

and we point them out here because no one else seems to have taken the trouble to do so, and lest the student should be led to waste valuable time in endeavouring to reconcile the observed facts with Dr. Bowerbank's descriptions and figures.

It might be urged that Mr. Carter has already given good descriptions and figures of the leading forms of spicules, including even the most complex; this is true, but unfortunately these occur scattered through a number of separate papers which are not likely ever to come into the hands of any but specialists. Vosmaer has also given some general account of the spicules, but his figures of the more complex and minute forms are far from perfect, being for the most part copied from other authors.

Perhaps we need say no more in excuse of giving here a general account of the minute anatomy of the spicules, and, more especially, of discarding the old and cumbersome nomenclature, and endeavouring to bring into use a more scientific and rational terminology. The terminology here adopted is the result, in so far as that result affects the Monaxonida, of the mutual agreement of several spongologists, who consulted together with a view to formulating a set of terms which might have some chance of being generally accepted, as an experience of over twenty years has shown that this cannot be hoped of the Bowerbankian nomenclature, and there exists no other system of scientific terms to fall back upon. We give in the form of an appendix a list of the terms here employed, with the more important synonyms of other authors.

Concerning the chemical composition and the development of the spicules very little is as yet known. It is, however, a generally recognised fact that each (at any rate of the larger forms, and probably, judging from analogy, of the smaller forms also) consists of a central, axial, organic thread (the "axial thread," commonly, though incorrectly, referred to as the "central canal"), surrounded by concentric layers of a peculiar siliceous substance, vaguely spoken of as "organic silica." That the spicules are the products of the activity of special cells (silicoblasts),¹ within which they originate, is now also an admitted fact; but it is also pretty certain that the larger forms at any rate become free from the parent cell (silicoblast) before attaining their full size. Whether it be within or without the cell, the spicule grows by apposition. The axial thread appears to be the portion first developed, and upon the form assumed by this in the course of its growth, depends the form of the fully developed spicule. Not infrequently, in the case of the minuter forms of spicules, several originate in one and the same silicoblast, and they then remain together in bundles for a longer or shorter period; to such bundles the general term *dragmata*² is here applied.

This brief account of the nature and growth of siliceous spicules is necessary for the

¹ *Vide* Pl. XXI. fig. 13., and *cf.* Vosmaer, Bronn's Klassen u. Ordnungen d. Thierreichs, Porifera, p. 436, where the name "Silicoblast" is first introduced.

² Greek, δράγμα, a sheaf.