

it is depressed into an annular valley, which surrounds a small mound-like eminence; the poriferous roofs of chones cover the sides of the sponge up to the outer rounded shoulder which bounds the valley externally; they fail over this, but set in again over the bottom of the depression, and extend all over the central mound except at its very summit, where they are absent. The cortex is about 1.3 to 1.6 mm. in thickness, the thickness of the ectochrote varying from 0.19 to 0.5 mm. This layer (Pl. XXI. fig. 10) consists of numerous cells lying nearly adjacent to each other, but separated by a thin layer of gelatinous matrix, in which they are embedded; in their youngest stage they present themselves as oval or oblong masses of granular protoplasm, which stains deeply, so as almost to conceal the spherical nucleus and nucleolus which it encloses; later the protoplasm begins to disappear, and first at the margins of the cell, leaving very visible an outer cellular membrane, which is quite distinct from the wall of the cavity in the gelatinous matrix within which it lies. In many of the cells of this tissue spherasters may be seen included. The diameter of the cells is about 0.0197 mm., of the nucleus about 0.0039 mm. As this tissue approaches the sterrastral layer the included cells lie somewhat further apart, and present a more regular oval or rounded form; the general appearance of the tissue is that of a gelatinous matrix with oval cells scattered through it. As it approaches the chones it becomes converted into ordinary collenchyma, the collencytes of which radiate more or less towards the chonal walls. The microscleres of this layer are all strongylate spherasters (5).

The sterrastral layer which succeeds is about 1.2 mm. in thickness, and presents the usual structure.

The poral roofs are traversed by fusiform cells. The pores lead into short canals which unite into long, winding, and branching canals, which extend horizontally through the ectochrote. These canals, lined by epithelium which is bulged out by the spherasters underlying it, are crossed by velar diaphragms, and each system which they form is continued into an incurrent chone. The chones are provided with thick muscular sphincters, the myocytes of which are all arranged concentrically (Pl. XXI. fig. 11), surrounding the inner end of the chone. The sphincters lie in the midst of collenchyme, with which they stand in sharp contrast (Pl. XXI. fig. 9). Towards the upper or outer limit of the sphincter, fusiform cells terminate abruptly against the lining epithelium, from which they extend radially into the surrounding myenchyma. These cells measure about 0.02 mm. in length, the nucleus lying about 0.01 mm. from their epithelial ends. Occasionally one may also observe darkly stained stellate cells lying in the myenchyma, near the inner ends of the fusiform cells. It is possible that we have here a rudimentary nervous structure: the fusiform cells may be sensitive, and the stellate cells ganglionic in function. As to the fact of the response of the sphincter to a stimulus directly applied to it there can be little doubt, since by touching or gently rubbing the sphincter of the oscular chones of *Pachymatisma* with the point of a pencil, or any other convenient