

Survey. In default of this method, the only other way when the observations are not simultaneous, is to refer the time of the tide to the moon's position; so that the various localities may be compared, and the progress of the tide ascertained. The tide is referred to the moon by the luni-tidal interval; which is the interval of time between the moon's transit across the meridian and the next following high water. This interval at the Spring tides, when the moon is new or full, is termed the "Establishment". In dealing with complete tidal observations, this interval can be strictly defined; and in the region under consideration, where the range of the tide is often less than one foot, the time of high water is more definite at the Spring tides because the best range is then obtained; and the Establishment is thus the best time-factor to deal with.

The other element in the tide is its height or range. This can be determined independently at each locality; and it should properly be referred to a low-water datum, but this was not attempted in these regions. It is best, therefore, to deal with the range of the tide, from high water to low water, which can be directly observed; rather than the rise above a fixed datum level.

When desirable, the readings on tide scales were plotted, to obtain the corresponding tide curves. This plotting, and the general reduction of the observations, was carried out by Mr. H. W. Jones, of the Tidal Survey staff.

TIDAL OBSERVATIONS OBTAINED IN 1914 AND 1915.

Collinson point.—On the north coast of Alaska. Longitude 9 h. 39 m. 19 s. West. Observations were obtained here in 1914 from January 16 to May 6, by Dr. J. J. O'Neill and Mr. J. R. Cox. As this was headquarters for the winter, the large recording tide gauge was used. There are some interruptions in the above period; but the observations afford the range at six Spring tides and five Neap tides. This range is only 7 inches at the Springs and 3 inches at the Neaps. With so flat a tide curve, the time of high water can only be obtained at all definitely at the Springs; and a value for the Establishment has been deduced, which shows a fair degree of constancy in the circumstances. The results are given in abstract in the table for Collinson point appended.

The time on the tide gauge record is assumed to be correct throughout. Collinson point local time was used; and although no time errors are noted, it is taken to be correctly kept on the average.

Martin point.—On the north coast of Alaska, 50 miles east of Collinson Point. The observations were for three days only, on March 19 to 21, 1914. They were taken by Messrs. F. Johansen and G. H. Wilkins, as readings on a tide scale; the readings being to the hundredth of a foot, or to the nearest quarter of a tenth. A watch was used to carry the time from Collinson point; but as its error and rate are not stated, the time remains uncertain. As the observations were at the Neap tides, they would not serve in any case for a determination of the Establishment. The only value obtainable, therefore, is the Neap range; which is taken as the mean of four consecutive differences of level, between high and low water, to eliminate inequalities. This method of obtaining the range is used in all cases in dealing with these Arctic tides; and it is justified because of the small range. The Neap range here at this date was $3\frac{1}{2}$ inches.

Demarcation point.—Close to the Alaska boundary. Longitude 9 h. 21 m. 49 s. West. The time was carried by a watch which was correct when Collinson point was left on April 25, and was 46 minutes fast of Collinson point time on the return from the trip, on May 26. By assuming the gaining rate to be constant, and allowing for the difference of $14\frac{1}{2}$ minutes in longitude, it is therefore possible to reduce the observations definitely to local time at Demarcation point.