Family 3. †Chonelasmatidæ.—Flat or beaker-shaped ; straight funnel-shaped canals perforating the wall perpendicularly and opening laterally on each side. Example : *Chonclasma,* Schulze.

Family 4. †Volvulindaæ.—Tubular, goblet-shaped, or massive ; crooked canals more or less irregular in their course. Examples : *Volvulina,* Schulze ; *Fieldingia,* S. Kent.

Family 5. Sclerothamxidæ.—Arborescent body ; perforated at the ends and sides by round narrow radiating canals. Example : *Sclerolhamnus,* Marshall.

Sub-order 2. *INERMIA.*

*Dictyonina* without uncinati, clavulæ, or scopulariæ.

Family 1. †Myliusidæ.—Depressed cup-shaped; a complex folding of the wall produces lateral excurrent tubes. Example : *Myliusia,* Gray.

Family 2. †Dactylocalycidæ.—Goblet-shaped or pateriform, with a thick wall consisting of numerous parallel anastomosing tubes, of uniform breadth, which terminate at the same level within and without. Examples: *Daclylocalyx,* Gray; *Sclcroplegma,* O.S. ; *Margaritella,* O.S.

Family 3. †Euryplegmatidæ.—Goblet-shaped or resembling ear-shaped saucers ; the wall deeply folded longitudinally so as to produce a number of dichotomously branched canals or covered-in grooves. Example : *Euryplegma,* Schulze.

Family 4. †Aulocystidæ.—Of massive rounded form, with an axial cavity ; wall consisting of a system of obscurely radiating anastomosing tubes and intervening inter-canals ; both inter-canals and the external terminations of the tubes are covered by a thin membrane, which is perforated by slit-like openings over the lumina of the tubes, and thus assumes a sieve-like character. Examples : *Aulocyslis,* Schulze ; C*ystispongia,* Roemer.

This arrangement of the *Hexactinellida* is taken from the latest work on the subject, Schulze’s *Preliminary Report on the "Challen­ger" Hexactinellida.* The reference of fossil forms to the families here instituted is rendered difficult by the disappearance of the requisite “ guiding ” spicules in the process of mineralization. A revision of the fossil families to bring them into harmony with the recent has certainly been rendered necessary, but this is too large a task to undertake in this place.

Sub-class II. DEMOSPONGIÆ.

Tribe *a.* Monaxonida.

Order 1. ΜΟΝΑΧΟΝΑ.

Family 1. Tethyidæ.—Skeleton consisting of radiately arranged strongyloxeas (except in the genus *Chondrilla,* which is without megascleres) and large spherasters. The ectosome is a thick fibrous cortex. Example : *Tethya,* Link. ; *Chondrilla,* O. S.

Family 2. Polymastidæ.—Skeleton consisting of styles radiately arranged and cortical tylostyles. The oscules in many cases open at the ends of long papillæ. Examples : *Polymastia,* Bwk. ; *Thcca- phora,* O.S. ; *Trichostemma,* Sars.

Family 3. Suberitidæ.—Skeleton consisting of strongylate or tylotate styles, arranged to form a felt. The flesh spicules when present are usually microrabds or spirasters. Examples : *Suberites,* Nardo ; *Cliona,* Grant ; *Poterion,* Schlegel.

Family 4. Desmacidonidæ.—The flesh spicules are cymbas. Examples : *Esperella,* Vosm. ; *Dcsmacidon,* Bwk. ; *Cladorhiza,* Sars.

Family 5. †Halichondridæ.—The flesh spicules when present are never cymbas. Examples : *Halichondria,* Fl. ; *Reniera,* O.S. ; *Chalina,* Bwk. ; *\*Pharetrospοngia,* Soil.

Family 6. Ectyonidæ.— The skeleton consists of fibres echinated by projecting spicules. Examples : *Plocamia,* O.S. ; *Eetyon,* Gray ; *Clathria,* O.S.

Family 7. †Spongillidæ.—*Halichondridæ* which are reproduced both sexually and by statoblasts. Habitat freshwater. Examples : *Spongilla,* Lmk. ; *Eρhydatia,* Link. ; *Parmula,* Crtr. ; *Potamolepis,* Marshall.@@1

The foregoing classification is purely provisional ; the group re­quires a complete revision.

Order 2. CERATOSA.

Family 1. Darwinellidæ.—Canal system of the eurypylous Rhagon type. Flagellated chambers, pouch-shaped, large ; the sur­rounding Collenchyme not granular. Horny fibres with a thick core. Examples: *Darwinella,* Fritz Muller; *Aplysilla,* F.E.S. ; *Ianthella,* Gray.

Family 2. Spoxgelidæ.—Canal system as in the *Darwinellidæ,* but the flagellated chambers more or less spherical. Horny fibres with a thin core, and usually containing foreign enclosures. Examples : *Velinea,* Vosm. ; *Spongelia,* Nardo ; *Psammoclema,* Marshall ; *Psammopemma,* Marshall.

Family 3. Spoxgidæ. —Canal system aphodal. Chambers small and spherical ; surrounding Collenchyme granular. Fibres with a thin core. Examples : *Euspongia,* Bronn ; *Coscinoderma,* Crtr. ; *Phyllospongia,* Ehlers.

