## DEPARTMENT OF MARINE AND FISHBRIES

The relative strength of the flood and ebb was quite unequal, however. The set into the bay to the northeastward continued for a longer time and was stronger than the set to the southeastward. As measured by the velocity, the difference is not large, but it is well marked. The mean velocities observed at half tide, flood and ebb, were as follows:—Northeastward, 0.86 knot; southeastward, 0.63 knot; which gives 35 per cent. in favour of the northeastward direction. As measured on a time basis, the proportion is even greater; as the northeastward direction continued for  $15\frac{1}{2}$  hours and the southeastward for only  $9\frac{1}{2}$  hours during the tidal day.

The under-current observations give the same resul<sup>\*</sup> with even greater emphasis. At a depth of 15 fathoms, the direction during flood is almost always to the north of northeast; or more directly into the bay than the surface current by  $2\frac{1}{2}$  points on the average. The strength of the current in this direction is more than double as great as to the southeastward.

It would thus appear that any westward tendency which the body of the water may have along the south coast from Cape Race to Placentia bay, does not continue to the westward of Cape St. Mary; as there is no set here to the westward of a north and south line (magnetic); but the water appears to turn at this cape, and to make inwards on the whole into the bay. There is no constant indraught however, but a fluctuation with the tide as described; and the velocity does not quite amour  $\rightarrow$  one knot, even as near shore as this point of observation, which was only  $5\frac{1}{2}$  miles from the cape.

As it was thus evident that the water makes inward on the whole, into Placentia bay around Cape St. Mary, two other stations were selected in the middle of the bay and on the western side, to ascertain whether this movement could be further traced throughout the area of the bay.

STATION E.—In the middle of Placentia bay, at the south end of Merasheen bank. Position, 19 miles W. by N. from Placentia light, in 66 fathoms. The anchorage made at this station was from Monday, June 8th to Thursday the 11th, and continuous observations were obtained during 70 hours. The weather was calm with a little swell, while the fog was persistent with occasional rain. The set of the current as observed at this station is shown on Plate III, and although at first sight it may appear irregular, there are two results of importance which throw light on the question which we have specially under consideration. The flood tide appears to have almost any direction, which may Le due to its meeting the large body of water in the head of the bay; but the ebb tide sets very constantly in a southwestward direction, towards the mouth of the bay on the western side. Also, the current during flood tide was superficial, where s the ebb was distinctly felt to a depth of 15 fathoms. Owing to this persistent set of the ebb, the water must work gradually in its direction; which corresponds with a general movement of the water from the eastern to the western side of the bay.

This general movement is also indicated by the total or resultant set throughout the tidal period. On Plate III, the direction of the centre line of Placentia bay is laid down; and it will be seen that much the larger part of the set is across this line to the left or westward side. When observations are taken in detail, it is only in such ways as these that the general movement of the water becomes apparent. The resultant