australis) were very abundant. Smaller Cetaceans, probably a kind of Grampus (*Orca*), were also abundant near the Antarctic Circle, with a high dorsal fin placed at about the middle of the length of their bodies.

The dredgings and trawlings during the Antarctic voyage were exceedingly productive, and yielded many new genera and species belonging to nearly all the invertebrate groups. In the Zoological Reports already published, species are described belonging to about twenty-five new genera and fifty new species.

FIG. 158.—*Tægeria pulchra*, n. gen. et sp. a representative of the Euplectellidæ.

The Hexactinellida.—Professor Franz Eilhard Schulze, who is engaged in preparing a Report on the Hexactinellida collected during the Expedition, has supplied the following notes :—

"The Hexactinellida collected by the Challenger Expedition, which were entrusted to me for the purpose of scientific investigation, were dried, or more or less well-preserved in alcohol of various degrees of strength. Only a few specimens, however, were quite perfect, most of them having been injured in some way or other. Sometimes there were parts entirely wanting, sometimes the sponge was torn, crushed, or the outside had been rubbed off, or sometimes the soft parts had suffered from the invasion of mud or had become dried, as indeed might have been expected considering how most of the specimens had been obtained. Of many species only fragments, and of others only isolated spicules were obtained. It was a fortunate circumstance that no means of cleansing, such as washing, maceration, or the like, had been adopted ; by these processes the specimen gains, it is true, in elegance, but, in general, the isolated spicules which are so important for the scientific determination of the species are lost. For the study of the soft parts of the Hexactinellida, which were hitherto almost unknown, and in the present instance demanded special attention, those specimens which had been hardened in absolute alcohol proved specially favourable; also those portions which had been preserved in a relatively large volume of spirit of the usual strength had to some extent retained their original structure, better when voluminous or very compact than when thin and loose in structure.

FIG. 159.—*Caulophacus elegans*, n. gen. et sp., a representative of the Ascoпematidæ.

"A serious drawback, however, arose from the fact that the isolation of the different species had not always been found possible. Even in the operation of dredging the different sponges had undoubtedly come into violent contact with each other; in many instances fragments of one sponge remained attached to the surface of another, or whole portions of one had penetrated into the body of another. But in those cases in which several individuals had been preserved in the same vessel it was afterwards found that the microscopic siliceous spicules, which are so important for diagnostic purposes, had, in consequence of their lying loosely scattered in the soft parts, become separated from one sponge and embedded in another lying either beside or beneath it. Obviously such intruding strangers, which may be only too easily mistaken for natives, materially increase the difficulty of fixing the character of the species or the determination of a solitary portion, especially when new and hitherto unknown forms are being treated of, whose characteristic spicules must be determined for the first time. It is true this danger of error is materially diminished by comparative examination of the various portions of the same sponge, or better still of several specimens of the same species if they are to be had, but even then there remain quite a sufficient number of instances in which a certain conclusion can be drawn only by the preparation of numerous fine sections, in which the disposition of the spicules in question will decide whether they are really in their normal situation.

FIG. 160.—*Hyalonema elegans*, n. sp., a representative of the Hyalonematidæ.

"The investigation began by a careful separation and arrangement of all the specimens; these were then placed according to the order of the dredging stations, and then one by one, thoroughly studied both with respect to their coarser as well as to their microscopic structure. The numerous preparations, drawings, and notes which were accumulated by this last difficult and tedious task form the foundation of the whole work. It was desirable not only to establish the characters of the various species, but, as far as possible, to discover the general plan of organisation of this curious and little known group of animals. Only by the application of various oftentimes very complicated methods (often newly devised for this special purpose) and instruments was it possible to arrive at a clear understanding as to the minute structure of the indifferently preserved specimens. Obviously just those portions have caused the most trouble which were the worst preserved, or only came to hand in small fragments.

Fig. 161.—*Poliopogon amadou*, Wyv. Thoms., a representative of the Hyalonematidæ. One-third the natural size. Attached to branches of *Corallium* (see p. 125).

