

and trawl were obtained, in depths varying from 63 to 130 fathoms, at a distance of from half a mile to a mile from the shore. The weather was squally, rainy, and cloudy all day, so that the summit of Api Island was not visible. So far as could be distinguished, the land was intersected by numerous deep ravines and water-courses, and covered with a rich vegetation.

At 4 P.M. the boats returned from the shore, and sail was made to the westward for Raine Island.

#### API TO RAINE ISLAND AND CAPE YORK.

On the 19th August, a sounding and serial temperatures were taken in 2650 fathoms. The bottom temperature here proved to be the same as that at 1300 fathoms, viz.,  $35^{\circ}8$ . Between Australia and New Zealand, and as far north as the 25th parallel, the temperature of the water at the bottom was  $34^{\circ}5$ .

On the 21st a sounding and serial temperatures were obtained in 2325 fathoms, the thermometer at the bottom again registering the same as those at 1300 fathoms ( $36^{\circ}0$ ).

On the 24th the depth was 2450 fathoms, and the temperature observations showed results similar to those on the 21st; the same phenomenon continued for the remainder of the Stations between the New Hebrides and Raine Island, at which depths of 2440, 2275, 1700, and 1400 fathoms were obtained (see Sheet 27).

The section from the Fiji Islands to Raine Island *via* Api Island shows that depths of 1400 fathoms exist between the Fiji and New Hebrides Islands, and of 2650 fathoms between the New Hebrides and Raine Island (see Diagram 13). The bottom shows a rapid fall from the Fijis and New Hebrides, but a very gradual rise to the Barrier Reef of Australia.

The bottom temperature the whole way from the Fiji group to the Barrier Reef was uniform at about  $36^{\circ}$ , and this temperature was also found at a depth of 1300 fathoms. There exists therefore between the New Hebrides and the Barrier Reef a mass of water 1300 miles long, and 1200 fathoms in depth, of the uniform temperature of  $36^{\circ}$ . The isotherms from the surface to the depth of 1300 fathoms are very nearly parallel, the isotherm of  $40^{\circ}$  occupying a mean depth of 480 fathoms, that of  $50^{\circ}$  a mean depth of 230 fathoms, that of  $60^{\circ}$  a mean depth of 160 fathoms, and that of  $70^{\circ}$  a mean depth of 100 fathoms. There can be little doubt that the uniform temperature of the water from the depth of 1300 fathoms to the bottom, between the New Hebrides Islands and Australia, is caused by the "Coral Sea" being cut off from the colder water by an elevated ridge on the floor of the ocean over which the greatest depth of water cannot exceed 1300 fathoms.

The deposits between the New Hebrides and Raine Island presented considerable variety, and were very interesting. At 2650 fathoms not a trace of carbonate of lime