CHOROLOGICAL SECTION.

CHAPTER IX.—GEOGRAPHICAL DISTRIBUTION.

(§§ 226–240.)

226. *Universal Marine Distribution.*—Radiolaria occur in all the seas of the world, in all climatic zones and at all depths. Probably under normal conditions they always float freely in the water, whether their usual position be at the surface (pelagic), or at a certain depth (zonarial), or near to the bottom of the sea (abyssal). This appears both from numerous direct observations, as well as from conclusions which may be drawn from their organisation (and especially their promorphology) regarding their floating life (compare §§ 40–50, 219, 220). Hitherto no observation has been recorded, which justifies the assumption that Radiolaria live anywhere upon the bottom of the sea (on stones, Algæ, or other firm substances), either sessile or creeping. They perform the latter action, however, when they fall accidentally upon a firm basis or are accidentally placed upon it, but they seem normally always to float freely in the water with pseudopodia radiating in all directions. Active free-swimming movements are only met with in the case of the flagellate zoospores (§ 142). The development of Radiolaria in large masses is very remarkable (see note A), and in many parts of the ocean is so great that they play an important part in the economy of marine life, especially as food for other pelagic and abyssal animals (see note B). Medium salinity of the water seems to be most favourable to their development in masses, although it is not unknown in seas of high and low salinity (see note C). There are no Radiolaria in fresh water (see note D).

A. The development of Radiolaria takes place in many parts of the ocean in astonishingly large masses on the surface, in different strata, and near the bottom. The Collodaria (and especially the Sphærozoida) often cover the surface of the sea in millions, and form a shining layer, phosphorescent in the dark like the *Noctilucæ*, as I observed in 1859 in the Strait of Messina, in 1866 at the Canaries, and in 1881 in the Indian Ocean. Similar masses of *Sphærozoum* and *Acanthometron* were seen by Johannes Müller on the French and Ligurian coasts (L. N. 12), and John Murray found another in the Gulf Stream, off the Færöe Islands, from the surface to a depth of 600 fathoms; considerable masses of large PHÆODARIA live there also.

B. The alimentary canal of Medusæ, Salpæ, Crustacea, Pteropoda, and many other pelagic animals is a rich field for the discovery of Radiolaria, and many of the species hereinafter described are from such sources. Fossil coprolites too (*e.g.*, those from the Jura) often contain many Polycystina.

C. Some ACANTHARIA (Acanthometra) and PHÆODARIA (species of *Mesocena* and *Dictyocha*)