

the least suitable to use as stations from which to determine the tidal differences of other points along the coast. The reason for this is, that many harbours such as Quebec, St. John, N. B., and New York, are at the mouths of tidal rivers; and this has the effect of complicating the times of the tide with local conditions. To avoid this difficulty, Sandy Hook has been chosen instead of New York harbour, as a point of reference for other places along the Atlantic coast. At Quebec and St. John, the same local difficulties occur; and although it is necessary to observe the tides at these harbours on account of their own importance, it is doubtful whether St. John will answer satisfactorily as a port of reference for the Bay of Fundy. On this account it is advisable to establish an additional tide gauge as soon as possible at Yarmouth, which is the best available point. It is free from local influences, and the tides have a more medium range than at St. John, making results more reliable, and it best commands the entrance to the Bay of Fundy, as the tides enter the Bay from the southward. For the Atlantic coast of Nova Scotia, Halifax is undoubtedly the locality to select, as it has the advantage of combining both the objects referred to. It is a question however, whether it would be best to place the gauge in the harbour of Halifax, where the influence of the accumulated tide in Bedford Basin may have an appreciable effect. It may be found on examination that a point outside the harbour, such as Chebucto Head, may give better results for the actual tide of the Atlantic.

In recommending the establishment of a tidal gauge at Halifax, it may be well to explain that to obtain a satisfactory basis for tide tables at so important a point the observations should be continued for a period of 19 years. This is the period of revolution of the moon's nodes, and the period in which eclipses recur successively in the same order. Although there is a recurrence in each year of unusually high tides at the equinoxes in the spring and autumn, due to the combined influence of the sun and moon at those seasons, yet the declination of the moon is different at each succeeding equinox until the period of 19 years has elapsed. At the end of that time the sun and moon are again in positions with respect to the earth which are practically identical with those which they had at first; and the whole of the associated phenomena, including the tides, recommence again in the same sequence. This is therefore the shortest available lunar cycle for the correct computation of tides at any standard point.

As the Gulf of St. Lawrence forms a large area which is nearly land-locked, it is of the first importance to obtain complete information regarding the tides and currents at the two main entrances which connect it with the ocean. The northern entrance by the Strait of Belle Isle is only about 10 miles wide and 40 fathoms deep, while the other opening between Cape Breton and Newfoundland, known on the charts as Cabot Strait, has a width of 60 miles and a depth over the greater part of this extent of about 250 fathoms. In comparison with these the Strait of Canso need not be taken into account in its relation to the tides and currents of the Gulf as a whole; but with regard to these two main entrances themselves, it must not be taken for granted that their influence depends solely upon their relative dimensions. Judging by the movement of icebergs in the Straits of Belle Isle, the general opinion is that a large amount of cold water finds its way through it into the Gulf. This may be in reality a branch of the Arctic Current on its way south from Baffin's Bay. Although this entrance to the Gulf may seem unimportant as compared to the other, it should be remembered that a current of even half a mile an hour through this Strait would admit to the Gulf a volume of cold water more than 20 times greater than the volume discharged by the river St. Lawrence.

As regard tide however, there is little doubt that the amount entering the Gulf by the Strait of Belle Isle is relatively very small; but owing to the nature of tidal undulations, it is quite possible that its effects may be felt further than at first sight would seem likely. In addition to this, the tide is sure to have a direct influence on the movement of the current in the Strait. It is therefore necessary to establish a tide-gauge there as soon as possible. The best position will probably be at Forteau Bay, where there is a wharf and good shelter. This Bay is also at the narrowest part of the Strait, where the currents can best be observed.