Family 1. Tetracladidæ.—With the characters of the sub­order. Examples: *Theonella,* Gray (fig. 21 *k)*; *Discodermia,* Bocage; *\*Siphonia,* Parkinson.

Sub-order 2. *RHABDOCREPIDA.*

The desmas are of various forms, produced by the growth of silica over a uniaxial spicule.

Family 1. Megamorinidæ.—The desmas are comparatively large. Triænes, usually dichotriænes, help to support the ecto­some. Microscleres usually spirasters. Examples : *Corallistes,* O. S. ; \**Hyaloimgos,* Zittel ; *Lyidium,* O. S. ; \**Dorydermia,* Zittel.

Family 2. Micromorinidæ.—The desmas are comparatively small. Triænes and microscleres are both absent. Examples : *Azorica,* Crtr. ; \* *Verruclina,* Zittel.

Sub-order 3. *ANOMOCLADINA.*

Desmas with a massive nucleated centrum, from which a variable number of arms *(28)* extend radiately (see fig. 12 *f*). Examples: *Velulina,* O. S. ; *\*Asiylospongia,* Roemer.

*Reproduction and Embryology.*

Fresh individuals arise by asexual gemmation, both external and internal, by fission, and by true sexual repro­duction.

Fission is probably one of the processes by which com­pound sponges are produced from simple individuals. Artificial fission has been practised with success in the cultivation of commercial sponges for the market. Ex­ternal gemmation has been observed in *Thenea, Tethya, Polymastia,* and *Oscarella.* A mass of indifferent sponge- cells accumulates at some point beneath the skin, bulges out, drops off, and gives rise to a new individual. Internal gemmation, which results in the formation of a statoblast, is only known to occur in the freshwater *Spongillidæ.* The statoblasts consist of a mass of yolk-bearing mesoderm cells, invested by a capsule, which in *Ephydatia fluviatilis* is composed of an inner cuticle of spongin separated from a similar outer layer by an intermediate zone of amphidisks and interspersed protoplasmic cells. On one side of the capsule is a hilum which leads into the interior.

Their development has recently been studied by Götte, with results that confirm the conclusions of Carter (*3*) and Lieberkühn (*13*). The process commences with an accumulation of amoeboid cells within the mesoderm to form a globular cluster; yolk granules develop within them, especially in those that lie nearer the centre. The external cells give rise to the investing capsule; some resemble sponginblasts and secrete the inner and outer horny cuticle ; others give rise to the amphidisks and interspersed cells of the middle layer. Under favourable conditions the interior cells creep out through the pore of the capsule, and form a spreading heap, which by subsequent differentiation gives rise to a young *Spongilla.*

Since the freshwater sponges can only be regarded as modified descendants of ancient marine species (prob­ably of the family *Halichondridæ),* we may consider the internal gemmules, like the similar statoblasts of the freshwater *Polyzoa,* as special adaptations to a changed mode of life. They appear primarily to serve a protective purpose, ensuring the persistence of the race, since they only appear in extreme climates on the approach of drought, and in cold ones on the approach of winter.

As a secondary function they serve for the dispersal of the species ; some are light enough to float down a stream, but not too far, so that there is no danger of their being carried to sea ; others, which are character­ized by large air-chambers, are possibly distributed by the wind.

Both sexual elements may be formed in the same individual, *e.g., Oscarella lobularis, Grantia raphanus,* and many others ; but even in herm­aphrodites one or other element usually occurs to excess in different individuals, so that some are predominantly male and others predominantly female. Polejaeff found only one such male form to 100 female forms in *Grantia raphanus.* In other sponges—*Reniera fertilis, Euspongia officinalis—*the sexes are distinct. The ova develop from archæocytes or wandering amoeboid cells, which increase in size and ac­quire a store of reserve nourishment in the form of yolk

granules ; at first they exhibit lively amoeboid movements, but later pass into a resting stage. The cavity of the mesoderm within which they are situated becomes lined

by a layer of epithelium, which may not appear, however, till a late stage of segmentation. In *Euspongia officinalis* the ova occur congregated in groups within the mesoderm, thus presenting an early form of ovary. The spermatozoa, which also develop from wandering amoeboid cells, are minute bodies with an oval or pear-shaped head and a long vibratile tail (fig. 24 *k*). Each amoeboid cell produces a large number of spermatozoa, which occur in spherical clusters or sperm-balls. The heads of the spermatozoa, as in the *Metazoa,* are produced from the nucleus of the mother-cell, the tails from the surrounding protoplasm.

The development in detail is upon two plans. In *Grantia*

*raphanus* (*15*) the nucleus of the mother-cell divides into two (fig. 24 *b) ;* one of the resulting daughter nuclei undergoes no further change, but with a small quantity of peripheral protoplasm forms a “ cover-cell ” to the other or primitive sperm nucleus and its associated protoplasm. The sperm nucleus repeatedly divides, with­