

The densities here given, were first determined at sea with the usual precautions to insure correct results, which will be described further on. The samples were then bottled, and the densities re-determined in Ottawa by means of new hydrometers of greater accuracy. In cases where the difference between the two determinations amounted to 0.0002 the mean value is given. The densities are all reduced to 60° Fahrenheit, and give the true specific gravity of the water. It may be mentioned for comparison that the typical density of ocean water is 1.0260.

The density of the deep water corresponds with the density at similar depths, in the open Atlantic off the coast of Nova Scotia, as reported by the "Challenger" expedition. This suggests the possibility that this deep water may be in reality a tongue of ocean water which penetrates the Gulf in its greater depths. It would, no doubt, be very interesting to trace the connection of this deep water with the ocean, as the channel in which it lies runs out into the Atlantic Basin with uninterrupted depth. But this investigation does not promise any result of immediate practical importance.

The chief advantage to be derived from these results is to enable the field of investigation in tracing the currents in the Gulf, to be limited to the layer of 50 or 60 fathoms from the surface; as the surface water of less density even at the lowest temperature it can have without freezing, does not penetrate beyond this limit. The rate at which the current decreases in velocity with the depth, as shown by a large number of actual measurements as far down as 40 fathoms, and the indications obtained at the greater depths already referred to, also make it improbable that there is any appreciable motion below 50 or 60 fathoms. Also, with regard to the disturbance caused by the waves, it is improbable that this would extend to more than half that depth. In the English Channel and the Mediterranean, the effect of the waves in the roughest weather does not appear to extend below 20 or 25 fathoms, judging by the disturbance of fine sand at the bottom. The height of the waves in the open Gulf during the two seasons in ordinarily rough weather, seldom exceeded 12 or 14 feet. During the exceptionally heavy gale of August 24th, 1895, while lying in Cabot Strait, the anemometer on board recorded an average of 71 miles per hour for 13 hours, including the night; and the waves had attained a height of 16 to 18 feet before dark. This was partly due to the shortness of the waves themselves; as the direction of the wind was backing rapidly at the time from east towards north.

It is very possible that some relations may subsist between the depth at which the coldest water is found, the density of the water itself, and the depth to which the disturbance of the wind and waves may extend; but for the purposes in view in tracing the currents, the limitation of the necessary investigations to the layer of water at the surface, of some 50 fathoms in thickness is the chief practical advantage which results.

GENERAL CURRENT ACROSS THE GULF AREA.

These general explanations have been given to make clear the nature of the problem and its limitations. Before making the actual endeavour to trace the water across the Gulf, from the entrance of the St. Lawrence to Cape Breton, it was necessary to begin by ascertaining the movements of the outflowing current in the vicinity of Gaspé, and its other characteristics. This occupied the month of July.

It will make the matter more intelligible however, to give first the results of the density observations and other information obtained with regard to the general movement of the water in the open Gulf; and afterwards to describe the nature of the Gaspé current more fully, from all the information obtained in both July and September. The actual movements of this current are complicated; for although in general terms it is constant in the one direction, it is liable to displacement in position; and consequently at any given point, the current is so far from being constant that it may even be reversed in its direction, while the main body of the current may have taken a different course.

For our present purpose it will be sufficient to state that in general a constant current flowing towards the south-east with a breadth of some 10 to 12 miles, will be found in some part of the width of 40 miles which lies between the Gaspé coast and Anticosti. The water in this current is unusually low in its density, especially towards the surface;

and its velocity varies. In Cabot Strait, there is a side next Cape North, and having a density near observations of the velocity when the conditions they are compared with.

It will be seen from varies somewhat in its between these changes velocity of the Gaspé, which will be referred.

The density of the VIII. These sections taken as typical. The that were found. The North, are due to the at three miles to the The density of this current of this Report.

Tracing the water water of low density rents, it was necessary should be taken. If the tage of obtaining same results would be more wind. A comparison as this would be about movement occurs. The ed by the banks in the tensive shallows around the best to select; as Anticosti, Prince Edward depth except around ten miles off shore. H rupted throughout the duration should be less for the purpose in view

It was necessary question of tracing th out any previous clue a water below the surface bottle, which consists the water at any desired line; and the line is convenient to mark o valves, the bottle wh through the water to carried down with it fr from 32° to 70° Fahr allowed to come as n densities were taken, ference in temperature. open range, specially d the advantage of enabl anchor; and although not interfere with accu