

ANNUAL REPORT
OF THE
Engineer in charge of the Survey of Tides and Currents in Canadian Waters
FOR THE YEAR 1899.

OTTAWA, December 20, 1899.

W. P. ANDERSON, Esq., C.E.,
Chief Engineer, Department of Marine and Fisheries.

SIR,—I have the honour to submit the following report on the progress of this Survey. All the tide tables have been prepared and issued as usual, with the improvements referred to in my last report; and considerable progress has been made in working out practical results from the tidal observations which have been secured. In this work, I have had the assistance of Mr. R. Angus and Mr. S. C. Hayden; who also attended to the office work while I was away; as leave of absence for three months was granted to me on account of my health. Because of this also, it was not possible to undertake much in the way of new work this season. The principal tidal stations have continued in operation under the charge of the observers; and nearly all of them have been visited this season by myself or Captain Douglas. One secondary tidal station has also been established this season at the outer end of Belle Isle Strait.

The last report, containing information as to the tides of the Bay of Fundy with observations on the tidal bore in the Petitcodiac River, has met with much appreciation. As the survey becomes more widely known, the requests for information and the correspondence resulting, continue to increase. Many examples could be given of the accessory ways in which this survey often proves of value, in addition to its direct service to the shipping interest. The tide-levels especially, which require to be carefully worked out for the reduction of the tidal observations themselves, have been of important service in connection with harbour works, in several instances during the past year.

The total expenditure on this Survey during the fiscal year from June, 1898 to June, 1899, was \$5,186.35. This includes, in addition to the ordinary fixed charges, the sum of \$973.22 for the tidal observations in the Bay of Fundy in the summer of 1898; and \$834.15 for repairs to the crib-work of the gauges at Forteau Bay and St. Paul Island.

THE PRINCIPAL TIDAL STATIONS.

These stations have been in continuous operation throughout the past year, with the exception of Yarmouth; although some interruptions of a minor character occurred also at other stations.

The gauge at Yarmouth, N.S., was fitted up originally in 1898, as a summer station; without any provision for heating in winter, which requires a much more elaborate construction. As it is milder there in winter than at any of the other principal stations, the gauge was continued in operation to obtain as much tidal record as possible. At Yarmouth the mean temperature for January and February is $26\frac{1}{2}$ Fahr., which is $3\frac{1}{2}$ higher than at Halifax. The tide-column is of wood which is non-conducting; and some thick oil on the surface of the water in the tide-column, protects the water from the cold air; and thus, as it rises and falls with the tide, the oil keeps the ice from adhering to the inside of the column as much as it otherwise would. Notwithstanding such precautions, more than a month of record was lost during the first winter, in 1899 on account of frost; namely, from February 2 to March 10.