

attribute to the birds, wind, and water a greater importance as disseminating agencies.

#### MEANS BY WHICH THE COSMOPOLITANISM HAS BEEN BROUGHT ABOUT

**I. Different Modes of Reproduction.**—If it should now be asked, What means do the species possess to enable them to adapt themselves to the varying and different demands imposed upon the individual organisms, partly in Greenland, partly in the large African lakes, attention must specially be directed to the following points.

It may be regarded as a well-known fact that a great part of the lower fresh-water fauna and flora, and probably more than we know of at present, have special resting-stages in which the species remains under unfavourable conditions; *e.g.* resting-cells in Cyanophyceæ, resting-spores in Diatoms, cysts in Chlorophyceæ, Flagellata, and Infusoria; resting-eggs in Rotifera, Cladocera, and Copepoda. In many cases these resting-stages proceed from special modes of reproduction; a great many plankton forms have several, generally two, modes. It further appears that the plankton forms employ the different modes of reproduction to a different degree in different climates: in certain zones one kind of reproduction prevails, in another, the other. In arctic regions reproduction in the Cladocera is only to a slight degree parthenogenetic, and is mainly digonic; the farther south we go the more parthenogenetic reproduction prevails, and the "sexual" becomes restricted to certain short periods. Quite the same thing is probably also displayed in the Rotifera. It is also certain that if the conditions differ very much in different localities, though in the same latitude, then reproduction also differs in these localities. In arctic regions reproduction is the same in pools and lakes, whereas farther south it differs in lakes and in ponds even for the same species. The pelagic races in the south pass from being dicyclic in ponds to monocycly and thence to acycly in lakes. The tendency to acycly increases in the pelagic races from north to south. *D. hyalina* and the *Bosminæ* are everywhere monocyclic in arctic regions; in the Baltic territory *D. hyalina* is dicyclic in ponds, at any rate in certain districts; in the lakes there is a decided tendency to acycly; in the lower-lying alpine Swiss lakes *D. hyalina* is distinctly acyclic, in the high alpine di- or mono-cyclic. Though not so conspicuous, very similar phenomena have been discovered in the Rotifers, and the very same can also be pointed out for many other lacustrine (bottom and littoral) groups of animals, in which either two sorts of eggs are met with (thick-shelled resting-eggs and thin-shelled summer eggs), or in which various modes of reproduction occur, the digonic or monogonic (parthenogenesis, gemmation, partition). The two modes