These results are remarkable, because although the pressure of dry air is below the standard of 760 mm., the volumes both of nitrogen and oxygen dissolved are greater than would have been the case at 760 mm. according to Professor Dittmar's tables; and further, there is more dissolved oxygen as compared with nitrogen than there should have been. It is only in this region that the excesses are sufficiently pronounced and constant to justify their being attributed to a natural cause. The few other cases which occur cannot be considered as other than accidental. It is possible that the excess of oxygen and nitrogen in the waters off the coast of Chili may be owing to the fact that there is a strong northerly current in these parts known as the Humboldt Current, which carries a temperate climate almost up to the Equator. It is possible that those waters may have been collected before equilibrium had been established between their gaseous contents and the atmosphere, though this can only be looked on as a very doubtful explanation. As a rule there is a deficiency of dissolved air, on the assumption that it had been absorbed at a pressure of 760 mm., and the temperature of the water *in situ*. This is what was to be expected, as the aqueous vapour reduces the effective pressure by the amount of its tension.

The highest temperature at which water was collected at the surface was 29°·4 C., and according to Professor Dittmar's table, the oxygen percentage ought to have been 33·5. In nearly every case where the temperature of the water was above 25° C., the oxygen percentage was below 33. This would indicate that oxygen disappears faster than it is absorbed. Towards elucidating this curious phenomenon it may be remembered that oxidation of organic matter goes on with greatly increased energy at high temperatures, and that these high temperatures occur chiefly in the regions of equatorial calms and rains. Calm weather is a great obstacle to the thorough aeration of the water, and rain affords an abundant supply of easily oxidised organic matter, the oxidation of which is much assisted by the sun's light as well as by its heat, to which the water, owing to its low density, is constantly exposed.

That rain water does bring from the air to the sea, and also to the land when it falls on it, much organic and probably organised matter was shown by some experiments made on rain water collected on several occasions when the ship was becalmed in the sea to the north of New Guinea. Here the temperature of the water of the surface was very constantly 83°·5 F., that of the air being slightly less, 81°·5. When a rain squall came on the temperature of the air fell considerably, and tended to assume that of the rain, which was found to be 73° to 74°. On several occasions the rain water was collected in stoppered bottles filled perfectly up to the stopper. Samples were then carefully transferred to the boiling flask, generally the day after collection, and the gases extracted as usual. All the samples were tested at the time of boiling with hydrate of baryta, but they remained perfectly clear. The samples of rain were collected on the 15th, 16th, and 19th February 1875; the gases were boiled out from the waters of the 15th and