I may therefore regard it as indubitable that in many cases the regular and typical tetracts have, by gradual reduction of individual rays, given rise to diacts and even monacts. I do not mean to say that all diacts and monacts have originated in tetracts. On the contrary, previous investigators of the Hexactinellida have shown, what I think I have also clearly demonstrated, that in this group at least the very abundant and richly developed diacts and monacts have arisen, not from the regular tetracts of the Tetraxonia (the so-called chevaux de frise), but from the regular hexacts of the Triaxonia. But while there are numberless extant transitions from the Tetraxonia with typical tetracts to the strict Monaxonia with only straight diacts or monacts, there are among living, and, so far as I know, among fossil sponges no transitions from the Triaxonia to strict Monaxonia, so that we have no reason for the supposition that the latter have been evolved from the former. The case is somewhat different in regard to some sponges without a skeleton, lately discovered in Australia by von Lendenfeld (such as *Bajalus*[1]) in which the structure agrees so closely with the soft parts of several Hexactinellids that one is inclined to suppose their derivation from the latter by a total loss of siliceous spicules.

Under these circumstances, the supposition is legitimate, that all the Monaxonia, and the Keratosa which have probably developed from them, have originated from the stem of the Tetraxonia. And since the spicules of the Lithistidæ, as O. Schmidt, Zittel, and others have conclusively shown, are derivable from the regular tetract type, we may thus regard the Tetraxonia with simple regular tetracts as the starting point for all the flinty and horny sponges except the Hexactinellida.

For the possibility that the Hexactinellida also stand in genetic relationship with the Tetraxonia, I find no basis of facts. In 1870 O. Schmidt[2] expressed the same opinion in the following words:—"Between the type of spicule in which the rays are determined by the three-sided pyramid and the triaxonial type, there are, so far as the forms go, no relations. The sponges in which these two types occur appear to be distinct and separate independent twigs, in regard to which one must distinguish clearly between the general homologies and the adaptive analogies."

We thus reach this conclusion, that the sponges may be grouped along three main stems, which may indeed be regarded as springing from a common root—a very simple primitive sponge without a skeleton—but which remain separate from this root onwards, without exhibiting any connecting links.

This may be expressed in the form of a genealogical tree (see fig. 9).

Now if we may regard it as probable that each of these three main stems, which represent the divisions of the great crowd of sponges, namely (1) Calcarea, (2) Tetraxonia with Monaxonia and Keratosa, and (3) Triaxonia, possessed to start with, either exclusively

[1] *Proc. Linn. Soc. N.S.W.*, vol. x. p. 5.

[2] Grundzüge einer Spongienfauna des atlantischen Gebietes, 1870, p. 5.