

that the bottom water at these high latitudes may have a temperature which is more nearly that of the surface than that of the intermediate warm layers. No. 414 and the three samples from the South Atlantic agree in all points very closely with one another; the oxygen percentage, however, 28.42, is decidedly higher than the average of the South Atlantic waters, 25.81, consequently the absolute amount of oxygen is also higher and the oxygen deficiency less. Judging from the amount of nitrogen, the temperature at which these waters had been exposed to the atmosphere would be from 2° to 4° C., or probably lower. In all these bottom waters from the Antarctic and South Atlantic Oceans there is considerable uniformity in the composition of the gases; in examining the waters of the North Pacific more irregularity is found. The oxygen percentage is very low, being generally under 20. The carbonic acid which is given off on boiling *in vacuo* is very high, over 10 c.c., and the amount of carbonic acid eliminable by distillation with chloride of barium varies much. Except in the case of No. 771 the amount of nitrogen is high, and indicates a low temperature of exposure to the atmosphere, while the deficiency of oxygen and the excess of carbonic acid indicate a prolonged seclusion from its influence.

*Intermediate Waters.*—At great depths the gases from intermediate waters resemble those from bottom waters of the same locality. In the North Pacific the water No. 1001 has by far the lowest oxygen percentage, 3.84, and the amount of carbonic acid in the gas tube is actually less than the "oxygen deficiency." No. 1009, on the other hand, is a deep water with abnormally high oxygen percentage, and No. 1269 a similar one from the South Pacific. Generally, however, in the Pacific Ocean the water at depths of from 100 to 500 fathoms above the bottom contain from 20 to 22 per cent. of oxygen. No. 1532 is from 1400 fathoms in the South Atlantic, and No. 1645 from 1500 fathoms under the Equator in the same ocean. The difference in the oxygen percentage is very striking. The water from the South Atlantic contains 27.54, while that from the Equator contains only 13.24, per cent. of oxygen. This is a phenomenon which repeats itself at more moderate depths. The water of higher latitudes contains a greater percentage of oxygen than that of lower latitudes at the same depth, and it is especially observable in the case of waters from near the Equator. It is not particularly observable at 800 and 400 fathoms, but at 300, 200, and 100 fathoms it is remarkable. In equatorial latitudes the surface has usually a lower salinity than the water at 50 or 100 fathoms below it, which impedes vertical circulation; it is also largely drawn away, forming the Equatorial Currents, and is to a certain extent replaced by water from greater depths, already to some extent impoverished as regards oxygen. When this water has risen to within 300 fathoms of the surface it enters a region where life is more abundant than at greater depths, and where, consequently, there is an increased consumption of oxygen. In the table there are two equatorial waters, Nos. 1661 and 1672, from 300 fathoms, and one, No. 1633, from 100 fathoms from