

the Equatorial Atlantic. At 300 fathoms the oxygen percentage is 10·75 and 11·98, and at 100 fathoms it is 18·70. At 200 fathoms there is no example of an equatorial water, but the examples that there are show a diminution of oxygen percentage as the Equator is approached. The water from a depth of 300 fathoms below the surface at the Equator is probably quite free from mixture with surface water from any low latitude, consequently there can be no renewal of the oxygen removed. Between 100 or 150 fathoms and the surface partial renewal begins to be experienced, but with water at 100 fathoms, containing only 18·7 per cent. of oxygen, and with the low temperature of 12°·9 C., it is evident that the mixture does not extend to any great depth.

Considering the largeness of the subject, the data available are very meagre, and hardly justify any very confident generalisations, but they seem to point to the following general conclusions. The surface water contains an amount of nitrogen which corresponds closely with the theoretical amount for the temperature at which it is exposed to the atmosphere; there is, however, usually a small deficiency. The variations in the amount of oxygen absorbed along with the nitrogen are much greater than would be expected from laboratory experiments, and taking the Norwegian observations along with those of the Challenger, there is reason to believe that the percentage of oxygen in the air, freed from carbonic acid, dissolved in surface water may vary between arctic and equatorial regions, from 37 to 32 per cent. In intermediate and bottom waters the nitrogen is usually deficient compared with what ought to have been absorbed from the atmosphere at the temperature of the water, but this deficiency is not generally of any great account; the oxygen is, as might have been expected, always deficient, the lowest percentage found being 3·84. With the exception of the case where the water was from about 50 fathoms above the bottom, bottom water is more deficient in oxygen than intermediate water of great depths, which is no doubt due to the fact that some of it is used up in oxidation of mineral matter as well as of animal matter.

The temperature and other meteorological observations taken during the voyage of the Challenger are being discussed by Mr. Alexander Buchan as regards their bearing on oceanic circulation. The following are the more important of the results already arrived at:—

“The daily range of the temperature of the surface of the North Atlantic has been determined from observations made on 126 days from March to August 1873, and in April and May 1876, the mean latitude of all the Stations being nearly 30° N. and mean longitude 42° W. The daily minimum, which is 0°·33 below the mean, occurs at 4 A.M., and the maximum, 0°·47 above the mean, at 3 P.M. Thus in this part of the ocean where the sun's heat is strong, and at the time of the year when the sun is north of the Equator, the diurnal range of the temperature of the surface of the sea is only 0°·8. An examination of the temperatures taken in other parts of the