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ween these two s the south east ence; they both good reason to proposed during between them; possible in the

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unusually broken and stormy, which also occasioned some loss of time. There was also considerable inconvenience for want of suitable anchorage appliances, as provision had to be made for anchoring in all depths up to 250 fathoms; and on account of the low state of the funds available, it was towards the end of the season before appliances of a satisfactory character could be obtained. To counterbalance these inconveniences, arrangements were made to continue the observations of the velocity and direction of the currents throughout the night ; as the velocity measurements were made by means of current meters registering electrically on board ship. From the experience of the previous season, these meters and their electrical connections were so far improved as to secure a continuous record from them at sea. These observations were made from the vessel while at anchor; as all uncertainity from lee-way and other causes was thus avoided. As the wind usually held the vessel at an angle to the direction of the current, it was necessary to measure the velocity of the surface current well below the keel ; as otherwise the side of, the vessel itself might interfere with the accuracy of the results. The draught of the "Lansdowne" is 13 feet 6 inches; and the surface velocity was therefore measured at the standard depth of 18 feet, which has been adopted from the first in this survey. It has also been found that there is seldom any appreciable difference in the velocity between the surface of the water and a depth of 5 fathoms. At the depth of 18 feet, the meter could usually be seen distinctly enough to indicate the direction of the current by its position in the water. When this was not the case, and at night, the direction was obtained by means of a canvas bucket, floating awash, and attached by a line from the stern.

The under-currents were also measured by means of an electrical current meter, which it was found practicable to lower to a depth of 40 fathoms. Their direction was accretained by means of a deep fan, consisting of two sheets of galvanized iron passing through each other at right angles, and presenting to the current in any position an area of 34 square feet. This fan was attached to a length of sounding wire, and used with a patent sounding machine; and its depth at any moment could thus be read on the dial of this machine. The sinking weight attached to the fan could be varied to give a reasonable inclination to the supporting wire, according to the speed that the current might have; and by reading off this inclination at various depths with a clinometer, very fair ratios for the velocity could be obtained ; as the resistance of the wire itself was so small. This was found specially useful for rapid approximate results at times when the surface and under-currents were veering and changing quickly in relation to each other. This deep fan was also employed to ascertain whether the deep water from 100 fathoms downwards had any motion ; as the electrical appliances available would not reach these depths.

Meteorological observations were also taken throughout the season, for comparison of the barometer and wind velocities with the results of the observations of the currents themselves.

Temperature and density of the water in tracing currents. The two characteristics of the water chiefly to be relied upon in tracing currents are its temperature and its density. The colour of the water also, has been found to be appreciably different in different parts of the Gulf of St. Lawrence, but this is not an indication of a very definite character, though it may sometimes be helpful.

An examination of the region at the entrance of the St. Lawrence between the Gapé coast and Labrador, and around the west end of Anticosti, was made at the seginning of the season, to ascertain which of the e characteristics of the water could be relied upon for the purpose of tracing its movements with the best hope of success. The temperatures of the water in this region when compared with the numerous observious already obtained in other parts of the Gulf area, soon made it evident that this could not be relie! upon as any definite indication of the direction of the movement of the water. The surface temperature in the summer season usually ranges from about 50' to 65'. Fahrenheit; and in proceeding downwards this temperature gradually falls, util at a depth of 40 or 50 fathoms it is only 30' to 34' or practically at the freezing point. Where the greater depths are met with, the water below this again is found to expericably warmer. There are considerable areas, however, in which the depth is less than 50 fathoms, and where the conditions are accordingly restricted.