This becomes at once very evident when we consider the two great subdivisions of Lyssacina and Dictyonina, which, according to most modern investigators of sponges, and in my opinion also, may be recognised in the Hexactinellida. The question at once arises whether these two divisions, regarded in classification as of approximately equal importance, are to be expressed by the forking of a common stem, or are not rather to be considered as the continuous but successive divisions of one ramified tree. In the first case we must suppose that the two divisions with divergent forms originated almost or quite contemporaneously from a common ancestral form, and that each developing by itself in a special direction gradually exhibited the distinctive characters of the modern forms. In the second case we have to suppose that the ancestors of the higher division must at first have had the characters of the lower, and have been systematically included within it,—we must suppose, that is to say, that the one division sprang from the other.

But before I proceed to the discussion of this and similar questions, I shall briefly review the relative opinions of previous investigators.

In his researches on Hexactinellida,[1] published in 1875, Marshall says:—"The state of skeletal coalescence" (in which the axial canals of the framework beams are said to form one connected anastomosing system) "I regard as phylogenetically oldest, as that from which have developed the Hexactinellida with free siliceous elements, and especially those with predominantly hexradiate spicules, which may be regarded as simply inherited. By adaptation we account for the large series of frequently very beautiful forms, for which Bowerbank has invented such an elaborate nomenclature. The third state, that of fusion, appears to arise in different ways: (1) by the simple union of the ensheathing substance of two adjacent spicules; (2) by lamella-like structures which extend like bridges between two adjacent but not directly apposed spicules; (3) by the development of lamellar layers of flinty material round two parallel and adjacent spicules."

In the memoir entitled Ideen über die Verwandtschaftsverhältnisse der Hexactinelliden,[2] Marshall has more definitely expressed his conclusions as to the phylogeny of the Hexactinellida. Starting from a Chalynthus-like ancestral form without skeleton, he regards it as probable that in the wall of this simple sack somewhat firmer longitudinal, circular, and radial strands of "hardened protoplasmic material" were developed, intersecting at right angles, and forming a connected fibrous framework with square or cubical meshes. "The next form," Marshall continues (*loc. cit*, p. 119), "is thus a sponge with simple connected siliceous lattice work, in which the central canals are also connected, and which has not yet acquired any functionally important free spicules. From such a simple Protohexactinellid there have developed, on the one hand, forms like *Sclerothamnus*, with single free spicules, and, on the other hand, forms in which

[1] *Zeitschr. f. wiss. Zool.*, Bd. xxv., Supplement.

[2] *Op. cit.*, Bd. xxvii. p. 111