

expected if the Gulf-stream came close to the western shore.

While the communication between the North Atlantic, and the Arctic Sea—itsself a second *cul de sac*—is thus restricted, limiting the interchange of warm and cold water in the normal direction of the flow of the Gulf-stream, and causing the diversion of a large part of the stream to the southwards, the communication with the Antarctic basin is as open as the day;—a continuous and wide valley upwards of 2,000 fathoms in depth stretching northwards along the western coasts of Africa and Europe.

That the southern water wells up into this valley there could be little doubt from the form of the ground; but here again we have curious corroborative evidence on the map in the remarkable reversal of the curves of the isotherms. The temperature of the bottom water at 1,230 fathoms off Rockall is  $3^{\circ}22$  C., exactly the same as that of water at the same depth in the serial sounding, lat.  $47^{\circ}38'$  N., long.  $12^{\circ}08'$  W. in the Bay of Biscay, which affords a strong presumption that the water in both cases is derived from the same source; and the bottom water off Rockall is warmer than the bottom water in the Bay of Biscay ( $2^{\circ}5$  C.), while a cordon of temperature soundings drawn from the north-west of Scotland to a point on the Iceland shallow gives no temperature lower than  $6^{\circ}5$  C. This makes it very improbable that the low temperature of the Bay of Biscay is due to any considerable portion of the Spitzbergen current passing down the west coast of Scotland; and as the cold current to the east of Iceland passes southwards considerably to the westward, as indicated on the map by the successive