tom temperature near Fernando Noronha, almost under the equator, is 0°·2 C., close upon the freezing-point; it is obvious that this temperature was not acquired at the equator, where the mean annual temperature of the surface-layer of the water is 21° C., and we may take the mean normal temperature of the crust of the earth as not lower, at all events, than 8° C. The water must, therefore, have come from a place where the conditions were such as to impart to it a freezing temperature; and not only must it have come from such a place, but it must be continually renewed, however slowly, for otherwise its temperature would gradually rise by conduction and mixture. Across the whole of the North Atlantic the bottom temperature is considerably higher, so that the cold water can not be coming from that direction; on the other hand, we can trace a band of water at a like temperature, at nearly the same depth, continuously to the Antarctic Sea, where the conditions are normally such as to impart to it its low temperature. There seems, therefore, to be no room for doubt that the cold water is welling up into the Atlantic from the Southern Sea; we shall, however, discuss this more fully hereafter.

The investigation, by this indirect method, of the movements of the water of the ocean, was one of the points to which our attention was very specially directed; and it was prosecuted throughout the voyage with great care. The method of taking temperature sections was first systematically employed, so far as I am aware, by the American Coast Survey in their examination of the Gulf-stream, and some modifications, extending its use to deep water, were devised during the cruises of the *Lightning* and *Porcupine;* and the instructions to the *Challenger* were chiefly based on our experience in the preliminary trips. (See "The Depths of the Sea," p. 284 *et seq.*)

The observing stations were fixed as nearly as possible in a straight line, if possible either meridional or on a parallel of latitude; the bottom temperature was carefully determined by the