

anatriænes which arise within the cortex and proceed from it for a short distance beyond the surface precisely after the manner of the cladoxeas in *Proteleia*.

*Methods of Attachment.*—Some of the Tetractinellida are without attachment or free, but the greater number are in some way or other attached to the sea-floor; in many cases the sponge is incrusting (*Placina*, *Astropeplus*), in others it rises from an incrusting base (*Pæcillastra*, many Lithistids), in some it is attached by strong fibrous bands produced by an outgrowth from the cortex (*Pilochrota*), and even in the case of sponges which are practically free, similar processes are present and attach to the sponge numerous small stones and other foreign bodies. In most deep-sea Sponges the attachment is by means of radical spicules, variously adapted to this purpose as already described (Fig. XIII.). Some species are excavating (*Pilochrota? lactea*, Carter), and some are parasitic (an undescribed species of *Geodia* which occupies the oscular tubes of a species of *Ectyon*).<sup>1</sup>

*Migration, Protrusion, and Extrusion of Spicules.*—Observations on various sponges (e.g., *Tetilla grandis*, p. 12; *Anthastra communis*, p. 144) show that the young triæne spicules originate within the choanosome at some little distance from the cortex, from which the cladome is the more remote as it is less advanced in growth. The cladome of the fully grown triæne on the other hand lies as a rule either within the cortex or beneath the floor of the subcortical crypts. Thus with the growth of the spicule, the cladome is carried from the interior towards the exterior of the sponge. This is no doubt partly due to the fact that the growth of the rhabdome is chiefly in the long direction; and the absence of triænes from all parts of the spicular fibres except their distal terminations may be explained as resulting from the close connection into which the cladome is brought with the cortex, so that the latter in its growth carries the former along with it.

It is, however, possible that in addition to the movement of the spicule by growth, another takes place by which it is gradually but bodily translated from the interior towards the exterior of the sponge; and only by some such process does it appear possible to explain the presence of sterrasters within the choanosome of the *Sterrastrosa* in all stages of development, while in the cortex none but those fully adult are met with.

Supposing this outward migration to occur, its continuance would lead to the protrusion of the distal end of the spicules, and thus the occurrence of hispidating rhabdi and triænes is to be explained.

With a further progress outwards the hispidating spicules would at length lose all connection with the sponge and fall out as deciduous spicules.

Since there is nothing to distinguish the deciduous spicules of a living sponge from those left behind by a dead one, it is not surprising that this process has hitherto been overlooked and indeed unsuspected; there are cases, however, in which, while the organic connection of the spicules with the sponge is dissolved, yet a more or less close association persists; thus in *Chrotella macellata* (p. 20) the toxaspores, which become

<sup>1</sup> Sollas, *Ann. and Mag. Nat. Hist.*, ser. 5, vol. v. p. 408.