than approximations, and how much less if we found our classification on the fossil rather than on the recent Sponges; in the former the microscleres are inevitably lost in the process of petrefaction, so that not a single fossil Sponge has yet yielded a trace of these important guides, and the characters of the chamber-system, only next important, must necessarily disappear with the soft parts.

The most important observation made by Schmidt bearing on Zittel's classification is the existence of a passage from the Tetracladine type of desma to the Rhizomorine, and this I can fully confirm from my own examination of Schmidt's material; the passage occurs in *Macandrewia clavatella*,[1] and clears up many difficulties as regards the relationships of the Lithistids, a subject that will be discussed directly. O. Schmidt[2] having found that the distinction between the Rhizomorina and the Tetracladina cannot be maintained as absolute, laid great, and as I think undue, stress on another, the presence, namely, of the discotriæne, which he made the character of what he named the "Discodermia" series; the presence of the discotriæne does not correspond either with generic or family distinctions, and can no more be made use of as a classificatory character than say the dichotriæne, as distinguished from the orthotriæne, in the case of the Choristida.

Too little is known of the characters of the soft parts in the Lithistida to enable us to judge how far they may be useful in classification. In the following five species, *Theonella swinhoei*, *Discodermia discifurca*, *Corallistes typus*, *Corallistes masoni*, and *Pleroma turbinatum*, the chamber system is aphodal, and the choanosomal mesoderm sarcenchymatous, in *Azorica pfeifferæ* the chamber system is diplodal and the choanosomal mesoderm of an exceptional character (*vide* p. 321). The difference between an aphodal and diplodal chamber system in the Lithistida is not very marked, and is not of the same importance as that between the aphodal and eurypylous systems. It is of interest, however, to observe that the species enumerated as possessing an aphodal system are more closely related to one another than to *Azorica*, which is widely separated from them on other grounds. The size of the chambers in six species, viz., *Theonella swinhoei*, *Discodermia discifurca*, *Corallistes typus*, *Corallistes masoni*, *Siphonidium capitatum*, and *Azorica pfeifferæ*, is very similar, ranging from 0·015 to 0·024 mm. in length, by 0·018 to 0·031 mm. in breadth; in *Pleroma turbinatum* it is exceptionally great, viz., 0·04 by 0·044 mm.

The characters on which we must depend for the subdivision of the order are those of the skeleton, including of course the microscleres, the presence or absence of which can be definitely ascertained in most of the existing Lithistida, though never in the fossil forms.

[1] O. Schmidt, Spong. Meerb. v. Mexico, p. 24, 1879.

[2] *Loc. cit.*