"As a rule small pieces selected from various regions of the sponge were first soaked for some time in concentrated hydrochloric acid and then boiled in it for a few minutes, washed out with water and alcohol, dehydrated by alcohol of increasing strength, cleared by oil of cloves, and finally after teasing and careful spreading out mounted in Canada balsam. In this manner the isolated siliceous spicules and the small fragments of continuous skeletons were perfectly cleaned and exposed to view; also pieces from different parts of the sponge were, after short treatment with hydrochloric acid and subsequent washing with water and alcohol, dehydrated *en masse,* soaked in spirit of turpentine or xylol, embedded in paraffin and cut into sections by means of the microtome in

FIG. 162.—*Pheronema carpenteri* (Wyv. Thoms.), a representative of the Hyalonematidæ.

various directions, but principally perpendicular to the surface. Such sections, in which all parts of the skeleton stood out clearly in the perfectly transparent soft parts, served principally for ascertaining the situation and distribution of the separate siliceous portions as well as for deciding whether the spicules which would have become separated in complete maceration were in their normal situation.

"Finally the exceedingly delicate soft parts were successfully examined, both with respect to their most minute characters as well as with reference to their relation to the skeletal structures. In addition to the usual methods of teasing and cutting into sections, it has been found advantageous to stain the specimen with some colouring matter, especially with picrocarmine, alum-carmine, and hæmatoxylin. For this purpose portions, about the size of peas or beans, were stained whole, then thoroughly washed out with alcohol of gradually increasing strength, and finally dehydrated with turpentine or xylol, embedded in paraffin and cut into sections of varying thickness with the microtome.

FIG. 163.—*Hyalonema lusitanicum*, Bocage, a representative of the Hyalonematidæ.

"In some cases it was desirable to obtain in the section not only the delicate soft-tissues but also the hard and brittle flinty skeleton as a complete network; but the well-known curling up of the thin sections was a serious hindrance, inasmuch as although the delicate, yet elastic, soft tissues were easily retained in connection, the brittle siliceous web was always obtained in fragments. I sought to discover a means by which this detrimental curling of the sections might be prevented, and after many attempts constructed that small accessory to the microtome which I have described and figured under the name of 'Schnitt-strecker';[1] by means of this simple instrument it was possible to obtain sections, not only of very firm and compact pieces, but also of more delicate and brittle objects, such as the tubes of the genus *Farrea*, in which not only the soft parts but also the brittle siliceous trabeculæ were retained in their normal positions. The sections prepared in this manner proved of assistance in

[1] *Zool. Anzeiger.*, Jahrg. vi. p. 108, 1883.

the comprehension of the plan of organisation and the structural relations, but they were less applicable to the study of minute histological details, which undergo alteration by treatment of the object with turpentine and embedding in paraffin. For this purpose therefore other preparations were used, which were simply teased out or cut by hand after being stained and then mounted in glycerin.

FIG. 164.—*Crateromorpha murrayi*, n. sp., a representative of the Rossellidæ.

"The glycerin has the advantage over balsam not only in that the delicate outlines of the cells may be more easily recognised, but also because, in consequence of its refractive index agreeing very closely with that of the siliceous skeleton, this latter becomes almost invisible, and thus the soft tissues stand out much more prominently.

"As one of the most important results of the carrying out of these detailed investigations, the fact has been established that the Hexactinellida, which were first clearly marked off and characterised by Oscar Schmidt in 1870, form a division of the siliceous sponges, definitely bounded on all sides, whose members are intimately united by a common plan of structure. The subclass Hexactinellida is, however, principally characterised by the triaxial or six-rayed type, which underlies the forms of its spicules, and also by the close agreement of the organisation of its soft parts. In no single instance was I ever in doubt whether I had before me a Hexactinellid or not; for even when many isolated spicules and the several parts of a connected trabecular skeleton did not show the typical Hexactinellid structure without further investigation, yet on careful examination this could be demonstrated, and spicules were found showing either the usual six-rayed form or an easily recognisable derivative from it. As Oscar Schmidt was the first to point out, the determination of the axial-relations of the central canal is of special importance; by means of studying it in every connected trabecular skeleton the individual six-rayed spicules, already partially united, are always easily recognised; even in the case of many highly modified isolated needles, the central canal gives a clue to the derivation from the typical six-rayed form. However great the number of forms of the spicules in the Hexactinellida may be, yet there are fundamentally but few principles of modification which have been carried out. These are—(1) unequal elongation of the individual rays, in which may be found all degrees of shortening, even to complete atrophy of one or more rays; (2) division of the rays into two or more branches; (3) flexion of the rays or their branches; (4) unequal thickening of the rays or their branches, which may lead to the development of swellings of various forms, hooks, teeth, or the not infrequent terminal knobs or toothed plates.

