Summary for Cabot Strait.

We thus find in Cabot Strait a current running out of the gulf on the western side, and into the gulf on the eastern side; while in the middle the current is weak and uncertain in direction. The temperature of the water is practically the same in both cases, except within eight miles of Cape North, where it is appreciably warmer. The depth of water in motion appears to be greater on the western side, while on the eastern side the width of the flow is greater and the under-current weaker in proportion. From a comparison of the under-current with the temperatures at various depths, it is to be inferred that the movement of the water does not extend to a greater depth than perhaps 60 or 80 fathoms at the most; and below that depth the water appears to be perfectly quiescent. The volume of water leaving the gulf on one side is thus balanced by the volume entering on the other; and as the temperatures are nearly the same, the loss or gain of heat to the gulf is much less marked than it would be if the balance of volume lay between a surface and a bottom current. The actual balance however, is on the side of loss of heat; as it is the outflowing water near the western side which has the highest temperature.

As to causes, it is not possible to speak very definitively from observations so limited in time and extent. It is more than likely that the layer of very cold water between 20 and 50 fathoms is the result of the chilling of the water during the winter; and that the warmer water at the surface is due to rise in temperature with the progress of the season. But the reason that the coldest water does not sink to the bottom is by by no means clear. If fresh water were in question, the temperature of 39° or 40° would then correspond with maximum density; but the density of sea water increases uniformly as the temperature falls. The increase however is exceedingly slight for the range from 41° to 32° which we have here to deal with; and this allows a possible explanation to be suggested. It would require the admixture of less than 1½ per cent of fresh water with sea water at 32° to give it the same density as unmixed sea water at 41°. The cold water might thus be prevented from sinking if it were chilled by fresh water ice from the river, which is not unlikely in the circumstances. The bottom water may enter direct from the unmixed water of the Atlantic; as a depth of over 200 fathoms extends uninterruptedly from this strait to the ocean.

It is clear in any case that there is no cold under-current running out along the bottom of the strait, as might be expected in accordance with the theory of continuous inflow of cold water at the Strait of Belle Isle.

The water in the greater part of this strait is as clear as average sea water, the colour having a slightly milky tinge. From St. Paul Island westward, however, a brownish tinge appears, which becomes more pronounced towards Cape North, where the water is nearly as brown as in the Ottawa river. The colour at station N. was sufficient to stain the gauze netting of the attached float used to show the direction of the current. This suggested the possibility that the presence of St. Lawrence water might here be detected; but the difference in density was too slight to be indicated by the hydrometers used. A number of bottled samples have been taken from the surface and from the cold layer at 40 fathoms, in order to determine the density with greater accuracy.

The determinations of the density were made at the laboratory of the Inland Revenue Department, with the following results, reduced to 60° Fahrenheit:—

Cape Ray to St. Paul Island.

Average of surface water, from a mixture of a number of samples (27 Aug., '94)	1·0242
At Station P. at centre of Strait, surface water (30 Aug., '94)	1·0241
do do at 40 fathoms (30 Aug., '94)	1·0253