

in regular rotation with water-masses from the marine areas to which these plankton-types belong.

Subsequent investigations have shown that Cleve's view, which he endeavoured to apply even more widely, was pre-conceived. His eagerness to discover how far the distribution of particular species depended on sea currents, made him apt to forget that algæ are living organisms which are incessantly in process of formation. Accordingly, when the conditions of existence in the flowing water-masses gradually alter, it is the new conditions of existence that decide the character of the flora, since the species best qualified to endure them will very soon get the upper hand over the others. When, therefore, in a sea like the Skagerrack we find northern and southern forms alternating during the course of the year, we are not compelled to assume that the flora is being periodically recruited from different areas. The periodic alterations in the conditions of existence, and particularly in temperature and sunlight, which in our latitudes follow the course of the seasons, sufficiently explain why at one time northerly species predominate and thrive in low temperatures, and why southern forms succeed them and benefit by the warmth which they find necessary for their proper development. Of course it is absolutely essential that germs should be present ready to develop whenever the conditions of existence become favourable. A certain proportion of these, no doubt, may be introduced by currents from elsewhere, but there is nothing to prevent them from remaining in a particular area, even though the water-masses are in constant motion. Recent hydrographical researches have shown us that eddies are far more common than was at one time believed. Even in areas where huge masses of water are constantly streaming in one direction, which one might naturally suppose would carry away with them all germs belonging to a local flora, these eddies act as a retaining factor, preventing any complete replacement till germs sufficient to maintain the local flora have been transferred to the supplanting water-masses. In coastal seas, moreover, many of the species are able to evolve resting bottom-stages, which lie waiting to reproduce the local flora, as soon as the conditions of existence are congenial.

Still Cleve's investigations have been of great value, and his plankton-types provide us with a biological division of species which is yet in the main quite serviceable. All that we have to say by way of qualification is that Cleve looked upon his types as representing communities of species limited