

upon climate and upon facilities for immigration ; and consequently along with the land the zones of shore-life are broken up into regions and provinces, more or less definitely characterised by predominating groups of inhabitants. It is thus allowable and convenient to speak of the littoral fauna of the Australian or of the Indian region, or of the Antillean or Mascarene province. These regions and provinces are somewhat more sharply defined in the *littoral* and *circum-littoral*, than they are in the *median* and *infra-median* zones, and the distribution of the genera of marine invertebrates which form the fauna of the shore belts, is as a rule much wider and more general than that of the animal forms, vertebrate and invertebrate, which inhabit the contiguous continents and islands. This probably arises from several causes ; conditions which are nearly similar, are much more continuous in the sea than they are on the land, and there are fewer definite barriers to distribution ; variations of climate are more extreme, and more immediate in their physiological effect in air than they are even in shallow water ; and the means and opportunity of diffusion of aquatic animals are as a rule much greater, seeing that most marine animals pass a longer or shorter period of their lives as minute free-swimming larvæ, and while in that condition are borne along and scattered by tides and currents. Mr Wallace states that "about forty-eight" out of upwards of eighty "families of marine mollusca are cosmopolitan, ranging over both hemispheres, and in cold as well as warm seas. About fifteen are restricted to the warmer seas of the globe ; but several of these extend from Norway to New Zealand, a distribution which may be called universal, and only two or three are absolutely confined to tropical seas."¹ Our information on this matter is still far from complete, but there is little doubt that the generalisation is in the main true, and that it applies with equal or even greater force to other classes of the shallow water fauna.

In temperate and tropical seas, at a depth of from 400 to 500 fathoms, the number of species begins to increase, and the number of individuals usually rises immensely ; but although many genera which occur in the *median* and *infra-median* shore-zones pass down to great depths, the *facies* of the abyssal fauna is not that of a mere extension of the fauna of the shore-belts into deeper water ; it gives rather the effect of a specific fauna deriving a marked individuality from the abundance of certain conspicuous forms which are for the most part special ; and which would appear to have been derived from a genetic source different from that of the shore fauna.

The abyssal fauna occupies the floor of the vast lake-like expanse of comparatively still water, which fills the bed of the ocean from depths of 500 or 600 fathoms to the bottom. Throughout the region occupied by the abyssal fauna the physical conditions which have the most immediate influence upon the distribution of animal life are very uniform, their variations occurring within narrow limits. Even at its more moderate depths the temperature is but little affected by direct solar radiation, and is consequently

¹ The Geographical Distribution of Animals, by Alfred Russel Wallace, vol. ii. p. 537, London, Macmillan & Co., 1876.