

This is true also of the attached algæ, which develop upon driftwood, vessels, and other large objects. They show that germs of littoral organisms abound in the open sea, and are far more numerous than our random samples would seem to indicate. In May 1904, when cruising in the Norwegian Sea, in lat. 67° N., where the bottlenose whales are annually shot, we came across some wadding from a whaler's gun drifting in the sea, the lower side of which was thickly overgrown with attached forms of littoral diatoms.

Castracane, after examining the first big collection of pelagic diatoms from all the seas of the world made by the "Challenger" Expedition, came to the conclusion that there was no essential difference between the flora of the different areas. In this, no doubt, he was right to a certain extent, since many species are very widely distributed; still a closer study has shown us that there are definite marine areas and conditions of existence in which they develop in vast numbers, whereas in other localities they occur perhaps in such small quantities that only their skeletons in the bottom-samples furnish evidence that they have actually been present. Besides, we often find that species with a wide distribution have different forms in the different areas, though we have not yet the means of deciding whether these forms diverge from the main type by virtue of hereditary characteristics, or whether they merge into one another through constant modifications. But in any case these forms are characteristic of the flora of a given locality, and any one who examines plankton-samples will become aware that it is nearly always possible to determine the area from which they have come. During the German Plankton Expedition under Hensen in 1889, Schütt convinced himself that the different currents had their characteristic flora, and he was at a loss to understand how it is that local boundaries of distribution can continue, seeing that the currents are ever carrying off the microscopic plant-life from one part of the ocean to another, and it might consequently be expected that all differences would be obliterated.

Schütt has also given a good description of the character of the plant-life in different parts of the Atlantic, but the honour of being the first to systematically investigate the distribution of all the different species, and the influence exerted upon them by ocean currents, must be assigned to the Swedish biologist Cleve. A chemist by profession, he had for many years made a

Geographical
distribution
of the pelagic
algæ.

Schütt.

Cleve.