

nearly 400 feet long. The results need not here be detailed: They will afford a table of correction to be applied to the readings of the height of the tide, to allow for the siphoning action; which is essential in the reduction of the observations.

The gauges at St John and Halifax were also visited in October; and careful instrumental levels were taken to check the elevation of the datum used. This is the more needful as both gauges are supported by timberwork; and check levels had not been taken for two years. At St. John the wharf against which the gauge is placed, floats up three inches at the higher tides. The column of the gauge itself, stands free of the wharf however, and rests directly on the bottom. It had not altered quarter of an inch in level since 1896. At Halifax the column of the gauge it set in a pile wharf; and it was found that no vertical movement had occurred of as much as quarter of an inch in two years, although the gauge sways with the piling when vessels moor to the wharf. The determination of these levels for datum is essential to the reduction of the observations.

The gauges at Forteau Bay and St. Paul Island were visited by Captain Douglas in the course of the season. Some important improvements were made; the levels were taken, and the dipeidoscopes, on which time for the observations depends, were adjusted by astronomical observations. The data for time and height are the two necessities at the tidal stations.

At the outer end of Belle Isle Strait a summer tidal station was established in July. The site chosen was in Henley Harbour, at the mouth of Chateau Bay. The record began on July 24, and is to continue as late as possible in the autumn. The reasons for the establishment of this station need not be discussed at length, although the best location for the purposes in view was carefully considered. By recording the tide of the open Atlantic at the outer end of the strait, it will afford a valuable comparison with Forteau Bay at the inner end, and possibly also with other Atlantic tidal stations.

#### OTHER TIDAL OBSERVATIONS RECEIVED.

We have to acknowledge during the year the receipt of the following information:—  
*Shubenacadie River.*—Observations of the speed and the time of turning of the tidal current in the Shubenacadie River, Nova Scotia, were received from Mr. J. F. Armstrong, Assistant Engineer on the Midland Railway, now under construction.

*Moncton.*—The level reached by an exceptional tide at Moncton was noted by Mr. E. P. Cook, the Harbour master. It occurred on August 21, 1899, and reached a level only  $4\frac{1}{2}$  inches below the exceptional tide of October 12, 1887, which is the highest tide there recorded, next to the Saxby tide of October, 1869. These levels are important with reference to the dyked lands around the head of the Bay of Fundy. Mr. Cook kindly sent also several observations of the time of arrival of the tidal bore.

*Chicoutimi.*—Tidal observations at Chicoutimi for a period of two months in 1897 have been received from Mr. F. W. Cowie, C.E., of the Public Works Department. These were obtained by means of a self-registering gauge loaned by this Survey. As Chicoutimi is at the head of tide-water on the Saguenay River, this record will be valuable in furnishing a basis for the Saguenay tides, which will be of advantage for the growing trade of that river. Chicoutimi is 75 miles inland from Tadoussac, at the mouth of the Saguenay.

*Annapolis.*—The level of the highest known tide at Annapolis, Nova Scotia, was determined and referred to a permanent bench-mark by Mr. J. S. Hodgson, C.E., of Wellington, Massachusetts, while engaged in a survey for the sewerage of that town. This information he kindly took the trouble to communicate. Unfortunately it does not at present afford a comparison with the tidal observations obtained at Digby, at the other end of Annapolis Basin, as continuous levels are wanting; but meanwhile it is locally important.

*Seymour Narrows, B.C.*—The original observations obtained here in 1897 by the United States Coast Survey have been kindly communicated to this department. These observations show the time of the turn of the current for a period extending from April to October in that year. Similar observations were also taken in Sergius