

the endoplasm, and the former is more voluminous than the latter. 2. In all Radiolaria the division of labour is so carried out between the central capsule and the extracapsulum, that the physiological significance and independence of both principal parts of the cell is almost equally great. 3. It is only in the ACANTHARIA that the formation of the skeleton takes place within the central capsule; in all the other three legions it is quite independent of it.

16. *The Malacoma and Skeleton.*—Whilst the division of the unicellular organism into central capsule and extracapsulum is undoubtedly the most important character of the Radiolarian organism, the development of a skeleton of peculiar and most varied form is of very striking significance. This skeleton is *always a secondary product of the cell*, but is always anatomically so independent, and so clearly marked off from the soft parts or malacoma, that it seems advisable to regard both separately in a general morphological survey. The skeleton stands in a different relation to each of the two principal constituents of the malacoma. Only in the ACANTHARIA is it centrogenous and developed from the central capsule outwards. In the other three legions the skeleton never arises in the centre of the capsule; in the NASSELLARIA and PHÆODARIA it is always extracapsular; in the SPUMELLARIA it is also outside the central capsule originally, but afterwards becomes often surrounded by it, and finally lies in most cases partly within and partly without the central capsule. The chemical basis of the skeleton in the ACANTHARIA is the curious acanthin (an organic substance allied to chitin), in the PHÆODARIA a silicate of carbon, and in the NASSELLARIA and SPUMELLARIA silica.

17. *Ground-Forms of the Radiolaria (Promorphology).*—The ground-forms of the the Radiolaria exhibit a greater variety than those of any other class in the organic world, greater indeed than is to be found in all the remaining groups together. For every conceivable ground-form which can be defined in the system of promorphology is actually present in the Radiolaria; their skeleton exhibits, as it were, in material existence, certain geometrical ground-forms which are found in no other organisms. The cause of this unexampled richness in different forms lies chiefly in the static relations of the Radiolaria, which swim freely in the sea, partly also in the peculiar plasticity of their protoplasm and the material of their skeletons.

Regarding the general system of ground-forms compare my *Generelle Morphologie* (1866, Bd. i. pp. 375–552; Bd. iv., *Allgemeine Grundformenlehre*). The ground-forms there proposed and systematically defined have, however, found but little acceptance (chiefly, no doubt, owing to the difficult and complicated nomenclature); but having now, twenty years after their publication, anew carefully revised and critically studied them, I can find no sufficient reason for abandoning the principles there adopted. On the contrary the study of the Challenger Radiolaria during the last ten years, with its incomparable wealth of forms, has only confirmed the accuracy of my system of ground-forms. The customary treatment of these in zoological and botanical handbooks (such as those of Claus and Sachs) is quite insufficient.