Almanac. The tide tables thus become of practical value; as is attested by Mr. H M. Mackay, a resident of Pictou, and formerly an assistant in this Survey, who superintended the tidal observations in this region in 1896. He thus writes in September last:—'You will be pleased to know that the tide tables for Pictou are regarded as very reliable. Those formerly in use, were, as might be expected, quite unsatisfactory.' It is also reported by residents of Charlottetown, that the same holds with regard to the tide tables for that port; these being computed from the Pictou tides.

Further improvement in the accuracy of these tables can only be obtained by the analysis of additional tidal record from St. Paul Island, on which they ultimately depend. This is the more needful, because the tides there have not a large range, and are consequently the more affected by wind disturbance; and a longer period of observation is therefore required as a basis of calculation. It has also been found best to refer to that station the tides in a large section of the south-western portion of the Gulf of St. Lawrence; and these tides would thus obtain the advantage of any improvement secured, as well as Northumberland Strait.

TIDES ON THE LOWER ST. LAWRENCE REFERRED TO QUEBEC.

The desirability of obtaining the best tidal data possible in this region need not be enlarged upon, not only because of the importance of the tides themselves to navigation, but also to obtain an adequate basis for the examination of the strong tidal currents on a route traversed by so large a volume of commerce.

On account of the discontinuance of the tidal station at South-west Point, Anticosti, a very thorough examination was made of the difference in the time of the tide based upon the simultaneous records obtained from the three principal stations at South-west Point, Father Point and Quebec, at the extreme ends and the middle of the estuary, a distance of 450 miles.

The time of the tide at South-west Point and Father Point can now be deduced from the Quebec tide tables by means of constant differences, which have been derived from a long series of simultaneous observations, as explained in previous reports. The tide tables for Father Point are computed from the Quebec tables in this way, one difference being used for high water and another for low water. With regard to the accuracy of the result as thus obtained, the point of importance is to know how far the differences in time for individual tides will vary from the average value, which is used as a constant difference. The range in the difference for high water between Father Point and Quebec is 56 minutes during the course of the year, and the range in the difference for low water is 1 hour 19 minutes. The extreme variation from the average value may be taken as half of this range in each case; and the limit of error in the present tide tables for Father Point, based upon the averages, is thus 28 minutes for high water and 40 minutes for low water. It is to be understood, however, that this is the limit; as usually the tides will be much nearer than this to their average value, especially in the summer season; and it is only occasionally that these more exceptional values will occur.

With a view to allow in the calculations for this variation in the difference, and thus to reduce the error, much labour has been expended, the object being to arrive at such relations between these three St. Lawrence stations as would enable the variation in the difference to be reduced to law. The investigations made need not be given here even in outline, as they may be considered technical. It may therefore be sufficient to say that no one law could be discovered under which a series of variable differences could be constructed, to allow for the greater part of the error resulting from this variation.

The outcome of the investigation was to show that improvement in the present method of the use of constant differences will only be secured when the means are available to make an analysis of the Father Point record itself, and to base tide tables directly upon this. It will probably be found that an improvement will then be obtained by making Father Point, instead of Quebec, the port of reference for other points in the open estuary for some distance above it. Also in the other direction, an improvement in accuracy as far as Anticosti Island and its vicinity will be obtained.