Zoology Part XL: Report on the RADIOLARIA. By Ernst Haeckel. Bound in Volume 18,1887.

which each of the two daughter-cells develops to a complete mother-cell depends upon simple growth. Another form of regeneration, different from this, has been observed in *Thalassicolla*. If the central capsule be extracted artificially from the large concentric calymma, the enucleated central capsule produces a new extracapsulum, with sarcomatrix, pseudopodia, and calymma. This experiment may be repeated several times with the same result. (Compare A. Schneider, 1867, L. N. 20.)

152. *The Formation of Colonies.*—The individual development of colonies takes place in all three families of the Polycyttaria (Collozoida, Sphærozoida, Collosphærida) in the same simple way, by the repeated division of a single monozootic SPUMELLARIAN. Since these divisions only affect the central capsule and not the extracapsulum, the sister-cells, which arise by repeated division of the mother, remain enclosed in a common rapidly growing calymma. Probably in all Polycyttaria the commencement of the formation of colonies immediately follows the *Actissa*-stage of the monozootic mother-cell (or takes place in the *Thalassicolla*-stage, which arises from the former by the development of alveoles in the calymma). The simple central nucleus separates (by direct nuclear division) into two halves, and the central capsule follows this process of bisection, becoming constricted in the middle between the two daughter nuclei (Pl. 3, fig. 12). In the further growth of the colony the process of division proceeds in the older, now multinucleate, central capsules, in which an oil-globule has taken the place of the original nucleus; then the division of the oil-globules precedes that of the central capsule (Pl. 5, fig. 1). Another mode of growth of the colonies is the multiplication of the central capsules by gemmulation, or the formation of the so-called "extracapsular bodies" (Gemmulæ, § 214). The characteristic skeletal structure of the different species appears at a later stage. Whether ripe central capsules can emerge from the social bond of a cœnobium, and, having become isolated, establish the formation of a new colony, is very doubtful. The various forms which the cœnobium assumes in the different species of Polycyttaria, are due partly to simple growth, partly to the development of large vacuoles in the calymma.

The *form and size* of the cœnobia appear in many fully developed Polycyttaria to exhibit specific differences, which require further investigation; in the young stage, on the contrary, they are simple spheres or ellipsoids, often cylindrical or sausage-shaped (Pl. 3, figs. 1, 4, 6, 11). In some species the cylindrical gelatinous bodies become moniliform, and separated by transverse constrictions into many segments, each of which encloses a large alveole (Pl. 3, fig. 10). The rare ring-shape (Pl. 4, fig. 1) which I figured in 1862 in the case of *Collozoum* (L. N. 16, p. 522, Taf. xxxv. fig. 1), I have recently observed in different species of Polycyttaria; it is capable of a very simple mechanical explanation, both ends of a sausage-shaped colony having been accidentally brought into contact by a wave and having united by agglutination. Quite recently Brandt has given a very complete account of the development, form, and growth of Polycyttarian colonies in his work on the colonial Radiolaria of the Bay of Naples (1885, L. N. 52, pp. 71–85).

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