The records made by the tide gauges now in operation have already accumulated to some extent; and it is only at present that a beginning is being made in the direction of working up the results. With the commencement of the survey of the currents, the staff at work in the summer season, could be utilized in the winter months to work up the tidal observations of the whole year. This affords a further reason in favour of carrying on the two branches of the work together.

METHODS AND APPLIANCES.

With regard to methods and appliances, it will only be necessary at present to Marine surveys have received a great stimulus in make a few general remarks. recent years from the Challenger expedition fitted out by the British Admiralty and from the investigations of the Gulf Stream by the Blake in connection with the United States Coast Survey. Much progress has thus been made in the appliances used; the use of the drift buoy for the measurement of currents has been largely superseded by the current meter, although in some cases the older methods can still be used to advantage. The appliances devised for the Blake have made it prac-, ticable to anchor in depths ranging from 2,090 to 3,000 fathoms. It is of the greatest advantage to work from a vessel at anchor, as it affords a fixed point from which to determine the direction and velocity of the currents. This is especially important where the land is too distant to determine the direction and speed of a current by the drift of the vessel itself; and such determinations from drifting are in any case complicated with lee-way from the wind. The depths in the Gulf are not so formidable as those encountered by the Blake, as they nowhere exceed 300 fathoms. For the survey of currents, the use of a sailing vessel is found to be impracticable on account of the long delay in arriving at the spot where the observations are required and the impossibility of doing so in a calm, which is the very time when the observations would be the most accurate, the long time required to heave up the anchor by a hand windlass, and the danger to the vessel during this delay, if bad weather is the cause of departure. For these reasons it is necessary to have a steamer with steam winches, &c., which a few additional appliances would prepare for anchoring.

The observations should include the density and the temperature of the water, as well as the direction of the currents. The density is chiefly useful as an indication of its admixture with fresh water, either in the estuary or in the neighbourhood of melting icebergs. The temperature has always been found a valuable guide in tracing currents. In some situations it will be advisable to determine the under currents also. The speed of the surface currents themselves should be determined at a uniform depth of 10 feet, as this may be taken in general as half the average draught of a vessel. The speed, at this depth, will best show the movement of the body of the surface water, in relation to its effect in drifting a vessel.

In the coming season, I would recommend, as the most effective way to commence the work, that surveys be made of the two main entrances to the Gulf, at Belle Isle and at Cabot Strait, between Cape Breton and Newfoundland ; in order to determine the amount and direction of the currents that may be found to pass through these dominant openings. To do this work satisfactorily, observations should be carried on simultaneously at the two places, and should be continued for about three months, in order to secure the truly normal conditions of the currents, the effect of the differ-