Fig. 165.—*Lefroyella decora*, Wyv. Thoms. (natural size), a representative of the Euretidæ.

"As in the case of the skeleton, so also in the general structure of the soft parts, a predominant principle might be recognised. In all Hexactinellids, that surface (usually the outer) which serves for the ingress of water, is covered by a thin perforated skin or membrane (which is supported by a special system of regularly arranged spicules), according to the form of the latter either a flat surface or one covered with numerous conical elevations is formed. A similar and similarly perforated membrane is found also on the opposed surface of the body-wall, the surface of egress, which indeed generally encloses an internal gastric cavity, but may also, as in the case of many flattened or mushroom-shaped sponges, be quite free and form an upper or lateral surface.

"Between these two perforated boundary-surfaces there extends the simple strongly folded layer of the ciliated cavities, which usually manifest a saccular shape, as I have already described in *Euplectella aspergillum*,[1] but in some cases, as in the family Hyalonematidæ, diverge to some extent from this. The delicate wall of the cavities allows the square lattice-marking to be perceived as in *Euplectella*, and is also more or less thickly but irregularly perforated by round pores. This system of ciliated cavities is connected with the two boundary-surfaces by means of a wide-meshed tissue of delicate anastomosing trabeculæ, which are suspended and stretched between them. Since, then, all the chambers are in direct communication, and since their convex surfaces are always turned towards the entering water, this latter must flow through them in such a manner that it enters through the pores and passes out through the wide oral opening.

FIG. 166.—*Melittiaulus ramosus*, n. gen. et sp., a representative of the Uncinataria.

"On account of the great uniformity in the structure of the soft parts, I have only been able to use these for systematic purposes in a few cases, such as in the definition of the Hyalonematidæ. For such purposes the form and arrangement of the siliceous skeleton, which has hitherto been almost exclusively applied by all spongiologists, is most significant.

"The two primary divisions of the Hexactinellida, LYSSACINA and DICTYONINA, which Zittel founded some years ago in his important work on fossil sponges, I retain with the same significance, but in consequence of my investigations I have been obliged to modify his original definitions to some extent.

"Zittel regards as LYSSACINA those Hexactinellida in which the whole skeleton consists of spicules which are only connected by means of the sarcode (exceptionally, however, irregularly by means of flattened siliceous bodies), and in which the spicules of the soft parts are for the most part very plentiful and highly differentiated.

"The DICTYONINA he defined as those Hexactinellida whose spicules are so united that

[1] *Trans. Roy. Soc. Edin.*, vol. xxix. pp. 661–673, 1881.

each arm of a six-rayed spicule is applied to the corresponding arm of a neighbouring spicule, both spicules thus becoming enclosed by a common siliceous covering. The connected skeletons of the DICTYONINA consist of a lattice-work with irregularly cubic meshes. Spicules belonging to the soft parts may be present or absent.

