

fig. 2), or only an incomplete Beloid skeleton (Cannorrhaphida, Pl. 101, figs. 3, 6, and Aulacanthida, Pl. 104, figs. 1-3). The *Phæosphæria* also (Aulosphærida, Cœlacanthida) and the *Phæogromia* (Tuscarorida, Challengerida) appear sometimes to divide; at all events, their central capsule often contains two nuclei. Of special interest is the spontaneous division of the *Phæoconchia*, especially the *Concharida* (Pl. 124, fig. 6). In all monozootic Radiolaria, the nucleus first divides by a median constriction into two equal halves (usually by the mode of direct division); then the central capsule becomes constricted in the middle (in the *PHÆODARIA* in the vertical main axis), and each portion of the capsule retains its own nucleus. In the *Phæoconchia* each half or daughter-cell corresponds to one valve of the shell, dorsal or ventral, so that probably on subsequent separation each daughter-cell retains one valve of the mother-cell, and forms a new one for itself by regeneration (as in the Diatoms). In the polyzootic Radiolaria, which already contain many small nuclei, but usually only a single central oil-globule in each central capsule, the division of the latter is preceded by that of the oil-globule. In many Polycyttaria the colony as a whole multiplies by division.

The increase of the central capsule by division was first described in 1862 in my Monograph (L. N. 16, p. 146); since then R. Hertwig (L. N. 26, p. 24) and K. Brandt (L. N. 52, p. 144) have confirmed my statement. In the *PHÆODARIA* the division of the central capsule appears always to take place in the main axis; in the bilateral sometimes in the sagittal, sometimes in the frontal plane. In the *Tripylea* each daughter-cell seems to retain one parapyle and half the astropyle (compare the general description of the *PHÆODARIA*, Pl. 101, figs. 1-6, Pl. 104, figs. 1-3, and also Hertwig, L. N. 33, p. 100, Taf. x. figs. 2, 11). Regarding the spontaneous division of colonies of the Polycyttaria, see K. Brandt, L. N. 52, p. 142.

214. *Cell-Gemmation*.—Reproduction by gemmation has hitherto been observed only in the social Radiolaria, but in them it appears to be widely distributed, and in very young colonies is perhaps almost universally present. The gemmules or capsular buds (hitherto described as “extracapsular bodies”) are developed on the surface of young central capsules before these had secreted a membrane. They grow usually in considerable numbers, from the surface of the central capsule, which is sometimes quite covered with them. Each bud usually contains a raspberry-like bunch of shining fatty globules, and by means of reagents a few larger or a considerable number of smaller nuclei may be recognised in them; the naked protoplasmic body of the bud is not enclosed by any membrane. As soon as the buds have reached a certain size they are constricted off from the central capsule and separated from it, being distributed in the meshes of the sarcoplegma by the currents in the exoplasm. Afterwards each bud becomes developed into a complete central capsule by surrounding itself with a membrane when it has attained a definite size. From the special relations of the processes of nuclear formation, which take place in the multiplication of the