

penetrated into the Sponge parenchyma, and on the surface of Sponges which are set in cavities of stones or are surrounded by sand and gravel.

Several attempts have been made to utilise for systematic purposes the various modes in which the spicules are more or less united into a framework. Thus, in contrast to the *Coralliospongia*, which possess a firmly united spicular framework, Saville Kent has named the Hexactinellida in which spicules remain disconnected, *Calicispongia*, and Carter has distinguished the following three great groups:—(1) spicules united by silicified fibre; (2) spicules united by amorphous sarcode; (3) spicules united partly by vitrified fibre, and partly by amorphous sarcode.

Marshall, on the other hand, maintains that the free or united condition of the spicules is less significant in the classification of Hexactinellida than the manner in which the union actually occurs. His distinction of Synauloidæ, with open communication between the axial canals of all dictyonalia, and Asynauloidæ, without such a union of the axial canals, did not, however, find acceptance, for it was soon shown that there are no Synauloidæ in this sense. Zittel accepted Marshall's ideas, however, to this extent, that he also based his classification mainly on the nature of the union between the dictyonalia, and distinguished two great divisions, Lyssacina and Dictyonina. The Lyssacina of Zittel embrace, besides forms with disconnected spicules, those in which there is simply a cementing of the spicules, that is to say, such an external union that the spicules do not seem to be checked either in their free arrangement or in their perfect development. In the Dictyonina the spicules of the lattice-framework, the dictyonalia, are, on the other hand, normally fused in such a way that the corresponding rays of neighbouring spicules are closely apposed, and become so completely united by a uniform coating of silex, that their original independence is revealed only in the presence of two separate but closely approximated axial canals. Zittel has also drawn attention to the fact, that Dictyonina frequently possess spicules which are apposed and bound together in more irregular ways; and O. Schmidt has confidently maintained the occurrence of transitional forms between Lyssacina and Dictyonina. He insists that this dictyonal character is manifested by many forms, as, *e.g.*, in his genus *Hertwigia*, in the firmly united inferior portion, while the loose and irregular union of the spicules in the middle, and the entire absence of fusion in upper and outer portions, relates the form to the Lyssacina.

It seems to me indeed difficult to distinguish, in many cases, whether a form belongs to the Lyssacina or Dictyonina. I have, in fact, found forms in which, in a few places, regular fusion was to be observed, while, in other respects, almost all the spicules were cemented together in the irregular way of the Dictyonina. I have, therefore, long endeavoured to find other characters which might serve as sure points of distinction between the two groups, but I have been able to discover only one fact, which might, indeed, justify a separation of the groups, though only at best a distinction of degree,