

afterwards a gradual descent to 2600 fathoms, the mean depth being 2275 fathoms. From a position in lat.  $40^{\circ} 3' S.$ , long.  $133^{\circ} W.$ , towards the coast of South America the bottom is undulating, varying from 2600 to 1500 fathoms, the mean depth being 2070 fathoms; these soundings seem to indicate the existence of a ridge along the bed of the ocean, stretching away from the South American coast on or about the 40th parallel of south latitude, but whether such a ridge does exist or not can only be ascertained by the slow process of deep-sea sounding.

The bottom temperature on the section from Tahiti to the 40th parallel varied from  $34^{\circ} \cdot 7$  to  $35^{\circ} \cdot 4$ , the mean being  $35^{\circ} \cdot 0$  or nearly the same result as between Tahiti and Japan, but from the position in lat.  $40^{\circ} 3' S.$ , long.  $133^{\circ} W.$ , towards Mocha Island the range in the bottom temperature was  $1^{\circ} \cdot 2$ , notwithstanding which the mean result was  $35^{\circ} \cdot 0$ , or precisely the same as before. The results in the last section appear to confirm the existence of a ridge in this part of the Pacific, for it will be noticed that the temperatures obtained after the shoal cast of 1500 fathoms (see Diagram 20) agree remarkably well ( $35^{\circ} \cdot 4$ ), whilst between the two shoal casts of 1600 and 1500 fathoms they fall to  $34^{\circ} \cdot 5$ , being again warmer west of the 1600 fathoms sounding, where the temperature was  $35^{\circ} \cdot 2$ , indicating probably that the ship was south of the ridge between the two casts of 1600 and 1500 fathoms, and north of it during the remainder of the section.

In the section from Tahiti to the parallel of  $40^{\circ} S.$ , the surface temperature changed gradually from  $78^{\circ}$  to  $54^{\circ} \cdot 5$ , and in the section towards Mocha Island remained at a temperature of  $54^{\circ} \cdot 5$  from the meridian of  $133^{\circ}$  to that of  $101^{\circ} W.$ , after which it gradually rose to  $58^{\circ}$ , and was  $58^{\circ}$  at Juan Fernandez and  $59^{\circ}$  at Valparaiso.

The serial temperatures show that in the section south from Tahiti, notwithstanding the change in the surface temperature from  $78^{\circ}$  to  $54^{\circ} \cdot 5$ , the isotherm of  $40^{\circ}$  remains at about the same depth (550 fathoms), but slightly deeper in the south than in the north. Above the isotherm of  $40^{\circ}$  the isotherms gradually rise as the surface temperature becomes lower. In the section from a position in lat.  $40^{\circ} 3' S.$ , long.  $133^{\circ} W.$ , towards Mocha Island the isotherms are nearly parallel with the surface. The surface and consequently the upper temperatures are slightly higher in the eastern than in the western part of this section, but this difference is readily accounted for, not only by the advance of summer, but from the fact that polar winds with a northerly current were experienced in the western, and equatorial winds with a southerly current, in the eastern part.

The currents on the passage were moderate, in no case exceeding 24 miles per day, the average rate being 11 miles per day, the direction of the current depending almost invariably on the direction of the wind.

Anemometer observations were taken on any favourable opportunity when the ship was stationary, sounding or dredging. The following table shows the results recorded:—