"In many sponges which, according to the rest of their organisation, belong without doubt to Zittel's 'Dictyoninen,' I have failed to observe that union of neighbouring spicules by the enclosure of the corresponding approximated branches in a common siliceous coating, which he mentions; on the contrary I found in these cases the spicules

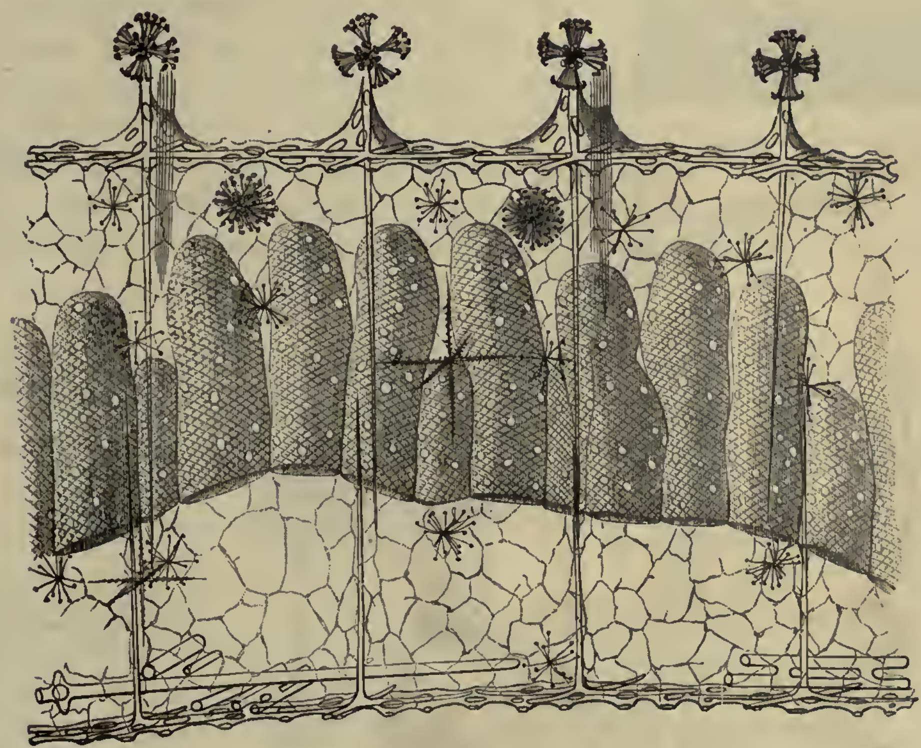

FIG. 167.—Section of the wall of *Walteria flemmingii*, n. gen. et sp., a representative of the Euplectellidæ $\left(\frac{70}{1}\right)$.

either united crossing each other quite irregularly or disposed in a different manner, which also has been already observed by Oscar Schmidt and Zittel; that is to say, the rays of the spicules were fused with other spicules in the angles between their rays, and thus united into a firm skeleton.

"On the other hand, in not a few LYSSACINA, I have, like Oscar Schmidt, met with a firm union of spicules of a particular kind, sometimes in a very irregular disposition, sometimes by lateral soldering, sometimes of closely approximated parallel spicules connected by transverse pieces (synapticulæ); this may take place only in the basal portion or throughout the whole body, as in *Euplectella aspergillum*, in its mature condition. I can, therefore, regard neither the union of spicules into a continuous trabecular skeleton, nor that particular mode of their union by means of the opposition of the corresponding branches of spicules and covering with a common envelope, as a sufficiently constant character for the diagnosis of the DICTYONINA, and for the division of the Hexactinellida into two primary classes, although I do not wish to deny that there are certain differences in the mode of union of the rays of the spicules between the DICTYONINA on the one hand, and the LYSSACINA, which are provided with a firmly united skeleton, on the other.

FIG. 168.—*Myliusia callocyathus*, Gray, a representative of the Inermia.

"On the contrary I find the chief difference between the above mentioned divisions of the Hexactinellida to be this—that in the DICTYONINA the skeleton is already deposited during the formation and growth of all the parts of the body, and hence typically and necessarily by the

