

struggle for food not being less severe in the deeper regions of the ocean basins than elsewhere. The great majority of deep-sea species live by eating the surface layers of the mud, clay or ooze, and by catching or picking up the small organisms and minute particles of organic matter which fall from the surface. Many of these species are of gigantic size when compared with their shallow-water allies, and in turn they become the prey of numerous rapacious animals armed with peculiar tactile, prehensile and alluring organs. Phosphorescent light plays an important role in the economy of deep-sea life, and is correlated with the prevailing red and brown tints in the majority of deep-sea organisms. Some species, in addition to large eyes, are provided with a sort of bull's-eye lantern, from which streams of light are thrown out at the will of the animal. Phosphorescent organs act also as a lure, or they may indicate the presence of prey or the passage of an enemy.

ECONOMY OF
DEEP-SEA LIFE.

In the shallower reaches of the ocean the materials on the bottom are assorted and distributed by currents in a way that produces a great variety of conditions. In some places there are siliceous or calcareous sands, in other places dead shells and pebbles; on submarine banks, rocks and boulders prevail; in depressions, fine muds and clays. On each of these bottoms there is usually a very different assemblage of animals. So that, although the trawl may not in shallow water bring up such a variety of organisms in any single locality as from deeper water, still the total number of genera and species inhabiting the whole area of depths less than 50 fathoms is recognised as much greater than in deeper water. With increasing depth, not only the nature of the deposits, but the other physical conditions, become more and more uniform, till a depth is reached along the continental shores facing the great oceans immediately below which the conditions become nearly uniform in all parts of the world, and where the fauna likewise presents a great uniformity. This depth is usually not far above nor far below the 100-fathom line, and is marked out by what I have elsewhere designated as the *Mud-line*.¹

THE MUD-LINE.

In all modern seas the depth at which minute particles of organic and detrital matters in the form of mud begin to settle on the bottom of the ocean is important both from the physical and biological points of view. This depth is determined by the distribution of land and water. It is dependent on the depth and extent of the ocean or basin, and varies temporarily with seasons of strong winds and calms. In small enclosed arms of the sea, like those of the west of Scotland, the mud-line is situated at depths of from 5 to 20 fathoms, but where currents rush through narrow passages or over submarine barriers it is much deeper. In the North Sea, the oceanic mud line to the north occurs at a depth of about 80 fathoms, but on the coasts of Scotland facing the great stormy Atlantic it is often found at a depth of over 100 fathoms. In the Faroe Channel the currents rush over the Wyville-Thomson Ridge with sufficient force to prevent mud

POSITION OF THE
MUD-LINE.

¹ See Deep-Sea Deposits Chall. Exp., pp. 185 and 252.