of the tube (though without the chambers); in *Semperella*, on the other hand, the cover consists, in that portion which is spread over the afferent passages, simply of the uplifted external skin, while the sieve plates extending over the oscular clefts appear as a chamberless continuation of the entire wall of the tube.

HISTOLOGY.

Though the material placed at my disposal for investigation was not very well suited for histological research, some facts of interest were established. It ought to be observed, in the first place, that the histological structure is so uniform throughout the entire group, that the modifications to be noted are hardly of an important character.

As I pointed out in my communication On the Structure and Arrangement of the Soft Parts in *Euplectella aspergillum*,[1] the Hexactinellida exhibit, like all other Sponges, three histological layers, viz., two distinct layers of epithelium, and an intermediate connective tissue with various substances enclosed within it. As to the delicate single layer of flat epithelum which covers the entire surface exposed to the water, I have not been able to detect the contours of the cells, but simply their characteristic, small, clear, spherical nuclei. These, and the small, shining, granule-like nucleolus, were distinctly recognisable on well-preserved portions of the surface when strongly stained with hæmatoxylin or picrocarmine. The nuclei are distributed with tolerable uniformity, and project a little above the general surface of the cell, as is indisputably demonstrated on profile view. They thus lie in the very outermost portion of the bounding surface. This can be best seen on the dermal and gastral limiting membranes, but these epithelial nuclei are also recognisable as slightly projecting elevations, on the netted strands of the subdermal and subgastral trabecular spaces, and also on the trabeculæ and membranes extending between the ciliated chambers (Pl. IV. fig. 8).

A peculiar character, which differs not inconsiderably from the known relations of other Sponge groups, is exhibited by the epithelium which lines the inner surface of the chambers. One could not, of course, expect that in these epithelial cells, structures so delicate as the flagellum and collar should be preserved. Although I have taken every trouble, I have failed to detect these structures which are so constant in the chamber-cells of all known Sponges. It cannot be doubted, however, that they were really present. In my variously stained preparations, the chamber-cells appear as small bodies, projecting for a variable distance into the lumen of the chamber, and provided with small spherical nuclei and usually with a single shining nucleolus, which is sometimes of a cylindrical, but usually of a kidney-shaped roundish form. The remarkably regular disposition of these cells, and their connection by flat lateral bands, which extend over the membranous chamber-wall, are worth noting. Since

[1] *Trans. Roy. Soc. Edin.*, vol. xxix., 1880.