

on the Atlantic coast of Nova Scotia. The tidal differences for the St. Lawrence have been extended, and now include the whole of the tidal portion of the river, from Three Rivers to Gaspé, a distance of 420 nautical miles.

The differences for the Lower St. Lawrence are based upon a comparison of the observations from the tide stations at Father Point and Anticosti, with the simultaneous observations at Quebec, throughout one year. The observations used for the purpose extend in all from 12th November, 1894, to 13th January, 1896. This comparison shows that the differences are very constant throughout the course of the lunar month; so that the tide at Father Point and Anticosti can thus be correctly deduced from Quebec. It was, therefore, justifiable to base tidal differences for intermediate places upon the differences between their establishments as given in the Admiralty list; and these will serve in the meantime until direct observations can be obtained throughout this region. This uniform progress of the tidal undulation up the estuary of the St. Lawrence from Anticosti to Quebec is in marked contrast to the great irregularity which is found elsewhere in the Gulf of St. Lawrence. It is, therefore, quite unsafe to assume that the difference in the time of the tide between one point and another is constant; unless it can be proved to be so by direct observation.

The differences between Quebec and places above, as far as Three Rivers where the tide ceases to be felt, are based upon two series of observations taken by Mr. R. Steckel, C.E., of the Department of Public Works, in October, 1887, and May, 1888. These observations were taken simultaneously at seven points along the river; and each series occupied one complete month, at the seasons of lowest and highest level of the water in the St. Lawrence river itself. These observations show that on the whole the tidal undulation travels more slowly up the river when the water is at its highest; it being then from eight to twelve minutes later on the average than when the level is lowest. The reason of this appears to be that the current in the river is stronger in the high level season, and thus keeps the tide back. The differences published are the mean values for the two seasons, and these should be practically exact. On the other hand, the high tide makes its way up the river much faster than the low tide, the difference in speed making the time of low water more than an hour late relatively to high water as far up as Grondines and Champlain. It is, therefore, necessary in the tables, to state separately the tidal differences for high water and low water respectively, for places above Quebec. A comparison was also made between these observations, and the time of the tide as noted throughout the season of 1895, by the semaphore operator at Lotbinière.

The tide tables themselves are in Standard time for the 60th and 75th meridians respectively; and the tidal differences for the other places are computed to give the time of high and low water in Standard time also. In this way the master of a vessel can know the time of the tide directly from his chronometer, by allowing an even number of hours from Greenwich time, without the trouble of looking up his longitude. Standard time is also the most convenient for harbour purposes as it is now used all but universally on shore.

SPECIAL OBSERVATIONS FOR TIDAL DIFFERENCES.

In the Gulf of St. Lawrence there are regions in which the tides show great irregularity, and where constant differences with ports on the Atlantic will not apply. This will be better understood from the following comparison, which shows the great irregularity in the difference in the time of the tide across the open Gulf, as contrasted with the even progress of the tidal undulation up the Lower St. Lawrence, when once it has entered the mouth of the river between Gaspé and Anticosti:—

Difference in the time of high water between St. Paul Island in Cabot Strait, where the tide enters the Gulf, and South-west Point of Anticosti at the entrance to the St. Lawrence. Distance, 190 nautical miles. From simultaneous observations in six months during the years 1893 and 1894. Difference in absolute time ranges from 4 h. 30 m. to 6 h. 50 m.

Differ
Quebec, on
simultaneo
absolute ti

The w
an unusua
and a short
when this
comes in fi
it is to be f
hand, this i
regions. I
trary tidal

The pr
of the impo
have been n
Atlantic co
these endea
marked at I

The dit
of the equat
change from
variation is
overrunning
unless these

These c
the importa
this purpose
twice destro
it was neces
had also bee
had been put
of comparis
in good work
in the Bay
referred by c
due to diurn

Arrange
extending fr
berland Strai
of coast-line,
avoid undue
claim; and c
from a tidal
points. The
ingly made:
avoiding the
mouth of Mir
of the bay; C
range; Fictou
Cape Breton I
Strait which
side of Cape I

The erect
of the observa
very efficient
much informa
vation with fo