

death, to the influence of sea-water, one always notices a more or less marked widening of the axial canal. This is due to the fact that the central siliceous layers are slightly more soluble than the outer. The time that has elapsed since death can thus be approximately estimated, and the differences have, of course, no systematic importance as was formerly supposed.

### THE SKELETON.

Under the title *skeleton* I include all the solid parts of the Sponge, whether these are bound together into a united framework, or lie isolated in the soft tissues. I would avoid the expressions, "skeletal" and "flesh" spicules, which are much used by Carter, Zittel, and others to distinguish the hard parts into two leading categories; since, on the one hand, these expressions are ambiguously used by different authors, and even by one and the same author, and, on the other hand, since they in no way indicate any essential distinction. By "spicules of the skeleton" Carter originally understood "large spicules, which are only concerned in the formation of the supporting structure or skeleton," but he subsequently applied the term only to the *larger free spicules*, in contrast to the *smaller free spicules* or "*flesh spicules*," and to the *vitreous fibre* of the continuous lattice framework. Zittel used the phrase "*skeletal spicules*," for the most part in reference to the skeletal parts concerned in the formation of a united lattice-like framework, but he occasionally applies it also to the larger free spicules which form the chief support of the soft parts.

Most spicules present a structure similar to those which Max Schultze and Claus first discovered in the larger spicules of *Hyalonema sieboldii* and *Euplectella aspergillum*. A fine central canal, corresponding to the typical axes of the skeletal body, is surrounded by numerous concentrically arranged layers of a solid substance. In its appearance and other physical properties the latter resembles glass so closely that it has been often, without the least hesitation, spoken of as *vitreous fibre*. For the same reason the entire Hexactinellid group has been designated "vitreous sponges," or more shortly "Vitrea." As to the nature of the soft, finely granular mass composing the axial thread or cord which fills the central canal, but little is as yet known. During the growth of the spicule it appears to be connected with the surrounding soft parts through an opening which is present at the end of every ray. After the ray has ceased to grow in length, the terminal opening is closed by an expansion of the layers of the glassy substance. That all spicules have a central canal is very probable, but not quite certain, since it has not been possible to recognise it in all cases. Especially in very thin and small spicules it is often very difficult or impossible to detect it. I have never found it in lateral prickles, prongs, scales, and the like, nor in the secondary terminal rays of the rosettes and scopulæ, nor in the short transverse connecting beams,