

every reason to believe that the physical conditions in these depths have been essentially the same at least for thousands of years.

We possess, of course, no information as to the time required for the distribution of a species into oceanic depths. In shallow waters we know quite well that new physical conditions may permit a species to migrate into new areas and to multiply enormously in a short space of time (as an instance may be mentioned the immigration of cod into the Liimfjord after the North Sea broke through at Thyboroen). At all events it seems reasonable, first of all, to look for factors in operation at the present day, the influence of which may be investigated, before we fall back on the hypothetical conditions prevailing in a previous geological period.

In his "Challenger" Summary, Sir John Murray has attempted an explanation of the quantitative distribution of organisms in different depths, which not only throws much light on these important geographical questions, but also possesses the great advantage of containing in itself a whole programme of future research. He found that many deep-sea animals—the hydroids, for example—had developed special apparatus for catching the minute shells and particles of food that fall from the surface waters, and the holothurians and other echinoderms—the most abundant of deep-sea animals—had their intestines always crammed with the surface layers of the deposit on which they were captured, either Blue mud, Diatom ooze, Globigerina ooze, Pteropod ooze, or Red clay.

Murray on
the "mud-
line" and
mud-eating
animals.

We have seen in Chapter IV. that marine deposits may be separated into two main groups: terrigenous deposits and pelagic deposits, the former occurring in deep and shallow water around all continents and islands within an average distance of one hundred or two hundred miles from the coast, and the latter occurring in the deeper water towards the central parts of the great ocean basins.

It is a well-known fact that the detrital matter which is carried into the sea by rivers is rapidly deposited on meeting salt water, but in shallow water, where currents and wave-action produce their maximum effect, these fine detrital matters are not allowed to settle on the bottom, but are moved along till they reach the lower limit of wave-action. In enclosed seas this may be at a depth of only a few fathoms, but along coasts facing the great oceans the waves are so long and so high that to a depth of several hundred fathoms minute particles of sand may be dis-