

Collinson point. It would appear, therefore, that the tide comes into this sea from the north, and proceeds southward and westward along its shores. This would accord with the view that the main tide of the Arctic ocean enters from its opposite side, from the North Atlantic, through the wide opening between Greenland and Norway.

The Establishments obtained from these observations are not definite enough to enable actual differences of time to be deduced from them, relatively to some one of these tidal stations. The general value of XII hours for the Establishment on these shores of Beaufort sea, is in good accord with XI h. 38 m. for Point Barrow, as formerly given in the Tide Tables of the British Admiralty; but it throws doubt on the value of VI h. 03 m. which is given for Herschel island.

At Bernard harbour, the Establishment VI h. 46 m. must be considered as later than the open sea by practically the whole of this amount with the deduction of the difference of longitude, which is 1 h. 46 m. relatively to Demarcation point. This leaves a difference of five hours for the run of the tide from the open, which seems large, when the distance from the mouth of Amundsen gulf is only 360 miles.

There is no uncertainty in the time however, as both watch and chronometer errors have been ascertained and allowed for. (See Supplementary Note.) As a term of comparison, the rate of travel of high water in the St. Lawrence estuary, in the wide part unaffected by river influence, is 1 h. 31 m. per 100 miles; which corresponds fairly well with this difference, if the depths are similar.

*Range of the tide.*—In regard to the range of the tide, it is too slight to have any direct effect upon navigation. It may be sufficient, however, to cause heavy ice that is grounded to move on, under certain conditions; and any rise of tide also tends to break up grounded ice.

*Procedure recommended.*—With regard to general procedure in any future tidal observations in the Arctic regions, it is to be strongly recommended that some permanent tidal station be established for reference in the region; and that it be maintained during the whole time that the explorations are in progress. The observations at the various points reached by the expedition, are liable to be for short periods or subject to interruption; but their value would be enhanced three or four fold if they could be compared with simultaneous observations at a reference station in the region.

Without such a reference station, the time of the tide at each local point where a short series of observations is obtained, has to be brought into direct relation with the time of the moon's transit. At the best, it may be quite uncertain whether the result represents a true average value, by which one locality can be compared with another, to determine the progress of the tidal undulation, or for other comparative purposes. But when the observations are simultaneous with those at the reference station, differences in absolute time can be determined which must be close to the true average even when the series of local observations is short. The results at different localities can then be compared without uncertainty, and the progress of the tide ascertained. At the reference station, the Establishment can be determined correctly from the long series of observations there; and the difference of time as found for any local point, when applied to this well-determined Establishment, should give a more trustworthy value than could be obtained independently.

In regard to the range of the tide, there are similar advantages in comparing local observations with the reference station. It can be readily seen, for example, whether the local range of the tide can be taken as the true Spring range or not, at the date of the observations. The comparison is valuable also as an indication of any abnormal tides due to wind or to ice obstruction; as such tides will be