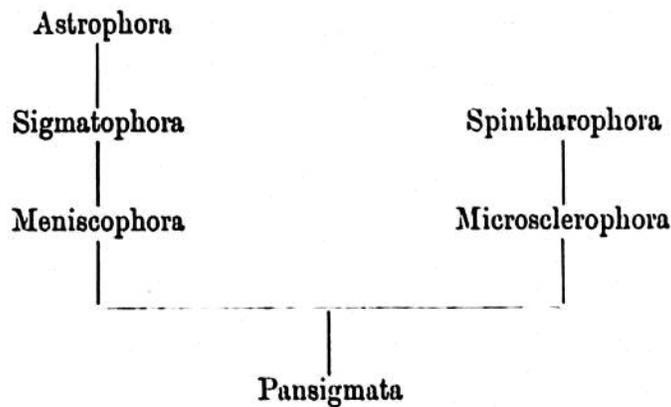


in the Tetillidæ is reduced to a diæne and even a monæne, a fact which on the assumption that the triæne is derived from a calthrops, would lead us to regard it here as a waning form.

If next the weight of evidence should lead us to abandon the assumption just made as to the origin of the triæne and to regard it as descended from a rhabdus, and the sigmaspire from a euaster, then we might construct our phylogeny on the assumption of a hypothetical ancestral family (Pansigmata) in which the skeleton should have consisted wholly of sigmaspires from which rhabdi on the one hand and microtrioids and microcalthrops on the other would have been derived; we should then have the following:—



The obvious objection to this scheme is the wide separation it involves between the Microsclerophora and the Astrophora, which we have good reason for believing to be more directly related; and in so far as it is thus rendered improbable, it throws doubts on the assumption on which it is based, *i.e.*, the rhabdal origin of the triæne. On this vexed question it would thus appear that Taxonomy and Ontogeny offer conflicting evidence, but considering how scanty the evidence is, particularly that furnished by Ontogeny, this is no wonder, and with an extension of knowledge a speedy reconciliation is certain.

## 7. METHODS OF INVESTIGATION.

*Preliminary Examination.*—The gross anatomy of the Sponge, including the general characters of the ectosome or cortex, of the canal-system, and the forms and disposition of the spicules, is most conveniently investigated by means of thick slices cut free-hand with a razor; these are stained with any rapidly acting dye-stuff,—magenta answers as well as any,—dehydrated with absolute alcohol, cleared with xylol in the usual way, and finally mounted in Canada balsam. By this process, which does not take longer than from five to ten minutes, the generic and usually the specific characters also of nearly all Tetractinellid Sponges can be determined. The flagellated chambers and other minute structures are frequently displayed by this process in the case of such Sponges as possess