

The pressure of this head of water occasioned leakage, and the column required to be pumped out frequently. It was accordingly taken up in March last, and strengthened with an outside layer of 3 inch planking and extra ribbing inside. A double layer of shipping felt was placed under the new planking; and it was also thoroughly tarred and caulked, to make it watertight. A large outside ballast box had to be added at the foot of the column to keep it from floating up.

The opportunity was also taken to put in the new form of inlet pipe, specially designed to enable it to be cleaned out easily at any time. This is being put in at all the gauges as opportunity offers.

At St. Paul Island a severe gale occurred on January 13th which damaged the tide gauge. This gale was the worst on record since 1875; a lobster factory on the island twenty-five feet above high water, was completely washed away. After persevering efforts during the remainder of January, the gauge could not be put in working order. It was impossible to reach this station till the opening of navigation at the beginning of May. One of the new recording instruments was taken there at the earliest opportunity (May 12th) but it was found on setting it up that its driving clock was defective, and would not work. As the communication with the island is fortnightly, this occasioned the most unfortunate delay. The clock had to be returned to Halifax for repairs; and after much trouble which interfered also with arrangements for other work, it was not until the middle of August that the station was ultimately put in working order.

The other two recording instruments were immediately inspected; and their defects corrected after several weeks of careful examination. It was fortunate that this was done in time; as one of the instruments was intended for Belle Isle, and any defect would probably have caused the loss of a year's observations at so isolated a station.

NEW TIDE GAUGES ESTABLISHED.

It was intended to complete during this season the system of principal tide-gauges; but as the survey of the currents was also commenced this year, and the funds for both purposes were limited to the amount granted in former years for tidal observations only, it was necessary to curtail the total amount of work. It was only possible therefore to establish two additional stations for the Gulf of St. Lawrence; and the establishment of stations on the Atlantic coast had to be postponed.

The stations most required for the gulf, were in the Strait of Belle Isle and at Father Point. The tide-gauge at Belle Isle is for tidal purposes a companion to the one on St. Paul Island; as these command the two entrances by which the tides of the Gulf and River St. Lawrence enter from the Atlantic. It was also essential to have a tide-gauge in the Strait of Belle Isle this season, to furnish tidal data for the survey of the currents. The deep channel of 100 fathoms which runs into the mouth of the Lower St. Lawrence, ends in the vicinity of Father Point; and from there to Quebec the river is relatively shallow, and the tides are more liable to be affected by the winds. The range of the tide which in the Gulf is less than five feet, increases at Father Point to seventeen feet. It can thus be well observed, as all the fluctuations are so much amplified. This is also a meteorological observatory, as well as the pilot station. It is thus a most important and suitable point for a tidal station.

In the Strait of Belle Isle the tide-gauge was erected on the west side of Porteau Bay. The shelter there is fairly good, as the bay is well within the strait; and it has also the advantage of being at the narrowest part. The chief difficulty is to avoid its destruction by ice in winter. The thickness of the ice along the shores of the strait is only limited by the depth of water in which it will float. Hence if a wharf were to run out into six feet of water, it would be struck by blocks of six feet in thickness, and so on in proportion; and these blocks have often an impetus from a heavy sea to help them in their work of destruction. The fishermen's wharfs do not therefore extend into a greater depth than about three feet at low water; and the tide-gauge was placed on a timber crib filled with stone, set at the end of one of these wharfs.

The inconvenience of the shallow water is that the wave motion is so great, that it records itself on the tide diagram, and thus gives considerable trouble in obtaining