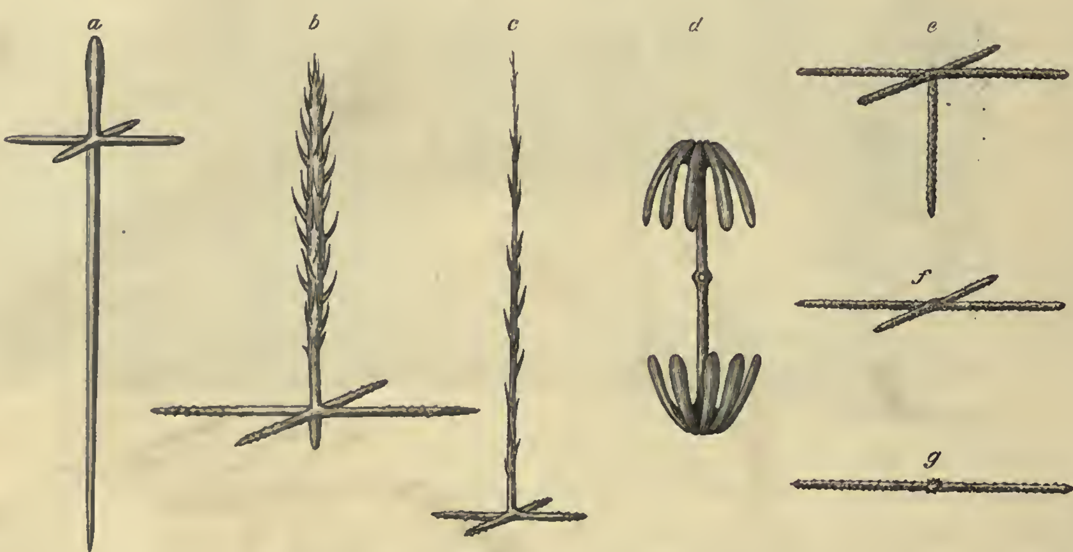

FIG. 169.—Characteristic forms of the dermal spicules of the four families of Lyssacina.
a, dagger-shaped spicule of *Walteria flemmingii*, n. gen. et sp. (a Euplectellid); *b*, "Pinulus," fir-tree shaped spicule of *Sympagella nux*, O. Sch. (an Asconematid); *c*, "Pinulus," and *d*, "Amphidisk" of the external surface of *Hyalonema sieboldi*, Gray (a Hyalonematid); *e*, *f*, *g*, dermal spicules of *Rossella antarctica*, Carter (a Rossellid).

union of certain spicules in more or less regular arrangement, whilst in the LYSSACINA either a continuous trabecular skeleton is entirely wanting or only formed at a later stage, partly by the enclosing of irregularly disposed spicules at their points of crossing or of contact, partly by transverse connecting trabeculæ (synapticulæ) between closely approximated parallel spicules; so that the adhesive process commences at one portion of the sponge, and is gradually continued to a greater or less extent.

"The order Lyssacina may be divided into four families—(1) Euplectellidæ, (2) Asconematidæ, (3) Hyalonematidæ, (4) Rossellidæ—which, apart from numerous other characters, may be easily distinguished as follows by the radially or tangentially directed spicules of the external membrane.

"The Euplectellidæ possess in the external membrane dagger-shaped six-rayed spicules with an elongated proximal ray.

"The Asconematidæ have 'pinuli,' that is six- or five-rayed spicules, whose strongly developed distal ray is in the form of a pine-tree, while the proximal ray is either entirely wanting or only feebly developed; 'amphidisks' are entirely wanting in this group.

"The Hyalonematidæ possess both pinuli and amphidisks.

"The Rossellidæ bear spicules in which the distal ray is either entirely wanting or much reduced, while the proximal ray is either strongly developed or also wanting;

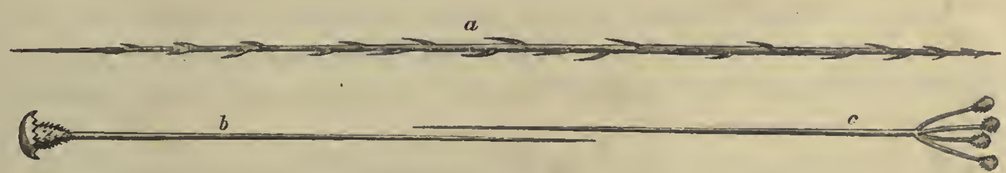

Fig. 170.—Characteristic spicules of the Uncinataria.
a, "Uncinatum," b, "Clavula" of *Farrea haeckelii*, n. sp.; c, "Scopula" of *Eurete carteri*, n. sp.

indeed two rays belonging to the same tangential axis may both be wanting, so that only simple tangentially directed rods remain.

