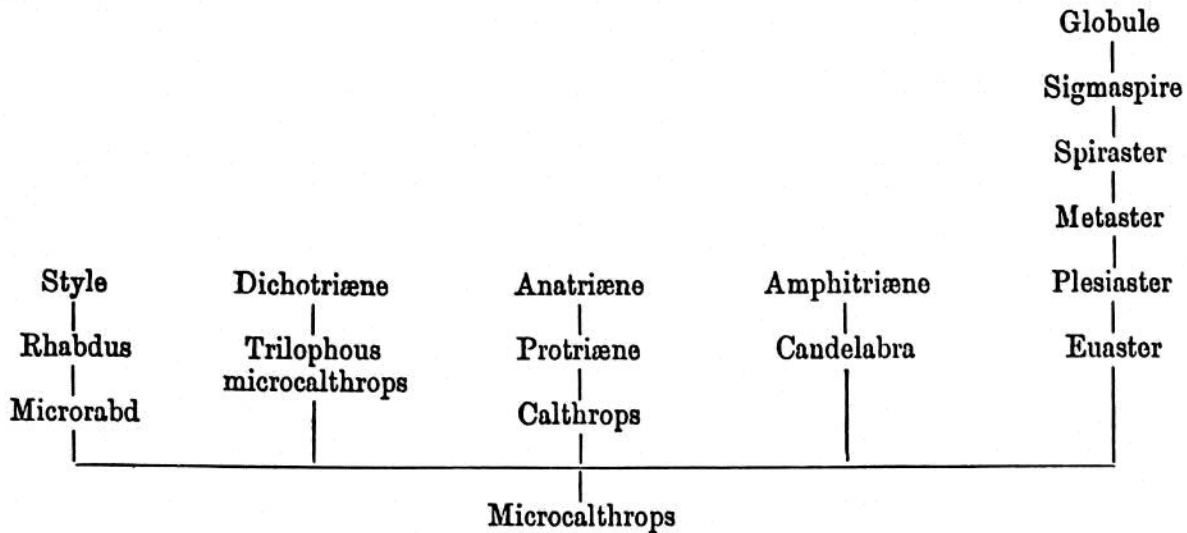


Should it eventually appear that the triæne has not descended from a rhabdus, then the phylogeny of the scleres will be more consistently represented by the following scheme:—



In cases where forms mentioned in the preceding scheme do not appear in this, it will be understood that no change in the relations previously expressed is involved.

In attempting an explanation of the origin of the different forms of spicules in the following section, I have taken as a basis for argument the first of the two schemes.

HYPOTHETICAL EXPLANATION OF THE FORMS OF SPICULES.

The regular geometrical forms which characterise so strikingly the spicules of sponges and other organisms have been often commented upon, but the attempts to explain them are few.¹ Haeckel has attempted to connect the forms of calcareous spicules with the crystalline forms of calcite, but without success; since in the first place they cannot with anything approaching universality be reduced to a rhombohedral type, and in the next precisely the same forms are presented by other spicules not composed of crystalline material, but of a colloid, either mineral, such as opal, or organic, such as spongin. This not only proves that the forms of spicules are not determined by the same causes as give rise to crystals, but warns us against attempting to account for them by their molecular structure at all.

Again, not only are similar spicular forms presented by chemically different material, but they occur in widely diverse groups of organisms. Thus in the Foraminifera, though the test usually has the form of a more or less continuous superficial shell, yet in at least one instance (*Rotalia spiculitesta*, Carter)² it consists of separate calcareous spicules, which have the form of short, stout, fusiform, strongylate or tornote rhabdi. The

¹ This and the greater part of the following explanation were written in 1885. Schulze has since propounded an important theory of spicules.

² *Ann. and Mag. Nat. Hist.*, ser. 4, vol. xx. pl. xvi, 1877.