

supposing these to be oxeas; a funnel-shaped cavity soon appears, its apex being directed towards the centre of the spicule, within this the axial rod is freely exposed (Pl. XLIII. fig. 18), and the increasing length of the liberated portion of the axial rod enables one readily to judge of the progress of the solution. Although at first sight the acid appears to remove all the substance of the spicule except the axial rod, careful observation will show that this is not the case, for a delicate film of organic matter also remains behind; it has the form of a hollow sheath, corresponding in form and position with the outermost boundary of the original spicule; between it and the axial rod the whole of the spicule is completely removed. The spicule thus consists of a central organic axis, surrounded by concentric layers of opal, the outermost of which is invested in a spicule sheath of organic matter or rather of organic matter in intimate association (chemical union?) with silica. I long ago discovered this sheath by finding it as an insoluble residue after boiling some of the spicules of *Plocamia plena*, Sollas, in caustic potash, but did not then recognise it by this name.¹

In making observations on the behaviour of spicules under the action of hydrofluoric acid, one has to provide first for the safety of the object-glass of the microscope and next to ensure the transparency of the preparation, for unless precautions are taken it will become obscured by the products of the action of the acid on the glass of the slide and the cover slip; the glass slide is therefore protected by coating it with a film of Canada balsam, which is hardened by drying in the water-oven; one side of the cover-slip is protected in the same way. The spicules isolated by treatment with nitric acid in the usual way are then placed along with a drop of water on the slide, and a drop of acid added, a ring of moderately fluid balsam is then run round the acid, the cover slip laid on—balsam face downwards and plenty of balsam run round the edge; in this way the spicules may be examined with safety under a Zeiss objective "D."

In all but the minutest microscleres, which are structureless and homogeneous, the spicule presents the structure just described, *i.e.*, a central organic axis, which is concentrically surrounded by successive layers of silica of very uniform thickness; the latter are excessively numerous and consequently of extreme thinness, they are readily distinguished by transmitted light and when viewed by oblique light at certain angles give rise to interference colours, which render them iridescent. In all true spicules the axial rod of organic matter extends close to the termination of the spicule, and in some cases can be traced extending a little beyond it. In the Lithistid desmas, however, the axis is continued comparatively only a short distance into the desma, and the mass of the structure consists of concentric layers of silica only; a difference can be discerned however between the axial and the peripheral portion of the more or less rod-like portion of the desma, a difference not altogether dissimilar to that which exists between the central and peripheral parts of the horny fibres of the Ceratosa; thus the central part is faintly

¹ Sollas, *Ann. and Mag. Nat. Hist.*, ser. 5, vol. iv. p. 51, fig. 3, 1879.