

deeper waters of which it very materially contributes. Another equally remarkable current is that which brings the cold water from the south polar regions up along the South American coast at the bottom as far as the Equator. The bottom water in the corresponding situations in the Pacific and Indian Oceans is found to be much warmer, and it is probable from this fact that the depth between Cape Horn and the south polar land is much shallower than that between either Africa or Australia and the same land. In any case it is certain that facilities must exist here for promoting the flow of cold water at the bottom from high Antarctic latitudes into the lower latitudes of the South Atlantic Ocean. The South American continent extends to the parallel of  $56^{\circ}$  S. The depth of the sea to the south is unknown, but from the edge of the bank south of the Falkland Islands to the South Shetland Islands is only 380 miles, so that there is some reason in dealing with water at depths of 1500 fathoms and upwards, for assuming a direct connection between the American continent and these islands. Farther to the eastward there are three groups of islands, namely, South Orkneys in  $61^{\circ}$  S., the Sandwich group in lat.  $59^{\circ}$  to  $56^{\circ}$  S., and South Georgia in  $54^{\circ}$  S. All of these are covered with eternal snow, and are exposed to a glacial climate. Of Georgia, which lies  $2^{\circ}$  farther north than Cape Horn, the bays are terminated by ice cliffs of considerable height, and according to Cook the country in the very height of summer is in a manner wholly covered many fathoms deep with frozen snow, but more especially on the southwest coast.<sup>1</sup> In the ice chart of the Southern Ocean the line "freezing point in air in January and February" passes through the Sandwich and South Shetland groups, and the northern limit of icebergs reaches the very low latitude of  $40^{\circ}$  S. The dense water of the tropics, which has been diverted in a southerly direction by the South American continent, is brought directly into this very cold climate, and by virtue of its great salinity affords the means of promptly conveying the surface cold to the bottom. If this cold water have a tendency to flow from the poles, it will in these high latitudes experience a strong thrust towards the westward, due to the increasing rotational velocity of the earth's surface. That this does take place is shown by the low bottom temperatures observed at every Station along the western side of the South Atlantic almost to the Equator, and that there is here a sensible current of cold water along the bottom is shown by the sudden change in the rate of decrease of temperature with increasing depth which is observed at depths of from 2000 to 2200 fathoms. It shows that the water between the bottom and 2000 fathoms is nearly as distinct from the water above it as the water of the "cold wall" on the North American coast is from the Gulf Stream outside it. The temperature observations on the 28th and 29th February 1876 show that the surface of this cold stratum is not level, but rises towards the American shores. On the 28th February the Station (323) was in lat.  $35^{\circ} 39'$  S., long.  $50^{\circ} 47'$  W., depth 1900 fathoms, and therefore on the continental declivity forming the western containing

<sup>1</sup> See Darwin, *Journal of Researches during the Voyage of H.M.S. "Beagle,"* p. 248, ed. 1879.