

Repeated endeavors have been made to ascertain the relation between the various datum planes in use in our cities and towns. There are often two or three of these, out of accord with each other; and further, there is usually uncertainty or actual discrepancy between the various marks by which these planes are defined. In these circumstances, the method which this Survey has adopted from the outset is to refer all the tide levels obtained, to some one satisfactory bench-mark in each port. Eventually, as the observations are continued, the value of Mean Sea Level, extreme tide levels, and other factors of importance, are determined with reference to this bench-mark. Such factors are of the highest value in city drainage works and harbour improvements. In certain rare instances, bench-marks have been established by the Admiralty, which define the low-water datum of the charts. These are always taken advantage of, where they exist. When the height of the tide is referred to this datum level, it shows the depth available in addition to the chart soundings. In the present Report, the result is given of the endeavour to correlate the various datum planes in use at Halifax; and to redetermine the low-water datum at Victoria, B.C. The relation between the tide levels and the Yarmouth town datum, is also given.

Five summer tidal stations were erected this season with the object of obtaining tidal data as a basis for the investigation of the current at the entrance to the Bay of Fundy, and in the bays on the south coast of Newfoundland.

A considerable amount of tabulation from the tidal record already secured, has been done during the year, and submitted to analysis as the means to do so have permitted. This will extend the basis from which the tide tables are calculated, which will be of permanent benefit in improving their accuracy in all future years. In the office work of this Survey, and in the erection of the summer tidal stations, I have had the assistance of Mr. R. Angus and Mr. S. C. Hayden.

The total expenditure on this Survey during the fiscal year from June 30, 1901, to June 30, 1902, was \$8,951.08 in which a supplementary estimate of \$1,500 is included, which was expended upon material for the heavy repairs at the permanent tidal stations.

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 tabulation of this character which has been submitted to analysis during the twelve-months since last report, is as follows:

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, now gives a total of eight years of observations for these tide tables; and this benefits all the ports on the Atlantic coast of Nova Scotia, that depend upon them.

St. Paul Island.—Two years, from May 20, 1899, to May 31, 1901; which benefits 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.

Father Point.—Three years from January 25, 1897, to February 25, 1900. This will be of great benefit to the St. Lawrence route; as it has now been ascertained that the best results are secured by referring to this station, the tides and currents throughout the open estuary.

In addition to the above, the following tidal record from the Pacific coast has been tabulated ready for analysis; which will be made as soon as the finances of the Survey will admit of it.

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