the so-called "synapticula," which stretch so frequently between neighbouring spicules of many Lyssacina, binding them into a solid framework, nor finally in those remarkable lattice networks which occur in many Hexactinellida on regions in contact with foreign bodies, but especially where the Sponge has grown on a solid substratum. In individual cases, as, *e.g.*, in the thickened extremities of many anchor spicules, the central canal exhibits a brush-like division into several diverging, blind, terminal branches (Pl. III. fig. 29; Pl. XIV. fig. 5).

The innermost layer immediately surrounding the central canal is called by Claus the "*axis cylinder*." It is generally distinguishable from the usually many layered outer cortex by its somewhat feebler refractive power and by the absence of lamination. From the behaviour of the spicules when heated, and when examined in polarized light, Max Schultze determined that the individual lamellæ were separated from each other by thin layers of an organic substance. After cautious heating, fine brown carbon streaks were seen between the adjacent hyaline layers. By the use of the polarising apparatus double refraction could be demonstrated in the thin intermediate layers, but not in the substance of the lamellæ.

Professor Maly of Graz was kind enough to analyse a number of spicules from the root tufts of a *Poliopogon amadou*, and has summed up the result in the following note, with which he has favoured me:—"The spicules after being placed in a desiccator, and dried at 105°, still contained 7·16 per cent. of water in chemical union. They are, therefore, not silicic acid in the mineralogical sense (quartz substance), but a hydrated silicic acid, and therefore resemble opal, in which the amount of water very frequently varies from 6 to 8 per cent."

In no other group of Sponges is there so great a variety in the form of the skeletal elements as in the Hexactinellida, yet nowhere are the numerous individual forms of the spicules so readily referable to a common fundamental type.

As was first recognised by Wyville Thomson, and subsequently abundantly confirmed by Oscar Schmidt, Marshall, and others, a system of three equal axes intersecting at right angles is the fundamental structure of the skeletal parts in all Hexactinellida, and that both in regard to the spicules united into a continuous framework, and those which lie isolated. Though the disposition of the axes is thus in fundamental agreement with that of the regular crystallographic system, the structure of the spicules is by no means the result of crystallisation. The silicic acid occurs here in an absolutely amorphous condition like that of the opals with which they are, chemically, so closely related. Only in a few fossil specimens does the existence of double refraction indicate a secondary transformation into the crystallised state.

The axes of the individual skeletal elements are usually quite distinctly indicated by the disposition of the principal rays in relation to the point of intersection, but frequently they can only be demonstrated by examination of the central canals.