sterraster. These bodies become closely packed together over large areas, and give the sponge a stony hardness.

*Hexactinellida.—*In this group the skeleton is composed of spicules of colloidal silica deposited in concentric lamellae around slender axes of an organic substance which in life occupies the “ axial canal ” of the spicule. Although varying greatly in detail and often exhibiting great complication or, it may be, reduction in structure, these spicules are all referable to the same fundamental triaxonid and hexactinellid type, characterized by the possession of three axes intersecting each other at right angles and each thereby divided into two rays or actines (fig. 26, *e).* According as one, two, three, four or five of these actines are suppressed we distinguish between pentact, tetract, triact, diact and monact spicules, and these may be further subdivided according to special modifications of the rays due to secondary branching, ornamentation by spines, knobs, &c., or curvature, or to excessive development of certain rays as compared with the remainder. Some of the most character­istic of these special types are represented in figs. 27 and 28. Two of them require special notice on account of their importance in the classification of the group. These are the *hexaster* and the *amphidisc.* A hexaster (=rosette) is a perfectly symmetrical hexact whose actines branch out into secondary or terminal rays, in a star-like manner (fig. 30, *t).* Various sub-types are distinguished according to the character of the rays *(floricome, plumicome,* &c.). An amphidisc (fig. 27, *d)* is a diact spicule consisting of two opposite rays each of which terminates in a disk-like or spherical expansion surrounded by marginal teeth.

In some cases the spicules all remain disconnected from one another (Lyssacine condition), in others some of them may be united by siliceous cement into a continuous framework (Dictyonine condition), and the distinction between these two types of arrange­ment was for a long time regarded as indicating a primary sub­division of the Hexactinellida into Lyssacina and Dictyonina, but this subdivision has now been abandoned. The term *prostalia* is applied to spicules which project freely from the surface of the sponge, and these are further distinguished as *basalia, pleuralia* and *marginalia,* according to their position at the base of the sponge, on the sides, or round the margin of the osculum. The basalia frequently form a root-tuft for attaching the sponge to the sub­stratum *(Hyalonema, Euplectella)* and commonly have anchor-like distal extremities. They may be extremely long, as in the well- known “glass-rope" of *Hyalonema.* In the remarkable genus *Monorhaphis* we find a single gigantic diact spicule, which may attain a length of two or three feet and the thickness of a lead pencil, transfixing the body of the sponge like a skewer from above down-wards. A special dermal skeleton is usually formed by a number of spicules distinguished as *dermalia,* and a gastral skeleton may be similarly formed by special *gastralia* surrounding the central gastral cavity. Between the dermal and gastral skeletons another set of spicules, known as *parenchymalia,* form the most important part of the skeleton, supporting the chamber-layer and adjacent tissues. The distinction into large *megascleres* and small *microscleres* is perhaps less well marked in this group than in the Tctraxonida.

*Tetraxonida.—*Here, again, the spicules are composed of colloidal silica deposited around organic axial threads. the starting-point in the evolution of the very complex series of tetraxonid spicules is the primitive tetract or calthrops, characteristic of the most primitive members of the group (e.g. *Plakina).* This fundamental ground-form (fig. 26, d) consists of four rays or actines of equal length, which all meet one another at equal angles in the centre of the spicule, while their apices would occupy the four angles of a regular pyramid whose sides are four equilateral triangles. It is thus both *tetraxonid* (with four axes) and *tetractinellid* (with four rays). In *Plakina* the spicules are all of about the same size, neither very large nor very small, but in higher forms we usually

find some of the spicules enlarged to form megascleres and others reduced to form microscleres. The megascleres play the principal part in building up the skeleton while the microscleres are usually scattered through the mesogloea.

*Triaene Series of Megascleres.—*When three rays (cladi) of the tetract resemble one another, while the fourth (shaft) differs in some respect the spicule is termed a *triaene.* The simplest form is the *plagiotriaene* (fig. 29, 2), with three short simple cladi and an elon­

gated shaft, the angles all remaining approximately equal. If the angles between the cladi and shaft become approximately right angles we have an *orthotriaene.* If the cladi point forward, we have a *protriaene* (fig. 29, 6). If the cladi are turned backwards towards the shaft we have an *anatriaene* (fig. 29, 5). If the cladi branch each into two we have a *dichotriaene* (fig. 29, 3). If the cladi are expanded laterally and fused together to form a plate, while the shaft is reduced, we have a *discotriaene* (fig. 29, 4). The cladi may be reduced in size or even suppressed (fig. 29, 7, 8), leaving only the shaft, which may be either sharp at each end *(oxeate)* or sharp at the apex and rounded at the base *(stylote).* The spicule has now become monaxonid or monaxonelíid *(i.e.* with a single axis) and monactinellid (with only a single ray) ; but this condition may also be arrived at in a different way, as we shall see directly.

The *tetracrepid desma* (fig. 29, 9), characteristic of many Lithistids, has been derived from the primitive tetract by ramification of the ends of all the rays.

*Monaxonid Series of Megascleres.—*We have already seen, in *Plakina,* how a diact inellid spicule may arise by suppression of two rays of the tetract (fig. 5). At first the two remaining axes