For examples of the relation of the under-current to the surface current, see Report of Tidal Survey, January, 1897, Table II ; and accompanying explanations in that report.

Temperature and density .-- The two characteristics chiefly relied upon in tracing the movement of currents, are the temperature and density of the water.

In the Gulf of St. Lawrence, the surface temperature in the summer season usually ranges from about 50° to 65°, and in proceeding downwards this temperature gradually falls, until at a depth of 40 or 50 fathoms it is only 31° to 34°, or practically at the freezing point. Where the greater depths are met with, the water below this again, is found to be appreciably warmer. There are considerable areas however, in which the depth is less than 50 fathoms, and where the conditions are accordingly restricted.

The best observations to ascertain the amount of change in the temperature of the surface water with the season, were obtained at a series of points, five miles apart, on each of the following lines: -(1.) From 30 miles off Heath Point, to Cape St. George on July 6. (2.) From a point off Cape Whittle, to the offing of Cape St. George, on August 3. (3.) Same line as No. 1, run a second time on September 28. The results were as follows :-

July 6. From 49¹/₂° to 51¹/₂°. Average = 50°.93.
August 3. From 50° to 54°. Average = 52°.68.

(3.) September 28. From 52° to 541°. Average = 53°.62.

Is appears, therefore, that in general, the temperature of the surface water merely rises with the progress of the season; and it is also natural that the water should become warmer to a greater depth as the season advances. Even this has its limitations, however; as at a depth of 50 fathoms no greater rise in temperature has yet been found than from 32° to 34°, between the month of June and the end of September.

At all three angles of the Gulf, the coldest water forms a layer between the depths of 30 and 50 fathoms. In the vicinity of Belle Isle Strait, the same low temperatures are also found at these depths; although there the temperature towards the surface is relatively lower as a rule, than in other regions. It is probable that this cold layer extends very generally over the Gulf area; and it cannot, therefore, be taken as an indication of direction of movement of the water.

Below this cold layer, in the deep channel of the Gulf, the temperature from 100 to 200 fathoms is found to range very constantly from 38° to 41°. This result was obtained in Cabot Strait, and also between the Gaspé coast and Anticosti, 220 miles further in from the Atlantic, along the deep channel. This deep water, from such indications as have been obtained, appears also to be entirely quiescent, and to have therefore little direct relation to the currents in the Gulf, in so far at least as they affect navigation.

With regard to the density, it may be stated broadly, that throughout the northeastern portion of the Gulf the average surface density ranges from 1.0235 to nearly 1.0245; while in the south-western portion, the density is below 1.0235, ranging usually down to 1 0220, and falling in the Gaspe Current itself to 1 0210. The dividing line between these two portions of the Gulf, runs approximately from South-west Point, Anticosti, to a point in the middle of Cabot Strait. The densities in the border region near this dividing line, naturally vary to some extent. The density of the north-eastern portion is practically the same as in the open Atlantic; as it was there found to range from 1 0237 to 1 0242, as shown by seven determinations made at the end of June, off the south and south-east coasts of Nova Scotia.

This result is important, in showing that the lower densities found in the southwestern portion of the Gulf of St. Lawrence are confined to that side ; and this further confirms the conclusion that the general set or drift across the Gulf, as shown by the water of lower density, is in the direction of a line from Gaspé to Cape Breton. On the other hand, the endeavour to obtain some differences locally, which would correspond with the various directions of the current, was without result; although a large number of temperatures as well as densities were taken at the various anchorages for this purpose.

The deep water as found from samples taken at depths of 100 and 150 fathoms, both in the vicinity of Gaspé and in Cabot Strait, ranges in density from 1 0254 to T

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