

gradually disappeared; but in other cases it persisted, and in this connection it is of especial interest to note that in certain so-called Keratose sponges, *i.e.*, species in which the spongin has entirely usurped the place of the spicules, there is around the horny fibre—(1) a sheath of special spongoblasts, and (2) outside this, a sheath of fibrous connective tissue, composed of elongated, fusiform cells, and much resembling (according to the figures) that found by us in *Suberites perfectus*. This condition is described and figured by von Lendenfeld in several species, *e.g.*, *Dendrilla rosea*,<sup>1</sup> *Dendrilla aërophoba*,<sup>2</sup> and *Aulena villosa*.<sup>3</sup> Possibly in these cases there was originally only one thick sheath of connective tissue around the skeleton fibres, and by degrees the cells of the inner layer, next to the fibre, became specially modified as spongoblasts, while those of the outer layer retained their original form unaltered, or, very possibly, became still more fibrous in order to form a protective sheath to the layer of spongoblasts. We must imagine that the outer layer still has some important function to fulfil in order to account for its very great degree of development in certain forms (*e.g.*, *Dendrilla aërophoba*).

### (c) The Arrangement of the Skeleton.

Although in the majority of Monaxonid sponges (the Halichondrina) there is more or less spongin present in the skeleton, yet this is, as a rule, subsidiary to the siliceous element, and serves merely as a cement to bind the spicules together in continuous fibres. Under certain conditions, however, the spongin forms by far the most important part of the skeleton, but cases in which this happens have been dealt with elsewhere.

#### (1) *The combination of the spicules to form fibres.*

This may take place according to three main plans, which we propose to distinguish as the *Renierine*, the *Axinellid*, and the *Ectyonine* type respectively.

1. *The Renierine type* (Pl. XLVI. figs. 2, 3, 6).—Here each individual fibre is composed of a central axis of parallel spicules, arranged either uniserially or polyserially, which may or may not be enclosed in a distinct sheath of spongin. The surface of the fibre is smooth. (Found in the Homorrhaphidæ, Heterorrhaphidæ, Esperellinæ, &c.)

2. *The Axinellid type*.—Here all the spicules of the fibre are, in a sense, "echinating." Each spicule has its base in the centre of the fibre (usually embedded in spongin), while its apex projects obliquely outwards and forwards in the direction in which the fibre is running (*i.e.*, more or less towards the surface of the sponge). There is no central core of longitudinally disposed spicules, the centre of the fibre being occupied by the bases of

<sup>1</sup> *Zeitschr. f. wiss. Zool.*, Bd. xxxviii. p. 286, pl. xiii. figs. 25, 26.

<sup>2</sup> *Loc. cit.*, p. 304, pl. xiii. fig. 28.

<sup>3</sup> *Proc. Linn. Soc. N.S.W.*, vol. x., pt. iii. p. 315, pl. xxx. fig. 18.