

miles from shore. It was thus found that within six miles of the shore the current ran from N. by W. with a velocity of 2.20 knots; and from 6 to 12 miles from shore, it ran from N.N.W. with a velocity of 1.55 knots per hour. On anchoring at the station 24 miles N.E. $\frac{1}{2}$ N. from Fame Point in the middle of the passage, the current was found to be running from the south-west, or across the direction of the passage. During a period of 24 hours on the 11th and 12th, it ran steadily from directions between W.S.W. and S.S.W. with a velocity which varied from 0.86 to 1.70 knots per hour. The least of these velocities occurred at high water, and the greatest at low water; which would indicate that although the current was there running across the passage, it may have formed a bend in a line of current which if traced would be found to make outwards and not inwards.

On account of this transverse direction of the current, the under-current was carefully examined, at three different times. It was found to run from the same direction as the surface current, or within one or two points of it. The strength and thickness of the under-current were greater than usual. Between 30 and 40 fathoms in depth, it was still on the average 61 per cent of the surface velocity; and the current also extended to a greater depth than 50 fathoms. The current in this transverse direction was thus remarkable for its strength and thickness.

In order to ascertain where this current came from, another anchorage was made 13 miles to the south-west against its direction, at a station 11 miles N.E. by N. from Fame Point. The current there, on September 12th and 13th, during a period of 20 hours, was found to veer continuously from the S.S.E. through south, west, and north, to N.E. and back to north. The velocity varied from 0.41 to 1.55 knots per hour. These changes in direction and velocity were without relation to the times of high and low water; but on closer examination they are found to be less anomalous than would appear at first sight. The greatest speed of the current was from south-westerly directions; and it was weak when running from directions between N.N.W. and N.E. The strength and thickness of the under-current during south-westerly directions were not obtained however, as these occurred during the night; but while the current ran from directions east of north, it was found to have a thickness of less than 5 fathoms; and below this, the under-current continued to run from the W. to a depth of over 50 fathoms. It thus appears that the body of the movement was from S.W. and W. while the veering of the surface current was superficial and weak. This station therefore lay at the outer edge of the veering current found nearer shore; and below this there was the same deep under-current as found at the middle of the passage, flowing from the south-west and west.

On the Anticosti side, at a station $5\frac{1}{2}$ miles off Ellis Bay, during the night of the 13th, where the total depth was only 45 fathoms, the current was found to run pretty steadily from the north-west at the surface; while the under-current from 15 to 30 fathoms, ran from the south and south-east. These directions were parallel to the shore; and the reverse directions of the surface and under-currents were probably due to the transverse direction of the deep under-current in the middle of the passage, which would tend to make it bear against this shore.

It is clear from these descriptions, that the direction of the current must have been very disturbed and circuitous during the above period. Under such conditions the difficulty is specially felt of arriving at definite conclusions and tracing the general course of the current by means of observations taken on a single vessel; especially when the vessel itself is so heavy and difficult to hold at anchor. The density methods however give valuable help in supplementing the current measurements themselves; which are necessarily interrupted in the above circumstances. The density contours shown on Plate V are based on sections run immediately before and after these observations, on the 7th and 14th of September. The irregular character of these contours corresponds with the disturbed condition of the current at the time, and with the transverse direction of the current in the middle of the passage. It is clear however, that the water in this transverse current finds its way outwards past Cape Gaspé eventually, as already inferred from the nature of its tidal behaviour. Also, from all the indications obtained, there can be no doubt that the current off Cape Gaspé ran continuously from the northward throughout these days.