"The Dictyonina may be divided into two suborders, Uncinataria and Inermia. The former are characterised by the possession of sharply pointed rods, 'uncinata,' which are abundantly provided with proximally directed recurved hooks; the latter are devoid of such 'uncinata.'

"In the first family of Uncinataria, the tubular or calyciform Farreidæ, there are found in the external membrane radially disposed acicular rods, the 'clavulæ,' while the five remaining families, instead of such 'clavulæ,' possess 'scopulæ,' that is radially directed structures formed like brooms or forks, with from two to eight prongs, the latter are termed Scopularia, whilst the former are called Clavularia.

"To the Scopularia belong—

"1. Euretidæ, in the form of a branched anastomosing tubular structure, or of a goblet with lateral outlets.

"2. Melittionidæ, of goblet or tubular form, with honeycomb-like walls, "3. Chonelasmatidæ, flat or beaker-shaped, with straight funnel-shaped canals which perforate the walls perpendicularly and open alternately on either side.

"4. Volvulinidæ, tubular, goblet-shaped, or massive, with crooked canals, more or less irregular in their course.

"5. Sclerothamnidæ, whose arborescent body is perforated at the ends and sides of the branches by round narrow radiating canals.

"The Inermia, which are devoid of either uncinata, clavulæ, or scopulæ, are divided into the following four families:—

"1. Myliusidæ, in form of low wide beakers, whose wall is complexly folded and forms lateral exhalent tubes.

"2. Dactylocalycidæ, of goblet or flat saucer shape, with thick wall, consisting of numerous parallel anastomosing tubes of equal breadth, which end on the same level without and within.

"3. Euryplegmatidæ, in the form of goblets or ear-shaped saucers, in whose walls there run parallel to the surface a number of dichotomously branching canals or partially covered-in grooves, which are due to a deep longitudinal folding.

"4. Aulocystidæ, of massive rounded form, consisting of a system of anastomosing tubes, which pass outwards from the sides of an axial cavity, and have intercanals between them. These latter, as well as the lateral terminal apertures of the tubes, are covered by a thin membrane which is provided with slit-like openings over the lamina of the tubes, and thus assumes a sieve-like character.

"A critical examination of all recent Hexactinellida, hitherto described, has led me to the conclusion that forty-two species have been sufficiently accurately defined for recognition, those being excepted which were described by Professor Wyville Thomson in preliminary communications from the Challenger Expedition; whilst in the rich material which was brought home by this Expedition I have been able to distinguish seventy-nine species, of which nineteen had been already described, while the remaining sixty are new. It is seen therefore that the investigations of the Challenger have raised the number of known species of Hexactinellida from forty-two to one hundred and two.

"The forty-two species previously known belonged to thirty genera, so that there were on an average 1·5 species to each genus; the sixty species which I have constituted are distributed in thirty genera, allowing on an average two species to each genus, whilst the total number of one hundred and two species, at present known, belong to fifty-three genera. Hence, as the result of the Challenger Expedition, the ratio between the numbers of the genera and species has been diminished from 3:4 to almost 1:2.

"This is readily understood when we consider that the first forms of a large and hitherto unknown group of animals which chance to be obtained, will as a rule belong to different divisions of the group; whilst the more this group becomes known the greater is the probability that the newly acquired species will be closely allied to forms which are already known, that is, the average number of species in each given genus will increase.

"Since the Challenger made an investigation of the great depths of all the important oceans, except the Arctic Ocean and the northern part of the Indian Ocean, a general view of the results obtained with respect to the geographical and bathymetrical distribution of the Hexactinellida will be of special value.

