NOTE.—On the Progress of the Tides in the Gulf of St. Lawrence, as ascertained by the Summer Observations of 1896; and the Tidal Differences derived from them. Explanation of Plates illustrating these tides.

On account of the great variety in the range of the tide on our eastern coasts and in the Gulf of St. Lawrence, it has been found necessary to establish seven principal tidal stations at which continuous observations are obtained throughout the year. In addition to affording the tidal data necessary for the investigation of the currents, these stations are so located as to serve for ports of reference, to which the tides in the intermediate regions may be referred. The aim of this Survey is to obtain this tidal information by means of secondary stations which are keep in operation during the summer season only ; without the substantial construction required to withstand winter ice, and the special arrangements needed at the principal stations for heating in winter. By this method, the undue multiplication of principal stations is avoided.

In the season of 1896, a beginning in this direction was made in the region extending along the south-western side of the Gulf of St. Lawrence, as explained in the last Report of Progress and mentioned in the present report. A valuable series of simultaneous observations was thus obtained. So far, the results worked out from them, have only comprised the differences in the time of the tide; in order to obtain a general knowledge of the progress of the tide throughout the Gulf, and to secure tidal differences with reference to the principal stations. A paper based upon this work was prepared by me in June last, for the Halifax meeting of the Royal Society of Canada, entitled " Uharacter and Progress of the Tides in the Gulf and River St. Lawrence; as ascertained by Simultaneous Observations with self-registering Tide Gauges." In it, an explanation is given of the complicated nature of these tides ; the series of comparisons with the various principal stations are detailed ; and the methods are described by which the most satisfactory tidal differences were finally arrived at. The paper is accompanied by the plates illustrating the character of these tides, which are now appended to this report.

The positions of the principal tidal stations themselves, are shown on the outline map, Plate I. They are as follows: --St. John, N.B.; Halifax, N.S.; Strait of Belle Isle; St. Paul Island, in Cabot Strait; South-west Point, Anticosti; Father Point, and Quebec.

and Quebec. The last four stations as above given, form a series extending from the main Gulf entrance to Quebec, a distance of 690 miles; and the character of the tide in its progress on this main route is shown in Plate II; and in the first half of Plate III, the simultaneous Atlantic tides at Halifax and in the Strait of Belle Isle, are given for comparison. The tide curves given in these plates, are fac-simile reductions from the actual traces obtained from the soff-recording tide gauges. The vertical seale of the gauge at each station, is adapted to the local range of the tide. The time used throughout is Standard time for the 60th meridian; four hours slower than Greenwich Mean Time. Each series of tides is thus a simultaneous set, in absolute time.

The tide in Cabot Strait is affected by an irregularity known as diurnal inequality. When the moon's declination is high, the two tides of the same day have there a long interval and a short interval of time between them; and their ranges are also very different in amount. It was already known that the tides at Pictou and Charlottetown, in Northumberland Strait were affected by diurnal inequality; but the reason of this was not understood. The nature of this inequality is shown in the tide curves obtained at Pictou and Charlottetown, as given in Plate IV, where it is strongly marked. It is remarkable that this irregularity in the tide is much less noticeable after it enters the mouth of the St. Lawrence, and at Father Point and Quebec it is scarcely appreciable.

The series of tidal stations established in the season of 1896 had for their object to trace the progress of the tide in the Gulf of St. Lawrence, in order to ascertain how far these irregularities are felt; and also to determine the extent of the region which can be referred to each of the principal stations as to a port of reference, as already stated. The positions of the secondary stations on the 801

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