, is made to ensure this. The number of hourly ordinates throughout the course of a year is 8,760; and these must be reduced to a uniform datum and freed from time errors. The steps accordingly necessary to prepare the tidal record for analysis are as follows:—(1.) Reduction to datum by comparison with a scale of feet or sight gauge, and with reference to the Bench-mark; and the ruling-in of the datum line on the tide-diagrams. (2.) Correction of the hour lines for the want of fit of the tide diagram around the cylinder, due to lap or shrinkage of the paper. This sometimes varies with the season. (3.) Correction of time error due to the error and rate of the driving clock. (4.) Interpolation of any breaks in the tide curves. If these do not exceed a day in duration, they can be filled in with advantage on the tide-diagrams themselves, rather than by calculation in making the analysis. (5.) Examination of the record for storm-tides, or anything exceptional which should not be included in the analysis.

The tabulation of this character done during the twelve-month since last report, and the year from which the tide tables will be benefited thereby, may be stated concisely as follows:—

Victoria, B.C.—One year's tidal record, from May 1, 1896, to April 30, 1897; extending the basis of these tide tables from one to two years and benefiting them from 1902 onwards.

St. John, N.B.—Two years' tidal record, from May 15, 1896, to May 31, 1898; extending the basis of these tide tables from two to four years; and thus improving their accuracy from 1903 onwards; and benefiting the whole Bay of Fundy region which depends on them.

Quebec.—Two further years of tidal record from March 1, 1898, to March 15, 1900; extending the basis of calculation from four to six years, and thus benefiting the tide tables for Quebec and Father Point from 1903 onwards, as well as the whole tidal estuary of the Lower St. Lawrence, which depends indirectly upon these.

Halifax.—Three years, from December 14, 1896, to January 15, 1900, extending the basis from which these tide tables are calculated from one to four years of recent observations. This, together with four years of old observations, obtained between 1851 and 1861, will give a total basis of eight years observations for these tide tables, and thus benefit all the ports on the Atlantic coast of Nova Scotia which depend upon them.

St. Paul Island.—Two years, from May 20, 1899, to May 31, 1901; which will benefit the tide tables for the ports in Northumberland Strait, and the south-west side of the Gulf of St. Lawrence, which depend directly or indirectly on St. Paul Island.

The tabulation for these last two places has not yet been submitted to analysis; but this will be done as soon as the finances of the Survey will admit of it.

When these analyses are made, the tide tables for our three principal tidal harbours, Quebec, Halifax and St. John, will be based upon a longer period of observation than any other harbours in North America, with the exception of New York, where a tidal record of eleven years in all has been obtained, either at Sandy Hook or Governor's Island. It is highly desirable that the record be extended however; as the irregularities due to storm disturbance can only be got rid of by a long series of observations which eliminates them eventually by a process similar to averaging. There are also long period elements in the tide itself, which require to be determined; the longest, which is also of much importance, having a period of nineteen years. The periods of observation on which the tide tables for India are based, range from six to twenty-seven years.