"I will therefore proceed to summarise the distribution of the Hexactinellida so far as the results of the Challenger dredgings permit. The number of dredging and trawling stations amounted altogether to about two hundred and eighty, of which fifty-three, that is about one-fifth, yielded specimens of Hexactinellida.[1] In many cases only one or two specimens were taken at each Station, but sometimes as many as fifty or more were obtained. If, however, not the number of specimens but (what is more important) the number of species found at each Station be reckoned, then a careful enumeration shows that of the fifty-three Stations—

32	gave each	1	species.
11	,,	2	,,
3	,,	3	,,
3	,,	4	,,
1	,,	5	,,
2	,,	6	,,
1	,,	18	,,

This last Station, rich both in individuals and in species, is Station 192, near the Ki Islands, southwest of New Guinea.

"The fifty-three Stations are distributed among the three principal oceans, so that

17	belong to the	Atlantic	Ocean.
27	,,	Pacific	,,
9	,,	Southern	,,

"From an examination of these Stations it appears that species of Hexactinellida are most numerous in the Southern Ocean, least so in the Atlantic; but on the other hand the number of species at particular places is greatest in the Pacific.

"The fact, which has been remarked in many other classes of animals, repeats itself here, namely, that the number of forms which live together in any given place is in general greatest in the tropics; the tropical zone of the Pacific being most remarkable

[1] It must be observed that in some cases (*e.g.*, Stations 149, 164) one number includes several dredgings which ought, perhaps, to be reckoned as so many different Stations; I have, however, reckoned each number as one Station.

in this respect. It is very probable, however, that the tropical zone of the Indian Ocean, which has not hitherto been investigated, will prove to be richer in species than that of the Pacific, since in its south temperate zone, which at present is alone available for comparison, it has shown itself to be richer. Hence we may anticipate that an investigation of the tropical region of the Indian Ocean would yield specially rich material as regards the Hexactinellida.

"Finally I will give the principal results of an inquiry undertaken to find out the dependence of the Hexactinellida upon the nature of the sea-bottom. For this purpose the Stations were classed according to the nature of the deposit found at each.

"When the different groups of Stations were examined it appeared that the Diatom ooze was specially favourable to the Hexactinellida, and also that Radiolarian ooze and blue mud were more or less adapted to their existence; while they appeared to be entirely wanting upon bottoms of sand and gravel, which is perhaps owing to the fact that deposits of this kind usually occur at depths of less than 100 fathoms, which are too shallow for these animals.

"It is also worthy of remark that several Hexactinellida, which came from great depths, were filled with Diatoms and Radiolarians, although the bottom at these Stations was not a Diatom or Radiolarian ooze."

The following is a list of the genera contained in the above mentioned families and subfamilies.

Type **CŒLENTERATA.**

Subtype **Spongiæ.**

Class Silicispongiæ. Subclass *Hexactinellida.*

Order I. LYSSACINA, Zittel.

Family I. Euplectellidæ.

Subfamily 1. Euplectellinæ.
(1) *Euplectella*, Owen.
(2) *Regadrella*, Osc. Schmidt.

Subfamily 2. Holascinæ.
(1) *Holascus*, n.
(2) *Malacosaccus*, n.

Subfamily 3. Tægerinæ.
(1) *Tægeria*, n.
(2) *Walteria*, n.
(3) *Habrodictyum*, Wyv. Thoms.
(4) *Eudictyum*, Marshall.
(5) *Dictyocalyx*, n.
(6) *Rhabdodictyum*, Osc. Schmidt.
(7) *Rhabdopectella*, Osc. Schmidt.
(8) *Hertwigia*, Osc. Schmidt.

Family II. Asconematidæ.

Subfamily 1. Asconematinæ.
(1) *Asconema*, Sav. Kent.
(2) *Aulascus*, n.

Subfamily 2. Sympagellinæ.
(1) *Sympagella*, Osc. Schmidt.

Subfamily 3. Caulophacinæ.
(1) *Caulophacus*, n.
(2) *Trachycaulus*, n.

Family III. Hyalonematidæ.

Subfamily 1. Hyalonematinæ.
(1) *Hyalonema*, Gray.
(2) *Dictyosphæra*, n.
(3) *Pheronema*, Leidy.
(4) *Poliopogon*, Wyv. Thoms.

Subfamily 2. Semperellinæ.
(1) *Semperella*, Gray.

Family IV. ROSSELLIDÆ.

