

These differences in the relation between the turn of the current and the time of high and low water are partly due to the irregularity in the tides themselves. On the average the current ran inward from the east for one hour and forty minutes after high water, and outward from the west for an equal period of time after low water. A similar result was also obtained from a direct comparison between the turn of the current and the time of the moon's transit.

A relation of this character is very important to obtain; as it shows most clearly the true tidal character of the current in the strait. When the tidal record itself, which is now being obtained from the tide gauge at Forteau Bay, becomes sufficient for the calculation of tide tables, such a relation will enable the direction of the current under normal conditions when undisturbed by the wind, to be given in advance as definitely as the times of high and low water themselves.

The actual direction of the current is much complicated by the disturbing influences of the wind and barometer, as will be seen from the following instances in which the current ran persistently from one direction or the other.

*Persistent Current in one direction or the other.*—The most marked example of a persistent current running out of the strait from the west occurred from Monday, July 16th, to Thursday, July 19th. During these three days the current (as observed three miles off the north shore) ran in from the east for only five hours, and out from the west for 19 hours each day. The maximum velocity of the current from the east was 1.38 knots per hour; and from the west 2.44 knots per hour. The long run from the west was stronger at the beginning and end of the time, with an interval of weaker flow between the two. The times of high water corresponded with this minimum in the current from the west, and with the maximum current from the east. This condition of the current may therefore be considered as consisting of two components; a steady flow from the west, together with the usual tidal current in the two directions. As the moon's declination was at its maximum at the time, the diurnal inequality would largely account for the difference between the actual current from the east at the one tide, and the minimum of the current from the west at the other.

The best example of a persistent current running in through the strait from the east occurred from Wednesday, September 5th, to Saturday, September 8th. All the indications concurred in showing that the current ran continuously in the one direction during these days; although the observations were much interrupted by bad weather. There were also about a dozen icebergs seen in the strait during this time; and their motion agreed with the regular observations in showing that the current ran continuously inward from the east. The current then varied from a minimum of 0.54 knots per hour to a maximum of 3.15 knots, in the one direction. The tides themselves were anomalous; as the low water for five successive tides scarcely fell below mean sea level, and the whole rise was less than two feet, or about half of the usual amount.

In stating the conditions of wind and barometer during these periods of predominant flow, it may be well to recall that a difference of barometric pressure should tend to produce flow from the higher towards the lower pressure, just as in the case of the wind.

At the time of the predominant flow from the westward (July 16th to 19th), the wind ranged from N. W. to S. W. For three days previously, from July 13th to 16th, the average for 72 hours was 16 miles per hour; and from July 16th to 18th, the average for 60 hours was 14 miles per hour from the same direction. This was succeeded by easterly winds and broken weather. Also, from the morning of the 14th the difference of barometric pressure gave a barometric gradient which was inwards at Cabot Strait and outwards at the Strait of Belle Isle. This continued till the evening of the 17th when the pressure equalized itself; and by the morning of 19th a low pressure area developed over the Gulf which gave inward gradients at both straits and thus reversed the conditions for Belle Isle. The effects of both wind and barometer are thus in general accord with the direction of the current from the westward. It will also be noted that the total mileage of westerly wind in the case

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