

well-being of the organism, both as sensory organs and as prehensile organs. By far the most important and most varied means for the actual defence of the soft body is to be seen in the endless modifications of the skeleton; first, in the production of the enclosing lattice-shells and projecting radial spines, but especially also in the very varied structure of the individual parts of the skeleton, and in the special differentiation of the small appendicular organs which grow out from it (hairs, thorns, spines, scales, spathillæ, anchors, &c.). Finally "mimicry" possesses a considerable significance among the different forms of adaptation which are to be observed in this class.

223. *Phosphorescence*.—Many Radiolarians shine in the dark, and their phosphorescence presents the same phenomena as that of other luminous marine organisms; it is increased by mechanical and chemical irritation, or renewed if already extinguished. The light is sometimes greenish, sometimes yellowish, and appears generally (if not always) to radiate from the intracapsular fatty spheres (§ 73). Thus these latter unite several functions, inasmuch as they serve, firstly, as reserve stores of nutriment, secondly, as hydrostatic apparatus, and thirdly, as luminous organs for the protection of the Radiolaria; probably the light acts by frightening other animals, for the phosphorescent animals are provided with spines, nettle-cells, poison glands or other defensive weapons. The production of the light depends probably, as in other phosphorescent organisms, upon the slow oxidation of the fat-globules, which combine with active oxygen in the presence of alkalis. Phosphorescence is very likely widely distributed among the Radiolaria.

The shining of the Radiolaria in the dark has been noticed by the earliest observers of the class (see L. N. 1, p. 163, L. N. 16, p. 2, and L. N. 52, pp. 136–139). In the winter of 1859 I observed the production of light in the case of many monozootic and polyzootic Radiolaria, but inadvertently omitted to record the fact in my Monograph. I made more accurate observations in the winter of 1866 at Lanzerote in the Canary Islands, and convinced myself that the light emanates from the central capsule, and in particular from the fat-globules contained in it. In most Polycyttaria (both *Collophærida* and *Sphærozoida*), when each central capsule contains a large central oil-globule the light radiates from it. In *Collozoum serpentinum* (Pl. 3, figs. 2, 3) each cylindrical central capsule contains a row of luminous spherules like a string of beads. In *Alacorys friderici* (Pl. 65, fig. 1) the four-lobed central capsule contains four shining points. Karl Brandt has recently made more detailed communication on this point (L. N. 52, p. 137).

224. *Sensation*.—The general irritability which we ascribe to all organisms, and as the basis of which we regard the protoplasm, remains at an inferior stage of development in the Radiolaria. For although they are subject to various stimuli, and certainly possess a power of discrimination, special sensory organs are not differentiated; the peripheral portions of the protoplasm, and especially the pseudopodia, rather act both as organs of the different kinds of sensation and various modes of motion. That different Radiolaria have attained different degrees of development in this respect may be seen