

making a round of 2,750 miles. Notes and sketches were made of the wharfs in the harbours around the Newfoundland coast, which will be of value for future reference.

SECONDARY TIDAL STATIONS IN SOUTHERN NOVA SCOTIA.

The object of the stations established this year on the Nova Scotia coast was to secure a better connection between the Atlantic tides and the Bay of Fundy. On a length of 60 miles of coast at the southern end of Nova Scotia, the tide increases from its oceanic range of 7 feet at Shelburne or Negro harbour, to 16 feet at Yarmouth at the entrance to the Bay of Fundy. It has already been ascertained by the observations of 1898, that the tides from Yarmouth upward throughout this bay, can best be referred to St. John, N.B.; and a further object of the present observations was to ascertain the dividing line between places referable to the principal tidal stations in the two directions, St. John, N.B., and Halifax. The tidal undulation in the North Atlantic strikes squarely upon the Atlantic coast of Nova Scotia, there being little difference in the time of its arrival at any of the harbours between Cape Sable and Scatarie, except where delayed locally in running up deep bays. The height of the tide also, is nearly the same throughout this distance, and this whole coast can therefore be correctly referred to Halifax.

The points selected after careful consideration were Shelburne, Clarke harbour, Barrington passage and Pubnico bay. Shelburne is sufficiently far to the eastward of Cape Sable to be beyond the reach of any influence of the Bay of Fundy and thus to give the unaffected Atlantic tide. The observations there will also furnish a check on the time at the intermediate ports from there to Halifax. Clarke harbour is practically the same as Cape Sable and the nearest point to that cape at which shelter can be secured. It thus gives the tide at the extreme outlying angle at the southern end of Nova Scotia. At Pubnico bay, which is only 18 miles north-westward, the tide already has the same characteristics as in the Bay of Fundy. Lastly, Barrington passage was selected to afford an intermediate point in the progress of the tide, at about the middle of the time-interval between Shelburne and Clarke harbour.

Another tide gauge was placed at Trepassay Bay, within 16 miles of Cape Race, the extreme south-eastern angle of Newfoundland. It is a locality difficult to reach, as with nine days travel it was only possible to obtain two days at the locality itself. The object of this station is to secure tidal data with reference to the currents in the bays on the south coast of Newfoundland.

A list of the stations established, with the length of record obtained, is given below:—

Shelburne, N.S.—Gauge placed on the north side of the steamboat wharf. The wharf is built of piles, to which the gauge column is braced. Tidal record from July 7 till October 10. Observer, J. C. Morrison, harbour master.

Barrington Passage.—Gauge placed at Robertson's wharf, at which the local steamers call. Tidal record from July 12 till October 22. Observer, E. Nickerson, captain of the ferry steamer.

Clarke Harbour.—Gauge placed at the Government wharf, Swim's point, at the inner end of the harbour. Tidal record from July 2 till October 22. Mr Hayden here acted as observer.

Pubnico Bay.—Gauge situated at Lower East Pubnico, at D'Entremont's wharf; about half a mile above the lighthouse. Tidal record from June 27 till October 20, Observer, W. H. Amiro, customs officer.

Trepassay Bay, Newfoundland.—Instruments and fittings shipped from Ottawa, with full instructions, on June 19th. After much correspondence and enquiry, delivered at Trepassay August 1. Gauge placed at the steamboat wharf, and observations begun on August 6, but unavoidably interrupted from August 8 till the 21, the date of my arrival there. Satisfactory observations secured from August 21 till late in November. Observer, J. L. Murphy, customs officer.

These stations were all equipped with self-registering instruments of the Richard type. The tide columns were built of timber, with a clear area of 13 by 10 inches in-