Current-measurements to the south of the Azores.

current-meters we took regular observations at 10 metres, 70 in all, from 1 A.M. till 2.45 P.M. on the 12th June. Fig. 181 shows the variations at this depth, which recall the current-lines on the Ling Bank. The tidal current predominated, attaining a maximum velocity of 38 cm. per second (0.7 knot per hour); there was also a general drift of the water towards the south-east, with a mean velocity of 8-9 cm. per second (0.2 knot per hour). Simultaneously another apparatus was employed to determine the current at different depths down to 732 metres (400 fathoms), the depth of water exceeding 900 metres. Some of the results are represented in Fig. 182, which shows the current at different depths: I. at 46 metres (25 fathoms); II. at 183 metres (100 fathoms); and III. at 732 metres (400 fathoms). At all depths the velocity and direction varied constantly, the changes in direction being clockwise, and it is notable that the direction shifted about 180° in the course of half a tide-period. In this case there is no doubt that tidal currents prevailed throughout the whole body of water from the surface to the bottom; they were unmistakable even at 732 metres; at this depth a velocity of more than 27 cm. per second (more than $\frac{1}{2}$ knot per hour) was once measured, showing that the tide can make its influence felt down to considerable depths. This is particularly the case where a plateau or ridge obstructs the passage of the tidal wave; in such places the current near the bottom is probably increased. This would explain the remarkable fact that on many submarine slopes and ridges no fine mud is deposited, because the strong current sweeps the bottom clean.

Another interesting result of these measurements is represented in Fig. 183, where the arrows show the currents at several depths simultaneously: I. at 3.35 A.M., and II. at 7.12 A.M. on the same date. We see that the currents set in different directions at the different depths. In the upper layers the direction shifted more and more to the right with increasing depth, but from 100 fathoms (183 metres) down to the bottom the direction was reversed. Thus the current at 500 metres ran in the opposite direction to that of the upper layers, which again approached that of the currents at the greatest depths. At a certain moment the currents are, then, arranged in the fashion of spiral staircases, the whole system turning in clockwise direction from top to bottom.

These observations in the Atlantic give rise to many interesting ideas about the currents in the sea, and show that there