

and the density 1.0240. Station D, the most southerly where serial waters were collected, shows the distribution of density in the neighbourhood of the pack. The comparatively light stratum of water at the surface is of but little thickness, at 50 fathoms the density has already risen from 1.02452 (its value at the surface) to 1.02527; at 140 fathoms it is 1.02542, and at 300 fathoms 1.02553. While thus the density steadily increases with the depth, at least as far as 400 fathoms, the temperature of the water falls from 32° at the surface to 29°·2 at 50 and 29°·0 at 100 fathoms; at 300 fathoms it has risen to 33°·8. At Stations B and C, both approximately on the same parallel, the rise of density with increasing depth is less marked, and there is no such irregularity in the distribution of temperature. At Station C, which is 14° of longitude to the west of B, the temperature at all depths is very decidedly lower than at the corresponding depths at B, while much farther east, at Station H, the water is much warmer and denser than even at B, though the position is 5° farther south. No serial waters were obtained on the way south between the 47th and the 64th parallel. At Stations D and E, waters and temperatures were taken in the vicinity of the pack. It will be seen that the temperature falls to a minimum at about 100 fathoms, while the density rises to about 1.0255 at that depth, and remains nearly constant at greater depths, while the temperature rises to 33° or 34° at 300 fathoms according to the latitude. The density of the bottom water was usually from 1.0254 to 1.0256. The observations at B, D, and E are exceptions. At B and E the densities observed are almost identical with those of the surface water at the same locality, and at D it is identical with that of water between the surface and 50 fathoms. The only risk attending the collection of bottom water is that due to the possibility that the water-bottle may close at or near the surface, and thus enclose surface water which it would take to the bottom and bring back again. Although there is no reason for believing that this took place at each of these three Stations, it is possible that it may have done so, and the results may be considered as doubtful, and the bottom water may be assumed to have an average density of 1.0255. It must be observed that the collection of the intermediate water is attended by no such danger. At the bottom the temperature was, owing to the nature of the thermometers, uncertain, but there can be little doubt from the indications which it was possible to have, that it was lower than at 300 fathoms, though it may not have reached the minimum of 29° observed in the superficial water. In regions free from ice the temperature of the bottom water was found to be somewhat above the freezing point of fresh water, namely, 33°, and as this temperature persists at the bottom without sensible alteration as far as equatorial regions, it is probable that the bottom water in the deeper regions of the Antarctic Ocean is due to a mixture of water cooled to a low temperature in these regions with water drawn in from a lower latitude and with a higher temperature. This will be easily understood if the effect which will be produced on a sea when its surface is frozen be considered. For this purpose some knowledge of the nature of sea water ice is necessary.