by this the body of superheated water which issues through the 'narrows' from the Gulf of Mexico), if it reaches this locality at all—which is very doubtful—could only affect the most superficial stratum; and the same may be said of the surface-drift caused by the prevalence of south-westerly winds, to which some have attributed the phenomena usually accounted for by the extension of the Gulf-stream to these regions. And the presence of the body of water which lies between 100 and 600 fathoms depth, and the range of whose temperature is from 48° (8°·85 C.) to 42° (5°·5 C.), can scarcely be accounted for on any other hypothesis than that of a great general movement of equatorial water towards the polar area, of which movement the Gulf-stream constitutes a peculiar case, modified by local conditions. In like manner the arctic stream which underlies the warm superficial strata in our cold area, constitutes a peculiar case, modified by the local conditions, to be presently explained, of a great general movement of polar water towards the equatorial area, which depresses the temperature of the deepest parts of the great oceanic basins nearly to the freezing-point." [1]

At first Dr. Carpenter appears to have regarded this oceanic circulation as a case of simple convection. "To what, then, is the north-east movement of the warm upper stratum of the North Atlantic attributable? I have attempted to show that it is part of a general interchange between polar and equatorial waters, which is quite independent of any such

[1] A Lecture delivered at the Royal Institution, abstracted with the Author's signature in *Nature*, vol. i. p. 488 (March 10th, 1870).