

The dictyonal character is, therefore, regarded as acquired, by some groups in the far past, by others at a later stage, while many do not in any way exhibit it. Thus we may explain that in former epochs Dictyonina and Lyssacina are found to have occurred together as they now do.

If we now take a survey of the various main and side branches of the hypothetical genealogical tree of the Hexactinellids, so far as that can be sketched out from the results of living forms, we are at once brought to face a deep division, affecting both soft parts and skeleton, between the Amphidiscophora or Hyalonematidæ on the one hand, and all the rest of the Hexasterida on the other.

While in the latter the membrana reticularis, which is doubtless so important in relation to the nutritive process, appears to form throughout approximately equal thimble-shaped chambers, longitudinally apposed to one another, in the Hyalonematidæ it is more or less irregular in its contour, and forms chambers not so sharply separated and without any typical structure and of approximately equal size. It seem to me that this peculiar condition of the membrana reticularis in the Hyalonematidæ perhaps suggests a relatively lower grade of differentiation, and is at any rate a not unimportant deviation in the general structure, which otherwise closely resembles the other Hexactinellida. But the Hyalonematidæ are yet more distinctly separated from the others in the constant and peculiar possession of the siliceous elements known as amphidiscs (or birotulæ), as also in the complete absence of hexasters which occur in all the other Hexactinellids. While these facts point to a marked independence of the Hyalonematids, and to a distinct separation from all other Hexactinellids, there are also certain other characters which occur with great constancy and uniformity within the whole group, but less so in other divisions. Thus we note the constant mode of attachment in the muddy bottom by means of a basal tuft, and the way in which the entire outer surface is covered with pinuli.

One cannot therefore but suppose an early separation and an independent development of the Hyalonematidæ or Amphidiscophora, as is represented in the genealogical tree by the deep cleft separating this important and at present richly developed branch from the other Hexactinellids.

Among the other Hexactinellids, which are without amphidiscs but contain hexasters, and may therefore be conveniently designated as Hexasterida, one group of families distinguished by the presence of uncinates may be somewhat sharply separated off from the others. These Uncinataria are all Dictyonina, and have apparently at an early stage separated into two divergent branches, namely, on the one hand, the small, but sharply defined family of Farreidæ, distinguished by the single-layered structure of their square-meshed lattice-work in its youngest growths, and also by the exclusive possession of the remarkable clavulæ in their limiting membranes; and, on the other hand, the Scopularia, which exhibit in their scopulæ spicules so peculiar and charac-