

formosus. The sperm clusters in these cases are from about 0·05 to 0·1 mm. in diameter; they lie in cavities lined by endothelium, and are never enclosed in a cover-cell.

No genital products have been observed in any species of the family Stellettidæ, nor in any of the order Lithistida.

THE SKELETON.

The Spicules.—The consideration of this subject should logically have followed on the description of the scleroblasts, but as its treatment is of necessity lengthy, it will be more convenient to assign it a chapter to itself.

The spicules of sponges may consist of calcite (*Calcispongiæ*), opal, or spongin (*Darwinella aurea*). In the Ttractinellida they are always composed of opal; and spongin only occurs in small quantity, uniting as by short synaptactulæ adjacent spicules together. The composition of spongin requires renewed chemical investigation, it is most nearly allied to silk but differs from it in yielding leucine and glycocine, instead of leucine and tyrosine, when treated with sulphuric acid.¹

The mineral matter of siliceous spicules is colloidal silica,² having a specific gravity of 2·0361 (Thoulet),³ or 2·04,⁴ its refractive index is 1·449, or almost identical with that of solid colloidal silica allowed to harden by spontaneous evaporation. As to its precise composition, somewhat different results have been obtained by different experimenters, thus Thoulet found 86·82 per cent. of silica and 13·18 per cent. of water, from which the formula $(\text{SiO}_2)_2\text{OH}_2$ may be deduced; Schulze, however, gives as the results of experiments made for him only 7·16 per cent. of water, and this more nearly corresponds to the formula $(\text{SiO}_2)_4\text{OH}_2$, the exact quantity of water required by this formula being 6·977 per cent.

My own determinations were made with special precautions to ensure the purity of the spicular material employed. The spicules were boiled out with fuming nitric acid, washed and dried; they were then freed, if necessary, from foreign particles, such as grains of sand, by separating with Thoulet's fluid; after washing and drying, they were then ground to an impalpable powder in an agate mortar, and again boiled in fuming nitric acid to destroy all traces of the axial organic fibre, which may escape the action of the acid when the spicule is boiled whole. After well washing, the powder was dried in a water oven at 98°; from 0·25 to 0·35 gramme was transferred to a platinum crucible and heated at first gently by means of a Bunsen over asbestos-board, and finally as intensely as possible by means of a Herapath for five to ten minutes. It was found that at the low temperature, below red heat, attainable over asbestos, about two-thirds of the contained water was expelled, and the powdered material, at first snow-white, acquired a faint but distinct yellowish-brown tint, like that of charred paper. Since all free organic matter had been previously destroyed, it is clear that a small quantity must

¹ Städeler, *Ann. Ch. Pharm.*, vol. cxi. p. 12.

² Sollas, *Quart. Journ. Geol. Soc.*, vol. xxxiii. p. 254, 1877.

³ Thoulet, *Comptus rendus*, t. xxviii. p. 1000, 1863. ⁴ Sollas, *Sci. Proc. Roy. Dubl. Soc.*, vol. iv., N. S., p. 374, 1886.