

may possibly be met with in the region to the south-east of the Cape of Good Hope. Probably investigations in these latitudes may be difficult; it must be remembered, however, that the marine fauna of these regions is nearly unknown, that it must bear a most interesting relation to the fauna of high northern latitudes, that the region is inaccessible except under such circumstances as the present, and that every addition to our knowledge of it will be of value. For the same reasons the expedition should, if possible, touch at the Auckland, Campbell, and especially the Macquarie Islands. Particular attention should be paid to the zoology of the sea between New Zealand, Sydney, New Caledonia, and the Fiji and Friendly Islands, as it is probable that the Antarctic fauna may be found there at accessible depths. New Britain and New Ireland are almost unknown, and from their geographical position a special interest attaches to their zoology, botany, and ethnology. The route through this part of the Pacific will give an opportunity of checking and repeating previous observations on the structure of coral-reefs and the growth of coral, and of collecting series of volcanic rocks. The Japan current will also be studied, and the current along the coast of California. The course from Japan to Vancouver Island, and thence to Valparaiso, will afford an opportunity of determining the physical geography and the distribution of life in these regions, of which at present nothing is known.

### I. PHYSICAL OBSERVATIONS.

In crossing the great ocean-basins, observations should be made at stations the positions of which are carefully determined, chosen so far as possible at equal distances, the length of the intervals being of course dependent on circumstances. At each station should be noted the time of the different observations, the state of the weather, the temperature of the surface of the sea, the depth, the bottom temperature determined by the mean of two Miller-Casella thermometers, the specific gravity of the surface and bottom water. The nature of the bottom should be determined by the use of a sounding-instrument constructed to bring up samples of the bottom, and also, if possible, by a haul of the dredge. When practicable, the amount and nature of the gases contained in the water, and the amount and nature of the salts and organic matter, should be ascertained. As frequently as possible, especially in the path of currents, serial temperature-soundings ought to be taken either with the instrument of Mr. Siemens or with the Miller-Casella thermometer, and in