

the inner entodermal epithelium of the canal-system. Comparing the descriptions which are given of the former in many different sponges, I am more inclined to regard it as a superficial epithelial differentiation of the mesoderm, with which it remains in closest connection. The fact that the main mass of the sponge-body (or the so-called mesoderm) belongs histologically to the connective tissue, is not in contradiction with its conception as exoderm. We know that the peculiar mantle of the *Ascidia* is a voluminous and most remarkable product of the exoderm; it is a true connective tissue in histological respect, but a true exodermal (not mesodermal!) production in genetical respect. The cells, which are scattered in the connective ground-mass of the *Ascidian* tunic, and which are derived from the epidermis (!), are often arranged on the outer surface of the thickened tunic in the form of an outer simple layer of pavement-cells (a quasi-secondary epidermis). This may be compared to the surface-epithelium of the sponges. The histological comparison of the tunic of the *Ascidia* with the so-called mesoderm of the sponges seems to be justified, especially as the further differentiation of both of them is often very similar.

*Entoderm* (Canal-Epithelium).—In opposition to the exodermal surface-epithelium, which we may regard only as a secondary superficial production of the primary outer cell-layer, the entodermal epithelium of the canal-system is independent from the beginning, a self-subsistent inner group of cells, which is separated already in the *Gastrula* from the different exodermal group (the fundament of the later mesoderm and the secondary exoderm). This entodermal or gastral epithelium seems to have in the *Keratosa*—and similarly in the *Calcarea*—two modes of development. It remains as a single continuous layer of flagellated cells through all the cavities of the canal-system in the *Ammoconidæ* (Pl. VIII.), closely agreeing with the *Asconidæ* (*Asconal*-type). It is differentiated into two very different portions in all the other *Keratosa*, the canal-system of which is developed on the *Leuconal*-type (as in the *Leuconidæ*). The flagellated epithelium remains here restricted to the flagello-chambers, whilst the entoderm in all the other parts of the canal-system is a simple flat pavement-epithelium.

*Mesoderm*.—The main mass of the sponge-body, which is usually now called the mesoderm, and which we derive from the original primitive exoderm, exhibits in the various sponges, as is well known, an infinite variety of detailed structure, mainly in the production of the skeleton. Regarded histologically, the mesoderm is always a kind of connective tissue or malthar tissue,<sup>1</sup> and exhibits similar manifold differentiations to those of the higher *Metazoa*. It is a relatively thin lamellar plate in the *Ammoconidæ* (as also in the *Asconidæ*), whilst it becomes massive and voluminous in the other *Keratosa* (as in the majority of sponges). We distinguish in the malthar tissue of the *Keratosa* (as in the various connectiva of other sponges) the following constituents:—

<sup>1</sup> On the conception of malthar tissue (*Maltha*) and its distinction from fulcral tissue (*Fulcrum*), compare the Report on the Deep-sea Medusæ (*Zool. Chall. Exp.*, pt. xii. vol. iv. § 50, p. xxxi).