

The fine structure of the hard tissue of the corallum of *Heliopora* is in many respects similar to that of the coralla of Hexactinian corals. It is composed of doubly refracting calcareous matter, which has a half-crystalline, half-fibrous structure. On transverse section (Pl. I. fig. 4), it is seen to be made up of a series of systems of radiating fibres, i.e., areas of calcareous tissue showing a radiate fibrous structure. In each system the fibres radiate from a central axis, and diverge to fuse at the margin of the system with the margins of the contiguous systems, a suture-like line being often observable where two systems join. The fibres are disposed more or less in laminæ which overlap one another. The radial fibrous structure is to be seen only in thin slices or fragments of the coral viewed by transmitted light. The fracture of the coral is irregular and crystalline. The central axes of the systems correspond to the centres of the vertical beams already described, which are prolonged above on the surface of the coral into papilliform projections. In a vertical section of the corallum (Pl. II. fig. 5, D), these axes are seen to take a vertical course within the beams and branch beneath the newly formed buds of the cœnenchym. The fibres are seen starting from the axes, spreading right and left from them throughout the tissue with a uniform inclination upwards (i.e., towards the surface of the corallum). In the plates forming the sides of the tubes (Pl. II. fig. 5, B) the sutures between the fibres meeting one another at an angle from the two systems are well marked. The appearance of a portion of the hard tissue, as seen under a high power, is shown in Plate II. fig. 6, where the appearance of the overlapping laminæ is to be remarked. In the corallum of *Pocillopora* definite rod-like prisms with polygonal ends are seen to exist when these structures are viewed end on; in *Heliopora* such a definite structure apparently does not occur.¹

The transverse partitions in the tubes and calicles give evidence in their structure that they are later additions to the insides of already formed tubes. They are not merely transverse floors, but flat-bottomed cups of tissue fitted inside the old tubes, and thus narrowing their bore considerably in the region where they become formed. In nearly all instances the old boundary line of the tube below the tabula can be traced, and is seen to continue its course for some distance beyond and above the tabula (Pl. II. figs. 5, 9). The tabulæ of the cœnenchymal tubes seem in all respects identical in structure with those of the calicles.

The structures which form the centres from which the systems of hard tissue radiate have here been called axes. They have the appearance of being canals in the hard tissue, but this appearance seems to be fallacious. They probably represent the points of junction of the walls of the opposed cœnenchymal tubes where imperfect fusion has taken

¹ The radiating components of the hard tissue are here spoken of as fibres to distinguish them from these well-marked prisms of which the hard tissue of *Pocillopora* is composed. The exact nature of the radial striæ seen in the tissue of the *Heliopora* I do not understand; they seem to represent spaces between variously shaped splinters, as it were, of hard matter arranged so as to form laminæ.