Subfamily 1. Rossellinæ.
(1) *Lanuginella*, Osc. Schmidt.
(2) *Polylophus*, n.
(3) *Rossella*, Carter.
(4) *Acanthascus*, n.
(5) *Bathydorus*, n.

Subfamily 2. Crateromorphinæ.
(1) *Crateromorpha*, Gray.
(2) *Rhabdocalyptus*, n.

Subfamily 3. Aulochoninæ.
(1) *Aulochonen*, n.

APPENDIX.
Hyalostylus, n.
Aulocalyx, n.

Order II. DICTYONINA, Zittel.

Suborder 1. UNCINATARIA.

Tribe I. Clavularia.

Family I. FARREIDÆ.
(1) *Farrea*, Bowerbank.

Tribe II. Scopularia.

Family I. EURETIDÆ.
(1) *Eurete*, Semper.
(2) *Periphragella*, Marshall.
(3) *Lefroyella*, Wyv. Thoms.

Family II. MELITTIONIDÆ.
(1) *Aphrocallistes*, Gray.
(2) *Melittiaulus*, n.

Family III. CHONELASMATIDÆ.
(1) *Chonelasma*, n.

Family IV. VOLVULINIDÆ.
(1) *Volvulina*, Osc. Schmidt.
(2) *Tretodictyum*, n.
(3) *Fieldingia*, Sav. Kent.

Family V. SCLEROTHAMNIDÆ.
(1) *Sclerothamnus*, Marshall.

Suborder 2. INERMIA.

Family I. MYLIUSIDÆ.
(1) *Myliusia*, Gray.

Family II. DACTYLOCALYCIDÆ.
(1) *Dathylocalyx*, Gray.
(2) *Scleroplegma*, Osc. Schmidt.
?(3) *Margaritella*, Osc. Schmidt.

Family III. EURYPLEGMATIDÆ.
(1) *Euryplegma*, n.
?(2) *Joannella*, Osc. Schmidt.

Family IV. AULOCYSTIDÆ.
(1) *Aulocystis*, n.
(2) *Cystispongia*, Rœmer.

The Tetractinellida.—Professor W. J. Sollas, who is preparing a Report on the Tetractinellid Sponges collected by the Expedition, writes as follows:—"Although my investigation of the Tetractinellida of the Challenger Expedition is by no means yet complete, it is sufficiently advanced to show that considerable additions have been made to our knowledge of this group. The excellent state of preservation in which the spirit specimens have been brought home has afforded me an opportunity of ascertaining the anatomy and histology of most of the recognised genera of the group. This is especially fortunate in the case of the Lithistidæ, of the soft parts of which next to nothing was hitherto known. These sponges conform in all essential characters of the canal system to the complicated racemose type which occurs in the majority of sponges, and neither in the characters of the pores, subdermal cavities, nor of the flagellated chambers, offer anything markedly distinguishing the group from the non-cortical Choristid Tetractinellids.

"The Choristidæ have not only afforded rich material for working out the relations of the genera of the group, but furnish also some new forms of considerable interest on account of the reduction and other modifications presented by the Tetractinellid spicules characteristic of the order.

"It would be premature to discuss questions of distribution before the practical study of the collection is concluded; so far I will content myself with stating that the majority of the Tetractinellid Sponges are not usually inhabitants of very deep water, they rather affect shallow water, say from 10 to 50 fathoms, but occasionally extend to greater depths, such as 1000 fathoms. There is only one characteristic exception to the rule, viz., in the case of the genus *Thenea*, which is usually found at depths of from 1000 to 1800 fathoms, but sometimes enters shallower water; in one case it was obtained from the comparatively shallow depth of 95 fathoms.

"Tetractinellid genera appear to be of world-wide distribution, but certain subgeneric groups of species appear to be restricted to particular areas. Thus, such a group as the Stellettina, characterised by a particular form of minute spicule, occurs along the track of the Challenger at various points between Australia and Japan. Another group appears to be confined to Southern Australia.

"Although I expect to add much on distributional questions when I have completed my study of the collection, I consider that the chief additions to our knowledge will be found to bear on problems of histology and minute anatomy."