

bottom. Indeed, those species which are captured in the trawl when it has been dragged near, but has not touched, the bottom, or are captured in traps like those the Prince of Monaco has used in deep water, have a much wider distribution than those species which live in or fixed to the muds, clays, and oozes. It will thus be seen that in the Stations close to each other the number of species common to two Stations is greater than when the Stations are further removed from each other, but the larger percentage of species common to the Stations in the high northern and high southern latitudes, than between either of these and the equatorial Stations, is noteworthy, and seems to indicate that a resemblance can be traced in deep water between the organisms of Arctic and Antarctic regions. It must be admitted from these considerations that with reference to species there is here no striking evidence of a universal deep-sea fauna spread all over the floor of the ocean. The same groups of organisms recur, but this is also true of animals living not deeper than the mud-line.

Many of the deep-sea animals, especially those found in very deep water far from land, present archaic characters. *Discina* and other Brachiopods undoubtedly represent a very ancient group. The irregular Sea-urchins and siliceous Sponges recall the fossils of the chalk. Still it must be admitted that those who expected to find in the deep sea remnants of faunas which flourished in very remote geological periods have been much disappointed.¹ *Heliopora*, the King-crabs, Lingulas, Trigonias, *Amphioxus*, Sturgeons, Port Jackson sharks, *Ceratodus*, *Lepidosiren*, *Protopterus*, and other shore and fresh-water forms, probably represent older faunas than anything to be found at present in the deep sea. Sir Wyville Thomson was of opinion that, from the Silurian period to the present day, there had been, as now, a continuous deep ocean with a bottom temperature oscillating about the freezing-point, and that there had always been an abyssal fauna.² I am rather inclined to think that in Palæozoic times the ocean basins were not so deep as at the present time, that the ocean then had throughout a nearly uniform high temperature, and that life was then either absent or represented only by bacteria and other low forms in great depths, as appears to be the case at present in the Black Sea. As in the Black Sea now, so also was there in all likelihood in Palæozoic times insufficient oxygen in deep water to support a deep-sea fauna. From many considerations, one is led to suggest that cooling at the poles commenced in early Mesozoic times, that cold water, descending then in polar areas, slowly filled the greater depths, and by carrying down a more abundant supply of oxygen, life in water deeper than the mud-line became possible; subsequently migrations gradually took place from the mud-line into deep regions of the ocean basins.

ANTIQUITY OF THE
DEEP-SEA FAUNA
COMPARED WITH
THAT OF SHORE
AND FRESH-WATER
FAUNAS.

The first trawlings and dredgings conducted by the Challenger in comparatively

¹ See *ante*, p. 103.

² Zool. Chall. Exp., vol. i. Introd. p. 47.