

either becomes itself the nucleus of a swarm-spore, or by repeated division gives rise to a group of spore-nuclei. All those Radiolaria which are uninuclear during the greater part of their existence, and in which the process of division is late, and takes place rapidly, are called "serotinous" or late-dividing forms. To this category belong all PHÆODARIA and NASSELLARIA, as well as all the solitary or monozoic SPUMELLARIA and some ACANTHARIA. On the other hand, the name "precocious," or early dividing, is applied to those Radiolaria in which the division of the nucleus takes place very early, and in which, therefore, the cell is multinuclear during the greater part of its existence. This is the case in all the social or polyzootic Radiolaria (Polycyttaria, Pls. 3-8), and also in the great majority of the ACANTHARIA, both *Acanthometra* and *Acanthophracta*. In the last two groups, however, there are numerous exceptions, and these are seen in remarkably large species, characterised by the great size of the central capsule. From a phylogenetic point of view, the conclusion is allowable that the precocious forms are secondary, and have arisen by adaptive modification from the primitive serotinous stem. In the Polycyttaria (or social SPUMELLARIA, *i.e.*, the three families Collozoida, Sphærozoida, and Collosp hærida), the cause of the adaptation lies most probably in the formation of the colony itself, for all these three families are so closely related to three corresponding families of serotinous, monozootic Radiolaria (Thalassicollida, Thallassosphærida, Ethmosphærida), that certain species of the latter are hardly to be distinguished from isolated individuals of the former. Perhaps the remarkable formation of the large central oil-globule, which particularly characterises the Polycyttaria, is the prime cause of their early nuclear division. In the ACANTHARIA the cause is most likely to be found in the characteristic *centrogenous development* of their acanthin skeleton, whose radial bars first of all appear in the centre of the capsule. Hence arises directly the excentric position of the nucleus, which in the archaic stem of ACANTHARIA (*Actissa?*) was probably central. In any case, but little weight is to be laid upon the precocious division of the nucleus in the ACANTHARIA in general, inasmuch as in certain species (both *Acanthometra* and *Acanthophracta*) the more usual serotinous division persists.

64. *Central and Excentric Nuclei.*—The position of the nucleus in the interior of the central capsule was no doubt primitively central, and this situation in the geometrical centre of the original spherical central capsule has been accurately retained in all monozootic SPUMELLARIA; in the polyzootic families of this legion (Polycyttaria), on the contrary, it is obscured by the precocious division of the nucleus. In the other three legions, which may be phylogenetically derived from the SPUMELLARIA, the position of the nucleus is rarely central, but usually excentric, or at most subcentral. In the ACANTHARIA (both *Acanthometra* and *Acanthophracta*) the central position of the nucleus is at once excluded by the constantly *centrogenous development* of the skeleton; the nucleus is therefore always excentric, and may lie at either side; it usually