interjacent pores, then the triradiate spicule is the fittest form. These can be distributed in such a way that each interspace between three adjacent pores is occupied by a regular triact with each of the three rays lying at uniform angle between two adjacent pores (fig. 10), or they may be disposed so that only half of the interspaces between the pores are occupied by the central portions of the triacts, while the other half contain the points of convergence of the extremities of three rays of three adjacent triacts (fig. 11). This latter mode is exhibited by numerous very simple calcareous sponges of the Ascon type. For the case of an open tube, fixed at one end, and with the other (oscular) extremity free, careful consideration will show that the latter mode of disposition is the most advantageous. In this way the boundary of each pore, especially on the lower margin, is strengthened by the forking of the triact which embraces it posteriorly, and the whole sponge-tube is better strengthened by the relatively longer spicules than it would have been on the former plan. We may therefore regard the development of the regular triact as that conditioned and demanded by the structure of the soft parts of the primitive calcareous sponges.

In regard to the Tetraxonia, with their regular tetracts, I submit the following consideration. When a number of spheres of equal size are uniformly pressed together on all sides, they become disposed to one another in such a way that between each four adjacent and directly contiguous spheres a regularly formed cavity is left, which is continued in four three-sided clefts disposed at a uniform angle, and is thus connected with the adjacent interspaces of similar form. One can best compare the form of these spaces to regular tetrahedra with inpushed walls and drawn-out angles, which pass into the similarly elongated angles of adjacent tetrahedral spaces, and thus secure the connection of all the cavities. Now, if one supposes this entire system of cavities to be filled with a semi-solid mass, and the spheres to be empty spaces, there is an obvious necessity for a supporting framework. And if the skeletal system necessary for the support of this framework consists of uniformly movable skeletal elements with cylindrical branches, then each of these bodies must necessarily have its centre in the middle of each tetrahedral mass between each four adjacent hollow spheres, and from this centre four strands must run out along the four elongated angles of the tetrahedron.

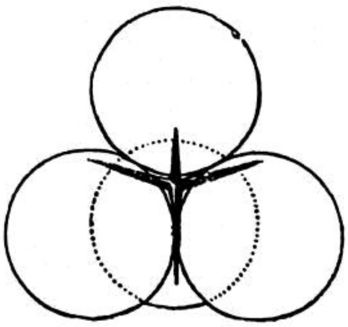

FIG. 12.—Tetract spicule in contact with four spheres.

The best supporting element for such a mass is afforded by such regular tetracts as we find in the similarly constituted parenchyma between the ciliated chambers of Tetraxonia, and known to be typical for this group of sponges.

Although the almost wholly unknown development of the Hexactinellida gives us as yet no basis for framing a conception of the architecture of the primitive Hexactinellida, it is possible, from the close resemblance in the essentials of structure exhibited