Family 4. Aplysixidæ.— Canal system diplodal ; Collenchyme surrounding the flagellated chambers densely granular. . Fibres with a thick core. Examples : *Luffaria,* Duch, and Mich. ; *Vcron- gia,* Bwk. ; *Aplysina,* Nardo.

The species of sponge in common use are three,—*Euspongia officinalis* (Linn.), the fine Turkey or Levant sponge; *E. zimocca* (O.S. ), the hard Zimocca sponge ; and *Hippospongia equina* (O.S.), the horse sponge or common bath sponge. The genus *Euspongia* is distinguished by the regular development of the skeletal network throughout the body, its narrow meshes, scarcely or not at all visible to the naked eye, and the regular radiate arrangement of its chief fibres. *Hippospongia* is distinguished by the thinness of its fibres and the labyrinthic character of the choanosome beneath the skin As a consequence its chief fibres have no regular radiate arrangement. The species of *Euspongia* are distinguished as fol­lows. In *E. officinalis* the chief fibres are of different thicknesses, irregularly swollen at intervals, without exception cored by sand grains ; in *E. zimocca* they are thinner, more regular, and almost free from sand. In *E. officinalis,* again, the uniting fibres are soft, thin, and elastic ; whilst in *E. zimocca* they are denser and thicker, to which difference the latter sponge owes its characteristic hard­ness. Finally, the skeleton of *E. officinalis* is of a lighter colour than that of *E. zimocca.* The common bath sponge *(Hippospongia equina)* has almost always a thick cake-like form ; but its specific characters are not yet further defined.

Tribe *b.* Tetractinellida.

Order 1. CHORISTIDA.

Sub-order 1. *SIGMATOPHORA.*

The microsclere is a sigmaspire.

Family 1. Tetillidæ.—The characteristic megasclere is a pro­triæne. Canal system in the lower forms eurypylous, in the higher aphodal. The ectosome in the simpler forms is a dermal membrane, in the higher a highly differentiated cortex. Examples : *Tetilla,* O.S.; *Craniella,* O.S. (fig. 21 *h, l).*

Family 2. Samidæ.—The characteristic megasclere is an ampħitriæne. Example : *Samus,* Gray.

Sub-order 2. *ASTEROPHORA.*

The microsclere is an aster.

Group 1. Spirastrosa.—A spiraster is usually present.

Family 1. Theneidæ, Carter.—The flesh spicule is a spiraster. Canal system eurypylous. Ectosome not differentiated to form a cortex. Examples : *Thenea,* Gray (fig. 21 *a, f) ; Pœcillastra (Normania),* Bwk.

Family 2. †Pachastrellidæ.—Canal system eurypylous in the lower, aphodal in the higher forms. Examples : *Plakortis,* F.E.S.; *Dercitus,* Gray.

Group 2. Euastrosa.—Spirasters are absent.

Family 1. †Stellettidæ.—Canal system aphodal, but approach­ing the eurypylous in the lower forms. The cortex chiefly consists of Collenchyme in the lower forms; in the higher it is highly differ­entiated. Example: *Stelletta,* O.S. (fig. 11); *Ancorina,* O.S. ; *Myriastra,* Soll.

Family 2. Tethyidæ.—Although this family has been placed in the *Monaxonida,* this seems to be its more natural position.

Group 3. Sterrastrosa.—A sterraster is present, usually in addition to a simple aster.

Family 1. †Geodinidæ.—The megascleres are partly triænes. Canal system always aphodal. Cortex highly differentiated. Ex­amples : *Geodia,* Lmk. (fig. 21 *n) ; Pachymatisma,* Bwk. (fig. 21 c) ; *Cydonium,* Miiller (fig. 10) ; *Erylus,* Gray.

Family 2. Placospongidæ.—The megasclere is a tylostyle. Triænes are absent. Example : *Placospongia,* Gray.

Sub-order 3. *MICROSCLEROPHΟRA.*

Microscleres only are present.

Family 1. Plakindæ, Schulze.—Canal system very simple, belonging to eurypylous Rhagon type. Characteristic spicules candelabra. Examples : *Plakina,* F.E.S. (fig. 26).

Family 2. Corticidæ.—Canal system aphodal or diplodal. Mesoderm a Collenchyme crowded with oval granular cells ; the spicules either candelabra, amphitriænes, or triænes irregularly dispersed in it. Example: *Corticium,* O.S. (figs. 9, 21 *b).*

Family 3. Thrombidæ.—Canal system diplodal. Spicules tricho- triænes. Example : *Thrombus,* Soil.

The *Pachastrellidæ* or the *Corticidæ* are probably the families from which the Tetracladine Lithistids have been derived. In the *Tetillidæ* the characteristic microsclere may occasionally fail, but there is never any difficulty in identifying the sponge in this case, as the triænes are of a very characteristic form : the aims of the protriænes are slender, simple, and directed very much forwards, making a very large angle with the shaft. Microscleres, Having the form of little globules, are sometimes present with the sigmaspires.

Order 2. LITHISTIDA, O.S.

Sub-order 1. *TETRACLADINA,* Zittel.

The desmas are modified calthrops spicules.

@@@1 Freshwater sponges without statoblasts are excluded from this family, and left for distribution amongst allied marine genera.