may in some cases be due to the continued growth of several endodermal folds towards the exterior, with a corresponding absorption of the mesoderm and ectoderm which lie in the way, till the folds penetrate to the ecto­derm and open at the exterior, thus giving rise to excurrent openings, which are not readily distinguishable from pores. At the same time the original osculum closes up and entirely disappears. Lipogastrosis, on the other hand, may be produced by the growing together of the roots of the choanosomal folds, thus reducing the paragastric cavity to a labyrinth of canals, which may easily be confounded with the usual form of excurrent canals. While in some sponges the original oscule is lost, in others secondary independent openings, deceptively like oscules, are added. This pseudostomosis is due to a folding of the entire sponge, so as to produce secondary canals or cavities, which may be incurrent (*vestibular)* or excurrent *{cloacal),* the opening of the latter to the exterior being termed a *false oscule* or *pseudostome.* The faulty use of the term oscule for what is neither functionally nor morphologically a mouth is here obvious, for in one sense the oscule is always a pseudostome ; it would be better if the term *pseudoproct* could be substituted.

*Skeleton.—*All sponges, except three or four genera be­longing to the *Myxospongiæ,* possess some kind of skeletal structures. They may be either calcareous or silicious or horny scleres, the latter usually having the form of fibres, which sometimes enclose silicious needles (spicules) or foreign bodies introduced from without. Foreign bodies also contribute to the formation of the skeleton of some silicious sponges, and occasionally form the entire skeleton, no other hard parts being present.

Mineral scleres usually occur in the form of spicules. The spicules of calcareous sponges consist of carbonate of lime, having the crystalline structure and other properties of calcite (*29*). Each spicule, so far as its mineral com­ponent is concerned, is a single crystal, all the molecules of calcite of which it is built up being similarly oriented. On the other hand, its form and general structure are purely organic. Its surfaces are always curved, and usually it has the form of a cone or combination of cones, each of which consists of concentric layers of calcite surrounding an axial fibre of organic matter,—probably of the same nature as spongiolin or spongin, the chief constituent of the fibres of horny sponges. A thin layer of organic matter, known as the *spicule sheath,* forms an outer investment to the spicule and is best rendered visible as a residue by removing the calcite with weak acid. Silicious spicules consist of colloid silica or opal, and hence can be distin­guished from calcareous by having no influence upon polar­ized light. Structurally the two kinds of spicules present no important difference. The spicules of different sponges differ greatly both in form and in size. They may be conveniently divided into two groups,—minute or flesh spicules, which usually serve as the support of a single cell only *{microscleres),* and larger or skeletal spicules, which usually contribute to the formation of a more or less con­sistent skeleton *{megascleres).* The distinction is not one that can be exactly defined, and must so far be regarded as of a provisional nature. There is usually but little diffi­culty in applying it in practice, except in some doubtful cases where large spicules do not form a continuous skeleton, or in others where flesh spicules appear to be passing into those of larger size. It is indeed highly probable that all large spicules have originated from flesh spicules (*12*).

(1) *Monaxon Biradiate Type {rhabdus).—*By far the commonest form is the oxea, a needle-shaped form pointed at both ends and produced by growth from a centre at the same rate in opposite directions along the same axis. It is therefore uniaxial and equibiradiate (fig. 12*a*). (2) *Mon­*

*axon Uniradiate Type (stylus).—*By the suppression of one of the rays of an oxea, an acuate spicule or stylus results (fig. 12 *b).* (3) *Triaxon Tmradiate Type.—*Linear growth

from a centre in three directions inclined at an angle of 120° to each other gives rise to the primitive form of tri- radiate spicule so eminently characteristic of the calcareous sponges, but by no means confined to them (fig. 12 *c).* (4)

*Tetraxon Quadriradiate Type \*Calthrops).—*Growth from a centre in four directions inclined at about 110° to each other produces the primitive quadriradiate form of the *Tetractinellida* and of some calcareous sponges (fig. 12 *d). (5) Sexradiate Type.—*Growth in six directions along three rectangular axes produces the primitive sexradiate spicule of the *Hexactinellida* sponges (fig. 12 *e).* (6) *Multiradiate*

*Type.—*Extensions radiating in many directions from a centre produce a stellate form (fig. 12 *f).* (7) *Spherical*

*Scleres.—*Concentric growth of silica about an organic particle produces the sphere, which occurs as a reduction of the rhabdus in some species of *Pœcillastra,* or as an overgrown globule (flesh spicule) in *Caminus.*

Usually conical, the spicular rays often become cylindrical ; usu­ally pointed (*oxeαte)* at the ends, they are also frequently rounded off (*strongylate),* or thickened into knobs (t*ylotate),* or branched (*cladose).* Their growth is not always rigorously confined to a

straight line : frequently they are curved or even undulating. They are also liable to become spined, either by mere superficial thicken­ing or by a definite outgrowth involving the axial fibre (fig. 13 *g, h).*

The rhabdus if pointed at both ends is known as an *oxea* (fig. 13*c*); if rounded at both ends as a *strongyle* (fig. 13*a*); if knobbed