

The *vibratile* movement of the swarm-spores is the result of active sinuous oscillation of the single or multiple flagellum, and is not essentially different from that of ordinary flagellate Infusoria (see note A). Of the active swimming of mature Radiolaria, only that form is known which is vertical in direction and causes the sinking and rising in the sea-water. This is probably, for the most part (perhaps exclusively), due to increase or diminution in the specific gravity, which is perhaps brought about by the retraction or protrusion of the pseudopodia; slow, oscillating, sinuous motions of these organs have been directly observed to take place (though very slowly) in suspended living Radiolaria. The most important hydrostatic organ is probably the calymma, by the contraction of which the specific gravity is increased, while it is diminished by its expansion; the contraction is probably brought about by active contraction of the sarcodictyum, and is connected with exosmosis, while the expansion is probably due to the elasticity of the calymma and the inception of water by endosmosis. In the *Acanthometra* (§ 96) the peculiar myophriscs appear to be charged with the duty of distending the gelatinous envelope, and thus diminishing the specific gravity; the latter increases again when the myophriscs are relaxed, and the calymma contracts by virtue of its own elasticity (see note B). The slow *creeping locomotion* exhibited by Radiolaria on a glass slide under the microscope, does not differ from that of the Thalamophora (Monothalamia and Polythalamia), but can only occur normally when the animal accidentally comes into contact with a solid surface or sinks to the bottom of the sea. Whether this actually occurs periodically is not known (see note C). The slow or gliding locomotion exhibited by creeping Monozoa on a glass slide is due to muscle-like contractions of bundles of pseudopodia, just as in the case of the social central capsules of Polyzoa, which live together in the same cœnobium and are able to move within their common calymma sometimes centrifugally to its surface, sometimes towards the centre where they aggregate into a roundish mass (see note D).

A. Regarding the movement of the flagella in mature swarm-spores compare L. N. 22, p. 375; L. N. 26, pp. 31, 35; L. N. 41, p. 452, and L. N. 52, p. 170.

B. On the active vertical swimming movements of mature Radiolaria, especially the cause of sinking and rising, see L. N. 16, p. 134; L. N. 41, p. 443, and L. N. 52, pp. 97-102.

C. On the active horizontal creeping movements of mature Radiolaria on a firm ground, compare L. N. 12, p. 10, and L. N. 16, pp. 132-134.

D. Regarding the motion of social central capsules within the same cœnobium and the changes thus brought about in the structure of the calymma, see L. N. 16, pp. 119-127, and L. N. 52, pp. 75-82.

221. *Contraction*.—Motions, which are due to the contraction of individual portions and cause changes in volume or form, have been partly already spoken of under the head of locomotion (§ 220) and are partly connected with other functions. Examples may be seen in the contraction of the central capsule and of the calymma. A certain